DRAFT ENVIRONMENTAL IMPACT REPORT
VOLUME I

DUTRA HAYSTACK LANDING ASPHALT AND RECYCLING FACILITY

Lead Agency:
County of Sonoma
Permit and Resource Management Department
2550 Ventura Ave.
Santa Rosa, CA 95403

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January 2008

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Permit and Resource Management Department
2550 Ventura Ave.
Santa Rosa, CA 95403

Environmental Consultant:

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January 2008

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I. INTRODUCTION

A. PURPOSE OF THE EIR

The subject of this Draft Environmental Impact Report (Draft EIR) is the Dutra Haystack Landing Asphalt and Recycling Facility (proposed project). The project consists of construction and operation of an asphalt batch plant, an asphalt recycling area, and an aggregate materials off-loading, storage and distribution facility for Dutra Materials (aka The Dutra Group). The proposal includes the construction and operation of new dock facilities within and adjacent to the Petaluma River for the receipt of barged aggregate materials, a conveyor and distribution system, stockpiled aggregate materials, sand and recycled asphalt and concrete, an asphalt mixing and loading facility, a portable asphalt and concrete recycling plant, and related office with truck scale. The project also involves construction and operation of a fire station facility for vehicle storage and training for the San Antonio Volunteer Fire Department.

The lead agency for this project is the County of Sonoma, Permit and Resource Management Department, located at 2550 Ventura Ave., Santa Rosa, California, 95403-2829. A detailed description of the proposed project is contained in Section III (Project Description) of this report.

Because the proposed project would require discretionary approvals by the County of Sonoma and other governmental agencies, the proposed project is subject to the California Environmental Quality Act (CEQA). Based on the preparation of a detailed Initial Study (Appendix A), it was determined that the proposed project may have a significant effect on the environment and that an EIR should be prepared pursuant to the State CEQA Guidelines.

The County has commissioned this EIR on the Dutra Haystack Landing Asphalt and Recycling Facility for the following purposes:

- To satisfy CEQA requirements;
- To inform the general public, the local community, and responsible, trustee, and state and federal agencies of the nature of the proposed project, its potentially significant environmental effects, feasible mitigation measures to mitigate those effects, and its reasonable and feasible alternatives;
- To enable the County to consider the environmental consequences of the proposed project;
- To provide a basis for preparation of any future environmental documents;
- For consideration by responsible agencies in issuing permits and approvals for the proposed project.

As described in CEQA and the *CEQA Guidelines*, public agencies are charged with the duty to avoid or substantially lessen significant environmental impacts, where feasible. Where impacts cannot be mitigated to less-than-significant levels, public agencies have an obligation to balance the project's significant impacts on the environment with other conditions, including economic, social, technological, legal and other benefits. This Draft EIR is an informational document, the purpose of which is to identify the potentially significant impacts of the proposed project on the environment and to indicate the manner in which those significant impacts can be avoided or significantly lessened; to identify any significant and unavoidable adverse impacts that cannot be mitigated; and to identify reasonable and feasible alternatives to the proposed project that would eliminate any significant adverse environmental impacts or reduce the impacts to a less-than-significant level.

The lead agency is required to consider the information in the EIR, along with any other relevant information, in making its decision on the proposed project. Although the EIR does not determine the ultimate decision that will be made regarding implementation of the project, CEQA requires the County to consider the information in the EIR and make findings regarding each significant effect in the EIR.

The County must certify the EIR prior to approving the proposed project. Once certified, the EIR will serve as the base environmental document for the County and will be used as a basis for decisions on implementation of the proposed project. Other agencies may also use this EIR in their review and approval process.

This Draft EIR was prepared in accordance with Section 15151 of the *CEQA Guidelines,* which defines the standards for EIR adequacy:

> *"An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR would summarize the main points of disagreement among the experts. The courts have looked not for perfection; but for adequacy, completeness, and a good faith effort at full disclosure."*

B. PROJECT BACKGROUND

The proposed project application was filed with Sonoma County on April 28, 2004. The project would construct and operate an asphalt producing and recycling facility on a vacant 38-acre site adjacent to Highway 101 and Petaluma River, in the southwestern portion of Sonoma County, approximately 35 miles north of San Francisco. The site had a number of older barns and a historic farmhouse built in 1860 that had been relocated to this site, which were removed or destroyed by fire in the Fall of 2004. Historically, the site was a shipping center and stopping point for people and products going between Petaluma and San Francisco. Between 1968 and 1990, the southeasterly portion of the property was used by American Rock and its successor, Dutra Materials, for settling ponds from their quarry operations. Most of the pre-existing trees on the site were removed based on aerial data.

From September 12, 2005 to September 19, 2005, unauthorized grading and equipment storage occurred on the project site. Other activities that occurred without permits include bringing in fill, installation of erosion control measures and crushed rock. The heavy equipment stored at the site was removed as part of a County Code Enforcement action on December 20, 2005.

Subsequent site inspections were completed by the applicant's biologist in conjunction with the California Department of Fish and Game (CDFG) and the United States Army Corps of Engineers (Corps). Based on these inspections, it was determined that the unauthorized actions resulted in impacts to approximately 0.53 acres of seasonal wetland and 0.01 acre of coastal marsh habitat subject to Corps and San Francisco Regional Water Quality Board (RWQCB) jurisdiction; pursuant to Sections 404 and 401 of the Clean Water Act, respectively. The Haystack Wetlands Mitigation Plan (available in Appendix E) will be reviewed by Corps and RWQCB and other applicable agencies to determine if the proposed mitigation will compensate for the unauthorized wetland fill in addition to the impacts that would result from the proposed project.

The project, as originally proposed in 2004, included 400 barge trips per year, and 880,000 tons of asphalt produced annually, based on the proposed facility's production capability of 400 tons per hour. Many of the applicant's technical reports available in the Appendices support this proposed volume. However, as evidenced by the correspondence included in Appendix D (Air Quality), in order to meet air quality emission standards for the Bay Area, the project reduced expected asphalt production to 225,000 tons, and barge trips to 125 trips per year. The environmental analysis in this EIR has been conducted for these new levels.

C. EIR REVIEW PROCESS

Notice of Preparation

Responses from identified responsible and trustee agencies, as well as interested parties on the scope of the EIR, were solicited through a Notice of Preparation (NOP) of the EIR process. The NOP for the EIR was posted and circulated for a 30-day review period starting on February 17, 2006. A public scoping meeting was also held on Monday, February 27, 2006 at the Petaluma Community Center; to solicit input from agencies, individuals, and organizations. Copies of the NOP and the Initial Study are included in Appendix A. Responses to the NOP and the public scoping meeting are included in Appendix B.

Environmental Review Process

The Draft EIR will be circulated for review and comment by the public and other interested parties, agencies, and organizations for 45 days. During the public review period, the County will hold a noticed public hearing before the County Planning Commission, to allow the Commission and interested parties and agencies to voice their opinions regarding the proposed project. Notice of the time and location will be published prior to the public hearing. All written comments or questions about the Draft EIR should be addressed to:

Sonoma County Permit and Resource Management Dept. (PRMD)

ATTN: Steve Dee, AICP, Senior Environmental Specialist

2550 Ventura Avenue

Santa Rosa, CA 95403

707/565-8350

707/565-8358 (fax)

sdee@sonoma-county.org

Any questions regarding the proposed project itself should be directed to Steve Padovan at 707/565-1352 or spadovan@sonoma-county.org.

Project Approvals

Following the close of the public and agency comment period, the County will respond to all written comments received regarding the project's environmental impacts in the Final EIR. The Final EIR will be prepared as a separate document from the Draft EIR, and will be considered by the County at a public meeting(s) and certified if it complies with *CEQA Guidelines*. Upon certification of the EIR, the County will consider the merits of the proposed project for approval.

CEQA Findings and Mitigation Monitoring

CEQA requires that when a public agency makes findings based on an EIR, it must adopt a reporting or monitoring program for those measures that it has adopted or made a condition of project approval to mitigate or avoid significant effects on the environment. Findings are the document that makes the connection between the analysis in the environmental document and the decision by the decision makers. The reporting or monitoring program must be designed to ensure compliance during project implementation. The mitigation monitoring program (MMP) for the EIR will be prepared at the time the Final EIR is prepared.

D. LEVELS OF SIGNIFICANCE

This EIR uses a variety of terms to describe the levels of significance of adverse impacts identified during the course of the environmental analysis. The following are definitions of terms used in this EIR:

- **Less-than-significant impact**: Adverse impacts that do not exceed the specified standards of significance.
- **Potentially significant impact**: Impacts that are equivalent to significant impacts and require the identification of feasible mitigation measures. Potentially significant impacts may also be impacts about which there is not enough information to draw a final conclusion; therefore, for the purpose of the EIR, they are considered significant.
- **Significant impact**: Impacts that exceed the defined standards (thresholds) of significance and that can be eliminated or reduced to a less-than-significant level through the implementation of feasible mitigation measures.
- **Significant and unavoidable impact**: Impacts that exceed the defined standards (thresholds) of significance and that cannot be eliminated or reduced to a less-than-significant level through the implementation of feasible mitigation measures.

E. ORGANIZATION OF THE DRAFT EIR

This Draft EIR is organized into ten sections as follows:

<u>Section I (Introduction)</u>: This section provides an introduction and a description of the intended uses of the EIR and the review and certification process.

<u>Section II (Summary)</u>: This section includes a summary of the project description, environmental impacts that would result from implementation of the proposed project, proposed mitigation measures, and the level of significance of the impact before and after mitigation.

<u>Section III (Project Description)</u>: This section presents a complete description of the proposed project including location, characteristics, and objectives. This section also provides an overview of the study area's environmental setting including a description of existing and surrounding land uses, and history and background of the project site and a discussion of related projects to be analyzed in the EIR.

<u>Section IV (Summary of the Initial Study)</u>: This section summarizes the results of the Initial Study and notes the components of the project that would not result with any environmental impacts, the environmental issue

areas that would have a less-than-significant impact with the implementation of mitigation measures, and the environmental issue areas that would have potentially significant environmental impacts and will require further analysis in this Draft EIR.

Section V (Environmental Impact Analysis): The Environmental Impact Analysis section is the primary focus of this Draft EIR. Each environmental issue contains a discussion of existing conditions for the project site, an evaluation and discussion of the significance of impacts associated with the proposed project, proposed mitigation measures, cumulative impacts, and level of impact significance after mitigation.

Section VI (General Impact Categories): This section provides a discussion of the potential growth inducement of the proposed project as well as a summary of any significant unavoidable impacts associated with the proposed project.

Section VII (Alternatives to the Proposed Project): This section includes an analysis of a range of reasonable alternatives to the proposed project to provide informed decision making in accordance with Section 15126(f) of the *CEQA Guidelines*. The range of alternatives selected is based on their ability to feasibly attain most of the basic objectives of the project and avoid or substantially lessen any of the significant effects of the project.

Section VIII (Preparers of the EIR and Persons Consulted): This section presents a list of lead agency, other agencies and consultant team members that contributed to the preparation of the Draft EIR. This section also identifies persons consulted during preparation of the Draft EIR.

Section IX (References Cited): This section presents a list of all references cited in the Draft EIR.

Section X (Abbreviations and Acronyms): This section includes a definition of all abbreviations and acronyms used in the Draft EIR.

II. SUMMARY

A. INTRODUCTION

The purpose of this section is to provide the reader with a clear and simple description of the proposed project and its potential environmental impacts. Section 15123 of the *CEQA Guidelines* requires that the summary identify each significant effect and recommended mitigation measures that would minimize or avoid potential significant impacts. The summary is also required to identify areas of controversy known to the lead agency, including issues raised by agencies and the public, and issues to be resolved, including the choice among alternatives and whether or how to mitigate significant effects. This section focuses on the major areas of the proposed project that are important to decision-makers, and uses non-technical language to promote understanding.

B. SUMMARY OF PROPOSED PROJECT

The proposed project would construct and operate an asphalt batch plant, an asphalt and concrete recycling facility, and an aggregate materials off-loading, storage and distribution facility for Dutra Materials (applicant). The proposal includes the construction and operation of new dock facilities within and adjacent to the Petaluma River; for the receipt of barged aggregate materials at various times within any given 24-hour period. The proposed project also includes a conveyor and distribution system, stockpiled aggregates, sand and recycled asphalt and concrete, an asphalt mixing and loading facility, a portable asphalt and concrete recycling plant, and a related office with truck scale. The normal truck loading facilities would operate weekdays between 6:00 AM and 6:00 PM with occasional night and weekend operations based on customer requirements. The project also involves construction and operation of a fire station facility for vehicle storage and training for the San Antonio Volunteer Fire Department.

It is possible that the County could approve the project several months before the applicant obtains permits and approvals from the San Francisco Bay Conservation and Development Commission (BCDC) and the Sonoma Marin Area Rail Transit (SMART) necessary to construct the barge off-loading facility and the conveyor proposed to span over the railroad tracks. If there is a delay in obtaining permits and approvals from BCDC and SMART, the project could operate in a "start-up" mode at less than full capacity. Specifically, the barge off-loading facility at Area A and the conveyor over the railroad tracks would not be in place during the start-up phase, and thus all material importation would be accomplished by trucks to Area B.

The proposed project will require a Sonoma County General Plan Amendment to change the land use designation on the primary portion of the project site (Assessor Parcel Numbers [APN] 019-320-022 and 019-320-023, also known as Areas B, C, and D) from Limited Commercial to Limited Industrial; a Specific Plan Amendment (Petaluma Dairy Belt Plan) to change the land use designation from Limited Commercial to Limited Industrial; and a Zone Change from LC (Limited Commercial) to M3 (Limited Rural Industrial), as well as a Use Permit and Design Review.

Additionally the project includes a proposed amendment to General Plan Policy LU-17e as follows: “Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986, *except that areas designated "Limited Commercial" may be redesignated to "Limited Industrial" within the Haystack Landing Site along Petaluma Boulevard South (APNs 019-320-022 and 019-320-023) as necessary to accommodate the relocation of an asphalt and recycling plant"*. (Proposed changes to Policy LU-17e are italicized.)

The project site is located on three parcels totaling 38 acres at 3355 Petaluma Boulevard South on the east side of the Boulevard, just outside the City of Petaluma. The proposed project would include the re-establishment of Dutra's existing asphalt batch plant facilities, temporarily operating at 1601 Petaluma Boulevard South (which was previously located on the opposite side of Petaluma Boulevard South). The project would include the construction of several new buildings, including the San Antonio Volunteer Fire Department, modular offices, and equipment related to the mixing and distribution of asphalt. In addition to the asphalt plant, the project would construct new dock facilities on the Petaluma River, with an overhead conveyor system that would distribute barged materials to on-site stockpiles adjacent to the proposed asphalt plant. The project also includes an asphalt and concrete recycling facility which would include an area for stockpiles of recycled asphalt product (RAP) and concrete. Additional site improvements consist of new parking areas, significant landscaping along the freeway, stormwater swales, security gates, lighting and a relocated driveway for the project site.

C. AREAS OF KNOWN CONTROVERSY / ISSUES TO BE RESOLVED

Section 15123 of the *CEQA Guidelines* requires an EIR to identify areas of controversy known to the lead agency, including issues raised by agencies and the public and issues to be resolved.

Based on the responses received on the Initial Study and the Notice of Preparation of the EIR, as well as input provided at the February 27, 2006 public scoping meeting, the following summarizes the areas of known controversy and issues to be resolved.

- Alteration to Fish and Wildlife Resources
- Take of Listed Plant or Animal Species
- Changes to the Bed, Channel, or Bank of the Petaluma River
- Surface Water Quality
- Provision of Water Service
- Water Use and Efficiency
- Construction Impacts Related to Traffic, Noise, Air Quality, and Public Heath and Safety
- Operational Impacts Related to Traffic, Noise, Air Quality, and Public Heath and Safety
- Liquefaction of Project Site and Settlement of Aggregate
- On-site Safety
- Fire Safety
- Conflict with Proposed Caltrans Marin-Sonoma Narrows Project Interchange and Frontage Road Improvements

- Activity Within State Right-of-Way
- Dredging Activity
- Public and Emergency Access
- Conveyor Over a Passenger Railroad and Private Crossing
- Airborne Dust and Particles Related to Train Safety
- Capacity of Existing Drainage Culvert
- Use of Private Railroad Crossing
- Truck Movement on Petaluma Boulevard South
- Production and Use of Crumb Rubber
- Impacts to Highway 101 Scenic Corridor
- Impact of New Light Source to Scenic and Biological Resources
- Potential for Hazardous Materials Spills
- Health Impacts
- Nuisance Odors
- Impacts to Native Species
- Introduction of Invasive Species
- Land Use and Zone Change
- Proximity to Heron/Egret Nesting Area
- Proximity to Shollenberger Park
- Interaction of Barges with River Equipment and Other Vessels
- Historic and Cultural Significance of the Site
- Economic Impact to Birding Activities
- Construction of Visual and Noise Barriers
- Night-time Operations
- Compatibility with Surrounding Land Uses

D. SUMMARY OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The following Table II-1 summarizes the various significant environmental impacts associated with the construction and operation of the proposed project. Mitigation measures are proposed for significant environmental impacts, and the level of impact significance after mitigation is also identified.

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
AESTHETICS		
Impact AES-1 Implementation of the Proposed Project Would Have a Substantial Adverse Effect on a Scenic Vista	***Mitigation Measure AES-1***	
Highway 101 acts as a scenic vista toward Sonoma Mountain to the east, which can be seen from and through the project site. In addition, the western border of the project site is within 200 feet of the centerline of Highway 101, which has been designated as a Scenic Corridor. The entire area surrounding the project site west of Highway 101 is designated with a Scenic Resource zoning overlay. Application of Sonoma County's *Visual Assessment Guidelines* indicates that the project would be visually dominant in the area, which in combination with the high sensitivity characteristics of the area would result in a ***significant*** impact to visual resources.	The following mitigation measures would reduce but not completely eliminate the project's significant impact to scenic vistas: • The proposed landscape plan shall be revised to include more landscape screening throughout the project site to further screen the proposed project from off-site views. The additional landscaping shall be provided: a) along the northern, western and southern edges of Area A; b) along the northern, eastern and southern edges of Area B; and c) along the eastern side of Area C. The landscape plan shall also be revised to incorporate a landscaped berm along the portion of the site that fronts Highway 101 and Petaluma Boulevard South. Finally, the revised landscape plan shall incorporate trees with the proposed ground cover within Area C to further screen the proposed project from off-site views. • Landscaping improvements along the east side of Petaluma Boulevard South shall conform with the South Petaluma Gateway Project Plan landscaping requirements. • Existing trees in the area between the project site and Highway 101 shall be preserved to the extent possible. • The screen plantings shall borrow from naturally established form, line, color and texture so that the visual characteristics are compatible with their surroundings. • Colors used for exterior building surfaces shall match the hue, lightness, and saturation of colors of the immediately	Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	surrounding trees and vegetation. Several colors matching those of the surrounding trees and vegetation shall be used in order to minimize uniformity. • Area A and Area D shall not be used to store equipment, tools, aggregate, etc. • No junk, debris, non-operative vehicles or equipment unrelated to the proposed project operations shall be stored on Areas B, C and D, unless visually screened from off-site views. • Prior to building permit issuance, the grading plan, development plan, landscaping plan, sign plan, elevations, and colors and materials shall be subject to review and approval by the Sonoma County Design Review Committee. While the additional landscaping would further screen the proposed project's various facilities, it would also increase impacts relative to the obstruction of scenic vistas. Additional landscaping along the eastern edge of Area B and Area C could also increase shadows in the vicinity of the homes situated along the River.	
Impact AES-2 Implementation of the Proposed Project Would Result in Significant Impact to the Visual Character of the Project Site and Surroundings	***Mitigation Measure AES-2***	
The primary character-defining feature of the site is its open space, rural character and adjacency to the Petaluma River. The proposed project would dominate the views in the area, standing out against the setting and attracting attention away from the surrounding landscape. Due to the project's scale, many other visual characteristics of the area would be diminished.	Implementation of Mitigation Measure AES-1 would reduce but not completely eliminate significant visual character impacts associated with the proposed project.	Significant and Unavoidable

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Overall, the proposed development on Areas A, B, and C would change the visual character of the parcel from that of a rural and agricultural nature to that of an industrial development. Because all of the primary character-defining features of the site would be substantially altered, project impacts related to the visual character of the site and surroundings would be ***potentially significant.***		
Impact AES-3 Implementation of the Proposed Project Would Create a New Source of Substantial Light and Glare Which Would Adversely Affect Day or Night-time Views in the Area	***Mitigation Measure AES-3***	
Normal hours of operation would be 6 AM to 6 PM Monday through Friday with night-time and weekend operations when needed. The project site is currently undeveloped, therefore implementation of the proposed project would introduce new sources of light and glare to the project area. The introduction of light and glare from the proposed project would be noticeable to viewers in the surrounding area, particularly by residents on the west side of Highway 101, residents adjacent to the project site, people driving along Highway 101 and Petaluma Boulevard South, and to a lesser extent, boats in the River and visitors at Shollenberger Park, which closes at sunset. The proposed project lighting would follow Sonoma County's guidelines for industrially zoned areas with no lighting directed toward residential areas, the park or open space areas across the River. However, because a lighting plan has yet to be submitted, the light and glare from the proposed project could adversely affect night-time views in the area. This is considered a ***potentially significant*** impact.	Prior to issuance of the Building permit, an exterior lighting plan shall be submitted for review and approval by Permit & Resource Management Dept (PRMD) Project Review staff and Design Review Committee. The lighting plan shall include but not necessarily be limited to the following: • Proposed project lighting shall follow Sonoma County's guidelines for industrially zoned areas with no lighting directed toward residential areas, the egret/heron colony on Area B, Shollenberger Park, or open space areas across the River. • The exterior lighting plan shall show all potential light sources with the types of lighting and their locations. • Typical lighting shall include low mounted, downward casting and shielded lights that do not cause spillover onto adjacent properties, and the utilization of motion detection systems where applicable. • No flood lights shall be utilized. • Lighting shall not "wash out" structures or any portions of the site. • Lighting shall be limited to the areas that would be in	Less Than Significant

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	operation during night-time hours with all recycling operations and general aggregate sales limited to between 6 AM to 6 PM. • Low intensity, indirect light sources shall be encouraged. • On-demand lighting systems shall be encouraged. • Mercury, sodium vapor, and similar intense and bright lights shall not be permitted except where their need is specifically approved and their source of light is restricted. • All light sources shall be fully shielded from off-site view. • All buildings and structures shall consist of non-reflecting material or be painted with non-reflective paint. • Generally, light fixtures shall not be located at the periphery of the property and shall shut off automatically when the use is not operating. Security lighting visible from the highway shall be motion-sensor activated. • All lighting shall be installed in accordance with building codes and the approved lighting plan during construction. Also see *Mitigation Measure Bio-4c* regarding illumination restrictions during the nesting season.	
Cumulative Aesthetics Impacts		
The Novato Narrows, Highway 101 Widening project would entail construction of an interchange on Highway 101 and would require the use of right-of-way that extends into the western portion of the project site. The Highway 101 Widening project would also include a new overpass (and associated lighting) that would touch down near or on the proposed project site. While this related project would result in the removal of the billboard sign just west of the site, it would also require the removal of existing trees and the project's		Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
proposed landscaping north of the Caltrans right-of-way line. The first landscaping requirement listed above in Mitigation Measure AES-1 was also structured so that this related project would not result in the loss of the 30-foot wide landscape berm required to be installed south of the Caltrans right-of-way line and east of the public right-of-way that extends into the project site. Because the project area is generally rural in nature, it is anticipated that future projects visible from and towards the project site would result in significant aesthetic impacts related to scenic vistas and visual character, and that this project would make a considerable contribution to those impacts. Therefore, cumulative impacts related to aesthetics would be ***significant***.		
AIR QUALITY		
Impact AQ-1 Construction Emissions	***Mitigation Measures AQ-1***	
Construction activities associated with development of the start-up and full build out phases of the project would include site preparation, soil excavation, backfilling, grading, and equipment vehicular traffic on paved and possibly unpaved roads. Soil disturbance caused by construction activities could be exacerbated by wind erosion. As a result, short-term dust emissions could cause a temporary increase in localized PM_{10} emissions. The operation of construction equipment would also result in the emission of criteria pollutants $PM_{2.5}$, ROG, NOx, and CO. Construction activities associated with project development would also result in short-term exhaust emissions from construction-related equipment. The primary pollutants associated with exhaust emissions from construction equipment are ozone precursors (ROG and NOx), CO, and PM_{10}. The Bay Area Air Quality Management District (BAAQMD) would	*Mitigation Measure AQ-1a* The following mitigation measures apply to activities associated with the proposed asphalt plant construction and are intended to reduce the temporary generation of fugitive dust. The measures to reduce construction related PM_{10} emissions reflect basic and optional dust control measures recommended by BAAQMD: • All active construction areas shall be watered at least twice daily. • All trucks hauling soil, sand, and other loose materials shall be covered with tarpaulins or other effective covers. • All unpaved access roads, parking areas, and staging areas at the construction site shall be paved; otherwise, water or non-toxic soil stabilizers shall be applied to all unpaved access roads. In addition, paved access roads, parking areas, and	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
consider project construction activities to be ***significant*** if established control measures are not implemented.	staging areas shall be swept daily with a water sweeper. Streets shall be swept daily with a water sweeper in areas where visible soil material is carried onto adjacent public streets. • The applicant shall hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded area inactive for ten days or more). • The applicant shall enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.). • The applicant shall limit traffic speeds on unpaved roads to 15 miles per hour. • The applicant shall install sandbags or other erosion control measures to prevent silt runoff to public roadways. • The applicant shall replant vegetation in disturbed areas as quickly as possible. • The applicant shall construct a gravel pad at all exits used by construction equipment or trucks to minimize soil adhering to the vehicle tires or tracks from leaving the construction site. The pads shall be constructed by placing crushed aggregate (greater than 3 inches and smaller than 6 inches) over geotextile fabric to at least 12 inches in depth. The pad shall be a minimum of 20 feet wide and 50 feet in length. • During periods when trucks are transporting soil to or from the site, dirt that may have been tracked off the site shall be removed daily from the street. The area to be cleaned is to extend to the limit of noticeable dirt tracked from the site or for a distance of 75 feet on each side of a vehicle entrance or exit, whichever is greater. If water is used to clean the street, then the quantity of water used shall not result in sediment	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	being washed into the storm sewer catch basins. Street sweepings shall be disposed of as a waste along with waste soil in accordance with applicable regulations. • The applicant shall terminate excavation and grading activities when winds exceed 25 mph or when fugitive dust emissions are visible for a distance of at least 100 feet from the origin of such emissions, and there is visible evidence of wind driven fugitive dust. Wind speed will be determined when an on-site anemometer registers at least two wind gusts in excess of 25 miles per hour within a consecutive 30-minute period. *Mitigation Measure AQ-1b* Implementation of the following mitigation measures would reduce short-term exhaust emissions from construction-related equipment to a less-than-significant level: • The idling time of all construction equipment used at the site would not exceed five minutes. • The applicant shall limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use. • All equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications. Emissions from all off-road diesel powered equipment used on the project site shall not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. A visual survey of all in-operation equipment shall be made at least weekly throughout the duration of the project construction. A record of the inspection shall be maintained on-site. The BAAQMD and/or other officials may conduct periodic site inspections to determine compliance.	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	• The applicant shall require construction contractors to install particulate traps when appropriate on diesel engines. • The applicant shall use the minimum practical engine size for construction equipment. • Gasoline-powered equipment shall be equipped with catalytic converters, where feasible.	
Impact AQ-2 Project Operation Would Result in Emissions of Criteria Pollutants	***Mitigation Measure AQ-2***	
Project operations would produce emissions of criteria pollutants, or their precursors (ROG and NOx), from operation of the asphalt and recycling facility, vehicle and barge emissions from the import of raw materials, truck emissions from the export of raw materials and finished product (asphalt), and employee vehicle trips. The overall increase in criteria pollutants from the operation of the proposed facility is the sum of the increase from asphalt plant emissions, truck trips, and barge trips. The net increase of 23 tons of NOx per year exceeds the BAAQMD's threshold of significance of 15 tons per year. This is a ***significant impact***.	*Mitigation Measure AQ-2a* The off-road equipment used on-site for the proposed asphalt and recycling facility will use 2007 emission standards. The emission standards may be met by upgrading to newer vehicles or retrofitting engines using CARB-verified retrofit technologies. *Mitigation Measure AQ-2b* The off-road equipment used on-site for will be operated in the following manner: • The idling time of all construction equipment used at the site would not exceed five minutes. • All equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications. Emissions from all off-road diesel powered equipment used on the project site shall not exceed 40 percent opacity for more than three minutes in any hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) would be repaired immediately. A visual survey of all in-operation equipment shall be made at least weekly throughout the duration of the project construction. A record of the inspection shall be maintained on-site. The BAAQMD and/or other officials may	Significant and Unavoidable

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	conduct periodic site inspections to determine compliance. • The applicant shall use the minimum practical engine size for construction equipment. • Gasoline-powered equipment shall be equipped with catalytic converters, where feasible. *Mitigation Measure AQ-2c* Although PM10 impacts associated with operation of the asphalt plant and recycling facility was found to be less than significant, the following dust control measures shall be implemented during the movement of aggregate using heavy construction: • Minimizing drop heights while loading/unloading aggregate to less than four feet, and • Applying water as needed to maintain visible dust to less than No. 1 on the Ringelmann Chart measured over a three-minute period.	
Impact AQ-6: Conflict with or Obstruct Implementation of an Applicable Air Quality Plan		
Given that the proposed project would result in both project-level and cumulatively significant contributions to ozone emissions, that a General Plan amendment would be required for this project, and that the General Plan does not appear to be fully consistent with the Bay Area Clean Air Plan (CAP), per BAAQMD guidelines the project conflict with the CAP would appear to be ***significant***.		Significant and Unavoidable

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Cumulative Air Quality Impacts		
The BAAQMD CEQA Guidelines state that any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. Therefore, cumulative impacts relative to regional air quality emissions would be ***significant***.		Significant and Unavoidable
BIOLOGICAL RESOURCES		
Impact BIO-1 Substantially Adverse Impact on Special-Status Species	***Mitigation Measures BIO-1***	
<u>*Special Status Animal Species*</u> There is a varying potential for a number of special-status animal species to forage and possibly nest in the small band of coastal brackish marsh along the shoreline of the Petaluma River or to seasonally occur in the open waters of the River, including the listed California clapper rail, California black rail, steelhead trout, and chinook salmon, and well as several Species of Special Concern (SSC) species such as the river lamprey, Sacramento splittail, northwestern pond turtle, saltmarsh common yellowthroat, and San Pablo song sparrow. This stand of brackish marsh is relatively small in size, occupying approximately 0.18 acres, and is isolated from other marshland along the west bank of the Petaluma River by the developed residential and industrial uses to the south and the bulkhead of the loading facility to the north. Construction and installation of improvements near or within the River could result in the destruction of active nests or loss of individuals, if present within the limits of disturbance. Fish and other aquatic species could be inadvertently taken during in-channel construction, including placement of pilings, installation of water	<u>*Mitigation Measure BIO-1a - Nesting Birds*</u> Initial grubbing, grading, and construction shall be prohibited within 50 feet from the bank of the Petaluma River during the nesting season (February 15 through August 31) to protect the potential nesting habitat that the stand of coastal brackish marsh on Area A that may provide for California clapper rail, California black rail, saltmarsh common yellowthroat, and San Pablo song sparrow. This zone shall be fenced and signed as a "Potential Nesting/No Disturbance Zone" in advance of any construction on the remainder of Parcel A to ensure equipment and workers remain outside the area. Construction within this zone may proceed during the non-nesting season (September 1 through February 14), but must consider other possible restrictions associated with in-channel construction activities. <u>*Mitigation Measure BIO-1b - Nesting Birds*</u> Any active raptor nests or nests of other birds protected under State Fish and Game Code and the Migratory Bird Treaty Act in the vicinity of proposed grading shall be avoided until young birds are able to leave the nest (i.e., fledged) and forage on their	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
diversion structure, and other improvements. Additional loss of fish and aquatic species could occur when water is pumped as part of long-term operations. This is considered a ***potentially significant*** impact. The proposed wetland mitigation program would result in the creation of additional tidal marsh, brackish marsh, and seasonal wetland, which would provide expanded foraging opportunities for a number of special-status bird species known or suspected in the project vicinity. The expanded tidal and brackish marsh habitat would be dominated by pickleweed, which would improve the suitability of the site for salt marsh harvest mouse as well. However, new structures and increased human activity along the shoreline of the Petaluma River would reduce the habitat value of the remaining brackish marsh and associated aquatic habitat. Depending on the location of the water diversion intake structure, proposed pumping could affect surface water levels in the wetland mitigation area and the feasibility and value of the proposed habitat enhancement efforts. Proposed lighting, noise generated by the periodic operation of the off-loading facility and conveyor, and vehicle equipment operation would all discourage foraging and possibly nesting along this segment of the River shoreline. Additional lighting could be disruptive to special-status wildlife species, particularly if off-loading were to occur at night. Impacts would be ***potentially significant***. Proposed construction could also affect nests of raptors or other birds recognized by the California Department of Fish and Game (CDFG)as SSC species and protected under the Migratory Bird Treaty Act if new nests are established on the site before vegetation clearance occurs as part of the project. While no raptor nests were observed on the site during the surveys conducted by the applicant's biologist or the EIR biologist, there is a potential for new nests to be	own. Avoidance may be accomplished either by scheduling initial grubbing and grading during the non-nesting period (September 1 through February 14) or, if this is not feasible, by conducting a pre-construction survey for raptors and other birds protected under State Fish and Game Code and the Migratory Bird Treaty Act. Provisions of the pre-construction survey and nest avoidance, if necessary, shall include the following: 1 If construction is scheduled during the active nesting period (February 15 through August 31), a focused survey for nesting raptors and other birds protected under State Fish and Game Code and the Migratory Bird Treaty Act shall be conducted by a qualified wildlife biologist no more than 15 days prior to initiation of grubbing or grading to provide confirmation on presence or absence of active nests in the vicinity. 2 If no active nests are identified during the survey period, or if construction is initiated during the non-breeding season (September 1 through February 14), grading and construction may proceed, unless prohibited by the provisions in Mitigation Measure BIO-1a. 3 If active nests are encountered, species-specific measures shall be prepared by a qualified biologist in consultation with the California Department of Fish and Game (CDFG) and implemented to prevent abandonment of the active nest. At minimum, grading in the vicinity of the nest shall be deferred until the young birds have fledged. The perimeter of the nest-setback zone shall be fenced with temporary construction fencing or adequately demarcated, and construction personnel restricted from the area. Signage shall be installed along the perimeter of the nest-setback zone at a minimum 100-foot intervals that read "Nesting/No Disturbance Zone." Fencing	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
established prior to initiating grubbing and construction. Tree and shrub removal or disturbance in the immediate vicinity of a nest in active use could result in abandonment of the nest or loss of eggs and young. Impacts would be ***potentially significant***. _Special Status Plant Species_ Areas of coastal salt marsh and brackish water marsh habitat were not surveyed extensively. If a population is present, several aspects of the project associated with in-channel modifications could adversely affect or even eliminate the occurrence unless appropriate protective measures are taken. Species of particular concern include Point Reyes bird's-beak and soft bird's-beak. Impacts related to special-status plant species would remain ***potentially significant*** until supplemental detailed surveys are conducted to confirm absence of any coastal salt marsh and brackish water marsh species on the site.	and signage shall remain in place until the qualified biologist has determined that any young have fledged. The distance between the active nest and edge of the "Nesting/No Disturbance Zone" shall depend on the nesting species, with a minimum distance of at least 200 feet for more sensitive species such as raptors and at least 75 feet for more common passerine birds. 4 If permanent avoidance of the nest is not feasible, impacts shall be minimized by prohibiting disturbance within the "Nesting/No Disturbance Zone" until a qualified biologist verifies that the birds have either a) not begun egg-laying and incubation, or b) that the juveniles from the nest are foraging independently and capable of independent survival at an earlier date. 5 A report of findings shall be prepared by the qualified biologist and submitted to Sonoma County PRMD for review and approval prior to initiation of grading and construction in the "Nesting/No Disturbance Zone." The report shall either confirm the absence of any active nests or shall confirm establishment of a designated "Nesting/No Disturbance Zone" setback during the breeding season for any active nests. Supplemental reports shall be submitted to the PRMD for review and approval to allow construction to proceed within these zones after any young birds have fledged. _Mitigation Measure BIO-1c - Fish and Other Aquatic Species_ Any in-channel construction work within the Petaluma River shall be restricted between July 15 through October 15 when out-migrating smolts and migrating adults would most likely be absent along this reach of the Petaluma River. The United States Fish and Wildlife Service (USFWS) and National Oceanic	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	Atmospheric Administration (NOAA) Fisheries would be involved in the review of the project application because of the potential wetland impacts as part of the Section 404 consultation process, and these agencies may impose additional restrictions to protect essential habitat for special-status species as part of the Section 7 consultation required as part of the Endangered Species Act. This would include screening of any intake for the pumping from the River, and restrictions on pumping when migrating individuals would most likely be present in the River segment bordering the site. *Mitigation Measure BIO-1d - Western Pond Turtle* If required by the CDFG and USFWS as part of the permit process, a pre-construction survey shall be conducted by a qualified biologist to determine if western pond turtle is present in the vicinity of proposed in-channel improvements along the Petaluma River and slough. If required by the agencies, a qualified biologist shall be present on-site during construction of in-channel improvements to ensure that any turtles within the vicinity of proposed work are not harmed. *Mitigation Measure BIO-1e - Permit Authorizations* As called for under Mitigation Measure BIO-3a, all necessary permits and authorizations shall be secured from regulatory agencies as required to allow for modifications to jurisdictional waters on the site, including any necessary consultation with the USFWS and NOAA Fisheries regarding a take determination. Evidence of permit authorization shall be submitted to the PRMD prior to issuance of any grading or building permits by the County to ensure compliance with applicable State and federal regulations. The applicant shall comply with all conditions therein that are not otherwise included as mitigation measures in	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	this Draft EIR or as conditions of project approval by the County. *Mitigation Measure BIO-1f - Special-Status Plants* Although the potential for occurrence of special-status plant species in areas of coastal salt marsh and brackish water on the site is remote, systematic surveys shall be required to confirm absence in advance of any in-channel disturbance. The supplemental surveys for special-status plants shall include the following components and shall meet the following standards. 1 Systematic surveys shall be conducted by a qualified botanist in spring and summer (April and June) to confirm absence of any special-status plant species in areas of coastal salt marsh and brackish water marsh. This shall include the segment of Area A along the shoreline of the Petaluma River and portions of Areas B, C, and D along the drainage ditch on the west side of the railroad right-of-way. 2 If populations of any special-status plant species area encountered, an appropriate mitigation program shall be prepared by the qualified botanist for any listed species or those maintained on Lists A, 1B, or 2 of the California Native Plant Society (CNPS) Inventory. The mitigation program shall be prepared in consultation with the CDFG, and shall include any appropriate authorizations from the CDFG and/or the USFWS for any species listed under the Endangered Species Acts. Measures taken in the mitigation program shall be based the life history of the species encountered, successful mitigation treatments used for this species in the past, and legal protective status. These measures may include one or more of the following components as negotiated with agency representatives: avoidance of the population; collection of seed or vegetative material during the appropriate	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	developmental stage of the plant; procedures for sowing, establishment, or translocation of the species; development of a maintenance and monitoring program specific to the environmental conditions necessary for survival of the new population; and identification of a funding source to provide for implementation of the plan, and for long-term management and maintenance of the mitigation area. 3 Potential impacts on any species that are maintained on Lists 3 and 4 of the California Native Plant Society (CNPS) Inventory would not be considered significant and no additional mitigation would be required for these species.	
Impact BIO-2 Substantial Adverse Effect on any Riparian Habitat or other Sensitive Natural Community	***Mitigation Measure BIO-2***	
The coastal brackish marsh, located along the shoreline of the Petaluma River, is considered a sensitive natural community type by the CDFG. An estimated 0.01 acres of this habitat type was filled during the unauthorized grading in September 2005 and additional habitat could be affected during installation of the off-loading facilities on Area A. The support ramp and conveyor system would overshadow an estimated 500 square feet of emergent marsh and would most likely reduce cover and habitat values beneath these structures. Operation of the conveyor may lead to side-casting of gravel that could accumulate below the structure and eventually fill the marsh and open water habitat over the life of the project. Installation of the pipeline and intake structure as part of the water diversion would also affect the shoreline vegetation and open water habitat of the River. Routine maintenance and operation of the site could lead to inadvertent fill and disturbance to additional shoreline habitat, and even the drainage and wetland mitigation areas to be preserved and	The proposed Wetland Mitigation and Monitoring Plan (WMMP) shall be revised and implemented to include restoration and enhancement of habitat along the shoreline of the Petaluma River on Area A of the site, and ensure its protection as part of long-term operations. The revised WMMP shall include the following: 1 A limited access zone shall be established within 50 feet of the High Tide Line and within 10 feet of the top of bank to the slough. Permitted improvements within this zone shall be clearly identified and mapped, including the pier, ramp, pier access, conveyor and transition support, pipeline and intake structure for pumping River water, and an access alignment along the north side of the conveyor to allow for future maintenance of these structures. 2 All areas outside the permitted improvements shall be designated for habitat restoration and enhancement. Fills shall	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
enhanced. This could lead to placement of additional gravel and fills at the edge of the marsh and drainage, as occurred during the unauthorized grading in September 2005. This would eliminate both the sensitive habitat and the adjacent upland buffer that provides important water quality filtration and other habitat functions. Maintenance of the in-channel improvements could also lead to temporary removal or disturbance to the surrounding marsh cover. This represents a ***potentially significant*** impact on a sensitive natural community.	be removed to create additional coastal brackish marsh, transitional upper-zone marsh, and upland buffer habitat. 3 The entire habitat enhancement/restoration area shall be designed, revegetated, monitored, and maintained as part of the proposed WMMP for the site. 4 A fence shall be installed along the perimeter of the habitat enhancement/restoration area to separate sensitive habitat from permitted industrial use. The fence shall consist of permanent 4-foot high wildlife friendly fencing. 5 Permanent signage shall be installed at 50 foot intervals along the perimeter fencing that reads "Sensitive Marsh Habitat/No Disturbance Zone."	
Impact BIO-3 Substantial Adverse Effect on Jurisdictional Wetlands and other Waters	***Mitigation Measures BIO-3***	
On-going operations could inadvertently result in fill to sensitive wetland habitat unless the limits of authorized work areas and buffers along wetlands and drainage are clearly fenced and signed, as discussed further under Impact BIO-4. The proposed approach to mitigating potential impacts on wetlands defined in the Wetland Mitigation Monitoring Plan (WMMP) appears adequate. However, four aspects require further refinement to ensure successful implementation of created, restored, and enhanced habitat. 1 The WMMP contains no provisions for control of invasive exotics, which can severely limit the establishment of native cover and prevent the mitigation program from reaching intended habitat improvement goals. 2 The second issue of concern is functioning of the partially obstructed culvert under the railroad right-of-way. This culvert	*Mitigation Measure BIO-3a - Jurisdictional Wetlands and Other Waters* The proposed WMMP shall be refined and implemented to address potential impacts on jurisdictional waters and to enhance the habitat values along the Petaluma River. The final WMMP shall be prepared by a qualified wetland consultant, and shall meet with the approval of Sonoma County PRMD, the Regional Water Quality Control Board, the San Francisco Bay Conservation and Development Commission (BCDC), the US Army Corps of Engineers (Corps), and the California Department of Fish and Game. The plan shall clearly identify the total wetlands and other jurisdictional waters affected by the project and provide for re-establishment, enhancement, and/or replacement of wetlands. Revisions to the WMMP shall include the following details:	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
provides the only hydrologic connection between the entire mitigation area and the Petaluma River. 3 The third issue relates to the establishment of enhancement plantings, and need to provide appropriate growing substrate and short-term irrigation to ensure successful establishment. 4 Based on the expanded wetland delineation conducted for the site in 2006, additional brackish marsh and uplands occur on the site along the west side of the railroad right-of-way that were not identified in the WMMP as this drainage was originally believed to be off-site. Impacts to jurisdictional wetlands and other waters would be ***potentially significant***.	1 Expand the proposed wetland mitigation area to include the additional habitat protection and creation specified under Mitigation Measure BIO-2 as well as enhancement of the drainage channel along the west side of the railroad right-of-way, a portion of which was previously believed to be off-site when the draft WMMP was prepared. This may provide options to increase the acreage of created or enhanced brackish marsh wetlands and adjacent uplands habitat, and possibly improve circulation in the southeastern portion of the proposed wetland mitigation area. 2 Incorporate appropriate provisions for the control of invasive exotic species from the wetland and upland enhancement mitigation area in Sections 5, 6, and 8 of the WMMP, based on input from the Corps, Regional Water Quality Control Board (RWQCB), and CDFG. This shall include monitoring and maintenance provisions that call for periodic inspection and removal in spring and summer, and a success criteria that specifies successful control of target species within five years of initial construction of the wetland mitigation area. Target species to be controlled in the wetland mitigation area include: sweet fennel, poison hemlock, Italian thistle, pampas grass, French broom, Scotch broom, eucalyptus, and acacia, among others. 3 Provide appropriate soil testing and amendment as part of the landscape plan and revise the maintenance measures in Section 8 to include additional provisions related to upland habitat created and enhanced as part of the WMMP. Soil amendment shall be provided as necessary to ensure successful establishment of desirable native species, as reflected in on-going monitoring and maintenance requirements of the WMMP	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	4 Require repair or replacement of the existing partially blocked culvert under the railroad right-of-way as part of the WMMP to improve tidal circulation in the proposed wetland mitigation area. The size and design of the new culvert shall be based on a detailed hydrologic assessment conducted by the applicant's consulting hydrologist, as reviewed and approved by the permitting agencies and the property owner. Sizing of the culvert replacement shall consider any possible water diversion demand proposed for dust control and its affect on surface water levels in the mitigation area, and the affects of possible sedimentation on the long-term viability of the created wetlands. 5 Ensure that any proposed water diversion for dust control does not adversely affect the feasibility and success of tidal and brackish marsh to be created in Area D. This shall be demonstrated on an annual basis as part of on-going monitoring and maintenance defined in Sections 8 and 9 of the WMMP. Diversion shall be curtailed or an alternative method secured if performance standards and success criteria defined in the WMMP for areas of tidal and brackish marsh are not met due in part or wholly because of the proposed water diversion. 6 Include minimum setbacks from the top of bank to the drainage channels to be retained in Areas C and D where they border proposed industrial uses. A minimum 5 foot setback shall be provided from the top of each bank to provide for improved enhancement and prevent inadvertent fill of these features. A fence shall be installed along the perimeter of the top-of-bank setback to separate sensitive habitat from permitted industrial use. The fence shall consist of a permanent 4-foot high wildlife friendly fencing that shall be	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	open in nature to allow for passage of wildlife through or under the structure with a minimum six inch clearance at the bottom. Permanent signage shall be installed at 100 foot intervals along the perimeter fencing that reads "Sensitive Marsh Habitat/No Disturbance Zone." *Mitigation Measure BIO-3b - Containment System* A containment system shall be designed and installed to catch and collect any side-cast gravels from the conveyor between the pier and transition support near the high tide line of the Petaluma River to prevent inadvertent fill of the jurisdictional waters. The containment system shall be regularly maintained as part of normal operations during the life of the project. *Mitigation Measure BIO-3c - Stormwater Pollution Prevention Plan* As recommended in Section V.G (Hydrology and Water Quality), a Stormwater Pollution Prevention Plan shall be prepared and implemented using Best Management Practices to control both construction-related erosion and sedimentation and project-related non-point discharge into waters on the site. The plan shall contain detailed measures to control erosion of exposed soil, provide for revegetation of graded slopes before the start of the first rainy season following grading, address non-point source pollutants to protect wetlands and water quality in the drainage, and specify procedures for monitoring of the effectiveness of the plan. *Mitigation Measure BIO-3d - Permit Authorizations* All necessary permits shall be secured to allow for modifications to wetlands, drainage channels, and the shoreline of the Petaluma River on the site. Evidence of permit authorization from the Corps, BCDC, RWQCB, and CDFG shall be submitted to the	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	PRMD prior to issuance of any grading or building permits by the County to ensure compliance with applicable State and federal regulations.	
Impact BIO-4 Interfere Substantially with the Movement of Native Fish or Wildlife, Established Wildlife Corridors, or Impede the Use of Native Wildlife Nursery Sites	***Mitigation Measures BIO-4***	
Development along the shoreline of the Petaluma River and the location of improvements in the vicinity of the egret/heron colony would impinge on existing wildlife movement opportunities and could impede use of these features. Colonial breeding sites (or rookeries) of egrets and herons are considered sensitive by the California Department of Forestry and Fire Protection. Nesting, roosting, and foraging birds tend to be sensitive to human and vehicle intrusion, and other disturbance factors. Repeated disturbance during the nesting season could disrupt egg incubation and feeding routines, and could possibly result in abandonment of the nests. It is likely that intrusion closer than the existing road on Area B and the railroad tracks to the east of the colony would be disruptive, particularly during the nesting season. Off-loading at night, the associated lighting and noise generation, would occur under the proposed project. This night-time light and noise would be sporadic depending on demand, but could disturb nesting and roosting wildlife, particular diurnal species that may flush and become disoriented as they attempt to flee and locate secure habitat. Collectively, the proposed improvements and project operations could significantly disturb the egret/heron colony on the site, which is a known wildlife nursery, and impede its future viability. Similarly, improvements and operations on the Petaluma River could significantly affect the habitat values along this segment of the River,	*Mitigation Measure BIO-4a* The egret/heron colony in the stand of blue gum eucalyptus shall be protected from disturbance associated with construction and future operations, particularly during the nesting season (February 15 through August 31). Proposed improvements at the entrance to the site and vicinity of the fire station shall be redesigned to retain most of the existing blue gum eucalyptus trees that provide visual screening of the existing egret/heron colony, including the row of three existing trees in the parking lot between the proposed fire station and the parking stalls to the south. Proposed roadway and building improvements shall be located no closer to the stand of trees supporting the colony than currently proposed. These trees and the blue gum eucalyptus comprising the stand currently used by nesting egrets and herons shall be retained as a condition of project approval unless and until the colony is no longer viable in the future. *Mitigation Measure BIO-4b* Proposed construction shall be restricted away from the known egret/heron colony and from potential nesting habitat along the shoreline of the Petaluma River during the general nesting season to prevent possible nest abandonment and ensure compliance with the Migratory Bird Treaty Act during the active nesting season. Construction activities in Areas A and north of the cross-	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
particularly the night-time operations during the nesting and breeding season of terrestrial and aquatic-dependent wildlife. Therefore, impacts to sensitive nesting habitat are considered to be ***significant***.	site access road on Area B shall be restricted to the non-nesting season (construction activities allowed between August 1 and January 31). This includes installation of all improvements on Area A (pier, ramp, pilings, conveyor, access and parking, and wetland enhancement) and the septic leachfield, fire station and associated parking improvements in the north portion of Area B. *Mitigation Measure BIO-4c* Project operations associated with off-loading the barge, running the conveyor, and illumination beyond that necessary for essential security purposes shall be restricted to the minimum necessary for critical tide dependent operations at night between sunset and sunrise during the nesting season (February 15 through August 31) to protect the sensitive nesting habitat in the egret/heron colony and the on-site marshland habitat along the shoreline of the Petaluma River. Barges may be docked during the restricted hours, but no off-loading activities or operation of the conveyer shall be allowed. Lighting as necessary for safety and security purposes during barge docking shall be allowed. If a barge is anticipated to arrive on a particular night during the nesting season, the lighting shall be turned on at dusk and remain on until the barge has docked to minimize the potential for disturbing birds if lights were to be suddenly turned on in the middle of the night. Lighting shall be turned off after docking is complete. Otherwise, night-time lighting during the nesting season shall remain off, with the exception of that necessary for essential security purposes. All lighting shall be designed to minimize light intrusion beyond the operation areas on the site, to protect sensitive wildlife habitat areas along the Petaluma River, the egret/heron colony, and the proposed wetland mitigation area.	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	<u>*Mitigation Measure BIO-4d*</u> The conveyor shall be designed to minimize disturbance to the nearby egret/heron colony. The conveyor shall be kept as low to the ground as possible within 300 feet of the colony. A solid roof (metal, fiberglass, or opaque plastic) shall be constructed over the conveyor system, and a walkway/maintenance access from the railroad crossing to the existing access road across Area B on the site. The covering shall extend down at least the upper half of the west wall facing the egret/heron colony. Human access shall be restricted to the covered area along the conveyor during the nesting season (February 15 through August 31). <u>*Mitigation Measure BIO-4e*</u> An employee education program shall be prepared and implemented to prevent inadvertent disturbance to the egret/heron colony during the nesting season (February 15 through August 31). Permanent signs shall be installed around the perimeter of a setback zone around the egret/heron colony at a minimum 100-foot interval to alert workers and the public that access to the area is restricted during the nesting season. Signs shall extend along the northern boundary of the site, east edge of the fire station improvements, north side of the cross-site access road, and west side of the railroad right-of-way. The signs shall read "Nesting Colony/No Disturbance Zone/February 15 through August 31."	
CULTURAL RESOURCES		
Impact CULT-1 Historical Resources	***Mitigation Measures CULT-1***	
According to Section 15064.5(a)(3) of the CEQA Guidelines, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (CRHR) as defined	<u>*Mitigation Measure CULT-1a*</u> Site documentation shall be updated and brought to the level of current professional standards.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
above. The literature review and field survey for the project site indicated that the Haystack Landing house, barn and artifact scatter described above shall be considered "historically significant" by the lead agency according to the following criteria as specified in Section 15064.5(a)(3)(A)-(B) and (D) of the CEQA Guidelines: Historic site Ca-Son-1465H, Haystack Landing, was "associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage." As has been indicated by historical maps, the house, and possibly the barn, had been situated within the study area prior to 1860 during which time Haystack Landing was a site of shipping and passenger travel activity. The landing was a terminus for steamboats from San Francisco, as well as stage travel north, as early as 1857. The first portion of the third railroad in California, from Haystack Landing to Petaluma, was built in the spring and summer of 1864. Haystack Landing represented the expansion of travel, commerce, and transportation from the city of San Francisco into the North Bay Area during the 1850s and 1860s. A portion of the historic Haystack Landing site is located within the project's boundaries. Though this site no longer contains any standing structures, it is nonetheless considered historically important. The mid-to-late 1800s artifact scatter that was located behind the house (and the potential for other historic features such as trash dumps, privy-pits, etc. to be located within the site area) indicates that the site "has yielded, or may be likely to yield, information important in prehistory or history." Due to the high probability of archaeological deposits and other remaining features associated with the house, ground-disturbing activities associated with the project could result in the loss of integrity of cultural deposits, the loss of information, and the alteration of site setting to cultural resources that are eligible for	<u>*Mitigation Measure CULT-1b*</u> Preservation through historical documentation of the former house and barns shall be completed, following the Secretary of Interior's Standards for the Treatment of Historic Properties.	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
listing on the CRHR. Therefore, project impacts would be ***significant***.		
Impact CULT-2 Archaeological Resources	***Mitigation Measures CULT-2***	
Although no known unique archaeological resources have been identified on the project site, other it is possible that underlying soils could contain undiscovered resources. Though the project site has been previously disturbed, without proper care during the grading and excavation phases of the proposed project, unknown resources could be damaged or destroyed. Therefore, project impacts to unknown unique archaeological resources would be ***significant***.	*Mitigation Measure CULT-2a* Prior to earth disturbing activities, archaeological deposits and other features associated with the house will be identified using techniques including remote sensing techniques and/or searching for features with a backhoe equipped with a smooth-edged blade under the direction of a professional archeologist. Following the conclusion of the archaeological monitoring, a Final Report of Findings shall be prepared by the archaeologist which minimally describes the monitoring process, including the final disposition of impacts to archaeological site Ca-Son-1465H and descriptions and analysis of any formal or diagnostic artifacts recovered as a result of the project. This Final Report of Findings shall be completed to the satisfaction of Sonoma County PRMD, abiding by the guidelines specified in Archaeological Resource Management Reports (ARMR): Recommended Contents and Format, developed by the California Office of Historic Preservation (OHP), February 1990. *Mitigation Measure CULT-2b* All employees shall undergo a cultural resources orientation and awareness training prior to commencing work activities on the site. Such training shall include familiarization with the stop-work restrictions, noticing, and handling procedures, and ultimate disposition of artifacts as described below: 1 Immediately upon discover of archaeological resources, the shift foreman or manager at the project site shall be notified, and shall notify Sonoma County PRMD of the discovery. PRMD shall notify the Northwest Information Center and the	Less Than Significant

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	Native American Heritage Commission. If the discovery occurs during ground disturbing activities, all work shall be halted in the immediate vicinity of the find, until the County's archaeological and Native American consultants have evaluated the find and mitigated associated impacts. Discovered cultural resources shall be stored in a protected environment to prevent vandalism, damage, or theft; until such time as they are examined by an archaeologist and/or Native American, as appropriate. 2 The identification and handling of archaeological resources at the site shall be conducted by qualified archaeologists or approved by local Native American representatives. 3 Any Native American artifacts discovered shall be returned to the local Native American Community, which will be responsible for the disposition of these materials. The operator shall provide PRMD with a verification list of the employees completing the orientation.	
Impact CULT-3 Human Remains	***Mitigation Measure CULT-3***	
No known human burials have been identified on the project site or vicinity. In addition, a search of the Sacred Lands file identified no culturally important areas on the project site. However, it is possible that unknown human remains could occur on the project site, and if proper care is not taken during the project's grading and excavating phases, damage to or destruction of these unknown remains could occur. Therefore, project impacts on human remains would be ***significant***.	In the event that human remains are discovered, there shall be no disposition of such human remains, other than in accordance with the procedures and requirements set forth in the California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98. These code provisions require notification of the County Coroner and the Native American Heritage Commission (NAHC), who in turn must notify those persons believed to be most likely descended from the deceased Native American for appropriate disposition of the remains. Excavation or disturbance may continue in other areas of the project site outside the area affected by such discovery.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Impact CULT-4 Paleontological Resources	***Mitigation Measure CULT-4***	
Much of the project site has been previously disturbed and upper soils layers consist largely of fill materials. Although no known paleontological resources have been identified on the project site, it is possible that deeper underlying soils could contain undiscovered resources. In addition, without proper care during the grading and excavation phases of the proposed project, unknown resources could be damaged or destroyed. Therefore, project impacts to unknown paleontological resources would be ***significant***.	If paleontological resources are encountered during the course of site development activities, work in that area shall be halted and the project paleontologist shall be notified of the find. The project paleontologist shall have the authority to temporarily divert or redirect grading to allow time to evaluate any exposed fossil material.	Less Than Significant
GEOLOGY & SOILS		
Impact GEO-1 Seismically-Induced Ground Shaking at the Project Site Could Result in Injuries, Fatalities, and Property Damage	***Mitigation Measure GEO-1***	
All structures and improvements in the Bay Area could be affected by ground shaking in the event of an earthquake on regional active faults. Ground shaking potential is estimated on a worst-case basis by assessing the maximum expected earthquakes and designing for peak accelerations that may be generated. Strong to violent ground shaking is expected at the project site during a large earthquake on the Rodgers Creek fault, which is 4.5 miles away. This level of seismic shaking could cause injuries and/or fatalities and extensive structural and non-structural damage to buildings at the site. This is a ***significant*** impact.	Project design and construction shall be in conformance with current best standards for earthquake resistant construction in accordance with the California Building Code (Seismic Zone 4). In addition, project design shall follow the recommendations of the site-specific geotechnical investigation report. The report provides specific design criteria for construction of the project in response to expected seismic events.	Less Than Significant
Impact GEO-2 Surface Instability Could Result in Damage to Buildings, Equipment and Present a Physical Hazard to Workers	***Mitigation Measure GEO-2***	
The project site consists of nearly flat slopes, and slope stability is not a geologic hazard. However, due to the presence of soft compressible Bay Mud and the proposed placement of heavy	The applicant shall retain a qualified geotechnical engineering firm to fully evaluate the potential for aggregate stockpiles (both new and recycled) to cause overloading and instability of the	Less Than Significant

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
stockpile loads, the risk of deep rotational failures within the Bay Mud are high. This is a ***significant*** impact.	underlying Bay Mud. The geotechnical firm shall, as appropriate, design and construct a stockpile storage area that is stable under both static and dynamic (i.e., seismic) conditions. The geotechnical design may include overexcavation of the Bay Mud and replacement with engineered fill, placement of geogrid reinforcement under the stockpiles, or other effective means to ensure that the stockpiles would not cause rotational failures or damage to the nearby railroad tracks. Controlled settlement over time at the stockpile storage area is acceptable. The design shall allow for no displacement at or adjacent to the railroad tracks. Post-construction monitoring of the performance of the geotechnical solution, including detailed measurement of settlements, shall be required and be conducted on a yearly basis for five years. The applicant shall ensure that annual monitoring reports are submitted to the County for review and approval. Any unexpected failures or settlements exceeding those that were predicted shall be addressed by prompt corrective active (at no cost to the County). If at the end of five years, the geotechnical consultant and the County are in agreement, the monitoring and reporting may be terminated. The geotechnical design shall be reviewed and approved by the County technical staff prior to approval of the grading permit for the project.	
Impact GEO-3 Lurching and Ground Cracking at the Project Site Could Result in Damage to Project Buildings and Other Improvements	***Mitigation Measure GEO-3***	
Lurching and ground cracking can occur during strong ground shaking. Ground cracking tends to occur at the top of slopes where stiff soils overlie soft deposits or along channel banks. Bay Mud deposits up to 15-feet in thickness underlie the southern two-thirds	Reduction in the potential for damage due to soil lurching and resulting surface cracking shall be achieved by either soil improvements techniques, such as deep soil mixing, the replacement of unstable soils with engineered fill, or a minimum	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
of the site near the River. Lurching and ground cracking could result in damage to site improvements and present a hazard to workers. This is a ***significant*** impact.	of 20 foot setbacks for all improvements from channel banks as recommended by the geotechnical reports.	
Impact GEO-4 Differential Settlement at the Project Site Could Result in Damage to Project Buildings and Other Improvements	***Mitigation Measure GEO-4***	
Soft, compressible Bay Mud ranges in thickness from 0 to 15-feet across the project site. This layer has the potential to compress under moderate foundation loads or placement of new fill or stockpiles. Southern and eastern portions of the site have been identified as containing variable artificial fill and grading of the project site in preparation for construction of buildings and utilities would result in additional areas of cut and fill. Fills of different thickness and fills adjacent to cut areas where native soils are exposed at the surface could create the potential for differential settlements if structures straddle this interface. The areas most susceptible to differential settlement are those where thick fills or fills over Bay Mud are adjacent to native soil or bedrock. If the settlement is not uniform for the fill and native materials (i.e., differential settlement), structural damage can occur. Buried utilities crossing the boundaries of different materials may also experience differential settlements along their alignments. The geotechnical investigation report for the proposed project provides specific recommendations for mitigating settlement, including replacing Bay Mud with engineered fill. The project could result in improvements being damaged due to differential settlement; this is a ***significant*** impact.	The recommendations of the geotechnical investigation report regarding settlement shall be implemented. The specific recommendations for mitigation of potential settlements associated with native soil, Bay Mud and fill boundaries shall be implemented, such as excavation of the soft compressible Bay Mud and replacement with compacted fill.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
HAZARDS AND HAZARDOUS MATERIALS		
Impact HAZ-1 Improper Use, Storage, or Disposal of Hazardous Materials During Construction	***Mitigation Measures HAZ-1***	
Construction activities would require the use and transport of hazardous materials, including fuels, oils, and other chemicals (e.g., paints, adhesives) used during construction. It is likely that these hazardous materials and vehicles would be stored by the contractor(s) on-site during construction activities. Improper use and transportation of hazardous materials could result in accidental releases or spills, potentially posing health risks to workers, the public, and the environment. This is a ***significant*** impact.	*Mitigation Measure HAZ-1a* The Storm Water Pollution Prevention Plan (SWPPP) required for the project (see Mitigation Measures in the Hydrology and Water Quality Section) shall include emergency procedures for incidental hazardous materials releases. The procedures shall include necessary personal protective equipment, spill containment procedures, and training of workers to respond to accidental spills/releases. *Mitigation Measure HAZ-1b* The SWPPP shall also include Best Management Practices, which shall include requirements for hazardous materials storage during construction to minimize the potential for releases to occur (See Mitigation Measures in the Hydrology and Water Quality Section). All use, storage, transport and disposal of hazardous materials during construction activities shall be performed in accordance with existing local, state, and federal hazardous materials regulations.	Less Than Significant
Impact HAZ-2 Site Grading Could Cause a Release of Potential Soil Contaminants or Creation of Safety Hazards to Construction Workers and the General Public	***Mitigation Measures HAZ-2***	
The proposed development would include grading of the site for construction of the asphalt plant and stockpile areas, barge off-loading facility, conveyor system, and facilities for use by the San Antonio Volunteer Fire Department. (SAVFD). Of the total site area, approximately 28.2 acres would be disturbed as part of the grading operation. Acreage at the southeast end of the site would be	*Mitigation Measure HAZ-2a* Prior to approval for any grading or construction permits at the project site, a Construction Risk Management Plan (CRMP) shall be prepared by a qualified environmental professional and implemented during the duration of construction activities at the site. The CRMP shall summarize previous environmental	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
preserved as open space/wetlands and could create habitat for vectors that may transmit disease (i.e., mosquitoes). During site grading, construction workers could encounter residual contaminants (e.g., cobalt) in site soils and underground structures (septic systems, water wells, and petroleum product pipelines near the railroad tracks). These actions could result in a health and safety risk to construction workers and the off-site receptors. Fill containing brick and fire debris was observed to have been stockpiled in a portion of one of the quarry ponds and could potentially contain hazardous materials and present health risks to construction workers if disturbed or reused on the site. Pipelines that formerly contained quarry wash water were also observed on-site and could be damaged during construction activities, resulting in safety concerns to construction workers. A release of potential soil contaminants or creation of hazards for construction workers or the general public by site grading activities is considered a ***significant*** impact.	investigations conducted for the project site and, in accordance with state and federal laws and regulations, shall describe worker health and safety provisions for all workers potentially exposed to residual contaminants in soil, including the need for dust suppression controls, air monitoring, personal protective equipment to be worn by workers to minimize exposures, soil management procedures, management of dewatered groundwater (as applicable), site control, and emergency response procedures. The CRMP shall also provide procedures to be undertaken in the event that previously unreported contamination or subsurface hazards (such as septic systems, wells, underground pipelines) are discovered during construction, and establish detailed procedures for the safe storage, stockpiling, sampling, reuse of fill, and off-site disposal of hazardous materials and other materials (fire debris, soil) at the project site. The CRMP shall incorporate construction safety measures for excavation and other construction activities and procedures for abandonment of the former quarry pipelines. The CRMP shall designate personnel responsible for implementation during construction activities and shall be submitted to the PRMD for review and approval. *Mitigation Measure HAZ-2b* The observed fill material containing brick and fire debris shall be sampled prior to soil disturbance by an environmental professional to assess the presence of hazardous materials and the potential risk to human health and public safety from the contamination (if any). The sampling shall be conducted by a qualified environmental professional in accordance with state and local guidelines and regulations, with oversight from the Sonoma County Department of Environmental Health (SCDEH). The	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	findings of the soil sampling investigation shall be documented in a written report and submitted to SCDEH and PRMD. If the results of the soil sampling investigation indicate the presence of hazardous materials that could affect public health or the environment, remediation of this area shall be required by the applicable regulatory oversight agencies. Specific remedies would depend on the extent and magnitude of contamination. Under the direction of the SCDEH and the PRMD, a Site Remediation Plan shall be prepared, if required, by the project sponsor or contractor(s). The Plan shall specify: 1) measures to be taken to protect workers and the public from exposure to potential site hazards, and 2) certify that the proposed remediation measures would clean up the waste, dispose of the waste, and protect public health and the environment in accordance with local, state, and federal requirements. Any remediation required shall be completed prior to earthwork in the areas affected. *Mitigation Measure HAZ-2c* A mosquito and vector control plan shall be prepared by a qualified professional and submitted to the Marin-Sonoma Mosquito and Vector Control District for approval. The approved plan shall be submitted to PRMD prior to on-site earthwork activities and shall be implemented as part of the proposed project. The plan shall specify areas where mosquito larvae are likely to be present on-site (e.g., in areas with standing water) and mosquito management methods.	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Impact HAZ-3 Operational Routine Transport, Use, Production, or Disposal of Hazardous Materials and Septage, and Potential Risk of Upset Associated with These Hazardous Materials Uses	***Mitigation Measure HAZ-3***	
Operation of the plant would require materials to be imported to the facility, including asphaltic oil, recycled asphalt products, sand, fines, aggregate, and recycled crumb rubber. In the production of asphalt, liquid asphalt would be sprayed onto the heated aggregate material. The applicant proposes: a 30,000-gallon tank for asphaltic oil storage and a 500-gallon fuel storage tank for equipment usage. The asphalt would be temporarily stored in silos (200 tons each) after it is made and before distribution to the end-user sites. The silos would be heated using natural gas. A Storm Water Pollution Prevention Plan prepared for the temporary facility indicated that lesser quantities of other hazardous materials and hazardous wastes were stored and generated on-site, including motor oil, gear lube, automatic transmission fluid, compressed gases, waste oil, and used oil filters. It is likely that similar hazardous materials and quantities of these materials would be stored and hazardous wastes generated at the proposed asphalt plant. Hazardous materials would be stored on-site for the San Antonio Volunteer Fire Department (SAVFD). Engine oil and other items associated with vehicle and equipment maintenance for four fire-related engines housed at the station would be stored on-site in approved storage containers. All businesses transporting, storing, using, or disposing of hazardous materials must comply with applicable local, state, and federal regulations for hazardous materials management. These include the primary hazardous materials programs administered by Sonoma County Department of Emergency Services as well as other requirements of state and federal laws and regulations, including	The applicant shall engage a Fire Protection Engineer to perform a code analysis and submit a comprehensive fire protection plan (Plan) for the proposed project for review by PRMD and the County Fire Marshall. The Plan shall include an evaluation of the project's compliance with the uniform fire code requirements relating to storage of hazardous materials (including aboveground tanks), the need for fire suppression system, alarm systems, storage of flammable or combustible materials, containment basins around hazardous materials, and compliance with hazardous materials regulations. Both hazardous materials at the proposed asphalt plant and those for the SAVFD shall be considered in the review.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
compliance with the Uniform Fire Code for hazardous material storage. Numerous hazardous materials would be routinely transported, used, produced, and hazardous waste generated at the site under the proposed project. Accidental releases associated with these hazardous materials uses could adversely affect on-site workers, off-site receptors, and the environment. This is a ***significant*** impact.		
HYDROLOGY AND WATER QUALITY		
Impact HYDRO-1 Substantially Alter the Drainage Pattern in a Manner That Would Result in Substantial Erosion or Siltation On- or Off-Site	***Mitigation Measures HYDRO-1***	
<u>*Pumping from the Petaluma River and Inland Waterways*</u> The project proposes to include pumping 40 gallons per minute (gpm) of water from the Petaluma River and on-site inlet for dust suppression. Water for dust suppression has been estimated at 10,000 gallons per day (gpd) average, with peak days requiring 20,000 gpd. Although the applicant proposes screening to prevent intake of aquatic species, it is possible that if not properly designed and constructed, entrainment of sediment and/or erosion could occur at the intake. In an extreme case, the suction could scour a depression in the channel bottom, potentially affecting bank stability, particularly at an inland waterway pumping location. Also it is possible that backflow could occur through the suction hose or piping, which could discharge water from the pumping system (which may have come into contact with pollutants) back into the River, degrading water quality. The potential impacts to erosion and sedimentation and water quality at the water supply intakes would be considered ***significant***.	<u>*Mitigation Measure HYDRO-1a*</u> The River water supply intakes shall be designed and constructed to minimize agitation and entrainment of sediments. This may be accomplished by elevating the intake above the River bottom and/or providing an energy dissipation structure around the intake. Water shall not be pumped from an inland tidal waterway when the tide is low and pumping could expose the channel bottom, potentially increasing erosion and scour. The potential for backflow to occur through the system shall be minimized by the incorporation of one or more check valves (backflow prevention devices). <u>*Mitigation Measure HYDRO-1b*</u> The grading of the project site shall be conducted in conformance with the approved Grading Plan. All recommendations for grading presented in the site-specific geotechnical reports shall be incorporated into the grading activities.	Less Than Significant

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
<u>Construction Impacts</u> Construction and grading within the project site would require temporary disturbance of surface soils. During the construction period, grading and excavation activities would result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment and contaminants in the runoff. Soil stockpiles and excavated areas on the project site would be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation and pollutants in storm water. In addition, installation of concrete piles for the proposed barge off-loading facility could result in temporary disturbance of River sediments and increases in turbidity within the River. The pile-driving activities would be of short duration (on the order of days or weeks). The potential impacts to water quality would be temporary and would be considered ***significant***.	<u>*Mitigation Measure HYDRO-1c*</u> Prior to construction, the owner/operator shall file a Notice of Intent to comply with the statewide General Permit for Discharges of Storm Water Associated with Construction Activities. A Stormwater Pollution Prevention Plan (SWPPP) shall be prepared for construction activities. The SWPPP shall include all provisions of the Erosion and Sediment Control Plan submitted by the applicant. In addition to the regulatory requirements for the SWPPP, the site-specific SWPPP shall include provisions for the minimization of sediment disturbance and production of turbidity in and adjacent to the Petaluma River during construction of the proposed barge unloading facility.	
Impact HYDRO-2 Substantially Alter the Drainage Pattern or Substantially Increase the Rate or Amount of Surface Runoff in a Manner That Would Result in Flooding On- or Off-Site	***Mitigation Measure HYDRO-2***	
<u>*Wetland Maintenance*</u> The project proposes the enhancement of existing wetlands in Area D of the site. Maintenance of existing drainage ditches as vegetated drainage channels is also proposed. The hydraulic system for the wetland area is connected to the Petaluma River at only one point, the Railroad Culvert. The project also involves pumping River water from drainage ditch DD1, west of the culvert. If the culvert partially or fully collapses or becomes otherwise blocked, tidal circulation into the proposed wetlands could be reduced or eliminated. The habitat of the proposed wetlands would be dependent on tidal circulation. Therefore, potential blockage of the Railroad Culvert would be a ***significant*** impact on the proposed project.	As required by Mitigation Measure BIO-3a(4), the applicant would be required to repair or replace the existing partially blocked culvert under the railroad right-of-way to improve tidal circulation. The function of the culvert shall be maintain for the life of the project. A maintenance program for all culverts shall be developed and incorporated into the site's Storm Water Pollution Prevention Plan (SWPPP).	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Impact HYDRO-3 Otherwise Substantially Degrade Water Quality	***Mitigation Measures HYDRO-3***	
Long-Term Operational Impacts The operation of the processing facilities and plant would introduce new potential sources of water quality degradation at the project site. The project proposes the storage of hazardous materials, including heated asphalt, which could be accidentally released to the surface and subsurface. Intensified land uses at the project site would result in increased vehicle use and potential discharge of associated pollutants. Increased numbers of vehicles and outdoor parking facilities at the project site would likely result in increased leaks of fuel, lubricants, tire wear, and fallout from exhaust, which would contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff being transported to receiving waters. Runoff from landscaped areas at the site may contain residual pesticides and nutrients. In addition, the barge off-loading facility would include operation of a diesel-powered loader and aggregate conveyor system adjacent to and over the Petaluma River. This operation could result in the direct discharge of petroleum hydrocarbons and sediment to the Petaluma River. Long-term degradation of water quality runoff from the site could impact local water quality in the River. The project proposes design elements that would reduce the potential for the discharge of untreated runoff from the proposed industrial facilities. According to the applicant, runoff from the asphalt plant area of the site would be directed into a below-ground catchment basin designed to provide for settlement of larger solids entrained in runoff. Discharge from the basin would pass through a sand filter prior to flowing to the vegetated drainage ditch DD6 at the western margin of the site. The ditch would serve as an extended detention basin during low and	*Mitigation Measure HYDRO-3a* Prior to commencement of operations, the owner/operator shall prepare a site-specific SWPPP for the operational period of the project. The SWPPP shall meet all requirements of the most recent statewide Industrial Storm Water General Permit. At minimum, the SWPPP shall include design, operation, and maintenance specifications for: • Control of sediment discharges at the loading facility on the Petaluma River that minimizes the potential for spillage of aggregate materials into the River and the disturbance of River sediments during anchorage of the barges. Barges shall arrive "clean" (no sediment or aggregate materials on horizontal surfaces outside of the hold). Off-loading procedures shall include provisions for eliminating the creation of dust (e.g.. continuous misting so that newly exposed aggregate surfaces stay wet, but not so much water application that runoff is created). The conveyor system shall be enclosed and fitted with dust control devices (e.g., misting units). Aggregate exiting the conveyor system shall be moist to wet so that dust is not generated as it drops from the conveyor to the storage piles. • Measures designed to protect River water quality at the barge off-loading facility. The loader shall not be refueled or receive major maintenance while on the over-the-water off-loading facility. The loader shall be moved to an appropriate land-based location (a minimum of 30 feet from the top of River bank) for refueling and maintenance. • The entire parcel adjacent to the off-loading facility (Area A) shall be modified to provide enhanced water quality protection	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
moderate runoff events. Additional settlement of suspended sediments (and associated contaminants such as hydrocarbons and metals) would occur within the ditch. Runoff from the aggregate storage area would primarily drain westward to DD5, which would also be operated as an extended detention basin. The project as proposed does not include specific measures to prevent stormwater and River water quality degradation at the barge off-loading facility. The application does not include specifications for site-specific emergency preparedness and response for the potential release of hazardous materials or a maintenance plan for operation of the storm water management system. This is a ***significant*** impact. The portion of the River adjacent to the project site has been designated as water-quality impaired for diazinon, pathogens, nutrients, and sediment. However, the project would not be expected to generate or discharge diazinon (an insecticide that has been banned except for specific agricultural uses). The project could create new sediment sources (as described under the Impact HYDRO-3 discussion above), but these potential sediment discharges would be fully mitigated by the project-level mitigation. Similarly, the project could generate a new pathogen source by installing a new septic system near the River. This is considered a ***potentially significant*** impact.	for the River and tidal inlet. A limited access zone shall be established within 50 feet of the High Tide Line and within 10 feet of the top of bank to the slough as further described under Mitigation Measure Bio-2 in Section V.C. (Biological Resources). This will allow limited access roads to the off-loading facility and along the conveyor system to be constructed. The roads shall be placed at the maximum feasible distance (but not less than 50 feet) from the tidal inlet to provide a water quality buffer. If it is necessary for any road to be elevated above the surrounding grade, the escarpment created by the road shall be protected by riprap and/or bioengineering techniques so that the road is stable if the site is inundated during flooding. Permitted improvements within this zone shall be clearly identified and mapped, and no industrial or commercial activities other than those proposed by this project shall be permitted on this parcel. The remainder of the parcel shall be regraded so that shallow stormwater bioswales border the access roads on either side. The bioswales shall be designed and constructed in accordance with the requirements of the County PRMD. The existing baserock shall be removed from the parcel and the existing soils either amended or new planting medium imported so that vegetation can be re-established over the entire parcel (except at the road locations). The applicant shall ensure that no net fill occurs on the site (i.e. any fill imported to the site must be offset by an equal or greater volume of material export out of the floodplain). • A pretreatment catch basin and sand filter (or multiple basins and filters) that will capture and treat all runoff from all processing and storage areas for at least the 10-year design storm event. Discharge from the catch basin and sand filter	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	shall be visibly clear (i.e., not turbid). If turbid water is observed to be discharging from the catch basin and sand filter, the system shall be expanded and/or redesigned in coordination with the County and Regional Water Quality Control Board (RWQCB) so that adequate pretreatment is achieved. Only visibly clear water shall be discharged to the secondary treatment system. The SWPPP shall include specifications for regular maintenance of the basin and sand filter and procedures for disposal and/or reuse of the used filtration material. • An emergency shutoff system that will allow the plant operator to stop discharge from the catch basin should a chemical spill occur at the facility. A gate valve or similar structure that can shut off flows out of the catch basin shall be included in the basin design. The method for engaging the shutoff system shall be simple and the procedure provided to all appropriate plant employees as part of routine training. • The secondary storm water treatment system shall use a portion of the existing network of drainage ditches to provide additional treatment and on-site residence time prior to discharge of site runoff to the Petaluma River. These drainage ditches shall be redesigned to act as extended wet ponds and/or detention features. Flows for the catch basin and sand filter shall be discharged into the tidally-influenced ditches in a manner so that turbulence is not created (e.g., using an energy dissipation structure). The grading plan and drainage design shall include measures that ensure maximum residence times in the detention features. • As required by the general permit for industrial activities, the applicant shall conduct regular inspections of the facility Best Management Practices (BMPs) and collect storm water runoff	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	samples during storm events where a discharge occurs. These data shall be reviewed for compliance with applicable published U.S. EPA benchmark values for storm water runoff. If the analytical results from the sampling events indicate that benchmark values are being exceeded, corrective action shall be implemented in coordination with RWQCB. All activities and operation of storm water runoff BMPs are subject to regular inspection by the County and the RWQCB. If the County inspectors observe practices that do not protect surface water quality to the maximum extent practicable, then they are empowered to and shall require the operator to implement corrective action. *Mitigation Measure HYDRO-3b* Prior to the commencement of operations, the proposed septic system shall be installed under permitting by the PRMD. Additionally, abandonment of the existing septic system shall be performed under PRMD permitting requirements.	
Cumulative Water Quality Impacts		
The proposed project would result in an incremental increase in nutrient loading. As noted in Impact Hydro-3, the implementation of BACT measures would significantly reduce phosphorous emissions, but a relatively small amount may be emitted from the asphalt plant process. This amount would not exceed National Oceanic and Atmospheric Administration 's water quality screening criteria of 0.1 ug/L even under a worst case scenario, in which all phosphorous emissions from the plant are assumed to deposit directly into the River. The amount would nevertheless represent a contribution to nutrient loading in the River, which is likely to continue experiencing a significant cumulative impact due to the contributions from Related Projects. Given the River's finite location		Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
and number of pollutant sources, the project's contribution is conservatively assumed to be ***cumulatively considerable***.		
LAND USE		
Impact LU-1 Conflict With Applicable Land Use Plans, Policies, or Regulations	***Mitigation Measure LU-1***	
The applicant seeks a General Plan Amendment to change Limited Commercial to Limited Industrial for APNs 019-320-022 and -023 (Areas B, C and D). As stated in Regulatory Settings for General Plan Land Use, a list of seven specific criteria must be met before amending land use to the Limited Industrial designation. The project does not appear to meet all of the required criteria (i.e., Criterion #5 and Criterion #7) for an amendment to the General Plan designation to Limited Industrial. The project also appears to be in conflict with several applicable policies listed in Section V.H. (Land Use) Tables V.H-2 through 4. Therefore, impacts related to the project's consistency with applicable land use plans, policies or regulations appear ***significant***. The two specific criteria in potential conflict are: 5. *Lands shall not be in environmentally sensitive or hazardous areas* The proposed General Plan Amendment would include land in an environmentally sensitive area, although required mitigation measures would reduce project impacts relative to on-site resources (e.g. Biological Resources, Cultural Resources) to less-than-significant levels. Additionally, the proposed amendment would include land in a hazardous area. Much of the project site is in the 100-year flood plain (F2). Other potential hazards include groundshaking and liquefaction from seismic activity. Section V.E (Geology and Soils) acknowledges that seismic hazards at the site;	There are no feasible mitigation measures known at this time that would eliminate this significant land use impact.	Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
however, mitigation measures have been included in the EIR to reduce the potential hazards associated with seismic activity to a less-than-significant level. All other potentially significant impacts related to on-site hazards would be mitigated to less-than-significant levels. However, not all of the mitigation measures involve avoidance of the environmentally sensitive and hazardous areas, which appears to be the intent of Criterion #5. Therefore, the project does not appear to meet Criterion #5. *7. Applicable Planning Area Policies* The project appears to be in conflict with several applicable policies in the Sonoma County General Plan, and the Petaluma Dairy Belt Area Plan as discussed in the Land Use Section.		
Impact LU-2 Land Use Compatibility	***Mitigation Measure LU-2***	
The proposed project would result in a change to the intensity and type of use for the site, as the project site is currently vacant. The primary land use compatibility impacts would be to several residences on the east side of the railroad tracks directly adjacent to the proposed project. Shollenberger Park, located across the Petaluma River from the project site, is also considered a sensitive receptor and would be subject to noise and aesthetic impacts from the proposed project. The project site has Combining District Zoning for Scenic Resources (SR) to preserve the visual character and scenic resources, and Scenic Design (SD). The project site is currently vacant, allowing views to the surrounding hills and adjacent River area. The proposed project would result in significant and unavoidable impacts relative to scenic vistas and visual character. The proposed project would create noise from a variety of sources. As described in detail in Section V.I (Noise) the impact from noise to adjacent sensitive receptors would be considered significant and unavoidable.	Implementation of the mitigation measures listed in Sections IV.A (Aesthetics) and IV.I (Noise) would reduce but not fully eliminate the significant land use impacts to adjacent residences and users of Shollenberger Park. No other feasible mitigation measures are known at this time.	Significant and Unavoidable

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Other considerations include sensitive receptors exposure to potential odors, as well as being subject to additional sources of light when the project is operating at night, including light from the barge and pier and associated front loader. Although the proposed project is consistent with adjacent area zoning to the north, the existing residential uses located along the River and, to a lesser extent, the residential uses across the highway and park users across the River would be subject to these impacts. Therefore, land use compatibility impacts would be ***significant***.		
Cumulative Land Use Impacts		
With regard to potential cumulative land use compatibility impacts, implementation of the proposed project, in conjunction with the SMART Train and the Novato Narrows Widening Project and associated interchange, would exacerbate the project's land use compatibility impacts. The SMART Train would travel within 65 feet of the nearest residence, generating additional (intermittent) noise beyond the noise from the proposed project. If proper safety precautions are not taken, the SMART train could result in potential safety impacts as the residents along the River have to cross the rail road tracks to access their homes. SMART has prefaced that access to all of the parcels east of the tracks along the waterfront may be limited, as there should only be one place where vehicles would cross the tracks for safety purposes. This may require an easement from Shamrock Materials that would allow access to the east side of the tracks. The interchange associated with the Novato Narrows Widening Project is currently proposed to encroach upon Area B of the project site, which, depending on the final design, could ultimately require the removal or relocation of the proposed fire station, trees, and modifications to the off-site transportation improvements proposed		Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
by the project. This related project would also exacerbate the project's impacts relative to aesthetics and noise. Therefore, given that the proposed project would result in land use compatibility impacts that can not be completely mitigated, cumulative land use compatibility impacts are considered ***significant and unavoidable***.		
NOISE		
Impact NOISE-1 Substantial Temporary or Periodic Increases in Noise	***Mitigation Measure NOISE-1***	
Construction of the proposed project would result in temporary and periodic increases in daytime ambient noise levels in excess of the existing ambient noise standards. Therefore, temporary increases in noise levels from construction would be considered a significant impact.	<u>*Mitigation Measure NOISE-1a*</u> Prior to issuance of a building permit, the project developer shall provide the County with the name and telephone number of the individual empowered to manage construction noise from the project. The individual's name, telephone number, and responsibility for noise management shall be posted at the project site for the duration of construction in a location easily visible to the public. The individual shall record all noise complaints received and actions taken in response, and submit this record to the project planner upon request. <u>*Mitigation Measure NOISE-1b*</u> The project developer shall implement measures to reduce the noise levels generated by construction equipment operating at the project site during project grading and construction phases. The developer shall include the following requirements or measures shown to be equally effective in construction contracts: • All construction equipment shall be equipped with improved noise muffling, and have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine isolators in good working condition.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	• Stationary construction equipment that generates noise levels in excess of 65 decibels level equivalent (dBA Leq) shall be located as far away from existing occupied residences as possible. If required to minimize potential noise conflicts, the equipment shall be shielded from noise sensitive receptors by using temporary walls, sound curtains, or other similar devices. • All equipment shall be turned off if not in use for more than 10 minutes.	
Impact NOISE-6 Asphalt Concrete Facility Equipment Noise	***Mitigation Measure NOISE-6***	
Predicted asphalt plant noise emissions would exceed County daytime noise standards for nearby residences and users of Shollenberger Park on the trail across the River. Operations of the asphalt plant would also exceed County night-time noise standards at all sensitive receptors. Therefore, this would be considered a ***significant*** impact.	• Baghouse fan stack silencer. Install a silencer between the baghouse fan and the exhaust stack. The silencer shall be designed to reduce the A-weighted sound level of the fan exhaust by 20 dBA when the fan is operating in the range of 70-100% of maximum airflow. • Baghouse fan casing barrier or enclosure. Install a barrier along the west side of the baghouse fan casing. The barrier shall be made of sound absorptive steel panels or mass-loaded quilted vinyl (1.5 pounds per square foot). The barrier shall be 12 feet tall and located within 3 feet of the fan casing. It shall return along the south and north sides of the baghouse fan casing. Alternatively, a ventilated enclosure can be used that is constructed of sound absorptive metal panels and designed to achieve an A-weighted noise reduction of 15 dBA. • Fiberbed fan stack silencer. Install a silencer between the fiberbed fan and the exhaust stack. The silencer shall be designed to reduce the A-weighted sound level of the fan exhaust by 15 dBA when the fan is operating at 100% of	Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	maximum airflow. • Gear reducer enclosure. Install an enclosure around the gear reducer for the asphalt burner drum to reduce its noise level by 15 dBA. • Air compressor enclosure. Install an enclosure around the air compressor to reduce its noise level by 20 dBA. • Air cylinder silencers. Install air cylinder silencers at the batcher and discharge gates designed to reduce the air release noise by a minimum of 20 dBA. • Asphalt Plant stockpiles along loop road. The loop road included in the proposed development plan shall be relocated to the west to allow for the asphalt plant stockpiles to be placed between the loop road and railroad tracks.	
Impact NOISE-7 Concrete Recycling Facility Noise	***Mitigation Measure NOISE-7***	
The recycle plant noise could exceed daytime noise standards by approximately 1 to 9 dBA at residences R1, R2, R4 and R5. Noise levels associated with the recycling plant could also exceed County daytime noise standards at the adjacent park facilities. This exposure is a potentially ***significant*** impact.	• Non-metallic aggregate sorting screens. Use non-metallic screening panels. Non-metallic materials such as neoprene, rubber or high-density polyethylene (HDPE) can significantly reduce the noise generated by the crushed concrete bouncing on the screens. • Hopper and chute liners. Line all unenclosed hoppers and chutes at which aggregate materials fall onto a metal surface with a sound deadening material such as heavy neoprene, rubber or HDPE. • Use PG&E power instead of an engine-generator set. Operate the recycling plant without the engine-generator commonly used to power portable concrete recycling plants. • Stockpiles to the north and east. Stockpiles of processed and unprocessed materials shall be located to the north and east sites of the recycling plant. These stockpiles will help reduce	Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	noise at the homes along the River and the park across the River. Since the presence of the stockpiles is dependent on the amount of material at the site, this EIR does not rely on their noise reduction potential in mitigating noise levels at the residential receivers. The noise predictions at the Shollenberger Park include the effect of stockpiles, because the recycle yard has enough space to always maintain piles at least 15 feet high. • Revision of landscape plan to include 10-foot high berm. As required in Mitigation Measure AES-1, the landscape plan shall be revised to incorporate a 10-foot high, 30-foot wide irrigated landscaped berm along the portion of the site that fronts Highway 101 and Petaluma Boulevard South, specifically south of the Caltrans right-of-way line and east of the public right-of-way that extends into the project site. The portions of the site plan affected by the 30-foot wide landscape buffer (i.e., stockpiles, access road, etc) shall be reconfigured to accommodate the landscaped buffer. Finally, the revised landscape plan shall incorporate trees with the proposed ground cover within Area C to further screen the proposed project from off-site views. • At the request of the homeowners along the River and at the hillside west of Highway 101, the applicant shall provide windows rated for a 10 dBA exterior to interior noise reduction for all habitable rooms on the side of the residence facing the project site. The applicant shall provide specifications for the windows to the homeowner. The homeowner will then be responsible for receiving 3 bids from qualified contractors to purchase and install the windows. The applicant shall promptly pay the homeowner for the cost of the lowest bid after the windows are installed and accepted by	

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	the homeowner. The applicant shall pay for normal installation of the windows but will not pay for any additional work necessary to allow installation of the window, such as repair of dry rot or termite damage.	
Impact NOISE-8 Barge Unloading Facility Noise	***Mitigation Measure NOISE-8***	
County noise standards would be exceeded at residences R3 and R5 and one of the park facilities (R6) as a result of barge unloading operations, therefore this would be considered a potentially ***significant*** impact. Additionally, noise from the tugboat would generate noise levels of 68 dBA at a distance of 160 feet. The barge-unloading facility is approximately 120 feet from R3, the nearest residence. This would exceed both night and day County standards for the nearest residence, and users of the Shollenberger Park viewing platform across the River.	• The applicant shall enclose the points along the conveyor system where material transfers from one belt to another by means of a hopper. The enclosure material shall have a minimum surface density of 1.5 pounds per square foot. • The tug boat shall either turn off its engines during barge unloading operations or relocate away from the riverfront residences while unloading operations are underway. • Noise barriers shall be placed on the southern portion of the barge to completely screen barge unloading activities in the direction of the riverfront residences. • Although the County's performance standards for non-transportation sources apply only to outdoor sound levels, consideration shall be given to improving the sound insulating properties of the affected residential structures. This mitigation measure, however, requires the cooperation of the residence owner, but could result in substantial reduction in indoor noise levels. • Project operations associated with off-loading the barge and running the conveyor shall be prohibited at night between sunset and sunrise. Note that sunset and sunrise times change with the seasons, and will range from approximately 5:30 PM to 7 AM in early February, to 8:30 PM to 6 AM in mid-June, to 7:30 PM to 6:30 AM in late August. Official sunrise and sunset times shall be obtained from a reputable source, such as the National Weather Service.	Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Impact NOISE-10 Composite Noise Levels from Project Operations	***Mitigation Measure NOISE-10***	
The combined noise levels associated with operations of all three facilities, the asphalt plant, barge unloading facility, and recycling plant, simultaneously would exceed the County daytime noise standards at all seven sensitive receptors. In addition, the Rosen, Goldberg & Der Report indicates that indoor noise levels generated by combined operations of the project would exceed the World Health Organization (WHO) recommendation for avoiding sleep interference at each of the three adjacent River residences, with the windows open. With the windows closed, only the northernmost residence would be exposed to noise levels expected to interfere with sleep. It should be noted that the night-time noise level at the northernmost residence is generated by barge unloading activities that would occur infrequently, about one or two nights per month. Considering that combined operations of the project would exceed County and WHO noise standards, this impact would be considered ***significant***.	In conjunction with the other mitigation measures above, the following mitigation measure is recommended to reduce noise impacts from the combined operations. • Strobe Lights. 1) Install an Occupational Safety and Health Administration (OSHA) approved strobe light back-up notification system on front-end loaders that are used at the asphalt plant and the barge unloading. 2) Use the strobe lights exclusively instead of the beepers during night-time hours.	Significant and Unavoidable
Cumulative Noise Impacts		
In addition to traffic noise, railroad noise from proposed SMART commuter trains and proposed freight trans could potentially affect cumulative noise levels in the project area, at least on a temporary yet periodic basis. The SMART FEIR concludes, the cumulative daily noise exposure from all rail operations, based on the above assumptions for freight operations, would be approximately 59 dBA Ldn at 50 feet and 54 dBA Ldn at 100 feet from the tracks. Cumulative noise exposure from passenger and freight rail operations at distances greater than 50 feet from the tracks would be less than 60 dBA Ldn, the level considered normally acceptable for outdoor use in residential areas. However, these temporary yet		Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
periodic noise levels would exceed the County daytime and night-time noise standards for residence R4. Implementation of the proposed project in conjunction with potential future commuter and freight trains would therefore result in ***significant*** cumulative operational noise impacts.		
TRANSPORTATION/TRAFFIC		
Impact TRANS-3 Highway Impacts	***Mitigation Measure TRANS-3***	
The project would add traffic to ramp movements and to Highway 101 mainline in both directions. Under existing conditions the highway mainline operates unacceptably in the southbound direction during the AM peak hour. Additional traffic from the project would exacerbate already unacceptable conditions; therefore, this is a ***significant*** impact. County staff indicate that although flow volumes are not high in the northbound direction during the PM peak hour, this is often because highway flow breaks down. Additional truck traffic would exacerbate this condition. This is a ***potentially significant*** impact. The project would also add traffic to the congested southbound ramps during the AM peak hour. This is also a ***significant*** impact. Overall, the project creates ***significant*** impacts to Highway 101 operations.	*Mitigation Measure TRANS-3a* The project shall be conditioned to require a fair share contribution towards the planned construction of High Occupancy Vehicle (HOV) lanes along the highway mainline. The added HOV capacity would improve highway operations to a minimum level of service (LOS E) in the southbound direction south of Petaluma Boulevard South. This would be an improvement over the existing conditions of LOS F. This is a planned improvement that Caltrans intends to serve existing traffic and background growth in traffic, therefore the project's fair share would be computed as a proportion of total near term cumulative traffic. The project sponsor shall fund a fair share towards any planned interchange improvements for the Highway 101/Petaluma Boulevard South interchange project. Since improvements have been planned and are intended to address existing conditions, and not simply future growth, a fair share is calculated as the project share of total peak hour traffic on the northbound and southbound ramps. Such an interchange is planned by Caltrans as part of the Marin Sonoma Narrows Project. Participation by the project sponsor would need to be coordinated with Caltrans. The future dedication of Caltrans right-of-way situated within the project	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	site for the Highway 101/Petaluma Boulevard South interchange project may be used in part or all of the fair share contribution.	
	Mitigation Measure TRANS-3b The project shall be conditioned to prohibit material export during the PM peak period from 4 PM to 6 PM. The trip generation determination assumes that no truck traffic would occur during the PM peak hour, based on existing patterns at the temporary site. The condition would eliminate the potential for some truck traffic to slip through during the PM peak hour. County staff anticipates that Caltrans input would be required.	Less Than Significant
Impact TRANS-4 Safety Impacts	***Mitigation Measure TRANS-4***	
The proposed access would force northbound project truck traffic on Highway 101 to weave across the northbound through lane to make left turns onto the on-ramp, this must occur within 460 feet neglecting any queues. Although the modified design of Petaluma Boulevard South would result in reduced speeds, trucks would be forced to accelerate, then weave, and brake all within a distance less then the minimum recommended acceleration distance. This condition is unsafe and constitutes a ***potentially significant*** impact.	The project sponsor shall install an actuated signal at the new intersection of Petaluma Boulevard South at the project driveway. The applicant shall also coordinate with Caltrans and the County to design the northbound off-ramp lane and shoulder striping to "narrow" width perception in an effort to lower driver exit speeds so they are closer to posted advisory speeds. The levels of service with signalization would be LOS B in the AM peak hour and LOS A in the PM peak hour. Outbound right turns from the driveway shall not be permitted on red. The applicant shall get Caltrans' comments on the signalized intersection mitigation for AM/PM signal timing in order to give priority to exiting Highway 101 northbound traffic and avoid excessive queuing. Advance signal detection warning devices shall be required for off-ramp traffic combined with long green times and short recall times for the northbound through movement. All future maintenance costs for signal maintenance shall be borne by applicant. Agreement between Caltrans and County shall be necessary for operational control.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Impact TRANS-7 Near-Term Cumulative Queuing Impacts	***Mitigation Measure TRANS-7***	
The project contributes to additional queuing at the northbound through approach to Petaluma Boulevard South at Highway 101 southbound ramps where the queue without the project would already exceed available storage. This queue would already extend beyond Landing Way. Therefore, impacts would be ***potentially significant***.	The exclusive northbound left-turn lane from Petaluma Boulevard South onto the Highway 101 southbound on-ramp shall be re-striped as a shared left turn/through lane. The exclusive lane is not necessary to avoid delay or queuing on the northbound left turn. The opposing (north) leg of the intersection already has a second receiving lane and the approach is brought to a complete stop so there are no operational constraints preventing the return to a shared left turn/through configuration. Under this configuration the intersection would have improved level of service (from LOS F with 90 seconds delay in the AM to LOS E with 35.5 seconds delay). This mitigation measure would result in queuing on the northbound approach would improve from 825 feet to 125 feet on both the through and the shared lane.	Less Than Significant
Impact TRANS-8 Near-Term Cumulative Highway Impacts	***Mitigation Measure TRANS-8***	
The project would add trips to congested segments of southbound Highway 101 during the AM peak hour, which is a ***potentially significant*** impact. The project could potentially add traffic to northbound Highway 101 during the PM peak hour where traffic has been observed to break down which is also a potentially significant impact. The project would add traffic to the congested southbound ramps during the AM peak hour where operation would be LOS F without project traffic. This is a ***potentially significant*** impact. Overall the project has a ***significant*** impact on highway operations.	<u>*Mitigation Measure TRANS-8a*</u> Mitigation Measure TRANS-3 (funding a fair share of the construction of planned HOV lanes, right-of-way dedication) would also address the significant impact identified in Impact TRANS-8. With this improvement the LOS would improve from LOS F to LOS E for the southbound AM condition and the impact would be reduced to less-than-significant levels. Improvements to the highway mainline are planned to address cumulative conditions and serve existing deficiencies as well as future growth. The near-term cumulative plus project condition is the ultimate scenario where the improvement would constitute a mitigation measure as it is assumed as part of the 2020 no-project cumulative condition. Therefore, the fair share is calculated based on near-term plus project conditions. It is	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
	evaluated as the project share of total peak hour mainline traffic. The project shall fund a fair share towards the construction of any new interchange between Highway 101 and Petaluma Boulevard South. The fair share for this improvement would be calculated under cumulative 2020 plus project impacts. Such an interchange is planned by Caltrans as part of the Marin Sonoma Narrows Project. Participation by the project sponsor would need to be coordinated with Caltrans. The future dedication of Caltrans right-of-way situated within the project site for the Highway 101/Petaluma Boulevard South interchange project may be used in part or all of the fair share contribution. *Mitigation Measure TRANS-8b* As indicated under Mitigation Measure TRANS-3b, the project sponsor shall establish that no material export occur during the PM peak hour. Caltrans input would be required.	
Impact TRANS-11 Cumulative 2020 Queuing Impacts	***Mitigation Measure TRANS-11***	
The project would cause 95th percentile queues to grow where they already exceed available storage on the eastbound approach to the proposed Petaluma Boulevard South/Highway 101 southbound ramps intersection. The project would extend the queuing on the northbound through approach to 1,300 feet, well beyond the Landing Way intersection. This is a ***significant*** impact.	As under near-term cumulative conditions, Mitigation Measure TRANS-7 would reduce the queuing impact to less-than-significant levels. Under 2020 plus project conditions returning to a shared left turn/through lane and an exclusive through lane on the northbound approach of Petaluma Boulevard South to the Highway 101 southbound ramps would reduce the queuing to 175 feet without adversely affecting the northbound left turn (which would also be at 175 feet). Also, the AM peak intersection level of service would improve to 60.7 seconds of delay, which is better than cumulative 2020 conditions without the project.	Less Than Significant

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
Impact TRANS-12 2020 Cumulative Highway Impacts	***Mitigation Measure Trans-12***	
The project would add traffic to the Highway 101 southbound on-ramp, which is already at LOS F. This is a ***significant impact*** similar to Impact TRANS-3.	*Mitigation Measure TRANS-12a* The project sponsor shall contribute a fair share towards interchange improvements for the planned Highway 101/Petaluma Boulevard South interchange. Since improvements have been planned and are intended to address existing conditions, and not simply future growth, a fair share is calculated as the project share of total peak hour traffic on the northbound and southbound ramps. The future dedication of Caltrans right-of-way situated within the project site for the Highway 101/Petaluma Boulevard South interchange project may be used in part to contribute to the fair share contribution. *Mitigation Measure TRANS-12b* As indicated under Mitigation Measure TRANS-3b, the project sponsor shall establish that no material export occur during the PM peak hour from 4 PM to 6 PM. Caltrans input would be required.	Less Than Significant
Impact TRANS-13a Transportation Policy Impacts	***Mitigation Measure TRANS-13a***	
The proposed project is predicated upon obtaining permission to utilize an at-grade crossing and to construct a conveyor system above the tracks. The crossing would allow for access to Area A, off-loading facilities, and the barge. Trucks would need to use this crossing to access the docks when barges are scheduled, and for occasional maintenance and refueling. The Sonoma Marin Area Rail Transit (SMART) sent a letter to the applicant in January 2007 conceptually agreeing to give permission (via an easement) for the conveyor system to cross the railroad tracks. Agreement would be conditioned on limiting access to all of the	The project sponsor shall obtain the necessary entitlement from SMART to allow for both a rail crossing and the conveyor system. It is assumed that SMART will allow the conveyor to be constructed on the condition that the at-grade rail crossing be closed. This could result in a secondary impact by eliminating the local access to the Area A for project traffic and for a few private residences along the River. To address this secondary impact the applicant/owner shall make an irrevocable offer to the County of Sonoma for a 50-foot public	Less Than Significant

Table II-1

Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
parcels east of the railroad tracks along the waterfront to one crossing only for the Haystack Landing area. Specifically, the rail crossing at the project site would be terminated, leaving only one crossing in the area at Landing Way. Without SMART approval, neither the conveyor nor the rail crossing would be permissible. This would prevent the use of barges to import aggregate material, requiring that the resources instead be brought in by truck. Although the SMART Board has met with the project applicant, the final approval has not been obtained. Because the project sponsor does not yet have the entitlements necessary to service the site with material imported by barge, impacts would be ***significant***.	access and utility easement parallel to the SMART railroad tracks on APN 019-220-001 for the purposes of ingress, egress and utilities. This would preserve options for a future public roadway through Landing Way to allow access to Area A and neighboring residential properties along the River if the existing railroad crossing is closed. This measure will cause a small number of passenger vehicles to be mixed with the larger volume of truck trips along the right-of-way. This is not a substantial concern, however, because most of this traffic would be from residents who are familiar with the area and currently there are employee and other passenger vehicle trips in the area so this increase will not represent a new condition for truck drivers using this route.	
Impact TRANS-13b Access for Neighboring Residential Land Uses	***Mitigation Measure TRANS-13b***	
Neighboring residents currently cross part of the Landing Way easement, SMART railroad tracks, and the project site to access the County's Petaluma Boulevard South. The same access route used by these residents is also used by emergency and service vehicles as well as the project proponent. Traffic circulation impacts to these existing access arrangements may occur as a result of the proposed project because SMART has expressed concern to the applicant about allowing the continued use of the existing railroad track crossing with the installation of a new overhead conveyor. In addition, mixing residential, emergency and service vehicle traffic with the proposed site plan and asphalt manufacturing activities could also affect safe traffic circulation in and around the facility. Landing Way was viewed as a possible solution to these potential traffic circulation and access impacts because it adjoins and partly crosses the project site before connecting to Petaluma Boulevard South. However, the private properties in the project area and the	The applicant shall provide neighboring residents an all-weather vehicular access route to Petaluma Boulevard South. Access shall be designed, operated, maintained and recorded to the satisfaction of SMART, DTPW, PRMD and the County Fire Marshall prior to building permit issuance.	Significant and Unavoidable

Table II-1
Summary of Significant Environmental Impacts & Mitigation Measures

Significant Environmental Impacts	Mitigation Measures	Level of Significance after Mitigation
underlying interests that have the recorded use of the easement is unclear. Until such time that it is clear whether access to and from Petaluma Boulevard South can be provided to these residents via Landing Way, a ***potentially significant*** impact to existing and proposed traffic circulation and access could occur with the implementation of the proposed project.		

IV. SUMMARY OF THE INITIAL STUDY

A. INTRODUCTION

Section 15128 of the *CEQA Guidelines* states:

> *"An EIR shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR. Such a statement may be contained in an attached copy of an Initial Study."*

Per Section 15050(d) of the *CEQA Guidelines*, the County of Sonoma has identified that an EIR is required to be prepared for the proposed project. An Initial Study was prepared to facilitate the appropriate due diligence and full disclosure of potentially significant impacts that may be associated with the project. The Initial Study was prepared for the proposed project in February 2006 and was distributed with the Notice of Preparation (NOP) to prepare a Draft EIR (both available in Appendix A). The purpose of this section is to summarize the Initial Study and the issues that will be analyzed in this EIR.

B. NO PROJECT IMPACTS

No project impacts identified in the Initial Study related to the following (see discussion in Appendix A):

- Agricultural Resources (2.a to 2.c) - The Initial Study determined that the project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), would not conflict with existing zoning for agricultural use, or a Williamson Act contract, and would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use.
- Biological Resources (4.f) - The Initial Study determined that the project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat conservation plan.
- Geology and Soils, 6.a(I) - The Initial Study determined that the project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known.
- Geology and Soils, 6.a(iv) - The Initial Study determined that the project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.
- Hazards and Hazardous Materials, 7.c - The Initial Study determined that the project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

- Hazards and Hazardous Materials, 7.d - The Initial Study determined that the project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.
- Hazards and Hazardous Materials, 7.e - The Initial Study determined that the project would not be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area.
- Hazards and Hazardous Materials, 7.f - The Initial Study determined that the project site is not located within the vicinity of a private airstrip, and therefore the project would not result in a safety hazard (related to a private airstrip) for people residing or working in the project area.
- Hazards and Hazardous Materials, 7.g - The Initial Study determined that the project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Hydrology and Water Quality, 8.g - The Initial Study determined that the project would not place housing within a 100-year hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Land Use and Planning, 9.a - The Initial Study determined that the project would not physically divide an established community.
- Land Use and Planning, 9.c - The Initial Study determined that the project would not conflict with any applicable habitat conservation plan or natural community conservation plan.
- Mineral Resources, 10.a - The Initial Study determined that the project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- Mineral Resources, 10.b - The Initial Study determined that the project would not result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.
- Noise, 11.e - The Initial Study determined that the project is not located within an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.
- Noise, 11.f - The Initial Study determined that the project is not located within the vicinity of a private airstrip, the project would expose people residing or working in the project area to excessive noise levels.
- Population and Housing, 12.a - The Initial Study determined that the project would not induce substantial population growth in an area, either directly or indirectly.

- Population and Housing, 12.b - The Initial Study determined that the project would not displace substantial numbers of existing housing necessitating the construction of replacement housing elsewhere.
- Population and Housing, 12.c - The Initial Study determined that the project would not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.
- Public Services, 13.a(I, iv) - The Initial Study determined that the project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios, response times or other performance objectives for schools and parks.
- Recreation, 14.a - The Initial Study determined that the project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Recreation, 14.b - The Initial Study determined that the project does not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.
- Transportation/Traffic, 15.c - The Initial Study determined that the project would not result in inadequate emergency access.
- Transportation/Traffic, 15.e - The Initial Study determined that the project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Transportation/Traffic, 15.f - The Initial Study determined that the project would not result in inadequate parking capacity.
- Transportation/Traffic, 15.g - The Initial Study determined that the project would not conflict with adopted policies, plans, or programs supporting alternative transportation.
- Utilities and Service Systems, 16.b - The Initial Study determined that the project would not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Utilities and Service Systems, 16.e - The project would use an on-site AdvanTex recirculating septic system, with an on-site leachfield for wastewater treatment. Preliminary analysis showed adequate septic capacity of the property. Therefore, the Initial Study determined that the project would not require a capacity adequacy determination by an outside wastewater treatment provider.
- Utilities and Service Systems, 16.f - The Initial Study determined that the project would be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.
- Utilities and Service Systems, 16.g - The Initial Study determined that the project would comply with federal, state, and local statutes and regulations related to solid waste.

C. LESS-THAN-SIGNIFICANT IMPACTS

Less-than-significant impacts identified in the Initial Study related to the following (see discussion in Appendix A):

- Aesthetics, 1.b - The Initial Study determined that the project would not have a substantial impact to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway because the project is not located near a state scenic highway.
- Cultural Resources, 5.a - The Initial Study determined that the project would not cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 because the structures associated with the existing Historic District Overlay Zone designation no longer exist and no other historic resources have been identified on the site.
- Geology and Soils, 6.b - The Initial Study determined that the project would not cause a result in substantial soil erosion or the loss of topsoil because the relatively flat topography of the site and proposed storm water drainage systems would limit erosion and because commercial uses typically have greater lot coverage than non-commercial uses.
- Geology and Soils, 6.d - The Initial Study determined that the project would not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property because the expansion characteristics of the soils on the site are considered low.
- Geology and Soils, 6.e - The Initial Study determined that the project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems, creating substantial risks to life or property because the County's Project Review Health Specialist has reviewed the project and has required that a Registered Civil Engineer or Registered Environmental Health Specialist design a septic system that can accommodate the wastewater generated by the project.
- Hazards and Hazardous Materials, 7.h - The Initial Study determined that the project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires. This includes where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands because, although the property is adjacent to grasslands and open space, the threat posed by wildland fires is minimal.
- Hydrology and Water Quality, 8.a - The Initial Study determined that the project would not violate any water quality standards or waste discharge requirements because the County's Project Review Health Specialist has reviewed the project and required that a Registered Civil Engineer or Registered Environmental Health Specialist design the proposed septic system to accommodate the wastewater generated by the project. Development of the project also requires an application for waste discharge permits from the Bay Area Regional Water Quality Control Board and a National Pollution Discharge Elimination System permit. The Board will assess all aspects of wastewater discharge to insure that there is no failure to the subsurface. This will insure that there would not be a violation of any water quality standards or waste discharge requirements.

- Hydrology and Water Quality, 8.b - The Initial Study determined that the project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. The project does not propose to use groundwater. Non-potable water would be supplied primarily from water pumped from the Petaluma River for various dust suppression purposes. Potable water needs for project employees and fire department personnel would be served by an existing water connection from the North Marin Municipal Water District pipeline that runs along the westerly side of the property. A large portion of the project site would remain unpaved to facilitate groundwater recharge.

- Hydrology and Water Quality, 8.e - The Initial Study determined that the project would not create or contribute runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. The project would be required to provide drainage swales and/or other Best Management Practices along the perimeter of the property to filter and retain contaminants that are present in any stormwater before they enter the drainage ditches or the wetlands.

- Hydrology and Water Quality, 8.i - The Initial Study determined that the project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam because all structures would have finished floors at least one foot above the 100 year flood elevation.

- Hydrology and Water Quality, 8.j - The Initial Study determined that the project would not be inundated by seiche, tsunami, or mudflow. The likelihood of a tsunami or seiche occurring is rare due to the distance from the open ocean; there likely would be adequate warning to allow employees to leave the property and seek high ground in the hills immediately to the west. Additionally, the property is located on relatively flat ground away from surrounding hillsides, and therefore it is not likely that the project site would be inundated by mudflow.

- Public Services, 13.a(i, ii, and v) - The Initial Study determined that the project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities. As existing police and fire services are adequate, the construction of new facilities is not required in order to maintain acceptable service ratios, response times or other performance objectives for fire and police protection, and other public facilities. Additionally, the County Fire Marshal has reviewed the project and required that all buildings comply with fire safe standards and may require an on-site water storage tank and pump for use in fire suppression operations.

- Utilities and Service Systems, 16.a - The Initial Study determined that the project would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board. The project was reviewed by the County Environmental Health Officer who would require the submittal of an approved wastewater discharge permit from the Bay Area Regional Water Quality Control Board.

- Utilities and Service Systems, 16.c - The Initial Study determined that the project would not require or result in the construction of new storm water drainage facilities or expansion of existing facilities.

The project includes a drainage swale on the perimeter of the site to capture and filter run-off from the pavement and processing areas and there is adequate carrying capacity in the drainage ditches to accommodate the increase in runoff.

- Utilities and Service Systems, 16.d - The Initial Study determined that the project would have sufficient water supplies available to serve the project from existing entitlements and resources, and new or expanded entitlements would not be needed. Potable water needs for project employees and irrigation needs would be served by an existing water pipeline connection from the North Marin Water District (NMWD). Although the site is outside of its territorial boundaries, NMWD has agreed to supply 4,452 gallons per day, shown as the historical entitlement when the water meter was connected. The projected demand for non-potable water would be 10,000 to 20,000 gallons per day, and would be provided by pumping from the River. Non-potable water demands would not require expansion of existing entitlements from NMWD, therefore would have a less-than-significant impact for Utilities.

D. LESS-THAN-SIGNIFICANT IMPACTS WITH MITIGATION

Less-than-significant impacts with implementation of recommended mitigation measures identified in the Initial Study related to the following (see discussion in Appendix A):

- Cultural Resources, 5.c - The Initial Study determined that the project has the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature because unknown paleontological resources could occur on the site. To mitigate this potential impact the following mitigation measure is proposed: If paleontological materials are discovered during project construction, construction would cease in the immediate vicinity of the find until a qualified archaeologist or paleontologist is consulted to determine the significance of the find, and has recommended appropriate measures to protect the resource. Further disturbance of the resource would not be allowed until those recommendations deemed appropriate by the County have been implemented.

- Cultural Resources, 5.d - The Initial Study determined that the project has the potential to disturb any human remains, including those interred outside of formal cemeteries because unknown resources could be encountered during project construction. To mitigate this potential impact the following mitigation measure is proposed: If human remains are discovered at the project site during construction, work at the specific construction site at which the remains have been uncovered shall be suspended, and the County coroner shall be immediately notified. If the remains are determined by a qualified archaeologist and/or paleontologist to be Native American, the Native American Heritage Commission (NAHC) shall be notified within 24 hours, and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains.

E. POTENTIALLY SIGNIFICANT IMPACTS REQUIRING FURTHER ANALYSIS

The following summarizes impacts that were identified in the Initial Study as potentially significant and requiring further analysis in this EIR (see discussion in Appendix A):

- Aesthetics, 1.a - The Initial Study determined that the project has the potential to have a substantial adverse impact on a scenic vista because the project site is located along a County designated scenic corridor (Petaluma Boulevard South/Highway 101). Proposed structures present a potentially significant visual impact to the freeway, to surrounding residences and to the users of the park along the River. The equipment and materials storage could be visually intrusive and the proposed landscape screening could be inadequate. In addition, the introduction of heavy landscaping and/or berming with landscaping along the freeway could result in the elimination of the view corridors from the freeway to the River. Refer to Section V.A of this EIR.
- Aesthetics, 1.c -The Initial Study determined that the project has the potential to substantially degrade the existing visual character or quality of the site and its surroundings because the proposed project would have a potentially significant visual impact as noted above. Refer to Section V.A of this EIR.
- Aesthetics, 1.d - The Initial Study determined that the project has the potential to create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area. The property is currently vacant and any new use or facility would introduce additional light and glare in the area. In addition, the potential for significant nighttime operations, especially night lights for parking, security, circulation and safety, could result in potentially significant impacts to the existing visual character of the area. Refer to Section V.A of this EIR.
- Air Quality, 3.a - The Initial Study determined that the project has the potential to conflict with or obstruct implementation of the applicable air quality plan because the proposed project is not entirely consistent with the existing land use designation and a General Plan Amendment is required. Refer to Section V.B of this EIR.
- Air Quality, 3.b - The Initial Study determined that the project has the potential to violate any air quality standard or contribute substantially to an existing or projected air quality violation. The proposed asphalt batch plant may produce significant stationary equipment emissions, process pollutants, odors from the mixing of the oils and tar to create asphalt and odors from the manufacturing of rubberized asphalt. Mobile sources for this project are primarily diesel truck traffic and the use of heavy equipment for the loading and sorting of aggregates as well as the barges on the River. Refer to Section V.B of this EIR.
- Air Quality, 3.c - The Initial Study determined that the project has the potential to result in a cumulatively considerable net increase of any criteria pollutant. The Bay Area is considered a non-attainment area for ozone under both the Federal Clean Air Act and the California Clean Air Act. The Bay Area is also considered a non-attainment area for PM10 under the California Clean Air Act. Although ozone and small particulate (PM10) concentrations are almost always below air quality standards in the Sonoma Valley, emissions from the area could be contributing to air quality violations in other parts of the Bay Area. The proposed project has the potential to violate applicable federal or state ambient air quality standards due to PM_{10} (fine particulate matter) in the form of dust emissions from the grading and handling of aggregate and recycled materials may occur during construction and operation of the proposed project. Refer to Section V.B of this EIR.
- Air Quality, 3.d - The Initial Study determined that the project has the potential to expose sensitive receptors to substantial pollutant concentrations. The proposed asphalt batch plant may produce

significant stationary equipment emissions, process pollutants, odors from the mixing of the oils and tar to create asphalt and odors from the manufacturing of rubberized asphalt. Mobile sources for this project are primarily diesel truck traffic and the use of heavy equipment for the loading and sorting of aggregates as well as the barges on the River. Based on the proximity of residential uses to this site, these air quality impacts could be potentially significant. Refer to Section V.B of this EIR.

- Air Quality, 3.e - The Initial Study determined that the project has the potential to create objectionable odors that could affect people because the proposed project is an asphalt batch plant that would manufacture rubberized asphalt directly adjacent to several homes along the Petaluma River. Refer to Section V.B of this EIR.

- Biological Resources, 4.a - The Initial Study determined that the project has the potential to have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. Eight special-status animal species were identified as having the potential to occur on or within the vicinity of the project site. Additionally the project is proposing a new barge off-loading facility on the Petaluma River which has a number of federal and state listed fish species. Refer to Section V.C of this EIR.

- Biological Resources, 4.b - The Initial Study determined that the project has the potential to have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service because the Petaluma River and 11.69 acres identified on the site are subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Refer to Section V.C of this EIR.

- Biological Resources, 4.c - The Initial Study determined that the project has the potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. There is a total of 11.69 acres of jurisdictional wetland on the site, including coastal brackish marsh habitat and seasonal wetlands. There is the potential for approximately 1.73 acres on the upland portion and the small barge loading area in the River to be impacted. Refer to Section V.C of this EIR.

- Biological Resources, 4.d - The Initial Study determined that the project has the potential to interfere substantially with the movement of native resident or migratory fish, wildlife species, established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. Eight special-status animal species were identified as having the potential to occur on or within the vicinity of the project site. Refer to Section V.C of this EIR.

- Biological Resources, 4.e - The Initial Study determined that the project has the potential to conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance. The proposed pier for the project is located in a Biotic Resource Overlay Zone, which is designed to protect biological resources. Refer to Section V.C of this EIR.

- Cultural Resources, 5.b - The Initial Study determined that the project has the potential to cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5. The site has been used for over 100 years as a trading and commercial zone and it is likely to contain additional artifacts from that time period, not to mention possible Native American artifacts. Refer to Section V.D of this EIR.

- Geology and Soils, 6.a(ii) - The Initial Study determined that the project has the potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. This could be because the majority of the site is located on unconsolidated alluvium and terrace deposits that are from 0 to 300 feet deep with increased shaking hazards depending on the thickness of the alluvium and the depth of groundwater. Refer to Section V.E of this EIR.

- Geology and Soils, 6.a(iii) - The Initial Study determined that the project has the potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure. This could include liquefaction because the majority of the site is located on unconsolidated alluvium and terrace deposits that are from 0 to 300 feet deep with increased shaking hazards depending on the thickness of the alluvium and the depth of groundwater. Refer to Section V.E of this EIR.

- Geology and Soils, 6.c - The Initial Study determined that the project has the potential to be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project. This could potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse because the majority of the site is located on unconsolidated alluvium and terrace deposits that are from 0 to 300 feet deep with increased shaking hazards depending on the thickness of the alluvium and the depth of groundwater. Refer to Section V.E of this EIR.

- Hazards and Hazardous Materials, 7.a - The Initial Study determined that the project has the potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. The proposed facility would store oils, tars, and recycled tires in crumb form related to the production of rubberized asphalt and would maintain an above ground fuel tank for the heavy equipment used to move aggregates. Refer to Section V.F of this EIR.

- Hazards and Hazardous Materials, 7.b - The Initial Study determined that the project has the potential to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. The proposed facility would store oils, tars, and recycled tires in crumb form related to the production of rubberized asphalt and would maintain an above ground fuel tank for the heavy equipment used to move aggregates. Refer to Section V.F of this EIR.

- Hydrology and Water Quality, 8.c - The Initial Study determined that the project has the potential to substantially alter the existing drainage pattern of the site or area through the alteration of the course of a stream or river. This could result in substantial erosion or siltation on or off the site during construction, as potential erosion and sediment transfer may result due to the removal of ground cover and the grading process. Refer to Section V.G of this EIR.

- Hydrology and Water Quality, 8.d - The Initial Study determined that the project has the potential to substantially alter the existing drainage pattern of the site or area. This would include the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off the site because increased impervious surfaces would increase the rate and the amount of storm water runoff. Refer to Section V.G of this EIR.
- Hydrology and Water Quality, 8.f - The Initial Study determined that the project has the potential to otherwise substantially degrade water quality. Refer to Section V.G of this EIR.
- Hydrology and Water Quality, 8.h - The Initial Study determined that the project has the potential to place structures within a 100-year flood hazard area, which could impede or redirect flood flows. Refer to Section V.G of this EIR.
- Land Use and Planning, 9.b - The Initial Study determined that the project has the potential to conflict with applicable land use plans, policies, and regulations of the agencies with jurisdiction over the project (including, but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. The project potentially conflicts with criteria 1, 5 and 7 required to change the General Plan land use designation to Limited Industrial. In addition, the project conflicts with the Petaluma Dairy Belt Specific Plan Land Use designation (Limited Commercial). Refer to Section V.H of this EIR.
- Noise, 10.a - The Initial Study determined that the project has the potential to expose persons to generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. This would include barge off-loading of aggregates at any time of the day, the conveyance of these materials to stockpiles, the production of asphalt and recycling operations, the loading of trucks with aggregates and asphalt, and the movement of trucks and equipment on the site. Additionally, the proposed project would include facilities for the San Antonio Volunteer Fire Department for response drills and equipment storage. Refer to Section V.I of this EIR.
- Noise, 10.b - The Initial Study determined that the project has the potential to expose persons to or generation of excessive groundborne vibration or ground borne noise levels because the construction of the pier for the off-loading of barges requires the installation of piles into the River. The residences directly adjacent to the project site would be effected by project noise levels. Refer to Section V.I of this EIR.
- Noise, 10.c - The Initial Study determined that the project has the potential to substantially and permanently increase ambient noise levels in the project vicinity above levels existing without the project as noted above. Refer to Section V.I of this EIR.
- Noise, 10.d - The Initial Study determined that the project has the potential to substantially and temporarily or periodically increase ambient noise levels in the project vicinity above levels existing without the project. The construction of the proposed project would result in a significant temporary increases in noise levels. Based on the physical proximity of the residences along the River, off-loading of aggregates by barge, batch plant, recycling, truck loading, and truck idling, noise

impacts may not be adequately mitigated through simple sound barriers and noise attenuation measures on the equipment. Refer to Section V.I of this EIR.

- Transportation/Traffic, 15.a - The Initial Study determined that the project has the potential to cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system. There could be safety issues between trucks, emergency vehicles, and the passenger vehicles associated with the adjacent off-site residences that travel through the project site to access their properties. Additionally, when future plus project conditions were studied, the southbound 101 ramp intersection dropped to LOS F. Refer to Section V.J of this EIR.
- Transportation/Traffic, 15.b - The Initial Study determined that the project has the potential to exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways. Added traffic volumes would lower the service levels on the southbound 101 ramp intersection with Petaluma Boulevard South to LOS F during the peak A.M. hour at build-out of Petaluma's General Plan (2030). Refer to Section V.J of this EIR.

V. ENVIRONMENTAL IMPACT ANALYSIS
A. AESTHETICS

INTRODUCTION

This section describes existing visual conditions and evaluates potential aesthetic effects associated with the proposed project. This section includes computer-generated visual simulations illustrating "before" and conceptual "after" visual conditions at the project site as seen from representative, public and private vantage points. Digitized photographs and computer modeling and rendering techniques were used to prepare the simulation images.

The analysis in this section has been conducted in accordance with the *Sonoma County Permit and Resource Management Department Visual Assessment Guidelines,* which provide procedures to assess visual impacts. Because visual impact assessments involve qualitative judgments, a defined methodology utilizes, to the extent feasible, objective standards that can be described and utilized in a consistent manner. The determination of a significant visual impact is made by establishing the level of visual sensitivity of the site and characterizing the visual dominance of the project in terms of its form, line, color, texture, and lighting using criteria discussed in the PRMD Guidelines. The project site has been characterized to have moderate sensitivity and the proposed project has been characterized to have visual dominance. With these characterizations determined, in accordance with the "Thresholds of Significance for Visual Impact Analysis" identified in the *Visual Assessment Guidelines*, implementation of the proposed project would have a significant and unavoidable impact on the environment. These impacts are discussed in more specificity below in the Project Impacts section.

ENVIRONMENTAL SETTING

The character of the project area is influenced by the Petaluma River (River), the surrounding hills, the flat valley floor, and the marshlands. The project site lies in a "bowl" defined by Sonoma Mountain Range on the east and the hills that extend from Burdell Mountain around the west. The Petaluma River, to the east of the site, runs through southern Sonoma County and flows across the Denman Flat area through Petaluma, eventually emptying into San Pablo Bay. The Petaluma River is actually a tidewater slough that was designated a river in 1959 by Congress, which allowed the Army Corps of Engineers (Corps) to permit dredging for commercial navigability access. Some tributary creeks flowing into the River remain in their natural state, while others have been channelized. To the south of the site, the River and its flood plain flare out, and marshlands and sloughs mark both sides of the River. The Petaluma Marsh and Wildlife area are approximately 1 ½ miles southeast of the site. Areas once used for hayfields throughout much of the valley floor have become developed with residential uses. The area west of Highway 101 generally remains rural in character; with low, rolling hills, fragmented parcels, and dairy farms. Existing uses to the north of the site and west of the River are primarily industrial.

For narrative purposes, the project site has been divided into four areas; A, B, C, and D, as described in detail in Section III. Project Description (Figure III-2 shows the Aerial Photograph). The entire site is approximately 38 acres.

The site has been extensively altered by past development and disturbance, and existing vegetative cover is dominated by non-native species typical of ruderal (weedy) conditions, seasonal wetlands, and limited coastal brackish marsh. The site is currently vacant, but previous uses include a dairy ranch; disposal of quarry wash water in a system of now abandoned settling ponds; and limited residential. All structures were removed over the past few years including the 1860 era home and farm buildings previously located in the northern portion of the site. The remaining trees on the site consist of a grove of primarily blue gum (*Eucalyptus globulus*) in the northern portion of Area B, two trees in the central portion of Area C, and a few trees along the western edge of Areas C and D. Nine seasonal wetlands are located in Areas C and D.

Views of the Project Site

The following discussion is based on an assessment of site visibility. The photos presented in this discussion include views from vantage points in areas surrounding the project site in which the site is visible. This grouping of photos is intended to show representative views toward the site from the surrounding areas.

Views of the project site are available from a variety of surrounding locations, including short-range, medium-range, and long-range views from the roadways and other land uses in proximity to the site. Portions of the project site are intermittently visible in long-range views from some vantage points in key areas; such as from Shollenberger Park and along portions of Highway 101.[1] Views of the site were photographed, and the location of the vantage points are shown in Figure V.A-1. The existing conditions photos are shown in Figures V.A-2 through V.A-8. A description of the existing views as seen in these photos is provided below.

Figure V.A-2 (Existing View A) is a medium-range view of the site toward the north (looking toward Area C) as seen from northbound Highway 101 just south of the Petaluma Boulevard South freeway exit. The edge of Highway 101 including the guardrail and freeway lighting are prominent in the foreground. A large tree, a billboard, and additional power lines are visible in the middle ground in the central portion of the view. Also in the middle ground through some medium-sized trees, development beyond the Petaluma River near Lakeville Highway is intermittently visible. Moving north along Petaluma Boulevard South, the small hill with its eucalyptus trees present on Area B is visible. The Sonoma Mountain Range is visible in the background (northeast portion) of this photo, however, from this viewpoint, the view of the hills is partly obscured by the large tree and billboard in the foreground. The large expanses of sky in this viewpoint are broken up by the tree and power lines.

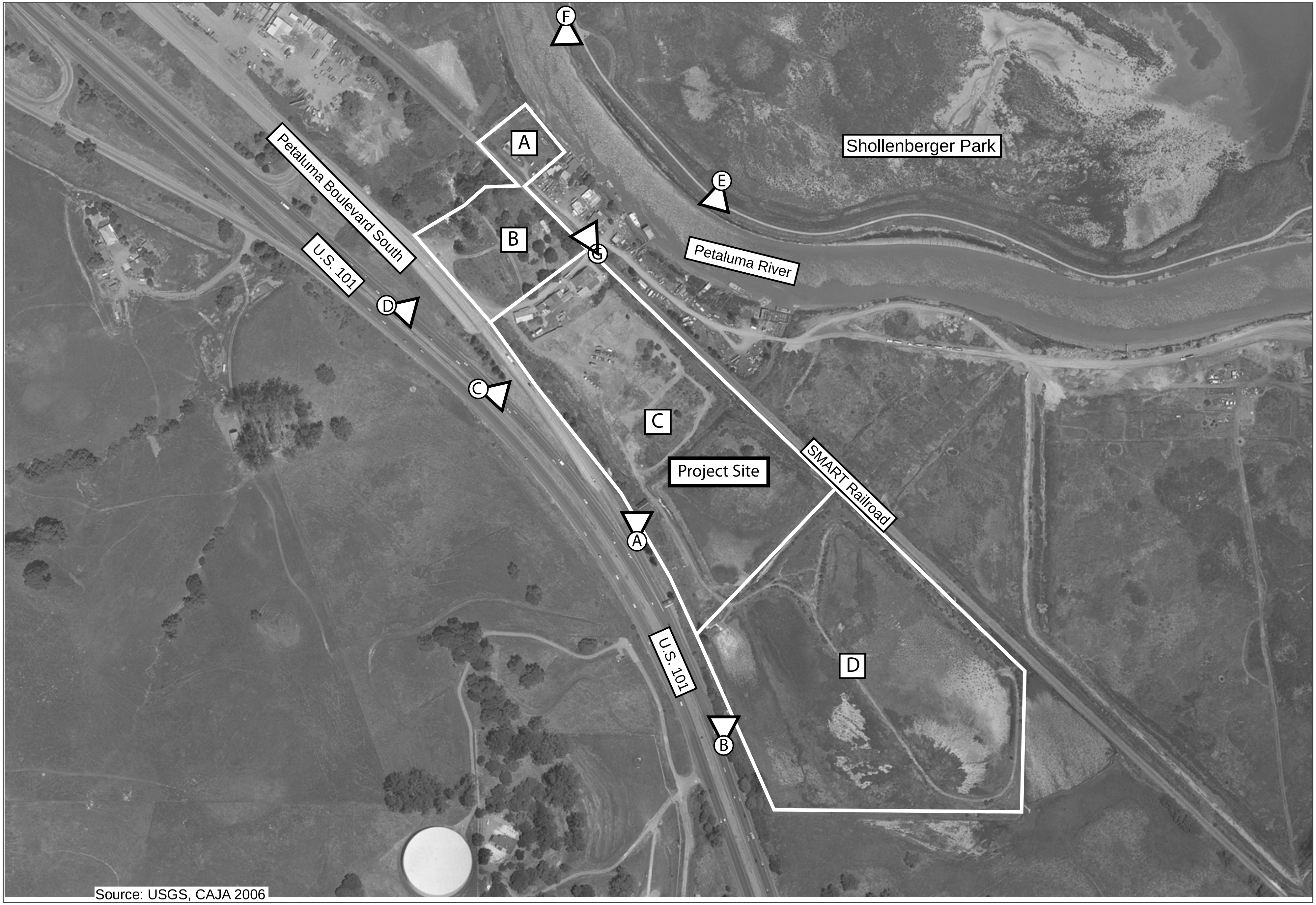
Figure V.A-3 (Existing View B) is a medium- to long-range view of the project site toward the north (looking toward Area D in the foreground and Area C in the middle ground, and Area B in the background). Highway 101 and the vegetation along the eastern side of the freeway are prominent in the foreground. The middle ground of this photo features Highway 101 extending north and curving slightly west. The vegetation that currently exists on the project site, mostly within Area C, is also visible in the middle ground of this viewpoint. Moving to the background, the small hill within Area B is visible. In the background of this photo, the Sonoma Mountain Range is visible in the northeast as well as large expanses of sky. The northwest background view from this point consists of Highway 101, which begins to increase slightly in elevation in this area.

Figure V.A-4 (Existing View C) is a medium-range view of the project site toward the southeast (looking toward Area C) as seen from a southbound lane of Highway 101. Highway 101 dominates the foreground. The middle ground of this photo features northbound Highway 101; the vegetation along the side of the

[1] *Additional, long-range views of the site are available from some elevated vantage points from the hills west of Highway 101 but are not included in this discussion..*

highway, including two large trees located on the project site; and power lines running parallel to the highway. Because of the relatively flat topography of the project site, this viewpoint provides a clear, relatively unobstructed view of the Sonoma Mountain Range in the background.

Figure V.A-5 (Existing View D), is a short-range view of the project site toward the southeast (looking toward Area C). Highway 101 and the small hill separating Highway 101 from the Petaluma Boulevard South off-ramp dominate the foreground. The hill between the highway and Petaluma Boulevard South block direct views of the project site. Looking further south down Highway 101, to the middle ground, the trees on the edge of the project site (Area C) and the City of Petaluma gateway sign are visible. The background of this photo consists of power lines that run parallel to the freeway and large expanses of sky.



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Environmental Planning and Research

Figure V.A-1
Photo-Simulation Location Map

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-2
Existing View A

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-3
Existing View B

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-4
Existing View C

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-5
Existing View D

Figure V.A-6 (Existing View E) is a medium-range view of the project site from Shollenberger Park looking to the west. The Petaluma River is the prominent feature in the foreground and extends into the middle ground of this photo. A boat and houseboat that are currently along the western bank of the River are visible in the middle ground. Beyond the River, looking further toward the middle of the photo, a variety of storage items, equipment and two boats are visible. Beyond this area the gravel access road is visible as well as several on-site trees and vegetation. The background of this view is dominated by the hills west of Highway 101, including a water tank access road on the left side of the view, grazing cattle and trees in the center portion of the view, and the Petaluma Golf and Country Club at the upper right portion of the view. Because Highway 101 is not visible from this vantage point, the hills appear as an unbroken extension of the landscape. Large unbroken expanses of sky make up much of the background.

Figure V.A-7 (Existing View F) is a medium- to long-range view of Areas A and B looking northwest from Shollenberger Park. The walking path in the park is adjacent to the Petaluma River, which is a prominent feature in the foreground. Both the walking path and the River extend into the middle ground of this photograph. From this viewpoint, the bend in the River is visible and structures including riverfront residences and storage areas are visible intermittently. The background of this viewpoint includes the hills and trees across Highway 101 which appear as an unbroken extension of the landscape, as the highway is not visible. During the daytime hours, the hills visible from this viewpoint are sometimes spotted with cows. From this viewpoint, a single-family home is partially visible amongst the trees on the hills, although the hills remain rural in character. Large expanses of unbroken sky are visible in the background of this viewpoint as well as a relatively unobstructed view of Burdell Mountain.

Figure V.A-8 (Existing View G) is a short- to medium-range view of small portions of Areas A and B looking northwest from the railroad crossing located between Areas B and C. In the foreground, the grassy slope of Area B and a metal post are visible, as well as the SMART railroad tracks. The middle ground of this viewpoint is characterized by the extension of the SMART railroad tracks as well a variety of storage items situated off the site, including but not limited to automobiles, equipment, a trailer, and large storage containers. A very small portion of Area A is visible in the middle ground. The background of this photo is characterized by Shamrock's aggregate stockpiles and equipment just beyond Area A, as well as power lines and a large unbroken expanses of the sky.

Scenic Vistas and Scenic Resources

The Open Space Element of the County of Sonoma General Plan includes three open space categories, community separators, scenic landscape units, and scenic highway corridors. The proposed project is not located within the Petaluma/Novato community separator, since areas designated as commercial are excluded from designation as an official community separator. Nor is the site located within a designated Scenic Landscape Unit (SLU) (defined as a landscape of special scenic importance in Sonoma County which provides important visual relief from urban densities).[2] The site is located in the vicinity of the community separator and has views of the Sonoma Mountain range and the Petaluma Hills, both designated SLUs. The vacant site currently contributes to distinguishing Petaluma as a separate, identifiable community from development to the south.

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2 *Sonoma County Permit & Resource Management Department Glossary website: http://www.sonoma-county.org/prmd/docs/gp/98gp-12.htm*

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Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-6
Existing View E

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-7
Existing View F

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-8
Existing View G

The area within 200 feet from the centerline of Highway 101 is designated as Sonoma County Scenic Corridor, which partially includes the western border of the project site. The General Plan designates Scenic Corridors (a strip of land of high visual quality along certain roadways) to preserve views of the landscapes that are important to the character of the County. Applicable policies related to Scenic Corridors are discussed in Section V.H (Land Use).

Visual Character

The visual character of the project site can generally be defined as rural, vacant land. The primary defining feature is open space with grasslands, light brush, and shrub vegetation present throughout the majority of the site. Some areas, such as the small hill within Area B with several mature eucalyptus trees, contain larger, more prominent clusters of vegetation. With the exception of the small hill in Area B, the topography of the site is relatively flat, with a small slope in elevation towards Area D. The overall character of the Areas within the project site does not vary greatly. There are minor variations in the natural landscape such as gravel roads or the seasonal presence of wetlands and coastal brackish marsh in Areas C and D. There are abandoned settling ponds separated by levees and drainage ditches in Area D and a few ephemeral channels and ditches that traverse the site. These natural features contribute to the rural character of the project area.

Surrounding land uses vary. There is a flat, vacant parcel immediately adjacent to the site to the north, which has been graded and now consists of weedy vegetation. Further to the north along Landing Way are various industrial uses. To the west of the site is a mixture of residential uses, including houseboats docked along the west bank of the River. To the east of Area B and immediately south of Area A, the parcel landowner is storing a large amount of various materials, including old cars and boats, and surplus Armed Forces vehicles. Vacant agricultural lands dominate areas to the southeast, with a few residential uses to the west across Highway 101. The railroad tracks that run along the eastern portion of the project site and bisect Areas A and B are barely visible in the summer vegetation. All parcels in the area west of Highway 101 in the immediate vicinity of the site have a Scenic Resource overlay for zoning. This is discussed further in Section V.H. (Land Use).

The Petaluma River is located east of the site, and on the River's eastern shore, directly across from the project site, is Shollenberger Park, a 165-acre wetland and sensitive habitat area. A trail for the park is adjacent to the river across from the proposed project, with a viewing platform directly across from Area A. A tidal marsh runs along both sides of the River to the south of Shollenberger, overlapping with the Petaluma Marsh and Wildlife area approximately 1½ miles southeast of the site.

Existing uses on Landing Way north of the site are primarily industrial. Two parcels north and adjacent to the site on the Petaluma River are occupied by Shamrock Materials, Inc., a facility that provides aggregate storage and distribution (primarily sand and gravel) to the construction trade. As mentioned above, the closest parcel to the north of the site is vacant with the exception of use for occasional storage. Additionally, Shamrock Materials has a barge-off-loading facility on the west bank of the Petaluma River, and is the only highly visible industrial use along this portion of the River. Other industrial uses northwest of the project site along Petaluma Boulevard South include a truck terminal and Novato Disposal.

The two homes adjacent to the east of the site along the River are classified as legal, non-conforming uses by the County of Sonoma. These residences existed before the zoning designations for that area became Limited Commercial (LC) and/or Limited Rural Industrial (M3). The presence of these off-site residential uses and the associated storage structures and vehicles prevent the area from appearing completely undeveloped. However, because the adjacent uses are small in scale, they do not significantly detract from the visual nature of the area as largely rural. The open space across the River at Shollenberger Park to the east, the agricultural uses to the south, and the largely undeveloped hills to the west all contribute to an overall impression of a rural area.

Light and Glare

Glare impacts tends to occur when a person's eyes have difficulty in adjusting to bright lights with a darker background. Glare can occur from a direct light source, such as oncoming headlights in the night; or indirectly from reflected light sources, such as light shining off water or buildings, depending on the angle of the sun. There are currently no sources of light and glare on the project site, as it is undeveloped. There are no areas of substantial development to the south of the project site. The residential uses located adjacent to the project site do not generate a substantial source of light and glare. The existing development to the north of the site (the Shamrock facility and land uses along Petaluma Boulevard South) also do not contribute substantially to light and glare sources on the site. Shollenberger park to the east is open during daylight hours only, and does not provide lighting along the paths. Headlights or windshields of vehicles and streetlights along Highway 101 and Petaluma Boulevard South are the primary sources of light and glare. The Petaluma River is also a source of daytime glare depending on weather conditions and time of day. Compared to light and glare conditions in a more developed area, the sources are minimal at the project site and during the nighttime hours, the site is characterized by a dark sky.

REGULATORY SETTING

Federal and State

Currently no Federal and State policies and/or mandates related to Aesthetics exist. Therefore, in addition to the thresholds of significance outlined in Appendix G of the *CEQA Guidelines*, the local policies and guidelines associated with view preservation and open space as defined by Sonoma County are utilized for this analysis.

Local

As previously mentioned, the Open Space Element of the County of Sonoma General Plan includes three open space categories: community separators, scenic landscape units, and scenic highway corridors. The applicable policies contained in the Scenic Resources section of the County's Open Space Element are analyzed in the Sonoma County General Plan Policy Analysis , in Section V.H (Land Use), Table V.H-2.

The site is within the Petaluma Dairy Belt Area Plan, which has several policies related to scenic resources applicable to aesthetics:

1. Protect the visual quality of unique scenic resources.
2. Protect and maintain scenic areas essential for defining community separation and community form.
3. Protect visually vulnerable landscapes, such as ridgelines.
4. Maintain scenic resources as an attraction for tourism and recreation.
5. Review new developments to minimize their impact on scenic quality.

These Area Plan policies are analyzed in further detail in Section V.H (Land Use), Table V.H-3.

The project site also has Combining District Zoning Designations that address aesthetic impacts. Portions of the site have a Scenic Design overlay, which provides for the preservation of the scenic beauty in the county; and a Scenic Resources overlay, which is designed to preserve the visual character of the area and to implement provisions of the Open Space Element of the General Plan. These designations are discussed in further detail in Section V.H (Land Use).

The County's Permit and Resource Management Department provides procedures for the assessment of visual impacts in their *Visual Assessment Guidelines.* While the analysis of visual impacts involves qualitative judgements, the *Visual Assessment Guidelines* intends to define a methodology that utilizes to the extent practicable, objective standards that can be described and utilized in a consistent manner.

Visual Assessment Guidelines

The *Visual Assessment Guidelines* provide direction for characterizing the site's sensitivity. The site may either have a low, moderate, high, or maximum level of sensitivity. According to the *Visual Assessment Guidelines*, the project site would be considered to have high sensitivity, as portions contain Scenic Resource and Scenic Design zoning. The project site is additionally characterized by a natural setting, acting as a scenic backdrop from Highway 101 looking toward Shollenberger Park, and a scenic foreground for views from the Park, as visitors look over the Petaluma River west toward the Petaluma Hills.

The *Visual Assessment Guidelines* also require determining the visual dominance of a project, by comparing and contrasting the characteristics of the proposed project with its surroundings. The project could be classified as dominant, co-dominant, subordinate, or inevident in comparison with its surroundings. According to the *Visual Assessment Guidelines*, the proposed project would be classified as visually dominant; the elements of the project would stand out and attract attention away from the surrounding natural landscape. Although significant industrial uses exist north of the project sit, there are no other industrial uses immediately south, east, or west of the site, and the surrounding parcels are vacant or consist of rural or agricultural uses.

In determining significance of a visual impact, the *Visual Assessment Guidelines* evaluates the level of visual sensitivity, and visual dominance, and compares them using the following Table V.A-1.

Table V.A-1
Thresholds of Significance for Visual Impact Analysis

Sensitivity	**Visual Dominance**			
	Dominant	**Co-Dominant**	**Subordinate**	**Inevident**
Maximum	Significant	Significant	Significant	Less than significant
High	Significant	Significant	Less than significant	Less than significant
Moderate	Significant	Less than significant	Less than significant	Less than significant
Low	Less than significant	Less than significant	Less than significant	Less than significant
Source: Sonoma County PRMD Visual Assessment Guidelines				

ENVIRONMENTAL IMPACTS

Thresholds of Significance

Based on the CEQA Standards of Significance, the project would generally be considered to have a significant impact on the environment if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway;
- Significantly degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Aesthetics Issues Not Analyzed Further

As discussed in the Initial Study, the project site is not within a state-designated scenic highway. Thus, the proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. No further analysis of this issue is required.

Proposed Project

As described in detail in Section III (Project Description), Area A would include a barge off-loading facility to provide materials for asphalt production and construction aggregate. Area B would include a small office complex, consisting of a reception and weighmaster area, an operations office, and a conference room. Area B would also include facilities for use by the San Antonio Volunteer Fire Department for drills and equipment storage which would be approximately 2,500 to 3,000 square feet.

Area C would include a six product cold feed bin assembly, a counter flow drum mix assembly, two oil storage tanks, a bag house, two silo towers, heating oil plant, and an area for stockpiling aggregate and recyclable asphalt and concrete for use in asphalt production.

Area D would be preserved and restored as 19 acres of open space and wetlands/brackish marsh that was the original site condition prior to the diking of the land for siltation ponds. Historic hydrologic conditions would be restored by reintroducing tidal circulation to the area.

The asphalt batch plant would be a maximum of 60 feet in height and the conical piles of aggregate materials would be up to 40 feet in height. The batch plant would include a tower approximately 10 feet in diameter for the vertical loading of trucks, conveyance systems to the tower and mixing and loading machinery at its base. In addition, an above-grade, enclosed conveyor system would be utilized from the barge dock to the storage piles at Area C that would be 20 to 24 feet above grade.

Barge off-loading would be tide dependent and would generally occur at high tide during normal operating hours. The barge off-loading equipment would include a conveyor/hopper, which would be lowered down onto a loaded barge. A front-end loader located on the barge would place material into the hopper for transport onto land. The conveyor/hopper would transport the material a relatively short distance (approximately 40 feet) before depositing the material onto a longer, enclosed conveyor (approximately 200 feet) that would rise from the barge off-loading facility to a height of 24 feet before crossing over the railroad tracks. This height is sufficient to allow standard-height freight and passenger trains to pass underneath the conveyor. After crossing the railroad tracks, the material would be deposited on another conveyor that would transport the material approximately 700 feet to the southeast, roughly parallel to the railroad tracks. At the end of this conveyor, a telescoping radial stacking conveyor would stockpile the material.

It is possible that the County could approve the project several months before the applicant obtains permits and approvals from the San Francisco Bay Conservation and Development Commission (BCDC) and the Sonoma Marin Area Rail Transit (SMART) necessary to construct the barge off-loading facility and the conveyor proposed to span over the railroad tracks. If there is a delay in obtaining permits and approvals from BCDC and SMART, the project could operate in a "start-up" mode at less than full capacity. Specifically, the barge off-loading facility at Area A and the conveyor over the railroad tracks would not be in place during the start-up phase, and thus all material importation would be accomplished by trucks to Area B.

The proposed project includes an on-site landscape plan that would vegetate the Highway 101 frontage with large and medium size shrubs, large and medium sized native trees, and a vegetated swale. Proposed tree types include Coast Redwood, Atlas Cedar, Norway Spruce, and Colorado Blue Spruce. Additionally, road and landscape improvements along the east side of Petaluma Boulevard South would be designed and constructed in accordance with the South Petaluma Gateway Project Plan. Figure III-25 shows the Preliminary Landscape Plan.

Project Impacts

Impact AES-1 Implementation of the Proposed Project Would Have a Substantial Adverse Effect on a Scenic Vista

Highway 101 acts as a scenic vista toward Sonoma Mountain to the east, which can be seen from and through the project site. In addition, the western border of the project site is within 200 feet of the centerline of Highway 101, which has been designated as a Scenic Corridor. As a result, no structures shall be sited within this area. However, the introduction of proposed facilities as well as the landscaping designed to screen the project site would change the character of the corridor by blocking some views in this area. As previously mentioned, the entire area surrounding the project site west of Highway 101is designated with a Scenic Resource zoning overlay. Application of the *Visual Assessment Guidelines* indicates that development of the project site would result in visual dominance of the area, which in combination with the high sensitivity assessment, would result in a ***significant*** impact to visual resources.

Simulated views of the project as it would appear after construction are included in Figures V.A-9 through V.A-18. Post-project conditions would be highly visible from nearby land uses and Highway 101. Some of the existing natural features, such as the wetland open space portion of the project site (Area D) would remain; however, approximately half of the currently undeveloped areas of the project site would be replaced with the asphalt plant and associated facilities, as well as large stockpiles of aggregate materials.

The project's impacts to views would be more prominent during and immediately after construction; whereas in five or ten years, the proposed landscaping would have time to mature and provide some screening of the facilities. For the purposes of this analysis, two scenarios are considered: with and without landscaping. Figures V.A-9 through V.A-16 show the views with and without proposed landscaping.

Figure V.A-17 (View F with Project) provides a post-project simulation across the Petaluma River from Shollenberger Park. Lastly, Figure V.A-18 (View G with Project and SMART Train) simulates the post-project conditions for View G which includes the proposed conveyor over the SMART Railroad tracks.

Source: CSW-Stuber/Stroeh, 2006.

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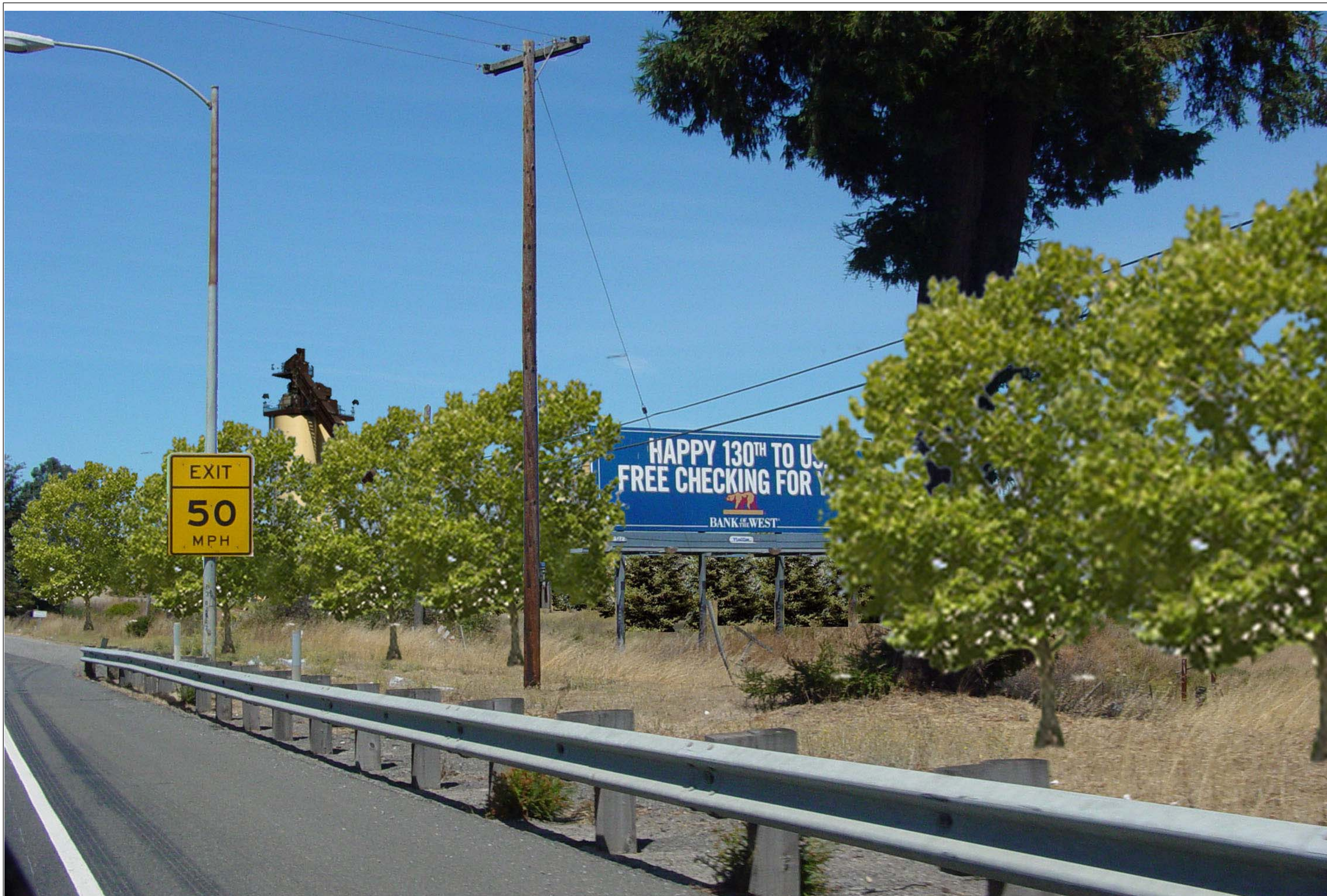
Figure V.A-9
View A with Project



Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-10
View A Project with Landscaping

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-11
View B with Project

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-12
View B Project with Landscaping

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-13
View C with Project

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-14
View C Project with Landscaping

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-15
View E with Project

Source: CSW-Stuber/Stroeh, 2007.

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Figure V.A-16
View E with Project and Landscaping

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-17
View F with Project

Source: CSW-Stuber/Stroeh, 2006.

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Figure V.A-18
View G with Project and SMART Train

Views A through D show the project site from Highway 101, as well as the surrounding rural landscapes. North from the project site and Haystack Landing area, development intensity increases towards the City of Petaluma. However, the project site is more rural in character. The proposed project would be visible from all viewpoints, even with the installation of landscaping, although the landscaping would screen a considerable amount of the project from Highway 101 once it matures.

As seen in Figure V.A-9 (View A with Project), post-project conditions would be visible from Highway 101, and from the hilltops located west of the highway which have residential uses. From this viewpoint, the Sonoma Mountain Range is visible although the view is broken up by the asphalt plant, stockpiles, the existing redwood tree at the edge of the project site, the existing billboard, and the powerlines. Although from this view the proposed project would not completely block the hills, it would nonetheless change the character of this view from rural in nature to industrial. Introduction of the proposed project would dominate the foreground of this view. Introduction of landscaping would not fully mitigate impacts, as shown in Figure V.A-10 (View A Project with Landscaping). In fact, introduction of the landscaping would block portions of the nearby hills that would still be visible with the project alone. Furthermore, the landscaping associated with the proposed project would change the character of Highway 101 views by developing an area visible in this scenic vista. As a result, the visual impacts related to View A would be ***potentially significant***.

Figure V.A-11 (View B with Project) provides a long-range view marked by open space, with the proposed project visible from Highway 101. Currently the mature trees partially block the view of the Sonoma Mountain Range. However, under post-project conditions, the silos of the asphalt plant would further break up these views, thereby substantially altering the character of this vista. Proposed landscaping shown in Figure V.A-12 (View B Project with Landscaping) would minimize impacts to this view by hiding the bulk of the asphalt plant. However, depending on the tree species to be used for landscape screening, it is possible that landscaping would not grow taller than the project, even at its most mature state. In relationship to the *Visual Assessment Guidelines*, the view of the project site from the highway would be co-dominant with the view of the billboard and lighted highway exit sign for Petaluma Boulevard South, which in combination with the high site sensitivity characteristics would constitute a ***significant*** impact relative to View B.

As seen in Figure V.A-13 (View C with Project), implementation of the project would introduce large-scale industrial development on a site characterized by rural land use and expanses of open space (although several industrial uses exist north of the project site, most of which are screened from Highway 101 views due to the small hill situated between the highway and Petaluma Boulevard South). The project would be visible from Highway 101 as well as from residential uses on the hills west of Highway 101. From this viewpoint, the Sonoma Mountain Range is much lower in elevation than from the views discussed above. However, compared to the other views from Highway 101, this view offers the largest expanses of open space and is most representative of the area's rural character. The proposed project would substantially alter this view and would almost entirely block the hills to the east. As shown in Figure V.A-14 (View C Project with Landscaping), the proposed landscaping would be most effective from this view compared to the others from Highway 101 as it would mask most of the mass and bulk of the project. However, as discussed above, the introduction of landscaping would change the character of Highway 101 in this area by giving it a closed-in feel, rather than the open space that currently exists, and would further obstruct views of the hills to the east. Scenic vista impacts relative to View C would be ***potentially significant***.

Figure V.A-5 (View D) shows a small hill separating Highway 101 from the Petaluma Boulevard South off-ramp. This hill obstructs any views of a potential scenic vista; therefore, impacts would be ***less than significant***.

Figures V.A-6 and V.A-7 (Views E and F), show existing views from the opposite shore of the Petaluma River at Shollenberger Park, which are relatively unobstructed. Although the existing residential structures are visible, the most dominant feature is approximately 20 feet in height. As shown in Figure V.A-15 (View E with Project), the proposed project would be visible from Shollenberger Park and would substantially alter and partially obstruct the view of the hills. Although not seen in this picture, there is a recently constructed viewing platform at Shollenberger directly across from Area A, and situated along the riverfront.

Due to the topography of the site, Highway 101 is not visible from this viewpoint; therefore the highway does not present a barrier between the River and the hills. Because the proposed conveyor system extends northeast out of the simulation, post-project views from this location give the impression that development extends beyond the viewpoint. Figure V.A-16 (View E with Project and Landscaping) shows the same view of the proposed project with trees for screening. In relationship to the *Visual Assessment Guidelines*, the visual dominance of the project combined with the high sensitivity characteristics of the area would result in a ***significant*** impact relative to View E.

As seen in Figure V.A-17 (View F with Project), the proposed project would be visible from Shollenberger Park from the path near the Petaluma River. The silos would be the most visible feature from this viewpoint and would partially obstruct the view of Burdell Mountain. Although not substantial in mass or bulk, the conveyor extends through almost two-thirds of this photograph. The barge off-loading facility along the River's bank is visible from this view and alters the foreground of this vista. The visual dominance of the project combined with the high sensitivity characteristics of the area would result in a ***significant*** impact relative to View F.

Figure V.A-18 (View G with Project and SMART Train) illustrates the proposed conveyor over the SMART railroad tracks and gives an example of views of the project from the residential properties along the River. The project would not block views of a scenic vista in this area; therefore, impacts would be ***less than significan***t.

In general, implementation of the proposed project would affect scenic vistas in the project area. Landscaping would reduce impacts in some cases, but overall, some landscaping would further obstruct views of nearby scenic resources even though it would block views of the proposed project. Therefore, impacts to scenic vistas would be ***potentially significant***.

While the western border of the project site is within 200 feet of the centerline of Highway 101, which has been designated as a Scenic Corridor, no structures are proposed within this area. Therefore, impacts related to the Scenic Corridor would be ***less than significant***.

Start-up Phase

During the start-up phase of the proposed project the barge off-loading facility and the conveyor over the railroad tracks would not be in place. Trucks would be used instead of barges to transfer all materials to the project site during this phase. As a result, impacts to scenic vistas would be reduced compared to impacts associated with full build out of the project. However, the overall significance of impacts to scenic vistas associated with the start-up phase would not change from that described above for Impact AES-1.

Mitigation Measure AES-1

The following mitigation measures would reduce but not completely eliminate the project's potentially significant impact to scenic vistas:

- The proposed landscape plan shall be revised to include more landscape screening throughout the project site to further screen the proposed project from off-site views. The additional landscaping shall be provided: a) along the northern, western and southern edges of Area A; b) along the northern, eastern and southern edges of Area B; c) clustered Redwood trees and landscape planters around the asphalt plant equipment; and d) along the eastern side of Area C along the railroad tracks. The landscape plan shall also be revised to incorporate a 10-foot high, 30-foot wide irrigated landscaped berm along the portion of the site that fronts Highway 101 and Petaluma Boulevard South, specifically south of the Caltrans right-of-way line and east of the public right-of-way that extends into the project site. The portions of the site plan affected by the 30-foot wide landscape buffer (i.e., stockpiles, access road, etc) shall be reconfigured to accommodate the landscaped buffer. Finally, the revised landscape plan shall incorporate trees with the proposed ground cover within Area C to further screen the proposed project from off-site views.
- Landscaping improvements along the east side of Petaluma Boulevard South shall conform with the South Petaluma Gateway Project Plan landscaping requirements.
- Existing trees in the area between the project site and Highway 101 shall be preserved to the extent possible.
- The screen plantings shall borrow from naturally established form, line, color and texture so that the visual characteristics are compatible with their surroundings.
- Colors used for exterior building surfaces shall match the hue, lightness, and saturation of colors of the immediately surrounding trees and vegetation. Several colors matching those of the surrounding trees and vegetation shall be used in order to minimize uniformity.
- Area A and Area D shall not be used to store equipment, tools, aggregate, etc.
- No junk, debris, non-operative vehicles or equipment unrelated to the proposed project operations shall be stored on Areas B, C and D, unless visually screened from off-site views.
- Prior to building permit issuance, the grading plan, development plan, landscaping plan, sign plan, elevations, and colors and materials shall be subject to review and approval by the Sonoma County Design Review Committee.

While the additional landscaping would further screen the proposed project's various facilities, it would also increase impacts relative to the obstruction of scenic vistas. Additional landscaping along the eastern edge of Area B and Area C could also increase shadows in the vicinity of the homes situated along the River.

Impact AES-2 Implementation of the Proposed Project Would Result in Potentially Significant Impact to the Visual Character of the Project Site and Surroundings

Although the visual character of the site varies slightly, the entire site is currently vacant. The primary character-defining feature of the site is its open space, rural character and adjacency to the Petaluma River. As discussed, Area D would be retained as wetlands and, as such, would remain consistent with the existing visual character of the site. However, implementation of the proposed project would result in the development of an asphalt plant and recycling facility, several new buildings, storage of aggregate, and a conveyer system traversing much of the project site. The introduction of industrial land uses to the project site would alter the character of the site as an area of open space in a rural setting, although Area A is zoned M2. As such, the proposed project would substantially degrade the existing visual character of the site. As shown in Figures V.A-9 through V.A-18, the project would be visible from nearby land uses and Highway 101. In many cases, the proposed project would dominate the landscape.

Development is present in the vicinity of the project site, particularly to the north and east, but primarily at low intensities. As previously discussed, Shollenberger Park is across the Petaluma River and is marked by a walking path used by park visitors to enjoy river views and views of nearby scenic resources. Currently, views from Shollenberger Park are of the rural landscape. Implementation of the proposed project would substantially change the view as seen from the Park looking toward the River, thereby changing the experience of visitors to the park. Also, large stockpiles of raw material visible in Figure V.A-16 (View E with Project) increase the overall visual effect of the project.

Existing land uses northwest of the site consist predominantly of industrial uses situated between Petaluma Boulevard South and the Petaluma River. Such industrial uses include a recycling facility, truck terminal, and the Shamrock Materials facility which includes a large white crane, aggregate stockpiles, and barge off-loading facilities. Views of theses industrial uses from Highway 101 are partially obstructed by the small hill situated between Highway 101 and Petaluma Boulevard South. Although these land uses are present in the general vicinity of the project site, areas to the east, west and south are still characterized by large areas of open space, rural and agricultural land uses. The proposed project would dominate the views in the area, standing out against the setting and attracting attention away from the surrounding landscape. Due to the project's scale many other visual characteristics of the area would be diminished.

Overall, the proposed development on Areas A, B, and C would change the visual character of the parcel from that of a rural and agricultural nature to that of an industrial development. Because all of the primary character-defining features of the site would be substantially altered, project impacts related to the visual character of the site and surroundings (to the south, east and west) would be ***potentially significant***.

Start-up Phase

As described above, the barge off-loading facility and conveyor over the railroad tracks would not be in place during the start-up phase of the project. Project impacts related to the visual character of the site and surroundings would be reduced during the start-up phase compared to impacts associated with full build out of the project. However, the overall significance of impacts to the visual character of the site and surroundings associated with the start-up phase would not change from that described above for Impact AES-2.

Mitigation Measure AES-2

Implementation of Mitigation Measure AES-1 would reduce but not completely eliminate potentially significant visual character impacts associated with the proposed project.

Impact AES-3 Implementation of the Proposed Project Would Create a New Source of Substantial Light and Glare Which Would Adversely Affect Day or Night-time Views in the Area

As previously discussed, normal hours of operation would be 6 AM to 6 PM Monday through Friday with night-time and weekend operations when needed. During nighttime hours, the project site is dark, with existing sources of light intermittently visible on the hills west of Highway 101 and along the River coming from the residential uses. Other existing sources of light are lights along Highway 101 and Petaluma Boulevard South. The glow from the City of Petaluma does not affect the project site. Even before construction of the barge off-loading facility and conveyor system, the introduction of light and glare from the proposed project would be noticeable to viewers in the surrounding area, particularly by residents on the west side of Highway 101, residents adjacent to the project site, people driving along Highway 101 and Petaluma Boulevard South, and to a lesser extent, boats in the River and visitors at Shollenberger Park, which closes at sunset.

Section III (Project Description) states that the proposed project lighting would follow Sonoma County's guidelines for industrially zoned areas with no lighting directed toward residential areas, the park or open space areas across the River. An exterior lighting plan would be provided showing all potential light sources with the types of lighting and their locations. Typical lighting would include low mounted, downward casting and shielded lights that do not cause spillover onto adjacent properties, and the utilization of motion detection systems where applicable. No flood lights would be utilized. Lighting would be limited to the areas that would be in operation during night-time hours with all recycling operations and general aggregate sales limited to between 6 AM to 6 PM. Also, all buildings and structures would consist of non-reflecting material or be painted with non-reflective paint.

However, because a lighting plan has yet to be submitted, the light and glare from the proposed project could adversely affect night-time views in the area. This is considered a ***potentially significant*** impact.

Start-up Phase

Project impacts related to light and glare would be reduced during the start-up phase due to the lack of a barge off-loading facility and conveyor over the railroad tracks. However, the overall significance of light and glare impacts associated with the start-up phase would not change from that described above for Impact AES-3.

Mitigation Measure AES-3

Prior to issuance of the Building permit, an exterior lighting plan shall be submitted for review and approval by PRMD Project Review staff and Design Review Committee. The lighting plan shall include but not necessarily be limited to the following:

- Proposed project lighting shall follow Sonoma County's guidelines for industrially zoned areas with no lighting directed toward residential areas, the egret/heron colony on Area B, Shollenberger Park, or open space areas across the River.
- The exterior lighting plan shall show all potential light sources with the types of lighting and their locations.
- Typical lighting shall include low mounted, downward casting and shielded lights that do not cause spillover onto adjacent properties, and the utilization of motion detection systems where applicable.
- No flood lights shall be utilized.
- Lighting shall not "wash out" structures or any portions of the site.
- Lighting shall be limited to the areas that would be in operation during nighttime hours with all recycling operations and general aggregate sales limited to between 6 AM to 6 PM.
- Low intensity, indirect light sources shall be encouraged.
- On-demand lighting systems shall be encouraged.
- Mercury, sodium vapor, and similar intense and bright lights shall not be permitted except where their need is specifically approved and their source of light is restricted.
- All light sources shall be fully shielded from off-site view.
- All buildings and structures shall consist of non-reflecting material or be painted with non-reflective paint.
- Generally, light fixtures shall not be located at the periphery of the property and should shut off automatically when the use is not operating. Security lighting visible from the highway shall be motion-sensor activated.
- All lighting shall be installed in accordance with building codes and the approved lighting plan during construction.
- Additionally, Section V.C (Biological Resources) *Mitigation Measure BIO-4c - Sensitive Nesting Habitat* shall be followed, which provides restrictions to project operations associated with off-loading the barge, running the conveyor, and illumination during the nesting season (February 15 through August 31).

Implementation of Mitigation Measure AES-3 would reduce the impacts associated with light and glare from the proposed project to a less-than-significant level.

CUMULATIVE IMPACTS

A few of the related projects listed in Section III.B are located within the project vicinity, including Novato Disposal and Royal Petroleum along Petaluma Boulevard South, Shamrock Materials near the Petaluma River, and the Sonoma-Marin Rail Transit project, which could use the railroad tracks that bisect the project site. Sonoma County is also implementing some improvements along Petaluma Boulevard South near the project site. In addition, the Novato Narrows, Highway 101 Widening project would be located in close proximity to the project site. The remaining related projects are not necessarily close enough to be seen within the same viewshed as the proposed project. The Novato Disposal, Royal Petroleum and SMART projects are not anticipated to change the character of these sites to the extent that they would contribute substantially to cumulative aesthetic impacts.

However, the Novato Narrows, Highway 101 Widening project would entail construction of an interchange on Highway 101 and would require the use of right-of-way that extends into the western portion of the project site. The Highway 101 Widening project would also include a new overpass (and associated lighting) that would touch down near or on the proposed project site. While this related project would result in the removal of the billboard sign just west of the site, it would also require the removal of existing trees and the project's proposed landscaping north of the Caltrans right-of-way line. The first landscaping requirement listed above in Mitigation Measure AES-1 was also structured so that this related project would not result in the loss of the 30-foot wide landscape berm required to be installed south of the Caltrans right-of-way line and east of the public right-of-way that extends into the project site. Because the project area is generally rural in nature, it is anticipated that future projects visible from and towards the project site would result in significant aesthetic impacts related to scenic vistas and visual character, and that this project would make a considerable contribution to those impacts. Therefore, cumulative impacts related to aesthetics would be ***significant***. Due to the magnitude of the Highway 101 interchange project, cumulative light and glare impacts are considered to be ***significant***, but the project's contribution to this potentially significant impact is not considered cumulatively considerable.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project impacts relative to scenic vistas and visual character would be ***significant and unavoidable***. Project light and glare impacts would be ***less than significant***.

V. ENVIRONMENTAL IMPACT ANALYSIS
B. AIR QUALITY

INTRODUCTION

This section describes existing air quality conditions in the region and potential project impacts to local and regional air quality. Mitigation measures to reduce or eliminate potentially significant air quality impacts are identified, where appropriate. This section has been prepared using methodologies and assumptions recommended in the air quality impact assessment guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] The EIR preparers reviewed the BAAQMD permit application for the proposed project, which is included in Volume II, Appendix D of this Draft EIR:

- *Application to the Bay Area Air Quality Management District, Barge Off-Loading Facility and Hot Mix Asphalt Plant*, prepared by Justice & Associates, September 2004.

The project proposes to incorporate the following design features to minimize impacts associated with criteria pollutant emissions, toxic air contaminant emissions, and potential effects on ambient air quality:

- Construction emissions would be minimized using techniques specified by BAAQMD CEQA guidelines;
- Emissions from the drum plant, silo loading, and truck loadout would be abated using best available control technology;
- Silo loading emissions would be captured and sent to the drum plant combustion chamber, reducing organic emission, blue smoke, and odors;
- The truck loadout would be enclosed in a shroud and vented to two 12,000 Cubic Feet per Minute (CFM) baghouses, controlling blue smoke and fugitive particulate emissions; and
- The drum plant would be vented to a cyclone and a baghouse, reducing particulate emissions. The captured particulate would be routed back to the drum plant, where organic material (including toxic condensable organic material) would be destroyed.

The new drum plant would replace the existing, smaller drum plant. This section estimates emissions of air pollutants based on maximum operation of the new drum plant, accounting for the shutdown of the existing drum plant.

AIR QUALITY SETTING

The project site is located within the San Francisco Bay Area Air Basin (Basin). The Basin encompasses approximately 5,600 square miles and includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, Santa Clara, and San Mateo counties, the western portion of Solano County, and the southern portion of Sonoma County.

[1] *BAAQMD, 1999, BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, December.*

Climate and Meteorology

The Basin is a large, shallow basin adjacent to the Pacific Ocean and the San Francisco Bay. The Basin is surrounded by coastal mountain ranges with sheltered inland valleys. Marine air coming into the Basin from the Pacific Ocean creates cool summers, mild winters, and infrequent rainfall. The average temperature in Petaluma ranges from 66.4 to 46.9 degrees Fahrenheit (F°). The highest temperatures generally occur in late summer or early fall, and reaches into the 80s. Low temperatures, around 38F°, generally occur in December and January.[2]

Petaluma is located in the Petaluma Valley, which is in the northern portion of the Basin. The valley is bordered on the east by the Sonoma Mountains, while to the west are a series of low hills extending to the Estero Lowlands. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap.[3]

Wind patterns in Petaluma are strongly influenced by the Petaluma Gap, with winds flowing predominantly from the west.[4] As shown in the wind rose on Figure V.B-1, the prevailing wind direction in the project site vicinity is generally from the north to northwest, with wind velocities typically between four and eight miles per hour.

Generally, air pollution is low in the Petaluma Valley because of marine air that enters the valley through the Petaluma Gap, and because of its low population density.[5] However the area can experience elevated air pollutant levels during stagnant conditions in the morning hours when airflow inland is weak or when an eastern or southeastern wind pattern in the afternoon brings in pollution from the Carquinez Strait and Central Valley.[6]

REGULATORY SETTING

Air Quality Standards

The Federal Clean Air Act (CAA) of 1970, and subsequent Federal Clean Air Act Amendments (CAAA) of 1977 and 1990, required the establishment of national ambient air quality standards (NAAQS) for six "criteria pollutants" (Table V.B-1). The standards are intended to protect all aspects of the public health and welfare with a reasonable margin of safety. The criteria pollutants are ozone, particulate matter, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The CAA and CAAA require the states to designate areas as attainment or nonattainment for each criteria pollutant NAAQS (Table V.B-2). Particulate matter has two separate standards: respirable particulate matter (PM_{10})[7] and fine particulate matter ($PM_{2.5}$).[8] The CAA and CAAA also require that states develop State Implementation Plans (SIP) for areas that are in nonattainment for any of the NAAQS.

2 *World Climate, http://www.worldclimate.com, Source: Petaluma Fire Station #2, averages derived from 1,015 months between 1893 and 1996.*

3 *BAAQMD, 1999, op. cit.*

4 *Ibid.*

5 *Ibid.*

6 *Ibid.*

7 *At or smaller than ten microns in size.*

8 *At or smaller than 2.5 microns in size.*

Source: Western Regional Climate Center

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Figure V.B-1
Wind Rose From Petaluma
Municipal Airport

Table V.B-1
State and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	National Standard	Violation Criteria	
				State	National
O_3	1-hour	0.09 ppm	–	If exceeded	If exceeded on more than 3 days in 3 years.
	8-hour	0.070 ppm	0.08 ppm	If exceeded	If the fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded.
PM_{10}	24-hour	50 µg/m^3	150 µg/m^3	If exceeded	If expected number of days with average 24-hr concentration is over one.
	Annual mean	20 µg/m^3	50 µg/m^3	If exceeded	If exceeded.
$PM_{2.5}$	24-hour	–	65 µg/m^3	If exceeded	If 98% of average 24-hour daily concentration, averaged over 3 years, is exceeded.
	Annual mean	12 µg/m^3	15 µg/m^3	If exceeded	If exceeded.
CO	1-hour	20 ppm	35 ppm	If exceeded	Not to be exceeded more than one day a year.
	8-hour	9.0 ppm	9 ppm	If exceeded	Not to be exceeded more than one day a year.
NO_2	1-hour	0.25 ppm	–	If equaled or exceeded	NA
	Annual mean	–	0.053 ppm	NA	Not to be exceeded more than one day a year.
SO_2	1-hour	0.25 ppm	–	If equaled or exceeded	NA
	24-hour	0.04 ppm	0.14 ppm	If equaled or exceeded	Not to be exceeded more than one day a year.
	Annual mean	–	0.03 ppm	NA	Not to be exceeded more than one day a year.

Source: CARB Ambient Air Quality Standards Table, 29 November 2005.
Notes: ppm = parts per million.
g/m^3 = micrograms per cubic meter.
"–" = no standard.
NA = not applicable.

Table V.B-2
Ambient Air Quality Attainment Status for San Francisco Air Basin

Pollutant	State-Level Attainment Status	National-Level Attainment Status
Ozone (1-hour)	Nonattainment (serious)	N/A
Ozone (8-hour)	Unclassified	Nonattainment (marginal)
Respirable Particulates (PM_{10})	Nonattainment	Attainment
Fine Particulates ($PM_{2.5}$)	Nonattainment	Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Hydrogen Sulfide	Attainment	N/A
Vinyl Chloride	No information available	N/A
Visibility Reducing Particles	Attainment	N/A

Note: N/A = not applicable
Source: CARB, http://www.arb.ca.gov/desig/adm/adm.htm, updated February 3, 2006.

Analogous to the CAA and CAAA, the 1988 California Clean Air Act (CCAA) establishes state ambient air quality standards (SAAQS) (Table V.B-1) and also requires areas of the state to be designated as attainment or nonattainment areas for the SAAQS (Table V.B-2). In addition to standards for the criteria pollutants identified under the CAA, the CCAA includes standards for hydrogen sulfide, vinyl chloride, and visibility reducing particles. Under the CCAA, air districts not meeting SAAQS for ozone, CO, SO_2, or NO_2 are required to prepare attainment plans intended to improve air quality and attain the standards.

In California, the task of air quality management and development of regulations has been legislatively granted to the California Air Resources Board (CARB) and local air quality management districts. The BAAQMD is the local air quality management district for this project. The BAAQMD coordinates with CARB in the effort to ensure that the Basin complies with both national and state standards.

Hazardous air pollutants (HAPs) or toxic air contaminants (TACs) are a category of air pollutants regulated separately from criteria pollutants. The TACs are suspected, or known, to cause cancer, birth defects, neurological damage, or death. There are no established ambient air quality standards for TACs; instead they are managed on a case-by-case basis depending on the quantity and type of emissions, and proximity to potential receptors. Their effects tend to be localized and directly attributable to specific stationary sources.

Air Quality Planning and Attainment Status

The CARB is responsible for oversight of air quality management in the state, including establishing emissions standards and regulations for certain mobile sources (e.g., autos, light-duty trucks) and overseeing the efforts of local air quality management districts. At the local level, the BAAQMD is responsible for demonstrating that attainment of the ambient air quality standards is either achieved, based on data from air monitoring stations, or will be achieved through regional planning. The BAAQMD directly regulates stationary emission sources through its permit authority and indirectly manages emissions from mobile sources through coordination with regional municipalities and transportation planning agencies. Air plans for the Basin are prepared by BAAQMD in cooperation with the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG).

The Bay Area Air Basin is currently classified as a "nonattainment" area for the 8-hour national ozone standard and the 1-hour ozone, PM_{10}, and $PM_{2.5}$ state standards. For all other criteria pollutants, the Bay Area is classified as either in "attainment" or "unclassified." The air quality standards and attainment status are summarized in Table V.B-2.

As a serious nonattainment area for the SAAQS for ozone, the Basin is required to adopt measures requiring best available retrofit control technology (BARCT) on existing sources of air pollution, and best available control technology (BACT) for new and modified sources with a potential to emit ten pounds per day or more of ozone precursors. The CCAA does not require planning documents for PM_{10} or $PM_{2.5}$ nonattainment areas; however, CARB is aggressively pursuing policies to reduce particulate matter emissions from mobile sources. On a statewide basis, diesel exhaust is estimated to account for one percent of the airborne PM_{10} and two percent of the airborne $PM_{2.5}$.[9]

The BAAQMD works with CARB to prepare plans for attaining and maintaining ambient air quality standards in the Basin, adopt and enforce rules and regulations concerning air pollutant sources, issue permits for stationary sources of air pollutants, inspect stationary sources of air pollutants, monitor ambient air quality and meteorological conditions, award grants to reduce motor vehicle emissions, and conduct public education campaigns. The Bay Area Clean Air Plan (CAP) and subsequent updates are developed in cooperation with MTC and the ABAG. The ABAG develops projections of future population and transportation trends, which are used to develop and evaluate strategies to bring the Basin into compliance with national and state air quality standards. The first CAP was adopted in 1991, and updates to the CAP occurred in 1994, 1997, and, most recently, 2000.

Criteria Pollutant Health Effects

Air pollutants come from stationary sources, area-wide sources, mobile sources, and natural sources. Much of the degradation of ambient air quality in the Basin is due to emission of criteria air pollutants from intensive use of motor vehicles (mobile sources).[10] Stationary sources (emissions from industry or urban development) contribute significantly less criteria pollutants to the ambient air. The primary pollutants of concern for the Basin are ozone, carbon monoxide, and particulate matter (PM_{10} and $PM_{2.5}$).

Ozone

Ozone is not emitted directly into the environment, but generated from complex chemical reactions in the presence of sunlight. The primary chemicals involved in these reactions are nitrogen oxides (NOx) and reactive organic gases (ROG); these components are often referred to as ozone precursors. The single largest source of ozone precursors in the Basin is motor vehicle exhaust. Ozone exposure causes eye irritation and damage to lung tissue in humans. Ozone also harms vegetation, reduces crop yields, and accelerates deterioration of paints, finishes, rubber products, plastics, and fabrics. The Basin is in nonattainment for the national and state ozone standards.

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9 *CARB, 2006, The California Almanac of Emissions and Air Quality.*

10 *Ibid.*

Carbon Monoxide (CO)

CO is released directly into the atmosphere by stationary and mobile sources. CO is an odorless, colorless gas formed by the incomplete combustion of fuels. The primary source of CO is motor vehicle emissions. The CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood when inhaled at high concentrations. Symptoms from exposure to high levels of CO include headaches, fatigue, slow reflexes, and dizziness.[11] The Basin is currently in attainment for the national and state CO standards. In contrast to ozone, which is a regional pollutant, CO has a localized impact because it dissipates fairly quickly as the distance increased from the source.[12] For this reason, CO is evaluated where it is likely to create high concentrations or "hot spots", such as highly congested intersections, where there are nearby human receptors.

PM_{10}

PM_{10} is also released directly into the atmosphere by stationary and mobile sources. The PM_{10} consists of a wide range of solid and liquid particles, including smoke, dust, aerosols, and metallic oxides. Similar to ozone precursors and CO, the single largest source of PM_{10} is motor vehicles. Approximately 50 percent of the particulate matter in the Basin is due to motor vehicles. PM_{10} is emitted from automobile tailpipes, brake pad and tire wear, and movement of road dust from vehicle travel. PM_{10} is among the most harmful of all air pollutants. PM_{10} evades the respiratory system's natural defenses and can lodge deep in the lungs when inhaled. PM_{10} can aggravate chronic respiratory diseases and can cause health problems for everyone, although children, the elderly, and those suffering from asthma, bronchitis, heart disease, or lung disease are more vulnerable. Long-term exposure to PM_{10} at levels exceeding state standards can lead to an increase in respiratory and cardiac illness, exacerbation of asthma and chronic bronchitis, and increased death rates. Short-term exposure to PM_{10} may lead to increased emergency room visits and an increase in days of restricted activity. The Basin is currently in attainment for the national PM_{10} standard, but is in nonattainment for the state PM_{10} standard.

$PM_{2.5}$

Fine particulate matter, $PM_{2.5}$, are those particles with an aerodynamic diameter less than or equal to 2.5 microns. $PM_{2.5}$ is classified as either primary or secondary particulates. Primary $PM_{2.5}$ is either carbonaceous or geological (crustal), but predominantly consists of carbonaceous $PM_{2.5}$, which is generated from combustion of fossil fuels or biomass. Carbonaceous $PM_{2.5}$ combustion sources include gasoline and diesel exhaust, wood stoves and fireplaces, land clearing, prescribed burning of wild land, and wild fires. Geological (crustal) $PM_{2.5}$, which makes up a minor amount of primary $PM_{2.5}$, is generated from fugitive emission sources, including paved and unpaved roads, dust, crustal material from construction activities, agricultural tilling, and wind erosion. Secondary $PM_{2.5}$ is created through atmospheric heterogeneous (gas to particle) reactions of gaseous oxides of sulfur (SOx) and NOx precursor emissions. The reactions involve chemical and physical interactions with the precursor emissions in the atmosphere.

Exposure to fine particulate matter has been linked to a variety of health problems; including bronchitis, acute and chronic respiratory symptoms (e.g., shortness of breath and painful breathing), and premature death. People with existing heart or lung disease (e.g., chronic obstructive pulmonary disease, congestive heart

[11] *Ibid.*

[12] *Ibid.*

disease, ischemic heart disease) are at risk of premature death or admission to hospitals or emergency rooms when exposed to $PM_{2.5}$. The elderly, individuals with cardiopulmonary disease, and children appear to be at greatest risk. Most of the premature deaths are among the elderly because their immune systems are generally weaker due to age or other health problems. Children are also susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems have not yet matured. In addition, $PM_{2.5}$ particles are a major source of visibility impairment in most parts of the United States. The Basin is currently unclassified for the national $PM_{2.5}$ standard, but in nonattainment for the state $PM_{2.5}$ standard.

Toxic Air Contaminants (TACs)

The Legislature enacted the Air Toxics Hot Spots Information and Assessment Act, AB 2588 (Toxics Hot Spots Act), in September 1987. This law requires stationary sources to report the types and quantities of certain substances their facilities routinely release into the air. Emissions of interest are those that result from the routine operation of a facility or that are predictable, including but not limited to continuous and intermittent releases and process upsets or leaks. The goals of the Air Toxics Hot Spots Act are to collect emission data, identify facilities having localized impacts, ascertain health risks, and notify nearby residents of significant risks based on estimated cancer and non-cancer health risks. Senate Bill 1731 amended the Toxics Hot Spots Act in 1992 to require owners of facilities that produce emissions resulting in significant health risks to the public to reduce their impact on air quality to an acceptable level.

The BAAQMD's Toxics Hot Spots Program is intended to identify and reduce ambient concentrations of TACs. TACs are non-criteria air pollutants. CARB identifies 192 substances as TACs (CCR §93001). The Toxics Hot Spots program includes the evaluation of health risks due to routine and predictable TAC emissions from industrial and commercial facilities. The BAAQMD has established specific public notification measures for various levels of risk identified under the program (Levels 1, 2, and 3). Level 3 corresponds to a cancer risk greater than 500 people in a population of one million (500 per million); Level 2 corresponds to a cancer risk between 100 and 500 per million; and Level 1 corresponds to a cancer risk between 10 and 100 per million.

Approximately 90 percent of the health risk from TACs in the Bay Area is due to diesel particulate matter (DPM), benzene, and 1,3-butadiene, primarily from mobile sources.[13] The majority of that risk is from DPM, which CARB identified as a TAC in 1998. Mobile sources such as trucks, buses, automobiles, trains, ships, and farm equipment are the largest source of diesel emissions.

Diesel Particulate Matter

In 2000, the EPA identified DPM as a "likely human carcinogen." The EPA established a comprehensive national control program to regulate diesel fuel and heavy-duty diesel vehicles. The program includes new regulatory standards based on the use of alternative fuels and high-efficiency exhaust emission control devices. The standards include the following major requirements:

- Promulgated particulate matter emissions standard for new heavy-duty engines of 0.01 gram per brake-horsepower-hour (g/bhp-hr), to take full effect in 2007.
- Required refiners to produce diesel fuel for use in highway vehicles with sulfur content of no more than 15 parts per million (ppm) as of June 1, 2006. By June 2007, refiners must produce low-sulfur

[13] *Ibid*.

(500 ppm) diesel fuel for off-road, locomotive, and marine diesel engines. Besides reducing emissions from the existing diesel fleet, these clean fuels will enable the use of advanced after-treatment technologies such as catalytic reduction systems on new engines.

- Required technologies like particulate traps, capable of emission reductions of 90 percent, under new standards set to begin phasing into the highway sector in 2007 and into the off-road sector in 2011.

Although the new EPA standards will improve diesel emissions in the future, these standards will primarily impact new engines. Because of their durability and long life, older uncontrolled diesel engines would continue to make up a significant portion of the heavy-duty vehicle fleet for years to come. As a result, efforts are underway to improve emissions from diesel engines already in operation and include a variety of strategies from fuel reformulation to engine retrofit through the Voluntary Diesel Retrofit Program.

The California Air Resources Board (CARB) identified particulate emissions from diesel-fueled engines as a toxic air contaminant (TAC) in August 1998. In California, mobile sources, such as trucks, buses, automobiles, trains, ships, and farm and construction equipment, are the largest source of diesel emissions. On-road engines account for about 27 percent of the emissions, off-road engines about 66 percent, and stationary and portable engines for the remaining seven percent.[14] CARB estimates that diesel engine emissions are responsible for a majority of California's estimated cancer risk attributable to air pollution.[15] The California Air Resources Board formed the Diesel Advisory Committee consisting of staff from CARB, EPA, state and local agencies, industry, environmental groups, and interested public to study this issue. With the help of the committee, CARB developed a Diesel Risk Reduction Plan to reduce particulate matter emissions from diesel-fueled engines and vehicles, which was approved on September 28, 2000.[16] The Diesel Risk Reduction Plan calls for reducing diesel PM 75 percent by 2010 and 85 percent by 2020 from the 2000 level. The plan contains the following components:

- New regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce diesel PM emissions by about 90 percent, overall, from current levels;
- New retrofit requirements for existing on-road, off-road, and stationary diesel-fueled engines and vehicles where determined to be technically feasible and cost effective; and
- New Phase 2 diesel fuel regulations to reduce the sulfur content of diesel fuel to no more than 15 parts per million to provide the quality of diesel fuel needed by the advanced diesel PM emission controls.

Although the new EPA standards will improve diesel emissions in the future, these standards will primarily impact new engines. Because of their durability and long life, older diesel engines will continue to make up a significant portion of the heavy-duty vehicle fleet for years to come. As a result, efforts are underway to improve emissions from diesel engines already in operation and include a variety of strategies from fuel reformulation to engine retrofit through the Voluntary Diesel Retrofit Program.

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[14] *CARB, 2000, Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, 28 September.*

[15] *Ibid.*

[16] *Ibid.*

Greenhouse Gases

Gases that trap heat in the atmosphere are called greenhouse gases. The major concern is that increases in greenhouse gases as a result of human activity are contributing to Global Climate Change. Global Climate Change is a change in the average weather on earth that can be measured by wind patterns, storms, precipitation and temperature. Although there is tremendous disagreement as to the speed of global warming and the extent of the impacts attributable to human activities, most agree that there is a direct link between increased emission of so-called greenhouse gases and long term global temperature. What greenhouse gases have in common is that they allow sunlight to enter the atmosphere, but trap a portion of the outward-bound infrared radiation and warm up the air. The process is similar to the effect greenhouses have in raising the internal temperature, hence the name greenhouse gases. Both natural processes and human activities emit greenhouse gases. The accumulation of greenhouse gases in the atmosphere regulates the earth's temperature, but emissions from human activities such as electricity production and motor vehicles have elevated the concentration of greenhouse gases in the atmosphere.

This accumulation of greenhouse gases has contributed to an increase in the temperature of the earth's atmosphere and contributed to Global Climate Change, also known as global warming. The principal greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and water vapor (H_2O). Carbon dioxide is the reference gas for climate change because it is the most prevalent greenhouse gas. To account for the warming potential of greenhouse gases, emissions of all greenhouse gases are often quantified and reported as CO_2 equivalents (CO_2E). Large emission sources are reported in million metric tons of CO_2 equivalents.

State Standards

In 2005, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gases would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32, or AB 32; Health and Safety Code, Sections 38500, et seq.). AB 32 identifies global warming as a serious environmental threat with the potential to exacerbate air quality problems, reduce the quantity and supply of water from the Sierra snowpack, cause a rise in sea levels, damage marine ecosystems, and increase human health-related problems. AB 32 requires CARB to adopt rules and regulations that, by 2020, would achieve greenhouse gas (GHG) emissions equivalent to statewide levels in 1990. On April 20, 2007, CARB published Proposed Early Actions to Mitigate Climate Change in California, a list of discrete greenhouse gas emission reduction measures that can be implemented. Emission reductions shall include carbon sequestration projects and best management practices that are technologically feasible and cost-effective. As defined under AB 32, GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. By January 1, 2009, CARB must design and adopt an overall plan to reduce GHG emissions to 1990 levels, including the recommendation of a de minimis threshold for GHG emissions below which emission reduction requirements would not apply. CARB has until January 1, 2011 to adopt the necessary regulations to implement that plan. Implementation begins no later than January 1, 2012 and the emissions reduction target must be fully achieved by January 1, 2020.

Under the law, CARB, the State Energy Resources Conservation and Development Commission (Energy Commission), and the California Climate Action Registry all have responsibilities with respect to the control of emissions of greenhouse gases, and the Secretary for Environmental Protection is required to coordinate emission reductions of greenhouse gases and climate change activity in state government. AB 32 does not indicate what role local land use planning should play in the statewide strategy, however, nor identifies implications to environmental review under CEQA. Guidelines on how to prepare an impact assessment for a project's GHG emissions contribution to Global Climate Change (GCC), or identified a significance threshold for project impacts have yet to be developed by CARB, the California EPA, the U.S. EPA, or any other appropriate governmental organizations.[17]

The CARB is proposing "Early Action Measures" in three groups, and together these measures will make a substantial contribution to the overall 2020 statewide GHG emission reduction goal of approximately 174 million metric tons of carbon dioxide equivalent[18] gases.[19] These measures that would relate to potential climate change impacts from the proposed project are summarized as follows. It should be noted that none of the early action measures address how local agencies should address GHG emissions associated with land use approvals.

Group 1: Discrete Early Action Measures

Three new GHG-only regulations are proposed to meet the narrow legal definition of "discrete early action GHG reduction measures": a low-carbon fuel standard, reduction of refrigerant losses from motor vehicle air conditioning system maintenance, and increased CH_4 capture from landfills. These regulations are expected to take effect by January 1, 2010.

- Measure 1-1, Low carbon fuel standard.

Group 2: Additional Greenhouse Gas Reduction Strategies

The CARB is initiating work on 23 other GHG emission-reducing measures in the 2007 to 2009 time period with rulemaking to occur as soon as possible, where applicable. These GHG measures relate to the following sectors: agriculture, commercial, education, energy efficiency, fire suppression, forestry, oil and gas, and transportation.

- Measure 2-6 and 2-7, Education: Guidance/protocols for local governments and businesses to facilitate GHG emission reductions.
- Measures 2-14, Transportation: Heavy-duty vehicle emission reductions, efficiency improvements.
- Measure 2-20, Transportation: Tire inflation program.

Group 3: Criteria and Air Toxic Control Measures

The CARB is initiating work on ten conventional air pollution controls aimed at criteria and toxic air pollutants, but with concurrent climate co-benefits through reductions in CO_2 or non-Kyoto pollutants

[17] *Association of Environmental Professionals, White Paper on Global Climate Change, Revised Draft 10 April 2007.*

[18] *The term "carbon dioxide equivalent" is used to account for the differences in global warming potential among the six greenhouse gases.*

[19] *CARB, 2007, Proposed Early Actions to Mitigate Climate Change in California, 20 April.*

(i.e., diesel particulate matter, other light-absorbing compounds, and/or ozone precursors) that contribute to global warming.

- Measure 3-1, Fuels: Diesel – Commercial harbor craft rule.
- Measure 3-2, Fuels: Diesel – Privately owned on-road trucks.
- Measure 3-3, Fuels: Diesel – Vessel speed reductions.
- Measure 3-4, Fuels: Diesel – Offroad equipment (non-agricultural).
- Measure 3-10, Fuels: Evaporative standards for aboveground tanks.

In consultation with CARB and the California Public Utilities Commission, the California Energy Commission (CEC) is currently establishing a GHG emission performance standard for local, public-owned electric utilities (pursuant to Senate Bill No. 1368). This standard will limit the rate of GHG emissions to a level that is no higher than the rate of emissions of GHGs for combined-cycle natural gas baseload generation. The rulemaking shall consider, but not necessarily be limited to, establishing a GHG emission performance standard for baseload generation facilities by June 30, 2007, a process for calculating the emissions of GHGs from baseload facilities and enforcing the standard, and a process for reevaluating and revising as necessary the GHGs emission performance standard. This standard must take into consideration the effect of the standard on rates, reliability, and financial resources, while recognizing the Legislature's intent to encourage use of renewable resources and its goal of environmental improvement.

In 2007, Governor Schwarzenegger signed SB 97, which requires the California Resources Agency, by 2010, to adopt guidelines for the mitigation of GHG emissions and their effects, including effects associated with transportation. SB 97 also amended CEQA to state that the failure to adequately analyze the effects of GHG emissions in a CEQA document for certain transportation projects shall not create a cause of action for a violation of the statute until 2010 or later.

AIR QUALITY REGULATIONS – STATIONARY SOURCES

Federal Regulations

Title V Operating Permit

Title V was added to the Clean Air Act in 1990, and introduced an operating permit program. It required EPA to promulgate regulations setting forth provisions under which states would develop operating permit programs for major facilities and submit them to the EPA for approval. A major facility is defined as any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit ten tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.[20] The BAAQMD is the local agency with permit authority over most types of stationary emission sources, which the BAAQMD exercises through its Rules and Regulations.

Standards of Performance for New Stationary Sources

Section 111 of the Clean Air Act, "Standards of Performance of New Stationary Sources," requires U.S. EPA to establish national emission standards for source categories, which cause or contribute significantly to air

[20]. *Clean Air Act, Sec. 112. Hazardous Air Pollutants*

pollution. These standards are intended to promote use of the best air pollution control technologies, taking into account the cost of such technology and any other non-air quality, health, and environmental impact and energy requirements. The U.S. EPA has established New Source Performance Standards (NSPS) for several source categories (40 CFR 60). The New Source Performance Standards program is implemented by the BAAQMD.

Two of the NSPS apply to the proposed facility. These include NSPS Subpart I: Standards of Performance for Asphaltic Concrete Plants and Subpart UU: Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture. Subpart I prohibits the discharge into the atmosphere from any affected facility any gases which: 1) contain particulate matter in excess of 90 milligrams per dry standard cubic meter (0.04 grain per dry standard cubic meter) or 2) exhibit 20 percent opacity, or greater. Subpart UU prohibits the discharge into the atmosphere from any asphalt storage tank exhaust gases with opacity greater than 0 percent, except for one consecutive 15-minute period in any 24-hour period when the transfer lines are being blown for clearing.

Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) process requires states in their SIPs to ensure that areas already in compliance with the national ambient air quality standards do not deteriorate to or above those standards at too rapid a pace. Such areas, depending upon the quality of their air in a baseline year, must control the emissions of certain pollutants such that the concentration of those pollutants increases no more than the allowable increment as set forth in the CAA. Before any new source may be built or any existing source may be modified, such sources must apply for and be issued a PSD permit, which demonstrates that they will comply with the PSD program. The BAAQMD also administers this program through Rules and Regulations.

BAAQMD Regulations

The BAAQMD has specific permitting procedures for hot mix asphalt facilities. A hot mix asphalt facility is defined by the U.S. EPA (40 CFR, Subpart I, 60.91) as any facility "used to manufacture hot mix asphalt by heating and drying aggregate and mixing with asphalt cements."

The *CEQA Guidelines*[21] state that "each public agency should, in its implementing regulations or ordinances, provide an identification or itemization of its projects and actions which are deemed ministerial under the applicable laws and ordinances." The BAAQMD has determined that the issuance of permits following prescribed procedures is a ministerial activity.[22]

Permits, prepared in accordance with the BACT/TBACT Workbook and Permit Handbook, are deemed "ministerial" for the purposes of CEQA. Permits that deviate from these documents, or permits for sources not covered by either document, will be reviewed on a case-by-case basis for compliance with CEQA.[23] The air emission achievement standards for hot mix asphalt plants using BACT are:

- 12 parts per million by volume (ppmv) NOx at 15 percent oxygen (O_2) dry;

[21] *Title 14, CCR, Chapter 3, Guidelines for Implementation of California Environmental Quality Act.*

[22] *Bay Area Air Quality Management District, Permit Handbook Chapters, retrieved from website: www.baaqmd.gov/pmt/handbook/default.htm*

[23] *Ibid.*

- 133 ppmv CO at 15 percent O_2 dry; and
- 0.01 grain per dry standard cubic foot.

The following are the BAAQMD's rules and regulations that apply to the proposed project.

Regulation 1 General Provisions and Definitions

Regulation 1 contains the general provisions and definitions of the terms used in the BAAQMD's rules. The standard for violations of air pollution regulations are defined as a public nuisance, i.e., "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property." For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

Regulation 2, Rule 1 Permits – General Requirements

The BAAQMD's Regulation 2 Rule 1 describes the permit requirements for sources of air pollution. In general, any equipment or operation that emits pollutants into the atmosphere requires a Permit to Operate from the BAAQMD unless it is excluded from BAAQMD Regulations per Regulation 1 or exempted from BAAQMD permit requirements by a specific section of Regulation 2 Rule 1. Any air pollution control equipment, associated with a source that requires a BAAQMD permit, is also required to have a Permit to Operate from the BAAQMD.

Regulation 2, Rule 2 Permits - New Source Review

This rule applies to new or modified air pollution sources. The rule contains requirements for Best Available Control Technology (BACT) and emission offsets. Rule 2 implements the Federal New Source Review and Prevention of Significant Deterioration requirements.

The following air pollutants are regulated by the BAAQMD:

- Nitrogen oxides and volatile organic compounds;
- Any pollutant for which a national ambient air quality standard has been promulgated;
- Any Class I or Class II ozone depleting substance subject to a standard promulgated under Title VI of the Federal Clean Air Act;
- Any pollutant that is subject to any standard promulgated under Section 111 of the Federal Clean Air Act;
- Any pollutant that is subject to any standard promulgated under Section 112 of the Federal Clean Air Act, except that a pollutant that is subject solely to Section 112 is not a regulated air pollutant; and
- Any of the asphalt production equipment with less than 10 million British Thermal Units (BTU) per hour rated heat input if fired exclusively with natural gas is exempt from the requirements.[24]

Regulation 2, Rule 5 Permits - New Source Review of Toxic Air Contaminants

This rule provides for the review of new and modified sources of toxic air contaminant (TAC) emissions to

[24] *The hot oil tanks would use a 2.0 million BTU/hr burner to heat the oil and is fired on natural gas.*

evaluate potential public exposure and health risk, to mitigate potentially significant health risks resulting from these exposures, and to provide net health risk benefits by improving the level of control when existing sources are modified or replaced. The rule applies to a new or modified source of toxic air contaminants that is required to have an authority to construct or permit to operate pursuant to Regulation 2, Rule 1. New and modified sources with Hazardous Air Pollutant emissions may also be subject to the Maximum Achievable Control Technology (MACT) requirement of Regulation 2, Rule 2, Section 317.

Regulation 2, Rule 6 Permits - Major Facility Review

This rule implements the operating permit requirements of Title V of the Federal Clean Air Act as amended in 1990. This rule applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility in a source category designated by the Administrator of the EPA in a rulemaking as requiring a Title V permit. This rule also provides a means by which facilities may avoid the Title V or other requirements by limiting their potential to emit.

A major facility is defined as: 1) a facility that has the potential to emit 100 tons per year or more of any regulated air pollutant except total suspended particulate. or 2) a facility that has the potential to emit 10 tons per year or more of a single hazardous air pollutant, 25 tons per year or more of a combination of hazardous air pollutants, such lesser quantity as the EPA Administrator may establish by rule; or 3) a facility with permit conditions that limit emissions to a level that is greater than the above thresholds is defined as a major facility.

Regulation 6 Matter and Visible Emissions

The purpose of this Regulation is to limit the quantity of particulate matter in the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions, and opacity using the following standards:

6-301 Ringelmann No. 1 Limitation: Prohibits a person from emitting from any source for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 1 on the Ringelmann Chart,[25] or of such opacity as to obscure an observer's view to an equivalent or greater degree.

6-302 Opacity Limitation: Prohibits a person from emitting from any source for a period or periods aggregating more than three minutes in a any hour an emission equal to or greater than 20 percent opacity as perceived by an opacity sensing device, where such device is required by BAAQMD regulations.

6-303 Ringelmann No. 2 Limitation: Prohibits a person from emitting for a period or periods aggregating more than three minutes in any hour, a visible emission which is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by BAAQMD regulations, be equal to a greater than 40 percent opacity, from: 1) internal combustion engines of less than 25 liters displacement, or any engine used solely as a standby source of motive power; 2) laboratory equipment used exclusively for chemical or physical analyses or experimentation; or 3) portable brazing, soldering, or welding equipment.

Regulation 7 Odorous Substances

[25] *The Ringelmann Chart provides examples of graduated shades of gray, between white and black, for the comparison of smoke density.*

This Regulation places general limitations on odorous substances and specific emission limitations on certain odorous compounds. A person must meet all limitations of this Regulation, but meeting such limitations shall not exempt such person from any other requirements of the BAAQMD, state or national law.

The limitations of this regulation shall not be applicable until the BAAQMD receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence. When the limits of this regulation become effective, as a result of citizen complaints described above, the limits shall remain effective until such time as no citizen complaints have been received by BAAQMD for one year. The limits of this Regulation shall become applicable again when the BAAQMD receives odor complaints from five or more complainants within a 90-day period.

Regulation 10 Standards of Performance for New Stationary Sources

This regulation incorporates the provisions of the federal regulations for new stationary source review (Title 40 of the Code of Federal Regulations Part 60; Standards of Performance for New Stationary Sources) as discussed earlier.

BAAQMD also has regulations that limit the use or manufacturing of certain types of asphalt:

- Regulation 8-15 limits the use of rapid-cure liquid asphalt, medium-cure liquid asphalt, emulsified asphalt, and slow-cure liquid asphalt (road oil); and
- Regulation 12-3-301 prohibits air blowing of asphalt unless all effluents are incinerated at temperatures above 1202 ºF for not less than 0.3 second, or use of an effective air pollution control as determined by the BAAQMD.

EXISTING CONDITIONS

Air Quality - Sonoma County

Mobile sources, such as motor vehicles, produce most of the air pollutants in the county. The state regulates air pollution from mobile sources through exhaust emissions standards, while local agencies can reduce emissions through improvement in the transportation system to reduce trips or traffic congestion. Stationary sources include mining operations, industrial and agricultural activities, and lumber mills. The BAAQMD regulates stationary sources through the Title V permitting process.

The BAAQMD operates a network of air monitoring sites within the Basin. The monitoring stations nearest to the project site are at 837 5th Street in the City of Santa Rosa, approximately 20 miles north of the project site, and 534 4th Street in the City of San Rafael, approximately 20 miles south of the project site. The ambient air concentrations of hydrogen sulfide and sulfur dioxide are not monitored at these stations because they are not expected to exceed air quality standards. Tables V.B-3 and V.B-4 summarize air quality data for the five major criteria pollutants from these monitoring stations during the 2004-2006 reporting period. The tables also summarize the number of days that the state or national standards were exceeded. The data indicate the monitoring stations have measured exceedances of the state 24-hour PM_{10} standard in 2006; the San Rafael monitoring station also measured exceedances of the state 24-hour PM_{10} standard in 2004. None of the other national and state standards was exceeded during the past three years.

The California Air Resources Board's (CARB) stationary source facility database indicates that the facilities shown in Table V.B-5 are major air pollutant dischargers in Petaluma. The data represent emission inventory estimates for the year 2002.

CARB maintains emission inventory data from stationary sources within the County. Table V.B-6 presents the emission inventory for ROG, CO, NOx, PM_{10} and $PM_{2.5}$ for Sonoma County in 2004. The inventory indicates that, as stated earlier, motor vehicles are the largest contributor to degradation of the air quality in the County. For non-mobile sources, consumer products and farming operations are the largest contributors to ROG, residential fuel consumption and food and agricultural processing are the largest contributors to CO and NOx, and residential fuel consumption and construction and demolition are the largest contributors to PM_{10} and $PM_{2.5}$.

Table V.B-3
837 5th Street, Santa Rosa Ambient Air Monitoring Station

Pollutant	Measurement	2004	2005	2006
Ozone	Highest 1-hour average (ppm)	0.760	0.072	0.077
	Highest 8-hour average (ppm)	0.06	0.051	0.058
	Days over State 1-hour standard (0.09 ppm)	0	0	0
	Days over National 1-hour standard (0.12 ppm)	0	0	0
	Days over National 8-hour standard (0.08 ppm)	0	0	0
Carbon Monoxide	Highest 8-hour average (ppm)	1.57	1.36	1.36
PM_{10}	Highest State 24-hour average (μg/m^3)	48.14	38.9	89.5
	Highest National 24-hour average (μg/m^3)	47.4	36.5	87.1
	Days over State 24-hour standard (50 μg/m^3)	0	0	11.8
	Days over National 24-hour average (150 μg/m^3)	0	0	0
$PM_{2.5}$	Highest National 24-hour average (μg/m^3)	26.6	33.6	59
	3-year State annual average (μg/m^3)	0	0	—
	Days over National 24-hour standard (65 (μg/m^3)	NA	NA	NA
Nitrogen Dioxide	Highest 1-hour measurement (ppm)	0.048	0.047	0.044
	Annual average (ppm)	0.011	0.011	0.011
	Days over State 1-hour standard (0.25 ppm)	0	0	0

Notes: (μg/m^3) = micrograms per cubic meter
ppm = part per million
— = insufficient data
NA = not available
Source: CARB website http://www.arb.ca.gov

Table V.B-4
534 4th Street, San Rafael Ambient Air Monitoring Station

Pollutant	Measurement	2004	2005	2006
Ozone	Highest 1-hour average (ppm)	0.091	0.081	0.089
	Highest 8-hour average (ppm)	0.063	0.072	0.058
	Days over State 1-hour standard (0.09 ppm)	0	0	0
	Days over National 1-hour standard (0.12 ppm)	0	0	0
	Days over National 8-hour standard (0.08 ppm)	0	0	0
Carbon Monoxide	Highest 8-hour average (ppm)	1.77	1.57	1.36
PM_{10}	Highest State 24-hour average (μg/m^3)	52.3	39.1	68.2
	Highest National 24-hour average (μg/m^3)	51	37.1	64.8
	Days over State 24-hour standard (50 μg/m^3)	6.1	0	5.8
	Days over National 24-hour average (150 μg/m^3)	0	0	0
$PM_{2.5}$	Highest National 24-hour average (μg/m^3)	NA	NA	NA
	3-year State annual average (μg/m^3)	NA	NA	NA
	Days over National 24-hour standard (65 (μg/m^3)	NA	NA	NA
Nitrogen Dioxide	Highest 1-hour measurement (ppm)	0.057	0.054	0.054
	Annual average (ppm)	0.015	0.013	0.014
	Days over State 1-hour standard (0.25 ppm)	0	0	0

Notes: (μg/m^3) = micrograms per cubic meter
ppm = part per million
— = insufficient data
NA = not available
Source: CARB website http://www.arb.ca.gov

Table V.B-5
Existing Facilities in Petaluma, Emission Inventory (tons/year)

Facility Name	Address	ROG	CO	NOx	SOx	PM_{10}
Sonoma County Dept. of Public Works	500 Mecham Rd.	79.9	122	42.0	6.07	13.4
Hunt and Behrens, Inc.	30 Lakeville St.	0.01	0.06	0.25	0.56	8.24
Willowbrook Feeds	40 Ely Rd.	0.01	0.27	1.06	0.00	4.77
Dutra Materials	1600 Petaluma Blvd. S.	0.012	0.76	3.05	0.01	3.6
Dairy Farmers of America	621 Western Ave.	0.08	2.17	8.69	0.04	0.17
Mrs. Grossman's Paper Company	3810 Cypress Dr.	5.18	0.00	0.00	0.00.	0.00
Sonoma Compost	550 Mecham Rd.	0.09	0.28	1.27	0.00	3.25
Cisco Systems	1435 N. McDowell Blvd.	0.07	0.75	3.00	1.09	0.30
North Bay Total Resource Recovery	Sonoma County Central	0.47	0.47	1.75	0.11	0.18
City of Petaluma	4400 Lakeville Hwy.	1.07	0.02	0.08	0.00	0.01
Srm Alliance Hospital Services	400 N. McDowell Blvd.	0.05	0.23	1.29	0.01	0.12
Hansel RV	1221 Petaluma Blvd.	0.82	0.00	0.00	0.00	0.00
Feed Sources, Inc.	900 Petaluma Blvd.	0.00	0.01	0.03	0.00	0.29

Source: http://www.arb.ca.gov/ei/areasrc/pointsources.htm

Table V.B-6
Sonoma County - 2004 Estimated Annual Average Stationary Sources Emissions (tons/day)

Category	ROG	CO	NOx	PM_{10}	$PM_{2.5}$
Stationary Sources					
Electric Utilities	0.18	0.01	0.0	0.46	0.27
Oil and Gas Production (Combustion)	0.01	0.02	0.08	0.01	0.01
Manufacturing and Industrial	0.02	.021	0.2	0.03	0.03
Food and Agricultural Processing	0.09	3.74	0.26	0.02	0.02
Service and Commercial	0.01	0.65	0.42	0.03	0.03
Sewage Treatment	0.01	0.0	0.0	0.0	0.0
Landfills	0.26	0.0	0.0	0.0	0.0
Incinerators	0.0	0.0	0.0	0.0	0.0
Soil Remediation	0.01	0.0	0.0	0.0	0.0
Laundering	0.02	0.0	0.0	0.0	0.0
Degreasing	0.6	0.0	0.0	0.0	0.0
Coatings and Related Process Solvents	1.9	0.0	0.0	0.0	0.0
Printing	0.13	0.0	0.0	0.0	0.0
Adhesives and Sealants	0.44	0.0	0.0	0.0	0.0
Petroleum Marketing	1.37	0.0	0.0	0.0	0.0
Chemical	0.06	0.0	0.0	0.0	0.0
Food and Agriculture	0.58	0.0	0.0	0.14	0.05
Mineral Processes	0.0	0.07	0.01	0.81	0.35
Wood and Paper	0.0	0.0	0.0	0.2	0.12

Table V.B-6
Sonoma County - 2004 Estimated Annual Average Stationary Sources Emissions (tons/day)

Category	ROG	CO	NOx	PM_{10}	$PM_{2.5}$
Electronics	0.02	0.0	0.0	0.0	0.0
Other (Industrial Processes)	0.26	0.11	0.29	0.21	0.09
Stationary Source Subtotal	**6.0**	**4.9**	**1.3**	**1.8**	**1.0**
Area Wide Sources					
Consumer Products	3.37	0.0	0.0	0.0	0.0
Architectural Coatings and Related Process Solvents	1.63	0.0	0.0	0.0	0.0
Pesticides / Fertilizers	0.95	0.0	0.0	0.0	0.0
Asphalt Paving / Roofing	0.23	0.0	0.0	0.0	0.0
Residential Fuel Combustion	1.35	20.63	1.34	2.74	2.64
Farming Operations	2.43	0.0	0.0	0.61	0.19
Construction and Demolition	0.0	0.0	0.0	3.1	0.65
Paved Road Dust	0.0	0.0	0.0	4.28	0.72
Unpaved Road Dust	0.0	0.0	0.0	1.45	0.31
Fugitive Windblown Dust	0.0	0.0	0.0	0.8	0.18
Fires	0.01	0.23	0.01	0.02	0.01
Managed Burning and Disposal	0.12	1.18	0.04	0.19	0.18
Cooking	0.05	0.0	0.0	0.25	0.15
Other (Miscellaneous Processes)	0.0	0.06	0.0	0.05	0.03
Area Wide Source Subtotal	**10.1**	**22.1**	**1.4**	**13.5**	**5.1**
Mobile Sources					
On-Road Motor Vehicles	15.45	145.7	26.15	0.75	0.5
Aircraft	0.06	1.75	0.01	0.0	0.0
Trains	0.01	0.04	0.24	0.02	0.02
Ships and Commercial Boats	0.05	0.14	0.3	0.02	0.02
Recreational Boats	2.1	13.1	0.58	0.16	0.12
Off-Road Recreational Vehicles	0.04	0.64	0.02	0.0	0.0
Off-Road Equipment	2.73	24.85	7.56	0.56	0.5
Farm Equipment	0.48	3.32	3.31	0.22	0.2
Fuel Storage and Handling	0.64	0.0	0.0	0.0	0.0
Mobile Source Subtotal	**21.6**	**189.6**	**38.2**	**1.7**	**1.4**
Sonoma County Total	**37.7**	**216.5**	**40.8**	**17.0**	**7.4**
Source: http://www.arb.ca.gov/ei/maps/statemap/cntymap.htm					

Sensitive Receptors

Ambient air quality standards have been established to identify air quality levels considered sufficient, with an adequate margin of safety, to protect public health and welfare. They are designed to protect that segment of the public most susceptible to respiratory distress, such as children under 14, the elderly over 65, persons engaged in strenuous work or exercise, and people with cardiovascular and chronic respiratory diseases. Areas of specific concern are where sensitive receptors are to be found, such as facilities that house or attract children, the elderly, or people with illnesses; or places where people engage in strenuous work or exercise.

The nearest school and daycare center to the proposed project, Montessori School of Petaluma and Shining Star Preschool, respectively, are located a mile or more to the northwest. These sensitive receptor locations are situated upwind from the proposed project, based on the prevailing wind direction (see Figure V.B-1). Shollenberger Park, the nearest park, is located approximately 525 feet across the Petaluma River to the east. The nearest sensitive receptors are the residents of the homes along the riverfront, approximately 300 feet east (downwind) of the proposed facility.

Former Petaluma Asphalt Plant Regulatory Compliance

Dutra Materials continues to operate an asphalt plant at their temporary location of 1601 Petaluma Boulevard South in Petaluma. A review of the regulatory record indicated that the plant had one recorded violation since permit issuance in 1992. The plant's operating permit limited tugboat trips to 25 round trips during any rolling 12 consecutive month period. On October 29, 2003, the plant exceeded the limit on tugboat trips and was levied a $700 fine. The plant had not had any nuisance or air quality emission complaints or violations.

ENVIRONMENTAL IMPACTS

The proposed project would affect air quality during construction and operation. The criteria of significance for air quality impacts are identified below and are followed by a discussion of impacts.

Thresholds of Significance

According to the environmental checklist in the *CEQA Guidelines*,[26] a project could have a potentially significant air quality impact on the environment if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

BAAQMD has developed thresholds of significance for ROG, NOx, and PM_{10} emissions from project operations as the result of vehicle trips and area source emissions (Table V.B-7). Project related ROG, NOx, or PM_{10} emissions would be considered significant if they would were to exceed BAAQMD thresholds.

Because this project involves the relocation and shutdown of the existing asphalt facility, the impact is evaluated based on the net increase in emissions due to construction and operation of the new facility. The new facility includes recycling of asphalt and a higher asphalt production capacity and, therefore, is expected to result in some increase in emissions. This evaluation used the five-year historic average production rate of 131,498 tons of asphalt per year and a maximum daily production rate of 2,000 tons per day that occurred at the original (now closed) facility and the temporary facility in Petaluma.

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[26] *California Code of Regulations (CCR), 2004. Title 14, Chapter 3, Guidelines to Implementation of the California Environmental Quality Act, Appendix G, 6 February.*

Table V.B-7
BAAQMD Thresholds of Significance

Pollutant	Pounds/Day	Tons/Year
ROG	80	15
NO_X	80	15
PM_{10}	80	15
CO	550	NE
Source: BAAQMD CEQA Guidelines, 1999.		

BAAQMD recognizes that construction equipment emit ozone precursors, but that these emissions are temporary and are generally accounted for in the emission inventory projections that provide the basis for regional air quality plans.[27] Therefore, temporary ROG, NOx, and PM_{10} emissions during construction are not expected to impede attainment or maintenance of ozone standards in the Bay Area. The BAAQMD CEQA Guidelines emphasize implementation of effective and comprehensive control of PM_{10} emissions rather than a detailed quantification of construction emissions.[28] The BAAQMD does not consider air quality impacts resulting from construction activities significant if appropriate construction control mitigation measures listed in the BAAQMD guidelines are incorporated.[29] The BAAQMD guidelines specify that an evaluation of the potential for CO "hot spots" at intersections as a result of the project should be performed where:

- Vehicle emissions of CO would exceed 550 pounds per day;
- Project traffic would impact intersections or roadway links operating at Levels of Service (LOS) D, E, or F or would cause LOS to decline to D, E, or F; or
- Project traffic would increase traffic volumes on nearby roadways by ten percent or more. CO concentrations need not be estimated if the increase in traffic volume is less than 100 vehicles per hour.

Under the guidelines, projects contributing to CO concentrations exceeding the SAAQS of nine parts per million (ppm) averaged over eight hours and 20 ppm for one hour (i.e., if it creates a "hot spot") would be considered to have a significant air quality impact.

The BAAQMD's Risk Management Policy has set a health risk threshold for significance impacts due to TACs at the "probability of contracting cancer for the maximally exposed individual exceeds ten in one million" and a "ground-level concentration of non-carcinogenic toxic air contaminants would result in a hazard index (HI) greater than one".[30]

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27 *BAAQMD, 1999, op. cit.*

28 *Ibid.*

29 *Ibid.*

30 *The HI is calculated by summing the hazard quotients for substances that affect the same target organ or organ system (e.g., respiratory system). The hazard quotient is the ratio of potential exposure to the substance and the level at which no adverse health effects are expected. An HI of less than 1 indicates no adverse health effects are expected as a result of exposure and an HI greater than 1 indicates adverse health effects are possible.*

Project Impacts and Mitigation Measures

Impact AQ-1 Project Construction Would Result in Emissions of Criteria Pollutants

Construction activities associated with development of the start-up and full build out phases of the project would include site preparation, soil excavation, backfilling, grading, and equipment vehicular traffic on paved and possibly unpaved roads. Soil disturbance caused by construction activities could be exacerbated by wind erosion. As a result, short-term dust emissions could cause a temporary increase in localized PM_{10} emissions. PM_{10} generated from construction-related activities is highly dependent on several factors, including activity level, specific operations, equipment type, and weather conditions. The operation of construction equipment would also result in the emission of criteria pollutants $PM_{2.5}$, ROG, NOx, and CO. Construction activities associated with project development would also result in short-term exhaust emissions from construction-related equipment. The primary pollutants associated with exhaust emissions from construction equipment are ozone precursors (ROG and NOx), CO, and PM_{10}.

BAAQMD considers PM_{10} emissions to be the greatest pollutant of concern associated with construction activities and has established feasible control measures for PM_{10} emissions from construction-related activities. There are several levels of appropriate control measures based on the size of the construction project. BAAQMD recommends that further optional control measures be implemented at construction areas that are large in area, located near sensitive receptors, or may for any other reason be warranted.

Project sizes that are greater than four acres are recommended to use enhanced control measures. The BAAQMD would consider project construction activities to be ***significant*** if the established control measures are not implemented.

Mitigation Measure AQ-1a

The following mitigation measures apply to activities associated with the proposed asphalt plant construction and are intended to reduce the temporary generation of fugitive dust to a less-than-significant level. The measures to reduce construction- related PM_{10} emissions reflect basic and optional dust control measures recommended by BAAQMD:

- All active construction areas shall be watered at least twice daily.
- All trucks hauling soil, sand, and other loose materials shall be covered with tarpaulins or other effective covers.
- All unpaved access roads, parking areas, and staging areas at the construction site shall be paved; otherwise, water or non-toxic soil stabilizers shall be applied to all unpaved access roads. In addition, paved access roads, parking areas, and staging areas shall be swept daily with a water sweeper. Streets shall be swept daily with a water sweeper in areas where visible soil material is carried onto adjacent public streets.
- The applicant shall hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded area inactive for ten days or more).
- The applicant shall enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.).
- The applicant shall limit traffic speeds on unpaved roads to 15 miles per hour.

- The applicant shall install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- The applicant shall replant vegetation in disturbed areas as quickly as possible.
- The applicant shall construct a gravel pad at all exits used by construction equipment or trucks to minimize soil adhering to the vehicle tires or tracks from leaving the construction site. The pads shall be constructed by placing crushed aggregate (greater than 3 inches and smaller than 6 inches) over geotextile fabric to at least 12 inches in depth. The pad shall be a minimum of 20 feet wide and 50 feet in length.
- During periods when trucks are transporting soil to or from the site, dirt that may have been tracked off the site shall be removed daily from the street. The area to be cleaned is to extend to the limit of noticeable dirt tracked from the site or for a distance of 75 feet on each side of a vehicle entrance or exit, whichever is greater. If water is used to clean the street, then the quantity of water used shall not result in sediment being washed into the storm sewer catch basins. Street sweepings shall be disposed of as a waste along with waste soil in accordance with applicable regulations.
- The applicant shall terminate excavation and grading activities when winds exceed 25 mph or when fugitive dust emissions are visible for a distance of at least 100 feet from the origin of such emissions, and there is visible evidence of wind driven fugitive dust. Wind speed would be determined when an on-site anemometer registers at least two wind gusts in excess of 25 miles per hour within a consecutive 30-minute period.

Mitigation Measure AQ-1b

Implementation of the following mitigation measures would reduce short-term exhaust emissions from construction-related equipment to a less-than-significant level:

- The idling time of all construction equipment used at the site shall not exceed five minutes.
- The applicant shall limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.
- All equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications. Emissions from all off-road diesel powered equipment used on the project site shall not exceed 40 percent opacity for more than three minutes in any hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. A visual survey of all in-operation equipment shall be made at least weekly throughout the duration of the project construction. A record of the inspection shall be maintained on-site. The BAAQMD and/or other officials may conduct periodic site inspections to determine compliance.
- The applicant shall require construction contractors to install particulate traps when appropriate on diesel engines.
- The applicant shall use the minimum practical engine size for construction equipment.
- Gasoline-powered equipment shall be equipped with catalytic converters, where feasible.

Impact AQ-2 Project Operation Would Result in Emissions of Criteria Pollutants

Project operations would produce emissions of criteria pollutants, or their precursors (ROG and NOx), from operation of the asphalt and recycling facility, vehicle and barge emissions from the import of raw materials, truck emissions from the export of raw materials and finished product (asphalt), and employee vehicle trips.

To determine the net impact from the proposed asphalt and recycling facility, the EIR preparers calculated the emissions of criteria pollutants from the operation of both the existing and new facility. The emissions from the existing and proposed asphalt plants were evaluated using the BAAQMD guideline for Hot Asphalt Mixing Plant.[31] Emissions from the recycling of asphalt at the proposed facility included PM_{10} emissions, which were evaluated using emission factors from U.S. EPA Office of Air Quality Planning and Standards' AP-42 emission factors. Emissions from truck trips were estimated using the vehicle and trip data provided in the Traffic Section and vehicle emission factors from CARB's EMFAC software for the year 2008.[32] Emissions from the barge diesel engines were calculated based on EPA guidance for marine vessel emissions.[33] The assumption used and the calculations are provided in the spreadsheets included in Appendix D.

Asphalt Plant Emissions

Both facilities were evaluated using the same BAAQMD recommended emission factors. Most hot mix asphalt facilities are comprised of the same basic air pollution sources: the dryer, burner-blower, exhaust fan, dust collection system, asphalt cement heating and storage, and reclaimed asphalt paving (RAP) area.[34] The proposed facility would be subject to the New Source Review permit system, which is designed to produce a net air quality improvement using BACT. Because the proposed project's emissions of ROG, NOx, PM_{10}, and CO are estimated to exceed ten pounds per day at the highest permitted production rate, the applicant has proposed to meet BACT requirements for the various processes. Methods to be employed include the following:

- Reducing PM_{10} emissions during aggregate off-loading from barges by using water sprays and a conveyor system;
- Reducing PM_{10} emissions by the use of a baghouse for the aggregate drying operation (capable of a 99 percent removal) and using water sprays;
- Reducing NOx emissions from dryer by using a low NOx (12 ppmv at 15 percent O_2) burner to heat the aggregate; and
- Using a blue smoke control filter pack to control PM_{10} and ROG emissions at the loadout silos.

The EIR preparers calculated the net increase in emissions using the same emission factors for evaluating the asphalt plant's emissions, and did not take into account that the reductions in the emissions due to BACT controls and newer, more efficient equipment. Table V.B-8 summarizes the annual increase in emissions

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31 *BAAQMD, Engineering Evaluation Template for Hot Mixing Asphalt Facilities, retrieved from website: www.baaqmd.gov/pmt/handbook/s11c02ev.htm on November 4, 2007.*

32 *EMFAC-2007.*

33 *U.S. EPA, 2000, Analysis of Commercial Marine Vessel Emissions and Fuel Consumption.*

34 *Bay Area Air Quality Management District, Permit Handbook Chapters retrieved from website: www.baaqmd.gov/pmt/handbook/default.htm*

from the existing and proposed facilities. Detailed calculations are provided in Appendix D; emissions from the existing asphalt plant are estimated in Tables D-1 through D-7 and emissions from the proposed asphalt and recycling plant are estimated in Tables D-8 through D-13.

Table V.B-8
Net Increase in Emissions of Criteria Pollutants from Asphalt Production (tons/year)

Criteria Pollutants	PM_{10}	VOCs[1]	SOx	NOx	CO
Existing Asphalt Facility					
Total Annual Emissions[2]	2.1	1.3	0.0080	2.5	1.1
Proposed Asphalt and Recycling Facility					
Total Annual Emissions[3]	4.3	2.8	0.0170	5.4	2.4
Increase in Criteria Air Pollutant Emissions					
Total Annual Increase	2.3	1.5	0.0092	2.9	1.3

[1]VOCs are synonymous with ROG.
[2]Based on 131,498 tons of asphalt per year.
[3]Based on 225,000 tons of asphalt and 150,000 tons of recycled asphalt per year.

Vehicle Emissions

Raw materials are brought to the existing asphalt plant, and would be brought to the proposed asphalt and recycling plant by trucks and barges. On-site equipment, such as front-loaders used to manage aggregate stockpiles, would also emit criteria pollutants. The proposed project would result in an increase in truck trips because of increased production capacity, import of RAP, and the export of raw materials locally. The number of truck trips was estimated based on the amount of raw material imported by trucks and the amount of raw and finished asphalt product that would be exported from the site. The distance trucks would travel was estimated based on the fact that the next nearest source of asphalt is Santa Rosa to the north and San Rafael to the south, both approximately 25 miles from the proposed project site. The truck emission factors were obtained by running CARB's EMFAC-2007 software, which provides composite emission factors for vehicle classes. The composite emission factor based on the number and age of vehicles in specific vehicle classes (e.g., passenger vehicles or heavy duty trucks) expected to operate in southern Sonoma County, using emission factors from 1965 through the target year. The emissions from the existing asphalt plant were based on 2007 emission rates while the emissions from the proposed asphalt and recycling plant were based on 2008 emission rates. Equipment emissions were estimated using emission factors from CARB's software, OFFROAD2007. This software provides emission factors for off-road equipment based on horsepower rating, fuel type, and age of the engine. It was assumed for this evaluation that the equipment was manufactured in the year 2000. The detailed calculations are provided in Tables D-15 through D-17 in Appendix D, the estimates of criteria pollutants from off-road equipment and on-road trucks for the existing and proposed asphalt plants, and the net increase, are provided in Table V.B-9.

Table V.B-9
Net Increase in Emissions of Criteria Pollutants from Truck Trips (tons/year)

Criteria Pollutants	PM_{10}	ROG	SOx	NOx	CO
Existing Asphalt Facility					
Total Annual Emissions	0.39	0.35	0.088	9.5	2.2
Proposed Asphalt and Recycling Facility					
Total Annual Emissions	1.0	1.3	0.12	27	11
Increase in Criteria Air Pollutant Emissions					
Total Annual Increase	0.59	1.0	0.03	17	8.4

Barge Emissions

The barges are primarily used to import aggregate from the San Rafael Quarry via the Petaluma River by 4,000-ton capacity barges pulled by tugboats. It is estimated that the proposed project would result in an increase in tugboat trips from 25 (allowed under BAAQMD's permit for the previously active plant) to 125 trips per year. The increase in tugboat emissions from tugboat trips was estimated using EPA methodology.[35] These emission factors are applicable to tugboats and marine freighters. The resulting emissions are provided in Table V.B-10. This evaluation did not consider potential energy savings, and therefore decreased emissions, as a result of the tugboats traveling with the tide. It is assumed that each tugboat would operate on the Bay for approximately 8 hours each round-trip: one hour maneuvering, five hours in slow cruise, and two hours on standby at the dock. The main engines would operate six hours, and the auxiliary engine two hours while docked. The SOx emissions have been adjusted to account for the use of low sulfur fuel, which is currently required by law. Table V.B-10 summarizes the annual increase in emissions from barge trips for the existing and proposed facilities. Detailed calculations are provided in Table D-18 in Appendix D.

The overall increase in criteria pollutants from the operation of the proposed facility is the sum of the increase from asphalt plant emissions, truck trips, and barge trips. The total net impact is summarized in Table V.B-11.

Table V.B-10
Net Increase in Emissions of Criteria Pollutants from Barge Trips (tons/year)

Pollutant	Existing Plant Emissions	Proposed Plant Emissions	Increase in Emissions
PM_{10}	0.021	0.11	0.085
ROG	0.022	0.11	0.090
SOx	0.15	0.76	0.61
NOx	0.83	4.2	3.3
CO	0.17	0.84	0.67

[35] *U.S. EPA, 2000, Analysis of Commercial Marine Vessel Emissions and Fuel Consumption.*

Table V.B-11
Net Increase in Emissions of Criteria Pollutants from Proposed Project (tons/year)

Criteria Pollutants	PM_{10}	ROG	SOx	NOx	CO
Existing Plant Estimated Criteria Air Pollutant Emissions	2.5	1.7	0.25	13	3.5
Proposed Plant Estimated Annual Criteria Air Pollutant Emissions	5.4	4.2	0.89	36	14
Net Increase in Criteria Air Pollutant Emissions	2.9	2.6	0.64	23	10

The net increase of 23 tons of NOx per year exceeds the BAAQMD's threshold of significance of 15 tons per year (Table V.B-7), resulting in a ***significant*** impact. As shown on Table D-19, the NOx emission would also exceed the daily threshold, assuming that the plants were running at maximum capacity. It should be noted that the number of days that the new asphalt and recycling plant could run at maximum capacity is limited by the annual production cap proposed for the facility. The plant could only run at the maximum capacity of 4,000 tons per day for approximately 56 days before reaching the annual cap of 225,000 tons. As shown in the tables above, the increase in NOx emissions is primarily the result of truck emissions, which accounts for over 70 percent of the increase. In the vast majority of cases, these trucks would not be owned or operated by the proposed facility and not under the project's direct control, and therefore, mitigation measures cannot be imposed upon these trucks. Mitigation measures will be implemented to require newer off-road equipment, which have lower emissions of criteria pollutants than older equipment and operational procedures to reduce emissions of particulate matter. However, this impact would remain significant and unavoidable.

However, in 2001, CARB adopted new NOx emission standards to clean up large diesel engines that power heavy-duty trucks. The new standard went into effect in 2007 and reduces emissions of NOx to 0.20 g/bhp-hr on 2007 and subsequent engines; the manufacturer may use averaging, banking, or trading programs to achieve this standard. This is a 92 percent reduction from the existing NOx standard. Pending regulations will also require commercial marine vessels, such as barges, to use low-sulfur content of diesel fuels, which would also indirectly reduce NOx emissions. Average NOx emissions from heavy-duty diesel trucks are predicted to be decrease, on a vehicle per mile (VPM) basis, as older vehicles are retired. Figure V.B-2 shows VPM emission rates from EMFAC-2007 for heavy-duty diesel trucks for the years 2008, 2010, and 2020. These rates indicate that future NOx emissions from the proposed project would decrease to below the threshold of significance of 15 tons per year.

<u>Start-up Phase</u>

During the initial start-up phase of the proposed project, raw materials such as aggregate and sand may be imported, primarily from the San Rafael quarry, until the barge off-loading facility is completed. This would result in an increase in truck trips associated with material imports. However, during the start-up phase, the allowed exports of asphalt product, sand, and aggregate would be approximately 35 percent less, and import and export of RAP would be 67 percent less than the anticipated annual rates under fully operational conditions. Therefore, the emissions from trucks would be less during the initial start-up phase than those estimated under fully operational conditions.

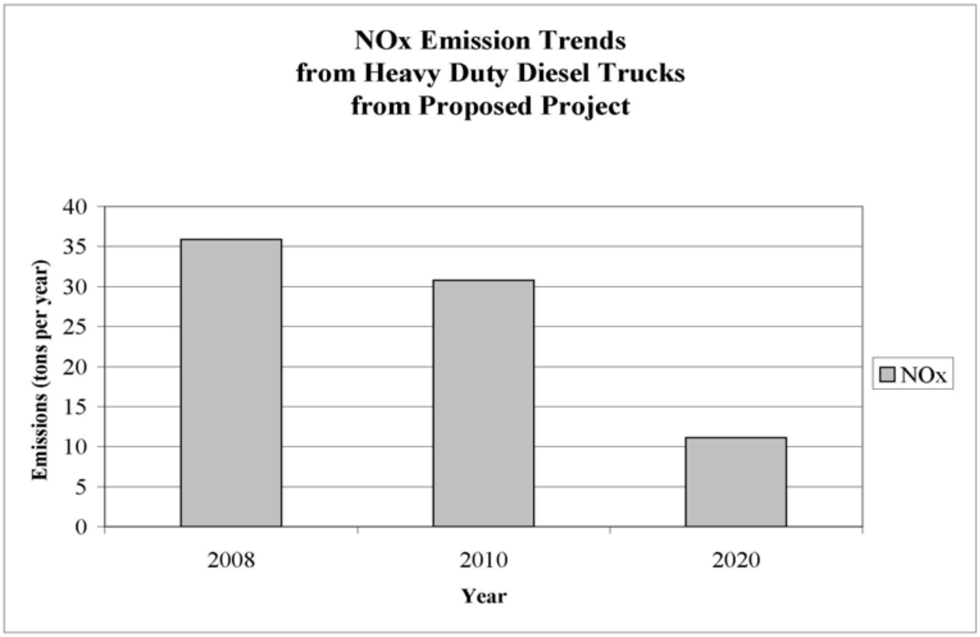

Figure V.B-2

Mitigation Measure AQ-2a

Off-road equipment used on-site shall use 2007 emission standards. Emission standards shall be met by upgrading to newer vehicles or retrofitting engines using CARB-verified retrofit technologies.

Mitigation Measure AQ-2b

Off-road equipment used on site shall be operated in the following manner:

- The idling time of all construction equipment used at the site shall not exceed five minutes.
- All equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications. Emissions from all off-road diesel powered equipment used on the project site shall not exceed 40 percent opacity for more than three minutes in any hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. A visual survey of all in-operation equipment shall be made at least weekly throughout the duration of the project construction. A record of the inspection shall be maintained on-site. The BAAQMD and/or other officials may conduct periodic site inspections to determine compliance.
- The minimum practical engine size shall be used for construction equipment.
- Gasoline-powered equipment shall be equipped with catalytic converters, where feasible.

Mitigation Measure AQ-2c

Although PM_{10} impacts associated with operation of the asphalt plant and recycling facility were found to be less than significant, the following measures are recommended to further reduce dust emissions.

The following dust control measures shall be implemented during the movement of aggregate using heavy construction:

- Minimizing drop heights while loading/unloading aggregate to less than four feet, and
- Applying water as needed to maintain visible dust to less than No. 1 on the Ringelmann Chart measured over a three-minute period.

Impact AQ-3 CO Hot Spots

Truck and tugboat trips delivering raw materials and transporting the finished products would generate emissions of CO. The estimated net increase in daily CO emissions (Table D-19) is 66 pounds per day, which is much less than the 550 per day threshold of significance. In addition, due to the facilities' proximity to Highway 101, the trucks would not be expected to create CO hot spots at locations where receptors would be located adjacent to the roadway. Therefore, impacts related to CO "hot spots" would be ***less than significant***.

Impact AQ-4 Project Operation Emissions of TACs

Operation of the facility would produce emissions of various materials that can be harmful to human health at high concentrations. BAAQMD requires permits for facilities that emit pollutants into the air from stationary sources. BAAQMD Regulation 2, Rule 5 specifies that all permit applications for new and modified sources must be screened for TACs.[36] If any project emits a TAC in an amount that exceed a listed trigger, then BAAQMD staff must complete a site-specific Health Risk Screening Analysis.[37] Estimates of public exposure and off-site worker receptor locations are then compared to BAAQMD risk standards (Regulation 2-5-301 and 302). Under regulation 2-5-301, the Best Available Control Technology for Toxics (TBACT)[38] requirements, the applicant shall apply TBACT to any new or modified source of TACs where the cancer risk is greater than 1.0 in one million (10^{-6}),[39] and/or a chronic hazard index greater than 0.2.[40] Under regulation 2-5-302, an Authority to Construct or Permit to Operate for any new or modified source of

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36 *A toxic air contaminant (TAC) is defined by BAAQMD as air pollutant that may cause or contribute to an increase in mortality or in serious illness or that may pose a present or potential hazard to human health (BAAQMD Website www.baaqmd.gov), reviewed online 23 February 2006.*

37 *Health Risk Screening Analysis guidelines generally conform to the Health Risk Assessment Guidelines adopted by California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA for use in the Air Toxics Hot Spots Program (BAAQMD Website www.baaqmd.gov).*

38 *Best Available Control Technology for Toxics (TBACT) requirements. The BAAQMD requires that an applicant shall apply TBACT to any new or modified source of TAC where the source risk is a cancer risk greater than 1.0 in one million (10-6) and/or a chronic hazard index greater than 0.20 (BAAQMD Website www.baaqmd.gov), reviewed online 23 February 2006.*

39 *Cancer risk is an estimate of the probability that an individual will develop cancer as a result of lifetime exposure to emitted carcinogens at a given location. A one in one million cancer risk represents one additional lifetime cancer developed from the exposure condition evaluated among one million persons exposed.*

40 *The hazard quotient is a measure of the non-carcinogenic toxicity of a compound (not a probability). The chronic hazard quotient is the ratio of the estimated does from exposure to compounds in air to a value, which is not believed to produce chronic adverse health effects. Adding all of these hazard quotients together results in the chronic hazard index.*

TACs, the permit shall be denied if the project risk exceeds any of the following project risk limits: a cancer risk of 10.0 in one million (10^{-5}); a chronic hazard index of 1.0; and acute hazard index of 1.0.[41]

BAAQMD completed a health risk screening analysis in support of an air permit for the proposed facility. BAAQMD calculated health risk using an initial proposed annual asphalt production of 880,000 tons/year; the project has since been revised to limit annual asphalt production to 225,000 tons/year.[42] Cancer risk is an estimate of the probability that an individual will develop cancer as a result of lifetime exposure to emitted carcinogens at a given location. A one in one million cancer risk represents one additional lifetime cancer developed from the exposure condition evaluated among one million persons exposed. Therefore, the excess cancer risk calculated by BAAQMD may be as much as four times the risks of the proposed plant. BAAQMD estimated emissions in accordance with the U.S. EPA AP-42 Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition. The analysis estimated that incremental health risk resulting from TAC emissions from operation of the plant. An air dispersion computer model was then used to estimate annual average ambient air concentrations from plant emissions using Petaluma meteorological data, information about stack heights for the proposed plant, and location of the nearest public receptor. Estimates of residential individual excess lifetime cancer risk assumed a continuous exposure to annual average TAC for 70 years.

The health risk screening analysis found that the project's estimated maximum cancer risk at a production capacity of 880,000 tons per year was 6.6 in a million (6.6×10^{-6}). According to the BAAQMD policies, this risk level is considered acceptable if the sources meet current toxic best available control technology (TBACT) requirements.[43] The proposed plant design includes current TBACT with the use of water sprays and baghouse to suppress PM_{10} emissions, and a blue smoke control filter pack to control PM_{10} and ROG emissions at the loadout silos.

The proposed project would generate diesel particulate matter (DPM) emissions from both off-road and on-road mobile sources. Mitigation Measure AQ-2a would result in a 60 percent reduction in DPM emissions compared to year 2000 off-road equipment diesel engines. The majority (86 percent) of the PM_{10} emissions from the proposed project would come from diesel fuel trucks used to import and export materials and finished asphalt product. The applicant would not have direct control over the trucks hauling material to and from the proposed project site; particulates from diesel exhaust are managed through vehicle emission control programs implemented on a state and federal level with the cooperation of fuel suppliers and vehicle and engine manufacturers. In addition, CARB has implemented a Diesel Risk Reduction Plan to reduce diesel particulate matter emissions through cleaner fuels, such as ultra, low-sulfur diesel, new diesel tailpipe regulations, and regulations governing operations such as idling restrictions. Therefore, DPM emissions from the proposed project would decline as regulations are implemented and older vehicles are retired. Some of the major regulations that have been implemented to reduce diesel PM emissions are summarized below:

[41] *BAAQMD Website, www.baaqmd.gov, reviewed online 23 February 2006.*

[42] *Taylor, Scott, 2006, Justice & Associates, Letter to J. Kirtley of Dutra Materials, Regarding CEQA Air Quality Analysis for Haystack Landing Barge Off Loading and Hot Mix Asphalt Plant, 7 April.*

[43] *Chong, Daphne, 2005, Bay Area Air Quality Management District, Interoffice Memorandum to T. Bui, Re: Results of Health Risk Screening Analysis for Dutra Materials (Petaluma, CA), Mix Drum Asphalt Plant, Plant #16483, Application #10901.*

- In 2001, CARB adopted new PM and NOx emission standards to clean up large diesel engines that power big-rig trucks, trash trucks, delivery vans, and other large vehicles. The new standard for PM went into effect in 2007 and reduces emissions to 0.01 g/bhp-hr. This is a 90 percent reduction from the existing PM standard. New engines would meet the 0.01 g/bhp-hr PM standard with the aid of diesel particulate filters that trap the PM before exhaust leaves the vehicle.
- In 2002, CARB adopted the Diesel Emission Control Strategy Verification Procedure, Warranty, and In-Use Compliance Requirements (Title 13, CCR, §2700 through 2710) for on-road, off-road, and stationary diesel-fueled vehicles and equipment. CARB verifies diesel emission control strategies to ensure that they significantly reduce diesel PM, are durable, and have a mandatory warranty. Owners are required to use only CARB-verified products to ensure the mandated PM reductions are real and durable. The regulation established three levels of verification based on the proven ability of the technologies to reduce exhaust emissions. Level 1 reduces particulate matter emissions by 25 percent or more, Level 2 reduces particulate matter emissions by 50 percent or more, and Level 3 reduces particulate matter emissions by 85 percent or more, or to 0.01 g/bhp-hr or greater.
- In 2003, CARB passed the diesel fuel regulations with low-sulfur diesel fuel required for all highway vehicles, non-highway heavy equipment, and stationary diesel generators starting in 2006 (Title 13, CCR, §2281). Reducing the sulfur content of diesel fuels contributes directly to the reduction of SOx and diesel PM emissions and indirectly to the reduction in emissions of NOx, CO, and hydrocarbons. Fuel sulfur content can affect engine wear, deposit formation, and emission performance. Sulfur compounds in engine exhaust can also reduce the effectiveness of emission control equipment. With the implementation of diesel fuel standards in the 1990s, improvements in diesel fuel quality have brought significant reductions in diesel PM emissions from diesel engines.[44]
- On July 22, 2004, CARB adopted Title 13, CCR, §2485 Exhaust Emission Standards and Test Procedures, Off-Road Compression-Ignition Engines, which sets emissions requirements for new heavy-duty off-road compression-ignition engines, produced on or after January 1, 1996, and all other new 2000 and later model year off-road compression-ignition engines. This section defines exhaust emission standards, in grams per kilowatt-hour, relative to engine size/power output for all compression-ignition engines sold in the state based on model year and maximum rated power. The standards are set in stages or "tiers" (Tier 1, Tier 2, and Tier 3) with years by which the specific tier must be met.
- On November 8, 2004, the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines was approved by the Office of Administrative Law and filed with the Secretary of State. This regulation establishes a number of new requirements for both existing and new emergency and portable diesel engines. The ATCM requires all portable engines to be certified to Tier 1, 2, or 3 U.S. EPA/CARB off-road engine standards by 2010. After 2010, all fleets of portable engines are required to meet diesel PM emission averages that become more stringent in 2013, 2017, and 2020.

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[44] *Lloyd, Alan C., and Thomas A. Cackette, 2001. Diesel Engines: Environmental Impact and Control, Environmental Manager, June.*

- On December 9, 2004, CARB adopted a fourth phase of emission standards (Tier 4). These standards are nearly identical to those finalized by the EPA on May 11, 2004 in its Clean Air Nonroad Diesel Rule. As such, engine manufacturers will be required to meet after-treatment-based exhaust standards for particulate matter and NOx starting in 2011 that are more than 90 percent lower than current levels, putting off-road engines on a virtual emissions par with on-road heavy-duty diesel engines.
- In 2005, CARB adopted a regulation (effective January 2008) requiring new heavy-duty on-road trucks to come equipped with an automatic engine shutoff device, limiting idling to five minutes. It also requires that trucks with sleeper cabs use alternatives to idling the main truck engine for heating and cooling during rest periods (Title 13, CCR, §2485).
- In 2007, CARB adopted regulations to reduce diesel PM from in-use off-road diesel fleets. The regulations require each fleet to meet target NOx and PM emission goals beginning in 2009. Target emission goals would be met through the use of verified diesel emission controls (Title 13, CCR, §2449). The new regulation requires all off-road diesel vehicle fleets to meet fleet average emission rate targets for particulate matter. The rule designates off-road diesel vehicle fleets by size based on total horsepower (hp) within the fleet. Large and medium fleets are required to meet fleet average emission rate targets for NOx. Fleets have the option to retrofit their vehicles with verified emission control devices, repower them with cleaner engines, or replace them with cleaner vehicles. The largest fleets are required to begin meeting the fleet average targets on March 1, 2009. Medium fleets must begin meeting the fleet average on March 1, 2010, and small fleets would have until March 1, 2012. The rule also requires that operators of off-road diesel vehicles shut down their vehicles rather than idle for more than five minutes, unless such idling is necessary for proper operation of the vehicle. The limit on unnecessary idling and the requirements to report information about affected vehicles begins in 2008.
- On February 16, 2007, new requirements regarding emission control labels (ECL) on heavy-duty diesel engines went into effect. Specifically, Title 13, CCR, §2183 (c) requires that no 1974 or newer diesel powered heavy-duty commercial vehicle shall operate in California without evidence that, at the time of manufacture, the installed engine met emission standards at least as stringent as applicable federal emission standards for the model year of the engine. CARB will determine whether an engine meets the above requirement by inspecting the ECL affixed to the vehicle's engine. A vehicle owner found in violation of the requirement is potentially subject to two distinct penalties: a) a tampered (missing) ECL carries a $300 penalty, and b) the regulation presumes that an engine without an ECL (or other documentation from the engine manufacturer) did not meet EPA standards at the time of manufacture, which carries a $500 penalty.

These regulations would result in significant future decreases in DPM emissions from trucks associated with the import and export of materials over existing conditions. In addition, CARB does not recommend locating new sensitive land uses within 500 feet of freeways with 100,000 vehicles per day to avoid DMP impact. At the maximum production capacity of 4,000 tons per day, and assuming large heavy duty trucks with a capacity of 23 tons per truck, which would be typical for a project requiring a large amount of asphalt, the rate of trucks entering and leaving the proposed asphalt and recycling plant would be about 175 trucks per day over a 10-hour day. As noted earlier, there is a limit to the number of days that the plant could operate at maximum capacity; the average number of trucks per day would be expected to be much lower. Based on the truck volume, the nearest receptors would not be adversely affected by DPM. Impacts related to TACs would be ***less than significant***.

Mitigation Measure AQ-4

Although PM_{10} impacts associated with operation of the asphalt plant and recycling facility would be less than significant, the following measures are recommended to further reduce DPM emissions. Off-road mobile diesel equipment, including Caterpillar front-end loader, Kubota tractor, Caterpillar excavator, 10-wheel dump truck, and 10-wheel water truck, shall use diesel fuel consisting of 20 percent biodiesel (B20 diesel). The use of B20 has been shown to reduce emissions of DPM from off-road mobile equipment up 10 percent.

Impact AQ-5 Odors

Blue smoke is the leading cause of odor complaints at asphalt facilities. The odor could affect on-site employees and residences downwind of the project. The facility proposes to devote up to ten percent of annual production to rubberized asphalt. The manufacture of rubberized asphalt is known to cause nuisance odors if not abated.[45]

The project is implementing BACT, which includes the use of Blue Smoke Controls, which would substantially reduce the potential odor impact associated with operations.

The proposed Astec fiberbed mist collector would efficiently capture and clean blue smoke from silo and loadout operations. In the blue smoke control system, ducts route emissions from batching and mix transfer operations to the collector. The gas stream enters the enclosure and passes through prefilters. A large knock-out area at the front of the unit allows particle matter to drop out of the gas stream before the prefiltering process. The prefilters capture any remaining particulate matter in the gas stream.[46]

These controls should eliminate nuisance odors and complaints to the BAAQMD. Odor complaints to the BAAQMD would require action by the facility to further mitigate odors (BAAQMD Regulation 7). Impacts related to odors would be ***less than significant***.

Impact AQ-6 Conflict with or Obstruct Implementation of an Applicable Air Quality Plan

The proposed project would require a General Plan Amendment to redesignate portions of the site from Limited Commercial to Limited Industrial, a Specific Plan Amendment to change the land use designation from Limited Commercial to Limited Industrial, and a Zone Change from LC (Limited Commercial) to M3 (Limited Rural Industrial). For General Plan amendments, the BAAQMD guidelines[47] recommend that the planning agency evaluate the impact of the change in land use designation with respect to vehicle miles traveled (VMT), and whether the change in land use designation would interfere with air quality planning. The change from Limited Commercial to Limited Industrial would not appear to generate a significant increase in VMT since: 1) the increased use of barges to transport aggregate to the proposed facility would result in less VMT and less criteria pollutants per ton of aggregate transported; and 2) the VMTs generated as export of asphalt and aggregate are not directly project related, i.e., if the proposed project were not implemented, other projects requiring asphalt or aggregate would purchase the materials at alternate locations,

45 *Pleasanton Weekly, 2003, "Haggerty on asphalt plant: 'Move it or close it'," 12 September.*

46 *ASTEC Fiberbed Mist Collectors Improved Design for Clean Air, www.astecinc.com.*

47 *BAAQMD, 1999, BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, December.*

likely at further distances thus increasing VMT. The proposed project also would not result in a significant increase in employment or population. However, given that the proposed project would result in both project-level and cumulatively significant contributions to ozone emissions, that a General Plan amendment would be required for this project, and that the General Plan does not appear to be fully consistent with the Bay Area Clean Air Plan (CAP), per BAAQMD guidelines the project conflict with the CAP would appear to be ***significant***.

CUMULATIVE IMPACTS

Criteria Pollutants

The exceedance of air quality standards is a region-wide problem with a multitude of stationary and mobile sources contributing to the problem. The Basin is currently in nonattainment for the state PM_{10} standard and the state and national ozone standards. The proposed project, in combination with pending development elsewhere in the City of Petaluma or Sonoma County, would contribute to the cumulative degradation of regional air quality.

Based on predictions of future emission inventories, which include the effect of adopting further rules and regulations to limit air pollutant emissions, the BAAQMD is formulating plans and strategies necessary to meet the state one-hour and the national eight-hour ozone standards. CARB's strategy to reduce emissions from heavy-duty diesel trucks would result in a significant reduction in the proposed project's regional impact. In addition, the asphalt plant would facilitate future transportation projects designed to reduce congestion and therefore reduce emissions of criteria pollutants from mobile sources. However, the BAAQMD CEQA Guidelines state that any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. Therefore, cumulative impacts relative to regional air quality emissions would be ***significant***.

The proposed project would make an incremental contribution to cumulative GHG emissions. No accepted methodology or standards exist for determining the significance of these emissions.

As discussed in the Setting section of this Chapter, no regulatory guidance or standard methodology yet exists for evaluating GHG emissions in the context of land use permitting and CEQA analysis. CEQA requires analysis of a project's environmental effects based on the net increment of change that would occur as a result of the project. Such an analysis requires a methodology to determine the increment of change, and appropriate standards for determining whether the change is significant. In the case of GHG emissions, the relevant federal, state, and local agencies have not yet identified either a methodology of standards for determining a land development project's incremental impact on climate change. Neither CARB nor the BAAQMD has developed guidelines for evaluating GHG emissions in the context of land use development. As noted previously, under SB 37, the State Office of Planning and Research has until July 1, 2009 to develop CEQA guidelines for addressing GHG emissions in environmental documents and to transmit those proposed guidelines to the State Resources Agency; the Resources Agency then has until January 1, 2010 to certify and adopt the proposed guidelines.

As indicated in the Governor's letter to the Senate upon signing SB 37, the development of CEQA significance thresholds and methodologies should be guided by the appropriate responsible agencies to achieve a standardized approach consistent with AB 32. This is especially important given the complexity of climate change and the State's leadership role in establishing California's response to this important environmental issue. Without this guidance, a significance determination with respect to GHG emissions would be speculative and premature (see CEQA Guidelines, § 15145).

Nevertheless, this EIR does attempt to quantify the greenhouse gases that would be emitted by this project (see "Project Greenhouse Gas Inventory" below), evaluate the project's consistency with the State's GHG emissions reduction goal, and propose appropriate, feasible mitigation measures to reduce the project's incremental contribution to cumulative GHG emissions.

Project Greenhouse Gas Inventory

For this EIR, GHG emissions were estimated using emission factors from the California Climate Action Registry, General Reporting Protocol, Version 2.2. Table V.B-12 provides the estimate of project-generated GHG emissions for 2007. Per convention, the total project-generated GHG emissions are estimated at 8,060 tons of CO_2 equivalent.

The majority of the emissions identified above would result from on-road truck traffic. According to the BAAQMD, 3.7 million tons of CO_2 equivalent gases were emitted in Sonoma County in 2002. The proposed project's net increase in CO_2 equivalent emissions is approximately 0.2 percent of Sonoma County's 2002 GHG emissions.

Consistency with the State Goal of Reducing GHG Emissions

As estimated above, the project would result in the emissions of approximately 8,060 tons of CO_2 equivalents per year from on- and off-site operations. The project would not qualify as a major source of greenhouse gas emissions. In fact, under the new greenhouse gas mandatory reporting regulation now being developed by CARB, the project would not be required to report its emissions, since they would be only about 32 percent of the lower reporting limit of 25,000 metric tons per year. Furthermore, the project would account for only approximately 0.004 percent of the state's emission reduction goal of 174 million tons by 2020.

It should also be noted that the project, as mitigated, would incorporate a number of measures to minimize project air emissions, which include greenhouse gases. Mitigation Measure AQ-4 would specifically result in a 27-ton decrease in CO2 equivalent emissions by requiring the use of B20 diesel fuel. The project would also be required to comply with Mitigation Measure AQ-5, below.

Table V.B-12
Net Increase in Greenhouse Gas Emissions from Proposed Project (tons/year)

Greenhouse Gases	CO_2	N_2O	CH_4	CO_2eq
Existing Asphalt Plant				
On-Site Mobile Equipment	6.10E+02	6.73E-05	2.21E-10	6.10E+02
Off-Site Mobile Equipment	1.19E+03	3.39E-02	4.05E-02	1.20E+03
Fixed Sources	2.00E+03	1.22E-03	2.23E-01	2.01E+03
Indirect Sources (electrical)	1.11E+02	9.24E-04	5.10E-04	1.11E+02
Proposed Asphalt and Recycling Plant				
On-Site Mobile Equipment	6.10E+02	6.73E-05	2.21E-10	6.10E+02
Off-Site Mobile Equipment	7.61E+03	1.93E-01	2.31E-01	7.67E+02
Fixed Sources	3.43E+03	2.08E-03	3.81E-01	3.43E+03
Indirect Sources (electrical)	2.69E+02	2.24E-03	1.24E-03	2.70E+02
Net Increase in Greenhouse Gases	8.00E+03	1.61E-01	3.50E-01	8.06E+03

More importantly, the proposed project would provide a needed local source of asphalt and aggregate for construction projects within the County. As discussed in the Project Description, the project is specifically intended to reduce cumulative truck trips by locating the facility within reasonable distance of source quarries located in Sonoma and Marin Counties, as well as within reasonable proximity of the southern Sonoma County and Marin County markets. Accordingly, the proposed project would reduce the need for aggregate and asphalt to serve this area to alternatively come from more distant sources, and would therefore reduce longer haul truck travel distances and associated air emissions, including greenhouse gases. As a result, the proposed project would likely reduce local, state, and worldwide GHG emissions as compared to the No Project Alternative or a reduced project alternative, and would help rather than hinder the state's goal of reducing GHG emissions by 2020.

Mitigation Measure AQ-5

CARB is currently evaluating 23 action strategies to reduce statewide GHG emissions, including heavy-duty vehicle emission reductions, and will likely consider further strategies going forward. The project shall comply with any applicable strategies adopted by CARB through promulgated regulations.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project would increase emissions of nitrogen oxides (an ozone precursor), primarily from trucks hauling raw materials and asphalt product. Even with mitigation, this increase would remain above the threshold of significance established by the Bay Area Air Quality Management District and would contribute to the San Francisco Air Basin’s air quality violation for ozone. Therefore, this impact and would be ***significant and unavoidable***. The project would also result in ***significant and unavoidable*** impacts related to consistency with the CAP. In addition, cumulative impacts relative to regional air quality emissions would be ***significant and unavoidable***. However, future emissions of NOx are expected to decrease with new heavy-duty diesel engine regulations, low-emission fuels, and retirement of older vehicles. All other air quality impacts are reduced to a ***less-than-significant*** level by implementation of recommended mitigation measures.

V. ENVIRONMENTAL IMPACT ANALYSIS
C. BIOLOGICAL RESOURCES

INTRODUCTION

This section of the Draft EIR provides a general description of biological and wetland resources on the site, information on regulations that serve to protect sensitive resources, and an assessment of the potential impacts of implementing the proposed project.

ENVIRONMENTAL SETTING

Background and Methodology

Biological resources were identified through the review and compilation of existing information, and field reconnaissance surveys of the site. The review provided information on general resources in the area and the distribution of wetlands, and the potential for occurrence of special-status species that have been recorded from or are suspected to occur in the vicinity. This information review included: records on occurrences of special-status species and sensitive natural communities maintained by the California Natural Diversity Data Base (CNDDB) of the Department of Fish and Game (CDFG); the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California*,[1] the CDFG's list of special animals and plants,[2] the *California Statewide Wildlife Habitat Relationships System*,[3] as well as studies conducted by the applicant's consultants. Studies completed by the applicant's consultants consist of the following and are included in Volume II, Appendix E and G of this EIR:

- *Salt Marsh Harvest Mouse Trapping Study*,[4] which summarizes the survey results of the presence/absence study for the State and federally-listed endangered salt marsh harvest mouse *(Reithrodontomys raviventris*) in Area D and the southern edge of Area C.
- *Biological Constraints Analysis*,[5] which describes special-status species suspected to occur on the site, makes conclusions regarding presence or absence and the extent of known sensitive habitats present on the site including jurisdictional wetlands, assesses potential impacts, and discusses measures to mitigate potential impacts to any special-status species and sensitive habitats.
- *Haystack Landing Tree Protection Report*[6] inventories the 20 trees on the site in 2004. All of these trees were proposed for removal by the applicant's arborist and were apparently either removed during unauthorized grading on the site in September 2005 or prior to September 2005.

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1 *California Native Plant Society, 2001, Inventory of Rare and Endangered Plants of California, Special Publication No. 1 (6th Edition) and on-line inventory (7th Edition).*

2 *California Department of Fish and Game, 2006, Natural Diversity Data Base, Special Animals and Special Plants.*

3 *California Department of Fish and Game, 1988, California Statewide Wildlife Habitat Relationships System, California Wildlife, Volume I, Amphibians and Reptiles, 2 May; 1990, California Statewide Wildlife Habitat Relationships System, California Wildlife, Volume II, Birds, November; and 1990a, California Statewide Wildlife Habitat Relationships System, California Wildlife, Volume III, Mammals, April.*

4 *Monk & Associates, 2004, Salt Marsh Harvest Mouse Trapping Study, Haystack Landing Project Site, letter report to U.S. Fish and Wildlife Service from Sarah Lynch, November 17.*

5 *Lucy Macmillan and Ecosystems West Consulting Group, 2004, Biological Constraints Analysis, Haystack Landing Project Site, prepared for Pagliaio Ventures, October 15.*

6 *Sherby Sanborn, Consulting Arborist, 2004, Haystack Landing Tree Protection Report, April 11.*

- *Preliminary Assessment of Wetland Impacts*[7] (PAWI) was prepared at the request of the San Francisco Bay Regional Water Quality Control Board (RWQCB) to provide information on impacts to jurisdictional wetland areas that occurred during unauthorized grading on the site in September 2005. The PAWI estimates wetland acreage and habitat types on the site, summarizes wetland losses from the unauthorized grading and immediate mitigation measures implemented to prevent erosion and sedimentation, summarizes anticipated future impacts on wetlands associated with the project, and summarizes the proposed draft wetland mitigation plan to compensate for the anticipated losses associated with the project.
- *Wetland Mitigation and Monitoring Plan*[8] (WMMP) is a detailed plan to mitigate anticipated impacts associated with the proposed project. The WMMP describes the site characteristics, mitigation design, construction and implementation, monitoring and maintenance, contingency measures, and long-term protection and management.
- *Supplemental Wetland Assessment*[9] (SWA) is an expanded preliminary delineation of potential jurisdictional waters on the site, expanding the delineation verified by the U.S. Army Corps of Engineers (Corps) in 2003 to include Area A, previously unmapped wetland depressions along the southern portion of Area B, and the previously unmapped drainage along the east side of Areas C and D. This SWA was submitted to the Corps to be verified in July 2006.[10]
- *Heron/Egret Rookery Impact Assessment and Recommendations* describes the heron/egret rookery known to use the grove of eucalyptus trees on the site, assesses the potential impacts and regulatory significance of the project on the rookery, and includes recommendations to address possible disturbance to active nests or nestlings.[11]

The EIR biologist conducted field reconnaissance surveys of the site on March 22, May 16, and August 4, 2006. The site was inspected by foot, focusing on locations with known or suspected resources such as wetlands, mature trees, shoreline of the River and sloughs, and nesting/roosting habitat. The reconnaissance surveys confirmed vegetation and wildlife habitat, potential for occurrence of special-status species and wetlands, and effects of unauthorized grading that occurred on the site in September 2005.

The following describes resources on the site and vicinity and the regulatory framework addressing protection of biological and wetland resources, assesses the potential impacts of the project on these resources, and recommends measures to mitigate these impacts.

7 *Lucy Macmillan, 2005, Preliminary Assessment of Wetland Impacts at the Proposed Dutra-Haystack Landing Asphalt and Recycling Facility Project Site, Petaluma, Sonoma County, California, submitted to San Francisco Bay Regional Water Quality Control Board, September 29.*

8 *Monk & Associates and Lucy Macmillan, 2006, Wetlands Mitigation and Monitoring Plan, Haystack Landing Wetland Mitigation Project, Petaluma, Sonoma County, California (U.S. Army Corps of Engineers File No. 28104N), prepared for Pagliaio L.L.C., April.*

9 *Lucy Macmillan, 2006, Supplemental Wetland Assessment, Haystack Landing Dutra Asphalt Plant Project Site, Petaluma, Sonoma County, California (U.S. Army Corps of Engineers File No. 28104N), prepared for Mr. Brian Peer, Dutra Materials, June 15.*

10 *Lucy Macmillan, 2006a, Request for Supplemental Jurisdictional Wetlands Determination, Haystack Landing Project Site, Petaluma, CA, U.S. Army Corps of Engineers File No. 28104N, letter to Mr. Philip Shannin from Lucy Macmillan, July 5.*

11 *LSA Associates, Inc. April 6, 2007. Heron/Egret Rookery Impact Assessment and Recommendations, Haystack Landing Project, Petaluma, California, letter report to Brian Peer, The Dutra Group from Steve Foreman, Principal/Wildlife Biologist.*

Vegetation

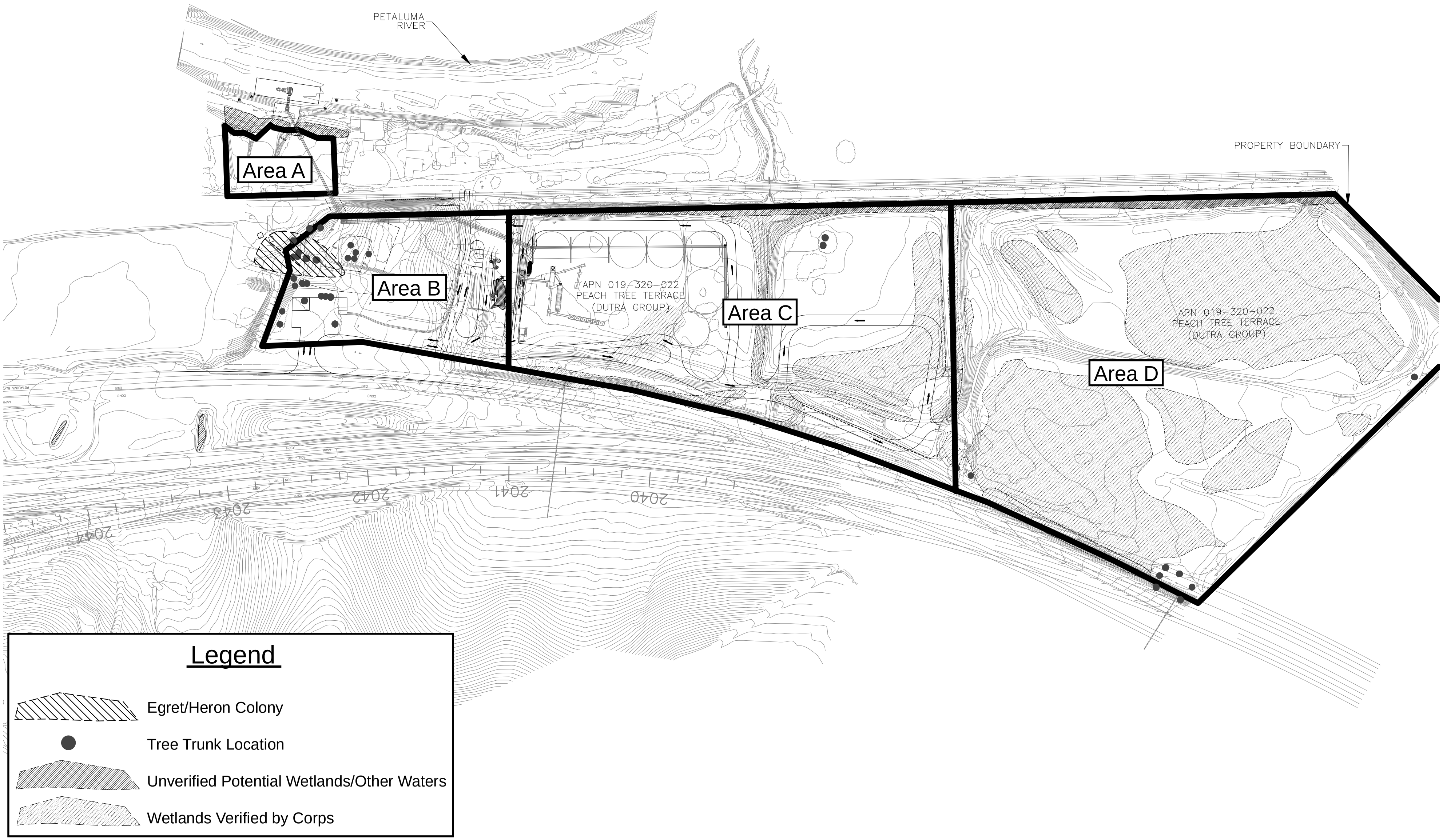
The site has been extensively altered by past development and disturbance, and existing vegetative cover is dominated by non-native species typical of ruderal (weedy) conditions, seasonal wetlands, and limited coastal brackish marsh. It is currently vacant, but was previously used as a dairy ranch, for disposal of quarry wash water in a system of now abandoned settling ponds, and limited residential use. All structures were removed over the past few years including the residences and farm buildings in the northern portion of the site. The remaining trees on the site consist of a grove of primarily blue gum (*Eucalyptus globulus*) in the northern portion of Area B, two trees in the central portion of Area C, and a few trees along the western edge of Areas C and D. The 20 trees inventoried in the *Haystack Landing Tree Protection Report*,[12] which were generally located in the central portions of Areas B and C, were all removed since the report was prepared in April 2004. Native vegetation on the site is limited to a small band of coastal brackish marsh along the shoreline of the Petaluma River and in the on-site drainage channels and abandoned settling basins, stands of coyote brush *(Baccharis pilularis*) shrubs, and a few scattered native valley oak (*Quercus lobata*) trees.

Figure V.C-1 shows the extent of known and potential wetlands, existing trees, and proximity of the site to the Petaluma River. The 165-acre Shollenberger Park, which is owned and maintained by the City of Petaluma, is across the River to the east of the site.

The portion of the site west of the railroad right-of-way (Areas B, C, and D) supports a mosaic of open grasslands, seasonal wetlands, brushfields, and coastal brackish marsh. The brackish marsh occurs on the bottom of the man-made drainage ditch on the west side of the railroad right-of-way, the two man-made ditches that bisect the site in an east-west direction in Area C, and the largest settling pond in the southwestern corner of the site in Area D. Characteristic marsh species in the low-lying areas include pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), and brass buttons (*Cotula coronopifolia*). The margins support transitional species, including a number of non-native ruderal species such as bristly ox tongue (*Picris echiodes*), birdfoot trefoil (*Lotus corniculatus*), and peppergrass (*Lepidium latifolium*). Narrow-leaved cattail (*Typha angustifolia*), bulrush (*Scirpus maritimus*), and cordgrass (*Spartina* sp.) occur in some segments of the drainage ditches where water ponds for a sufficient length of time to support emergent vegetation.

Seasonal wetlands occur over the sparsely vegetated abandoned settling basins in Areas C and D, and the vicinity of the former farm structures along the southern edge of Area B. Both native and non-native species occur in the seasonal wetlands, with dominants including bristly ox tongue, birdfoot trefoil, peppergrass, curly dock (*Rumex crispus*), soft chess (*Bromus hordeaceus*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), annual beard grass (*Polypogon monspeliensis*), toad rush (*Juncus bufonius*), salt grass (*Distichlis spicata*), and alkali heath (*Frankenia salina*).

[12] *Sherby Sanborn, Consulting Arborist, 2004, Ibid.*



Source: Lucy MacMillan; Environmental Collaborative, 2006.

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Figure V.C-1
Biological/Wetland Features

The margins of the seasonal wetlands support rye grass (*Lolium multiflorum*), Italian thistle *(Carduus pycnocephalus*), vulpia (*Vulpia bromoides*) and geranium (*Geranium dissectum*), among other ruderal grassland species and brushfields. The brushfields surrounding the seasonal wetlands and edge of the drainage channels are dominated by coyote brush, but a number of highly invasive non-native species are present as well, including: yellow star thistle (*Centaurea solstitialis*), fuller's teasel (*Dipsacus fullonum*), French broom (*Genista monspessulana*), poison-hemlock (*Conium maculatum*), and sweet fennel (*Foeniculum vulgare*).

A small band of coastal brackish marsh occupies approximately 0.18 acres along the shoreline of the Petaluma River, with the remainder of Area A currently largely unvegetated. The transition between marsh and uplands has been reduced by past fill activities and more recently by the unauthorized grading in September 2005, including installation of compacted gravel. Dominant species in the band of marshland include bulrush (*Scirpus* spp.), visid tule (*Schoenoplectus acutus*), and three-square (*Schoenophlectus americanus*). The marsh forms a discontinuous band 25-40 feet wide along the bank of the River. A narrow slough averaging about nine feet in width bisects the marsh and extends westward for a distance of approximately 124 feet before entering a culvert that receives surface water from an open ditch within the railroad right-of-way. The slough is largely unvegetated, with evidence of old, collapsing retaining walls and debris along the banks. Vegetation on the remainder of Area A was largely eliminated during the unauthorized grading in September 2005, but reportedly supported a cover dominated by ruderal grasses and forbs with scattered coyote brush shrubs.[13]

Non-native, ruderal grasslands occupy the majority of the rest of the site, together with a stand of blue gum and other trees at the northern portion of Area B. Grassland species are dominated by non-native grasses and forbs, including Italian rye grass, wild oat (*Avena barbata*), bromes (*Bromus* spp.), rattlesnake grass (*Briza minor*), black mustard (*Brassica nigra*), yellow star thistle, and winter vetch *(Vicia villosa* ssp. *varia*). As indicated in Figure V.C-1, a relatively dense stand of trees occurs near the northern edge of the site, with blue gum forming the dominant tree species. Other species in the stand of trees include English elm (*Ulmus procera*), two large native valley oaks, and several native California black walnut (*Juglans californica* var. *hindsii*). The blue gum vary in size from several mature specimens with trunk diameters of up to 48 inches to younger sapling trees. The oaks have trunk diameters of 24 to 14 inches, and are located near the property line. The California black walnut all have trunk diameters under 16 inches and are not believed to be native to the site, having most likely sprouted from original root grafts with planted English walnut. Several other trees occur along the western edge and scattered locations on the site, consisting primarily of eucalyptus and valley oaks. A single willow (*Salix* sp.) and coast live oak (*Quercus agrifolia*) tree occur together near the center of Area C. As noted previously, the 20 trees inventoried as part of the *Tree Protection Report*[14] have all been removed. These trees occurred on the southern slope of the knoll in Area B and the central portion of Area C. With the exception of a single valley oak at the southeastern edge of the knoll, which had a trunk diameter of 48 inches, all of the trees removed were non-native or most likely planted on the site.

Wildlife Habitat and Movement Opportunities

Wildlife species associated with the site reflect the grassland, seasonal wetlands, coastal brackish marsh and riverine habitats in the vicinity. The disturbed condition and limited vegetative cover over much of the site

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[13] *Lucy Macmillan, 2006, Ibid.*
[14] *Sherby Sanborn, 2004, Ibid.*

limits the existing habitat values in these areas. Features of particular importance include the shoreline and aquatic habitat of the Petaluma River and tidally influenced drainage channels, the stand of blue gum eucalyptus in the northern portion of Area B that serves as nesting and roosting habitat for an expanding colony of egrets and herons, and the seasonal wetlands that provide important foraging and resting areas when surface water is present.

The Petaluma River and associated estuarine ecosystem provide important habitat functions and values to aquatic and terrestrial wildlife, and serve as a movement corridor for numerous species of fish and other aquatic life, reptiles, amphibians, birds, and some mammals. The bed and open waters of Petaluma River support large populations of invertebrates and fish, which in turn provide important foraging opportunities for numerous shorebirds, water fowl, egrets, herons, river otter, muskrat, and raccoon, among other species. Fish and other vertebrate species known from the River and tributary streams include resident and migratory species, such as pacific staghorn sculpin, prickly sculpin, and threespine stickleback, as well as several special-status species such as steelhead trout, Sacramento splittail, chinook salmon and possibly pacific lamprey and river lamprey. Resident and migratory birds associated with the open water and marshlands along the River estuary include: mallard, common merganser, northern pintail, Canada goose, pied-billed grebe, black-crowned night heron, great blue heron, great egret, green heron, snowy egret, northern harrier, American coot, American avocet, western sandpiper, willet, ring-billed gull, belted kingfisher, barn swallow, marsh wren, white-crowned sparrow, and red-winged blackbird, among many others. A number of special-status species are found in the aquatic and marshland habitats along the River, including the salt marsh harvest mouse, California clapper rail, California black rail, saltmarsh common yellowthroat, San Pablo song sparrow, and western pond turtle, among others.

The band of coastal brackish marsh on the site has limited habitat value and importance to the larger Petaluma River ecosystem due to its narrow width, small size, proximity to existing developed uses to the north and south, and lack of any vegetated buffer. However, this small band of marshland and the unvegetated slough do provide foraging opportunities for birds and aquatic life, and the dense vegetation does provide some important cover along this segment of the River shoreline. The current absence of any existing uses on the site and limited human activity in the adjacent unvegetated uplands does serve to limit possible disturbance to wildlife activity along this segment of the River frontage. But the absence of any vegetative cover where compacted gravel was installed in September 2005 severely limits the important transition between marshland and upland that can be important to numerous species of wildlife for foraging and retreat during severe storms. The removal of the upper marsh zone plants and the adjacent non-native grassland cover in 2005 basically eliminated habitat and opportunities for natural filtration before surface water flows into the marsh and slough.

An existing egret and heron colony uses the stand of blue gum in Area B. As indicated in Figure V.C-1, the colony is used for nesting and roosting by great egret, snowy egret, and great blue heron. Colonial breeding sites (or rookeries) of egrets and herons are considered sensitive by the California Department of Forestry and Fire Protection, and these species tend to be highly sensitive to human intrusion and disturbance of nesting colonies. Egrets and herons typically feed in shallow water and shoreline of wetlands and other aquatic habitat, and the Petaluma River and associated marshlands provide essential foraging opportunities for this colony. This colony has obviously acclimated to the nearby Highway 101 traffic and activities on the parcels north and south of Area A on the site. However, the site's currently undeveloped condition has likely contributed to the success of this colony as there is only limited human activity in the immediate vicinity of the trees. The adjacent lot immediately north of Area B appears to be used for vehicle and trailer storage, including vehicles under some of the trees used for nesting and roosting. However, the level of activity associated with access to the vehicles, together with vehicle activity on the cross site roadway on Area B and any human activity on Area A, is apparently of insufficient duration or frequency to result in abandonment of the colony. Monitoring conducted by the Cypress Grove Research Center of Audubon Canyon Ranch[15] indicates that the colony is actually increasing in size, which is consistent with the EIR biologist's observation of more nests than the estimated 5 reported by the applicant's consulting biologist in the *Biological Constraints Analysis*[16] in 2004. The *Heron/Egret Rookery Impact Assessment and Recommendations* references a total of from 36 to 40 nests for great egrets, snowy egrets, and great blue herons in the colony.[17]

The seasonal wetlands, drainage channels, and surrounding grasslands provide habitat for a number of wildlife species. The wetlands provide aquatic foraging and resting areas for shorebirds and waterfowl during the winter and spring, including mallard, cinnamon teal, blue-winged teal, Canada goose, and black-necked stilt. As the basins dry, they function as part of the surrounding grasslands and brushfields, which support species such as killdeer, meadowlark, song sparrow, mourning dove, American goldfinch, black-tailed hare, California vole, pocket gopher, gopher snake, and western fence lizard. The smaller birds, mammals, and reptiles serve as prey to raptors, herons, and egrets, including marsh hawk, white-tailed kite, red-tailed hawk, American kestrel, and great horned owl. Highway 101 physically separates the site from the undeveloped grasslands to the west, but the undeveloped rolling hills, savanna, and marshlands to the south and southeast provide for relatively unobstructed connectivity to the undeveloped habitat on the site.

Wetlands

Wetlands are generally considered to be areas that are periodically or permanently inundated by surface or ground water, and support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their high inherent value to fish and wildlife, use as storage areas for storm and flood waters, and water recharge, filtration, and purification functions. Technical standards have been developed as a method of defining wetlands through consideration of three criteria: hydrology, soils, and vegetation.

The U.S. Army Corps of Engineers (Corps), CDFG, and Regional Water Quality Control Board (RWQCB) have jurisdiction over modifications to stream channels, river banks, lakes, and other wetland features. Jurisdiction of the Corps is established through the provisions of Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into "waters" of the United States without a permit, including certain wetlands and unvegetated "other waters of the U.S." The Corps also has jurisdiction over navigable waters, including tidally influenced ones below Mean High Water, under Section 10 of the Rivers and Harbors Act. Jurisdictional authority of the CDFG is established under Section 1602 of the Fish and Game Code, which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any lake, river, or stream. The Fish and Game Code states that it is "unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake" without

15 *Dyer, Norris R., 2005, Concerns about Safeguarding Heron/Egret Colony on Dutra Site, memo to County of Sonoma Permit and Resource Management Department, Dutra Haystack Landing Asphalt and Recycling Facility, February 27.*

16 *Lucy Macmillan and Ecosystems West Consulting Group, 2004, Ibid.*

17 *LSA, 2007, Ibid.*

notifying the Department, incorporating necessary mitigation, and obtaining a Streambed Alteration agreement. The Wetlands Resources Policy of the CDFG states that the Fish and Game Commission will "strongly discourage development in or conversion of wetlands... unless, at a minimum, project mitigation assures there will be no net loss of either wetland habitat values or acreage." Jurisdictional authority of the RWQCB is established pursuant to Section 401 of the Clean Water Act, which typically requires a water quality certification when an individual or nationwide permit is issued by the Corps. The RWQCB also has jurisdiction over "waters of the State" under the Porter-Cologne Water Quality Control Act.

Known and potential jurisdictional wetlands and other unvegetated "waters of the U.S." on the site are shown in Figure V.C-1. These consist of small and broad areas of seasonal wetlands and drainage channels on the west side of the railroad right-of-way, and the band of coastal brackish marsh and slough along the shoreline of the Petaluma River in Area A. Most of the jurisdictional waters were identified and mapped by the applicant's consulting wetland specialist and then verified by the Corps in 2003.[18] Additional potential jurisdictional waters were mapped by the applicant's wetland specialist in 2006[19] in response to changes observed following removal of the former farm structures on Area A, questions about the property boundary on the west side of the railroad right-of-way, and the need to more accurately map the extent of wetlands and other waters on Area A.

A total of 11.69 acres of confirmed jurisdictional wetlands, and an estimated 1.08 acres of potential jurisdictional waters yet to be confirmed by the Corps, occur on the site. An additional 0.04 acres of potential jurisdictional waters occurs off the site in ditches along the railroad right-of-way and near the ramps to Highway 101. Verified and unverified wetlands on Areas B, C, and D of the site range from 0.006 to 4.0 acres in size. These include seasonal wetlands and marsh within the abandoned settling basins, drainage ditches (DD1, DD2, DD3, DD4, DD5, and DD6), and the drainage ditch along the west side of the railroad right-of-way. The unverified band of coastal brackish marsh and unvegetated slough on Area A occupy an estimated 0.18 and 0.03 acres, respectively. As mapped in the SWA conducted in 2006, an additional estimated 0.02 acre of freshwater marsh occur off the site near the ramps to Highway 101 and 0.02 acres of seasonal wetlands occur along two off-site ditches within the railroad right-of-way.

Special-Status Species

Special-status species[20] are plants and animals that are legally protected under the state and/or federal

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18 *U.S. Army Corps of Engineers, 2003, Subject: File Number 28104N, letter to Lucy Macmillan from Calivin C. Fong, Chief, Regulatory Branch, November 13.*

19 *Lucy Macmillan, 2006, Ibid.*

20 *Special-status species include:*

- *Designated (rare, threatened, or endangered) and candidate species for listing by the CDFG.*
- *Designated (threatened or endangered) and candidate species for listing by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NOAA Fisheries).*
- *Species considered to be rare or endangered under the conditions of Section 15380 of the California Environmental Quality Act (CEQA) Guidelines, such as those identified on lists 1A, 1B, and 2 in the Inventory of Rare and Endangered Vascular Plants of California.*
- *And possibly other species which are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included on lists 3 and 4 in the California Native Plant Society Inventory or identified as animal "California Special Concern" species by the CDFG. California Special Concern species or Species of Special Concern (SSC) have no legal protective status under the state Endangered Species Act but are of concern to the CDFG because of severe decline in breeding populations in California.*

Endangered Species Acts[21] or other regulations, as well as other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, breeding locations, communal roosts, and other essential habitat. Species with legal protection under the Endangered Species Acts often represent major constraints to development, particularly when they are wide ranging or highly sensitive to habitat disturbance and where proposed development would result in a "take"[22] of these species.

The applicant's consulting biologist conducted detailed studies to determine whether special-status species occur on the site. The *Biological Constraints Analysis* (BCA)[23] provides a summary of reconnaissance level and detailed surveys conducted to determine the potential for occurrence of special-status species on the site. These include systematic surveys for special-status plants and protocol surveys for the State and federally-endangered salt marsh harvest mouse. The following discussion provides a summary of the conclusions regarding occurrence of special-status plant and animal species on the site.

Special-Status Plant Species

The CNDDB has reported a number of special-status plant species as occurring in the Petaluma vicinity, but none on the site. These include: Franciscan onion (*Allium eninsulare* var. *franciscanum*), Suisun marsh aster (*Aster lentus*), Sonoma spineflower (*Chorizanthe valida*), Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*), soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*), fragrant fritillary (*Fritillaria liliacea*), Contra Costa goldfields (*Lasthenia conjugens*), Petaluma popcornflower (*Plagiobothrys mollis* var. *vestitus*), Marin knotweed (*Polygonum marinense*), and showy indian clover (*Trifolium amoenum*). Most of these species are maintained on List 1B of the CNPS *Inventory*, and a few are listed under the State and/or federal Endangered Species Acts.

As discussed in the BCA, a qualified botanist conducted systematic surveys of the site in spring and summer of 2003 and 2004. The botanist identified 36 different special-status species as possibly occurring in the project vicinity. All vascular plants were identified to a level necessary to determine rarity. No special-status plant species were encountered during the surveys or are believed to occur on the site. Surveys within the stands of coastal brackish marsh were limited because the project would generally avoid this habitat type. The BCA indicates that further surveys may be needed to confirm absence of Point Reyes bird's-beak and soft bird's-beak within areas of coastal salt marsh.

21 *The federal Endangered Species Act (FESA) of 1973 declares that all federal departments and agencies shall utilize their authority to conserve endangered and threatened plant and animal taxa. The California Endangered Species Act (CESA) of 1984 parallels the policies of FESA and pertains to native California species.*

22 *"Take" as defined by the FESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect" a threatened or endangered species. "Harm" is further defined by the USFWS to include the killing or harming of wildlife due to significant obstruction of essential behavior patterns (i.e., breeding, feeding, or sheltering) through significant habitat modification or degradation. The CDFG also considers the loss of listed species habitat as "take," although this policy lacks statutory authority and case law support under the CESA. Two sections of FESA contain provisions which allow or permit "incidental take." Section 10(a) provides a method by which a state or private action which may result in "take" may be permitted. The applicant must provide the USFWS with an acceptable conservation plan and publish notification for a permit in the Federal Register. Section 7 pertains to a federal agency which proposes to conduct an action which may result in "take," requiring consultation with USFWS and possible issuance of a jeopardy decision. Under the CESA, "take" can be permitted under Section 2081 of the Fish and Game Code. The applicant must enter into a habitat management agreement with the CDFG, which defines the permitted activities and provides adequate mitigation.*

23 *Lucy MacMillan and Ecosystem West Consulting Group, 2004, Ibid.*

Special-Status Animal Species

A number of bird, mammal, reptile, fish, and invertebrate species with special-status are known or suspected to occur in the southern Sonoma County vicinity. These include: Cooper's hawk (*Accipiter cooperi*), sharp-shinned hawk (*Accipiter striatus*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia*), tricolored blackbird (*Agelaius tricolor*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), prairie falcon (*Falco mexicanus*), American peregrine falcon (*Falco peregrinus anatum*), saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), loggerhead shrike (*Lanius ludovicianus*), California black rail (*Laterallus jamaicensis coturniculus*), San Pablo song sparrow (*Melospiza melodia samuelis*), double-crested cormorant (*Phalacrocorax auritus*), California clapper rail (*Rallus longirostris obsoletus*), California tiger salamander (*Ambystoma californiense*), northwestern pond turtle (*Clemmys marmorata marmorata*), California red-legged frog (*Rana aurora draytonii*), foothill yellow-legged frog (*Rana boylii*), steelhead (*Oncorhynchus mykiss*), chinook salmon (*Oncorhynchus tshawytscha*), river lamprey (*Lampetra ayresi*), Pacific lamprey (*Lampetra tridentata*), Sacramento splittail (*Pogonichthys macrolepidotus*), pallid bat (*Antrozous pallidus*), Townsend’s big-eared bat (*Corynorhinus townsendii*), Yuma myosits (*Myotis yumanensis*), and salt marsh harvest mouse (*Reithrodontomys raviventris*).

Table V.C-1 provides information on the name, status, preferred habitat, and potential for occurrence of each of these species on the project site. Most of the special-status animal species known or suspected from the site vicinity are bird and fish species associated with the Petaluma River and estuary. A number of other bird species may forage in the seasonal wetlands and grasslands on the site. The absence of suitable habitat characteristics or separation from known geographic range precludes the potential for occurrence of a number of special-status species otherwise known from the site, including California tiger salamander, foothill yellow legged frog, California red-legged frog, colonial roosts for double-crested cormorant, and roosting habitat for special-status bat species. Summary information on those species known or suspected to possibly occur on the site or the adjacent Petaluma River corridor is summarized below.

Table V.C-1
Special-Status Animal Species Known or Suspected to Occur in Region

Species	Status Federal / State	Preferred Habitat Type (Potential Occurrence at Site)
Amphibians/Reptiles/Fish/Lampreys:		
California tiger salamander (*Ambystoma californiense*)	ST/SSC, CP	Vernal pools, ponds, streams and adjacent grassland (**unlikely** – suitable freshwater aquatic habitat absent)
California red-legged frog (*Rana aurora draytonii*)	FT/SSC	Ponds, streams, adjacent riparian and upland (**unlikely** – suitable freshwater aquatic habitat absent)
Foothill yellow-legged frog (*Rana boylii*)	-/SSC	Permanent streams with cobbles (**unlikely** – suitable freshwater aquatic habitat absent)
Pacific lamprey (*Lampetra tridentata*)	-/-	Aquatic habitat of Bay and Delta, tributary rivers and streams (**possible** - marginal habitat along shoreline of Petaluma River)
River lamprey (*Lampetra ayresi*)	-/SSC	Aquatic habitat of Bay and Delta, tributary rivers and streams (**possible** - marginal habitat along shoreline of Petaluma River)
Sacramento splittail (*Pogonichthys macrolepidotus*)	/SSC	Sloughs and other slow-moving waters of San Pablo Bay and Delta tributaries (**possible** - marginal habitat along shoreline of Petaluma River)
Northwestern pond turtle (*Clemmys marmorata marmorata*)	-/SSC, CP	Pond, rivers, and streams (**unlikely** – possible dispersal habitat along shoreline of Petaluma River)
Steelhead Trout (*Oncorhynchus mykiss*)	FT/-	Aquatic habitat of Bay and Delta, tributary rivers and streams (**possible** – marginal habitat along shoreline of Petaluma River)
Winter-run chinook salmon (*Oncorhynchus tshawytscha*)	FE/SE	Aquatic habitat of Bay and Delta, tributary rivers and streams (**possible** – marginal habitat along shoreline of Petaluma River)
Birds:		
White-tailed kite (*Elanus leucurus*)	-/CP	Grassland (**known** – suitable foraging habitat present but no known nesting reported or observed)
Burrowing owl (*Athene cunicularia*)	-/SSC	Grassland (**unlikely** – no known nesting reported or observed)
California black rail (*Laterallus jamaicensis coturniculus*)	-/ST, FP	Salt marsh (**possible** – marginal foraging and nesting habitat along shoreline of Petaluma River)
California clapper rail (*Rallus longirostris obsoletus*)	FE/SE, FP	Salt marsh (**possible** – marginal foraging and nesting habitat along shoreline of Petaluma River)
Cooper's hawk (*Accipiter cooperi*)	-/SSC	Riparian/grassland (**unlikely** – suitable nesting habitat absent)
Double-crested cormorant (rookeries) (*Phalacrocorax auritus*)	-/SSC	Bays, rivers and lakes (**unlikely** – suitable colonial roosting/nesting habitat absent)
Golden eagle (*Aquila chrysaetos*)	-/SSC,CP	Open grassland and savanna (**unlikely** – suitable nesting habitat absent but infrequent foraging possible)
Loggerhead shrike (*Lanius ludovicianus*)	-/SSC	Grassland and scrub (**possible** – suitable foraging habitat present but no known nesting reported or observed)
Northern harrier (*Circus cyaneus*)	-/SSC	Grassland (**known** – suitable foraging habitat present but no known nesting reported or observed)

Table V.C-1
Special-Status Animal Species Known or Suspected to Occur in Region

Species	Status Federal / State	Preferred Habitat Type (Potential Occurrence at Site)
Peregrine falcon (*Falco peregrinus anatum*)	Delisted/SE,CP	Open water and grassland (**unlikely** – suitable nesting habitat absent, but infrequent foraging possible)
Prairie falcon (*Falco mexicanus*)	-/SSC	Grassland (**unlikely** – suitable nesting habitat absent but occasional foraging possible)
Salt marsh common yellowthroat (*Geothlypis trichas sinuosa*)	-/SSC	Salt and brackish water marsh (**possible** – marginal foraging and nesting habitat along shoreline of Petaluma River)
San Pablo song sparrow (*Melospiza melodia samuelis*)	-/SSC	Salt and brackish marsh (**possible** - marginal foraging and nesting habitat along shoreline of Petaluma River)
Sharp-shinned hawk (*Accipiter striatus*)	-/SSC	Riparian and grassland (**unlikely** – suitable nesting habitat absent)
Tricolored blackbird (*Agelaius tricolor*)	-/SSC	Freshwater marsh and fields (**unlikely** – suitable nesting habitat generally absent)
Mammals:		
Pallid bat (*Antrozous pallidus*)	-/SSC	Roosts under bridges and in caves, mines, and buildings (**unlikely** – suitable forage habitat present but roosts absent)
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE/SE	Salt marsh and adjacent grassland (**unlikely** – not found in protocol surveys and suitable habitat generally absent along shoreline of Petaluma River)
Townsend's big-eared bat (*Corynorhinus townsendii*)	-/SSC	Roosts in buildings, mines, caves (**unlikely** - suitable foraging habitat present but roosts absent)
Yuma myotis (*Myotis yumanensis*)	-/SSC	Roosts in buildings, trees, mines, caves, bridges (**unlikely** – suitable foraging habitat present but roosts absent)

Federal Status*:*
FE = Listed as "endangered" under the FESA.
FT = Listed as "threatened" under the FESA.
C = A candidate species under review for federal listing. Includes species for which the USFWS currently has sufficient biological information to support listing endangered or threatened.

State Status*:*
SE = Listed as "endangered" under CESA.
ST = Listed as "threatened" under CESA.
CP = California fully protected or protected species; individual may not be possessed or taken at any time.
SSC = Species of Special Concern (SSC) by the CDFG; taxa have no formal legal protection but nest sites and communal roosts are generally recognized as significant biotic features.

Potential Occurrence on Site*:*
Known = Reported or observed.
Possible = Suitable habitat present, although no individuals observed or reported.
Unlikely = Suitable habitat either marginal or absent, and likelihood of occurrence on the site is low to nonexistent.

Fish and Lamprey. A number of special-status fish and lamprey species are known to exist in the Petaluma River estuary and tributary streams. These include steelhead trout, chinook salmon, Sacramento splittail, river lamprey, and pacific lamprey. Steelhead trout, chinook salmon, and pacific lamprey are anadromous, with migration occurring between marine and freshwater habitat during life stages. Sacramento splittail occur in the Sacramento River delta and estuarine systems. The river lamprey has received very little scientific study. The aquatic habitat of the Petaluma River provides foraging opportunities for immature and adults, and serves as a migration corridor as individuals move from the spawning areas to deeper habitat. Individuals could occasionally be expected along the shoreline and open water habitat adjacent to Area A on the site where they may feed on terrestrial and aquatic insects, amphipods, other small crustaceans, and small fish. The tidally influenced drainage ditches on Areas B, C, and D are assumed to not be used by these species due to their shallow depth and partial obstruction of the culvert under the railroad right-of-way that provides the hydrologic connection to the downstream slough that flows into the Petaluma River.

<u>California Clapper Rail.</u> The California clapper rail is a State and federally-listed endangered species. This species is a local resident of coastal wetlands and brackish areas around San Francisco, Monterey, and Morro bays. In the San Francisco Bay area, it breeds from mid-March through July. In coastal salt marsh habitat, this species tends to nest in the lower zones where cordgrass is abundant and tidal sloughs are nearby. In brackish water conditions, the clapper rail tends to build nests in dense cattail or bulrush.

The nearest documented CNDDB occurrence (CDFG 2007) of clapper rail is located greater than 1 mile to the southeast in the Petaluma River Marsh, north of Mud Hen Slough. Clapper rails are also reported as a rare sighting in fall and winter on the "Birds of Shollenberger Park and the Petaluma Wetlands" bird list, published by the City of Petaluma, Petaluma Wetlands Alliance and Madrone Audubon Society. Although this list does not provide exact locations of sightings, it is likely that they occurred in the marshland to the north of Adobe Creek, which is adjacent to Shollenberger Park to the north and is visible from Shollenberger Trail. The park itself is primarily composed of upland habitat resulting from past fill activities, and does not provide suitable marsh habitat to support rails. Clapper rails are also reported as occurring in the Petaluma River Marsh to the south of Ellis Creek (Enhancement Plan for Petaluma River Marsh, Questa Engineering, 1992). This southern extent of this area is on the east side of the River, approximately 800 feet to the north of the proposed dock location on the project site.

The BCA does not provide any conclusion regarding the potential for foraging or breeding on the site. Based on site conditions observed by the EIR biologist, rails may occasionally forage on the site, but breeding and nesting in the narrow band of emergent vegetation along the River in Area A, which is bordered by industrial use to the north, and residential and boating activities to the south, appears highly unlikely.

<u>California Black Rail</u>. The California black rail is State-listed as threatened. Black rail is a secretive resident of saline, brackish, and fresh emergent wetlands in the San Francisco Bay area, Sacramento-San Joaquin Delta, coastal southern California at Morro Bay and a few other locations. This species nests in dense marsh vegetation near the upper limits of the tidal zone, typically from mid-March to early June.

The nearest documented CNDDB occurrence (CDFG 2007) of black rail is located greater than 1 mile to the southeast in the Petaluma River Marsh. The occurrence reports that rails are distributed throughout the Petaluma River Marsh in both Sonoma and Marin Counties; the nearest location specifically mentioned in the record is in Marin County, in the south side of Black John Slough. Black rails are also reported on the Shollenberger Park/Petaluma Wetlands bird list as an uncommon sighting in winter and spring. Again, although this list does not provide exact locations of sightings, it is likely that they occurred in the marshland to the north of Adobe Creek, which is adjacent to Shollenberger Park to the north and is visible from Shollenberger Trail. As stated previously, the park itself is primarily composed of upland habitat and does not provide suitable marsh habitat to support rails. Black rails are also reported as occurring in this area of the Petaluma River Marsh as far south as Adobe Creek in the Enhancement Plan for Petaluma River Marsh (Questa Engineering, 1992). This southern extent of this area is on the east side of the River, approximately 800 feet to the north of the proposed dock location on the project site.

The band of coastal brackish marsh on the site provides potential foraging habitat for black rail, but nesting in this area is very unlikely.[24]

Saltmarsh Common Yellowthroat. The CDFG considers the saltmarsh common yellowthroat a Species of Special Concern (SSC). It occurs in emergent brackish and freshwater marshlands and adjacent grasslands. Its population in the Bay Area is not well known, but there are historic records along the Petaluma River north and south of the site. The band of coastal brackish marsh on the site along the shoreline of the Petaluma River provides marginal potential nesting and foraging habitat for this species.

San Pablo Song Sparrow. The CDFG considers the San Pablo song sparrow a SSC. This subspecies of song sparrow inhabits emergent wetlands on the north side of San Francisco and San Pablo Bays, and along the south side of San Pablo Bay to San Pablo Point in Richmond. Although the BCA did not identify this species as potentially occurring on the site, the band of coastal brackish marsh along the shoreline of the Petaluma River provides marginal potential nesting and foraging habitat for this subspecies.

Egret and Heron Rookeries. An established colony of great egret, snowy egret, and great blue heron occurs in the stand of blue gum in the northern portion of Area B on the site and adjacent property to the north. None of these species are listed or candidate species under the State or federal Endangered Species Acts, or are recognized as a SSC by the CDFG. However, the CDFG considers colonial breeding sites (or rookeries) of egrets and herons sensitive, and these species tend to be highly sensitive to human intrusion and disturbance of nesting colonies. Rookery sites of great egret and great blue heron are recognized as "Sensitive Species" by the California Department of Forestry and Fire Protection which warrant special protection during timber operations. As with most other species of native birds, the eggs, individuals and active nests are protected under the federal Migratory Bird Treaty Act (MBTA), and Section 3503 of the Fish and Game Code of California prohibits the unlawful take, possession, or destruction of nests or eggs of any birds except as otherwise provided under the code. Monitoring conducted by the Cypress Grove Research Center of Audubon Canyon Ranch[25] indicates that the colony on the site is actually increasing in size.

Raptors. Nests of raptors are protected under the federal MBTA and the Fish and Game Code of California (Sections 3503, 3503.5, and 3800). White-tailed kite is a State "fully protected" species and the CDFG considers the northern harrier a SSC. No active nests were observed during studies conducted by the applicant's biological consultant but there is a possibility that new nests could be established in the future, particularly for more common species such as American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), Cooper's hawk, great-horned owl (*Bubo virginianus*), white-tailed kite, and northern harrier. Several other species of raptors most likely occasionally forage in the vicinity but are not expected to nest in the site due to the absence of suitable nesting substrate. These include sharp-shinned hawk, golden eagle, peregrine falcon, prairie falcon, Ferruginous hawk (*Buteo regalis*), merlin (*Falco columbarius*), and bald eagle (*Haliaeetus leucocephalus*).

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[24] *Lucy MacMillan and Ecosystem West Consulting Group, 2004, Ibid.*

[25] *Dyer, Norris R., 2005, Ibid.*

Salt Marsh Harvest Mouse. The salt marsh harvest mouse is State and federally-listed as endangered and is a California fully protected species. This species is found only in saline emergent wetlands of San Francisco Bay and its tributaries, dominated by pickleweed. Grasslands adjacent to pickleweed marshes are sometimes used for dispersal and foraging where adequate cover is present. The northern subspecies is found on the Marin Peninsula, through Petaluma, Napa, and Suisun Bay marshes, and in northern Contra Costa County.

As summarized in the BCA, Monk & Associates evaluated the site to determine if suitable habitat for salt marsh harvest mouse is present on the site. The USFWS requested that trapping studies be conducted to definitively determine if this species inhabits the site. A trapping plan was submitted to the USFWS and CDFG, approved, and then implemented by Monk & Associates.[26] Traps were set on approximate 10-foot centers throughout the area. The 698 Sherman live-traps were set for 8 nights, constituting a total of 5,554 traps. The trapping survey took place in the fall of 2004 in what was determined to be the most suitable habitat containing pickleweed and other marsh cover in Area D. No salt marsh harvest mice were captured, and the USFWS concluded that the site is "not likely to result in take of the salt marsh harvest mouse." Although Area A was not included in the detailed trapping survey, the band of coastal brackish marsh along the Petaluma River lacks the dense stands of pickleweed necessary to support permanent occupation by salt marsh harvest mouse.

Western Pond Turtle. Western pond turtle typically occurs in freshwater ponds and streams with permanent pools used as retreat habitat. Individuals are known to establish nests in protected uplands near aquatic habitat, sometimes several hundred feed from pools and ponds used for retreat. The brackish water conditions along this segment of the Petaluma River and on-site drainages limits the likelihood of prolonged occupation by pond turtle.

REGULATORY SETTING

In addition to protection provided by State and federal regulations, such as the Endangered Species Acts and Clean Water Act, the County of Sonoma recognizes the importance of preserving sensitive biological and wetland resources. Local protection includes relevant goals and policies in the Open Space and the Resource Conservation Elements of the Sonoma County General Plan, and County ordinances related to the protection of trees. Applicable policies from the General Plan are addressed in Section V.H (Land Use), Table V.H-2. The Sonoma County tree protection ordinances are summarized below.

Tree Protection Ordinances

The Sonoma County Tree Ordinance No. 4044 regulates the removal of certain designated native trees, including oaks, madrone, redwood, and California bay. "Protected trees" are defined as trees having a minimum trunk diameter of nine inches measured at 4.5 feet above grade. According to the ordinance, compensatory mitigation is required for the loss of protected trees. The arboreal value of the protected trees to be removed is calculated as stipulated in the ordinance, and either an appropriate number of trees are replanted or in-lieu fees are paid to mitigate for the loss of the protected trees. Douglas fir is not considered a protected tree species under this ordinance.

In 1997, regulations also went into effect regarding the protection of valley oaks. These included a General Plan amendment to include new policies to identify and protect valley oaks, a zoning ordinance text

[26] *Monk & Associates, 2004, Ibid.*

amendment establishing the Valley Oak Habitat (VOH) combining district zoning and requiring mitigation where tree removal is proposed, a zoning ordinance map change designating areas with soils which tend to support valley oak, and establishment of general guidelines required in the VOH zoning district. Although several valley oaks occur on the southeast portion of Area D, they are in the area designated for Wetland Mitigation and are not proposed to be removed.

Biotic Resources Zoning

Area A has a Biotic Resource Zoning overlay, which is designed to protect biotic resource communities including critical habitat areas and riparian corridors for their habitat and environmental value.

Unauthorized Grading and Equipment Storage

As noted previously, unauthorized grading and equipment storage occurred on the site in September 2005 without appropriate permits from Sonoma County, the RWQCB, Corps, and CDFG. The grading removed vegetation, disturbed surface soils, and resulted in modifications to some of the existing jurisdictional wetlands and waters on the site. In Area A, a compacted gravel surface was created that slopes northward to the slough and Petaluma River. According to the review conducted by the applicant's consulting wetland specialist in response to a request by the RWQCB,[27] approximately 0.01 acre of coastal marsh habitat subject to Corps jurisdiction was disturbed and filled along the shoreline of the Petaluma River. In Area C, approximately 0.53 acre of seasonal wetlands habitat was scraped and disturbed along the north side of drainage ditch DD2. Measures were taken immediately after discovery of the unauthorized activities to try to prevent sedimentation and erosion into adjacent waters, including installation of silt fencing and fiber rolls. In addition to these immediate erosion and sedimentation control measures, the applicant's consulting wetland specialist has proposed that long-term mitigation for the losses associated with the unauthorized activities be provided during implementation of the mitigation program to be implemented as part of the proposed project, as summarized below.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

As identified in Appendix G of the State *CEQA Guidelines*, potentially significant environmental effects on biological resources would occur if the project would:

- Substantial adverse effect, either directly or through habitat modifications, on any special-status species;
- Substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

[27] *Lucy MacMillan, 2005, Ibid.*

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Project Provisions Related to Biological and Wetland Resources

The proposed project includes a detailed plan to mitigate potential impacts on wetlands, and is intended to address both the anticipated potential impacts of proposed development as well as the affects of unauthorized fills and grading modifications that occurred without appropriate permits in September 2005. The *Wetlands Mitigation and Monitoring Plan* (WMMP)[28] provides a detailed approach to mitigating potential impacts (see Volume II, Appendix E of this Draft EIR). The WMMP provides details on mitigation design, success criteria, monitoring, construction and implementation, maintenance, contingency measures, fiscal responsibilities, and long-term protection and management. The WMMP also summarizes information on existing vegetation, wildlife, wetlands, and potential for occurrence of special-status species. Technical appendices contained in the WMMP include the BCA, a geotechnical investigation on the proposed restoration,[29] and a preliminary hydrologic evaluation of wetland restoration feasibility.[30]

The proposed WMMP calls for creating and enhancing wetland communities typical of the inner edge of the ecotone between estuarine and freshwater habitat that were once widespread around the bay, creating a complex of tidal wetlands, seasonal brackish wetlands, and seasonally inundated wetlands, together with enhancement of the adjacent upland areas.

Figure V.C-2 shows the proposed complex of the various wetland habitat types to be created and enhanced as part of the WMMP, together with estimated acreages of each habitat type.

Figure V.C-3 shows cross sections of the proposed mitigation areas, with a range from open water to emergent wetlands and enhanced uplands. The wetland mitigation program would generally extend over the portion of the site south of the southern drainage ditch (DD2) and west of the railroad track, encompassing approximately 19 acres of the site. Approximately 8.48 acres of seasonal wetlands would be enhanced, 2.71 acres of new tidal marsh and seasonal wetlands would be created, and 2.11 acres of uplands would be enhanced. Approximately 0.90 acres of existing wetlands would be preserved within the proposed mitigation area. The *Preliminary Assessment of Wetland Impacts* (PAWI)[31] assumes that wetland-related impacts resulting from the project would be mitigated at approximately a 3:1 ratio (assuming full credit for creation of 2.71 acres of new wetland habitat and 50% credit for restoration/enhancement of 8.48 acres of existing low quality wetlands).

The WMMP recognizes that the distribution of wetland/marsh plant species is largely controlled by vertical elevation and water salinity levels. The range of elevations within each wetland/marsh area to be created reflect the depth, duration, and extent of inundation necessary to support the respective marsh type, from

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28 *Monk & Associates and Lucy MacMillan, 2006, ibid.*

29 *Miller Pacific Engineering Group, 2004, Geotechnical Investigation, Haystack Landing Wetlands Restoration, prepared for Ms. Lucy Macmillan, October 1.*

30 *Balance Hydrologics, Inc., 2004, Preliminary Hydrologic Evaluation of Wetland Restoration Feasibility at Haystack Landing, Petaluma, California, October.*

31 *Lucy Macmillan, 2005, Ibid.*

freshwater to tidal brackish marsh. Flows would be directed along drainage ditches from upland areas to the west and southwest into preserved, created, and enhanced wetlands, eventually flowing into a large created tidal marsh area before moving along the drainage channel along the west side of the railroad right-of-way, passing through a partially blocked culvert under the railroad tracks, and entering a slough connecting to the Petaluma River. Target vegetation and wildlife would vary for each marsh type, with cattails and tule forming the dominant cover in freshwater conditions, pickleweed and other native salt marsh species in tidal marshlands, and rushes, sedges, salt grass, brass buttons and other transitional wetlands species in the seasonal wetlands. Upland areas would be planted with native trees and shrubs, including coast live oak, California blackberry (*Rubus ursinus*), and toyon (*Heteromeles arbutifolia*). A detailed planting plan prepared by a qualified restoration specialist would be prepared for review and approval prior to permits being issued for project grading.

The proposed WMMP would be reviewed by jurisdictional agencies as part of permit authorization for proposed wetland fills associated with the project. Jurisdictional agencies include the Corps, USFWS, NOAA Fisheries, RWQCB, and CDFG. The feasibility and adequacy of the proposed WMMP are reviewed below under the various impact discussions.

Project Impacts and Mitigation Measures

Impact BIO-1 Substantially Adverse Impact on Special-Status Species

While construction activities could result in disturbance or adversely affect essential habitat for a number of special-status species, the proposed project is generally not expected to have any substantial adverse impacts on special-status species.

Special Status Plant Species

No special-status plant species were encountered during surveys or are believed to occur on the site. However, areas of coastal salt marsh and brackish water marsh habitat were not surveyed extensively as acknowledged in the BCA. Although the potential for occurrence of any special-status plant species in this habitat type on the site is unlikely, given the extent of past modifications, relatively small area of suitable habitat, and isolation from other suitable habitat, supplemental detailed surveys would be required to confirm absence. If a population is in fact present, several aspects of the project associated with in-channel modifications could adversely affect or even eliminate the occurrence unless appropriate protective measures are taken. Species of particular concern include Point Reyes bird’s-beak and soft bird’s-beak. Therefore, impacts related to special-status plant species would remain ***potentially significant*** until supplemental detailed surveys are conducted to confirm absence of any coastal salt marsh and brackish water marsh species on the site.

Legend

ACRES	SYMBOL	DESCRIPTION
0.67		CREATED TIDAL MARSH
2.04		CREATED SEASONALLY INUNDATED WETLAND
2.71		TOTAL NEW WETLAND HABITAT
0.51		EX. SEASONAL WETLAND– RESTORED TO TIDAL MARSH–
5.47		ENHANCED EX. SEASONALLY INUNDATED WETLAND
2.50		EX. SEASONAL WETLAND–RESTORED TO EMERGENT MARSH– BELOW 6
8.48		TOTAL ENHANCED WETLANDS
2.11		PROPOSED UPLAND ENHANCEMENT/ BUFFER ZONE
		LIMITS OF CORPS JURISDICTIONAL WETLANDS.
0.90		PRESERVED EXISTING WETLANDS
19.0		MITIGATION BOUNDARY
		TIDAL FLOW DIRECTION

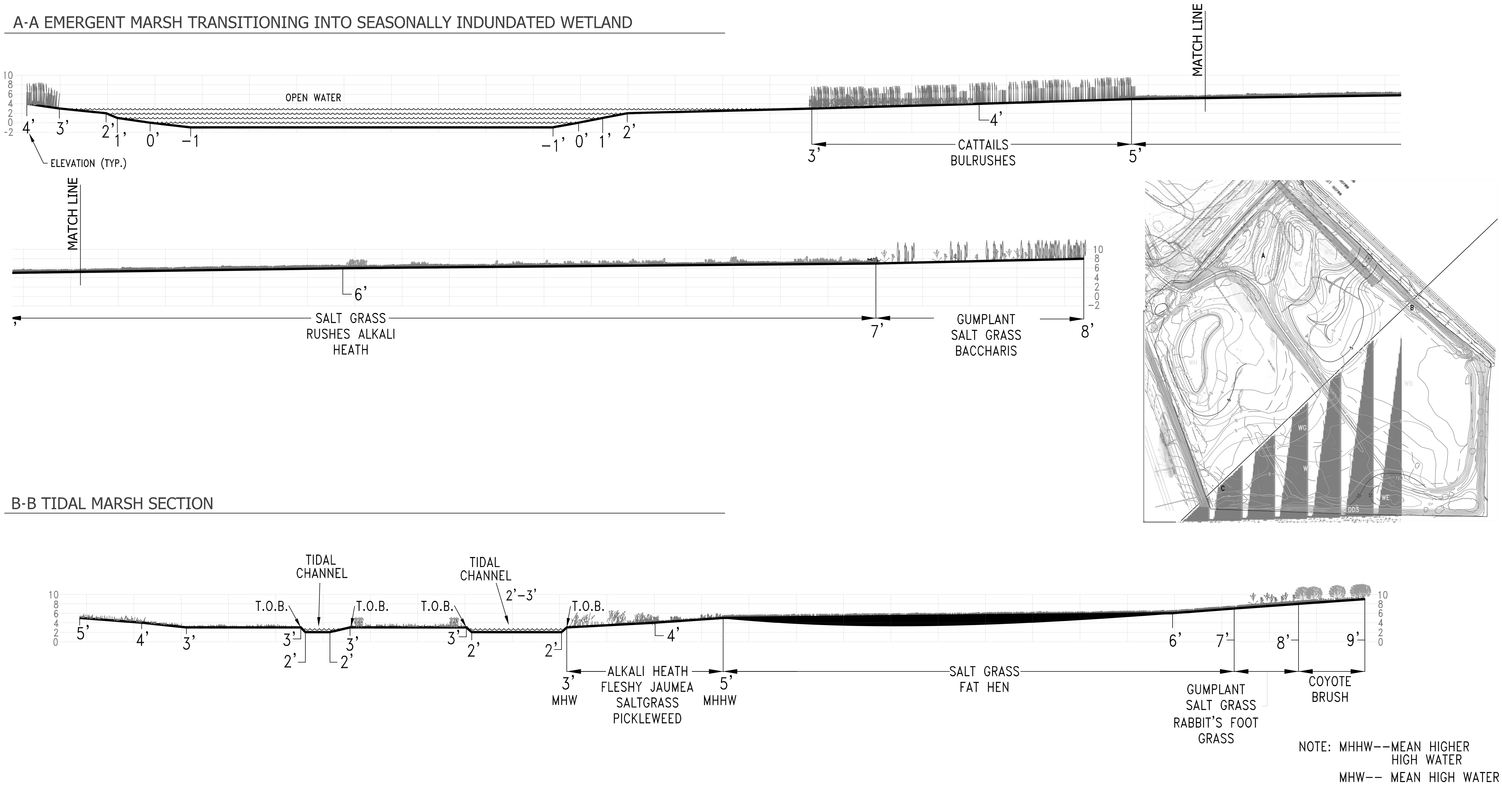
Source: CSW/Stuber-Stroeh Engineering Group, Inc., 2006.

0 225 550 775 1100
Scale (Feet)

NORTH

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure V.C-2
Wetland Mitigation Plan



Source: CSW/Stuber-Stroeh Engineering Group, Inc. 2006.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure V.C-3
Cross-Section of Wetland Mitigation Plan Area

Special Status Animal Species

With the exception of the Petaluma River corridor and possible nesting by raptors and other bird species protected under the Migratory Bird Treaty Act, most of the site is not expected to provide habitat for special-status animal species. The endangered salt marsh harvest mouse was absent during protocol surveys of Areas B, C and D as confirmed in the determination by the USFWS,[32] and suitable habitat is similarly absent in Area A.

There is a varying potential for a number of special-status animal species to forage and possibly nest in the small band of coastal brackish marsh along the shoreline of the Petaluma River or to seasonally occur in the open waters of the River. These include the listed California clapper rail, California black rail, steelhead trout, and chinook salmon, and well as several SSC species including the river lamprey, Sacramento splittail, northwestern pond turtle, saltmarsh common yellowthroat, and San Pablo song sparrow. Impacts in this area would be avoided during the project start-up phase, and would likely be minimal even upon operation of the full production project. This stand of brackish marsh is relatively small in size, occupying approximately 0.18 acres, and is isolated from other marshland along the west bank of the Petaluma River by the developed residential and industrial uses to the south and the bulkhead of the loading facility to the north. However, the adjacent uplands on the site are currently vacant and any human disturbance to species utilizing this small band of shoreline is relatively infrequent.

Proposed improvements on Area A include installation of a conveyor and supports, a new pier at the confluence of the slough and River, a ramp and footings on the north side of the slough to provide pedestrian and vehicle access to the pier and barge, and four groupings of pilings or dolphins to secure the transport barge when present for off-loading gravel. The current plans also include pumping 40 gallons per minute of water from the Petaluma River in Area A, and/or the tidal slough in Area C, to be used for dust suppression. The applicant proposes to use between 10,000 and 20,000 gallons per day, however the details for appropriation and diversion have not yet been defined.

Construction and installation of improvements near or within the River could result in the destruction of active nests or loss of individuals associated with the River habitat, if present within the limits of disturbance. Although the potential for nesting by special-status bird species is considered low due to the small size of the brackish marsh and relatively exposed location, if active nests were to occur within the vicinity of proposed construction they could be abandoned, depending on proximity and duration of disturbance. Conducting preconstruction surveys to confirm absence of any nesting birds, or restricting construction activities on the shoreline portion of Area A to the non-nesting season (September 1 through February 15) would avoid the remote potential for abandonment of any active nests.

Fish and other aquatic species could be inadvertently taken during in-channel construction, including placement of pilings, installation of the water diversion structure, and other improvements. Additional loss of fish and aquatic species could occur when water is pumped as part of long-term operations, although similar diversion has occurred as part of the existing operations west of Highway 101 and north of the project site. Most construction-related potential impacts on steelhead trout and other aquatic species could be avoided by scheduling in-channel construction activities between July 15 through October 15 when

[32] *U.S. Fish and Wildlife Service, 2005, Request for No Take Determination for the Haystack Landing Project Site, City of Petaluma, Sonoma County, California, letter to Ms. Sarah Lynch, Senior Associate Biologist, Monk & Associates from Catrina Martin, Deputy Assistant Field Superisor, January 13.*

out-migrating smolts and migrating adults would most likely be absent along this reach of the Petaluma River. The National Marine Fisheries Service (NOAA Fisheries) has developed fish screening criteria for anadromous salmonids[33] that are designed to minimize entrainment and loss of individual fish as a result of in-channel pumping and diversion. Proper design and installation of pump intake screening should serve to avoid inadvertent take of individual fish during water diversion from the River or slough. However, this possible loss of listed and protected species associated with the River habitat is considered a ***potentially significant*** impact.

Some aspects of the project would improve habitat, while others would degrade existing potential habitat for special-status species. The proposed wetland mitigation program would result in the creation of additional tidal marsh, brackish marsh, and seasonal wetland, which would provide expanded foraging opportunities for a number of special-status bird species known or suspected in the project vicinity. The expanded tidal and brackish marsh habitat would be dominated by pickleweed, which would improve the suitability of the site for salt marsh harvest mouse as well.

Conversely, new structures and increased human activity along the shoreline of the Petaluma River would reduce the habitat value of the remaining brackish marsh and associated aquatic habitat. Depending on the location of the water diversion intake structure, proposed pumping could affect surface water levels in the wetland mitigation area and the feasibility and value of the proposed habitat enhancement efforts. Proposed lighting, noise generated by the periodic operation of the off-loading facility and conveyor, and vehicle equipment operation would all discourage foraging and possibly nesting along this segment of the River shoreline.

Special status species associated with nearby off-site habitats, including Shollenberger Park and marshland on the east side of the Petaluma River north of Adobe Creek, are not expected to be adversely affected by the proposed project. These areas are already exposed to human disturbance and industrial activities on the west side of the River near Shamrock Materials, which is directly across the River from the Petaluma River Marsh, approximately 250 away. The proposed dock will be located about 800 feet away and downstream from the marshland habitat. Therefore, potential indirect impacts to salt marsh harvest mouse, California clapper rail, California black rail, saltmarsh common yellowthroat, San Pablo song sparrow, and western pond turtle located in off-site habitats is considered to be ***less-than-significant***.

Impacts to special-status species suspected to possibly occur on the project site, along the shoreline of Area A, have become acclimated to the existing level of human activity on the west side of the River, but the proposed level of activity and additional lighting could be disruptive, at close proximity, particularly if barge off-loading were to occur at night. Therefore, impacts would be ***potentially significant***.

Further discussion of the potential impacts of the project on wildlife habitat values along this segment of the Petaluma River is provided under Impact BIO-4. These impacts could affect marginal potential foraging and nesting activity of special-status species as well, but this is considered a remote potential on special-status species that would be addressed by the measures recommended to mitigate potential impacts on wildlife habitat in general, as detailed below. Further discussion of the possible implications of water diversion on the success of the on-site wetland mitigation program is provided under Impact BIO-3.

[33] *National Marin Fisheries Service, Southwest Region, 1996, Juvenile Fish Screen Criteria for Pump Intakes, May 9, and 1997, Fish Screening Criteria for Anadromous Salmonids, January.*

Proposed construction could also affect nests of raptors or other birds recognized by the CDFG as Species of Special Concern (SSC), regulated under the State Fish and Game Code, and protected under the Migratory Bird Treaty Act if new nests are established on the site before vegetation clearance occurs as part of the project. While no raptor nests were observed on the site during the surveys conducted by the applicant's biologist or the EIR biologist, there is a potential for new nests to be established prior to initiating grubbing and construction. Tree and shrub removal or disturbance in the immediate vicinity of a nest in active use could result in abandonment of the nest or loss of eggs and young. Impacts would be ***potentially significant***. Preconstruction surveys would be necessary to confirm presence or absence of any active nests in the vicinity of construction, with appropriate setbacks provided until young have successfully fledged. Alternatively, initial grading could be initiated during the non-nesting season (September 1 through February 14) to avoid disturbance or loss of any active nests, eggs, or young. Mitigation below recommending preconstruction surveys address both raptors and all species regulated under the Migratory Bird Treaty Act, for simplicity purposes.

The egrets and herons occupying the colony in the stand of trees in Area B are protected under the Migratory Bird Treaty Act when nests are in active use, but are not listed or special-status species. Appropriate restrictions on the timing of construction activities in the vicinity of this colony would be required to ensure compliance with the Migratory Bird Treaty Act. Further discussion of the importance of this colony as a sensitive wildlife habitat feature, and additional measures recommended to mitigate potential loss of this resource are provided under Impact BIO-4.

<u>Start-up Phase</u>

During the start-up phase of the proposed project the barge off-loading facility and the conveyor over the railroad tracks would not be in place. No construction related to the barge off-loading facility would occur along the Petaluma River at Area A of the site. Area A would not be used for material transport or for pumping of water from the River for dust suppression during this phase.

As described previously, a small band of coastal brackish marsh occupies approximately 0.18 acres along the shoreline of the Petaluma River (Area A), with the remainder of Area A currently largely unvegetated. Dominant species in the band of marshland include bulrush (*Scirpus* spp.), visid tule (*Schoenoplectus acutus*), and three-square (*Schoenophlectus americanus*). The marsh forms a discontinuous band 25-40 feet wide along the bank of the River. A narrow slough that is largely unvegetated bisects the marsh and extends westward before entering a culvert that receives surface water from an open ditch. The small band of marshland and the unvegetated slough at Area A provide foraging opportunities for birds and aquatic life, and the dense vegetation does provide some important cover along this segment of the River shoreline. For example, river lamprey could occasionally be expected along the shoreline and open water habitat adjacent to Area A on the site where they may feed on terrestrial and aquatic insects, amphipods, other small crustaceans, and small fish.

During the start-up phase, impacts related to special-status species would be reduced or avoided compared to special-status species impacts associated with the full build out phase of the project. This is attributed to the start-up phase not including several components associated with the full build out phase that have the potential to result in significant impacts to special-status species. Specifically, the start-up phase would not involve any construction (i.e., barge off-loading platform and conveyor system) or project operation along the River or marshland that could result in the destruction of active nests or loss of individuals associated with the River habitat. Also, potential loss of fish and aquatic species would be reduced because no pumping of water from the narrow slough at Area A would occur during this phase of the project. The start-up phase also would not involve the use of barges to deliver materials to the site, nor the unloading of materials from a barge to a off-loading platform which would reduce potential disturbance to special-status animal species, particularly at night.

Mitigation Measure BIO-1a Nesting Birds

Initial grubbing, grading, and construction shall be prohibited within 50 feet from the bank of the Petaluma River during the nesting season (February 15 through August 31) to protect the stand of coastal brackish marsh on Area A that may provide habitat for California clapper rail, California black rail, saltmarsh common yellowthroat, and San Pablo song sparrow. This zone shall be fenced and signed as a “Potential Nesting/No Disturbance Zone” in advance of any construction on the remainder of Parcel A to ensure equipment and workers remain outside the area. Construction within this zone may proceed during the non-nesting season (September 1 through February 14), but must consider other possible restrictions associated with in-channel construction activities.

Mitigation Measure BIO-1b Nesting Birds

Any active raptor nests or nests of other birds protected under State Fish and Game Code and the Migratory Bird Treaty Act in the vicinity of proposed grading shall be avoided until young birds are able to leave the nest (i.e., fledged) and forage on their own. Avoidance may be accomplished either by scheduling initial grubbing and grading during the non-nesting period (September 1 through February 14) or, if this is not feasible, by conducting a pre-construction survey for raptors and other birds protected under State Fish and Game Code and the Migratory Bird Treaty Act. Provisions of the pre-construction survey and nest avoidance, if necessary, shall include the following:

1) If construction is scheduled during the active nesting period (February 15 through August 31), a focused survey for nesting raptors and other birds protected under State Fish and Game Code and the Migratory Bird Treaty Act shall be conducted by a qualified wildlife biologist no more than 15 days prior to initiation of grubbing or grading to provide confirmation on presence or absence of active nests in the vicinity.

2) If no active nests are identified during the survey period, or if construction is initiated during the non-breeding season (September 1 through February 14), grading and construction may proceed, unless prohibited by the provisions in Mitigation Measure BIO-1a.

3) If active nests are encountered, species-specific measures shall be prepared by a qualified biologist in consultation with the CDFG and implemented to prevent abandonment of the active nest. At minimum, grading in the vicinity of the nest shall be deferred until the young birds have fledged. The perimeter of the nest-setback zone shall be fenced with temporary construction fencing or adequately demarcated, and construction personnel restricted from the area. Signage shall be installed along the perimeter of the nest-setback zone at a minimum 100-foot intervals that read “Nesting/No Disturbance Zone.” Fencing and signage shall remain in place until the qualified biologist has determined that any young have fledged. The distance between the active nest and edge of the “Nesting/No Disturbance Zone” shall depend on the nesting species, with a minimum distance

of at least 200 feet for more sensitive species such as raptors and at least 75 feet for more common passerine birds.

4) If permanent avoidance of the nest is not feasible, impacts shall be minimized by prohibiting disturbance within the "Nesting/No Disturbance Zone" until a qualified biologist verifies that the birds have either a) not begun egg-laying and incubation, or b) that the juveniles from the nest are foraging independently and capable of independent survival at an earlier date.

5) A report of findings shall be prepared by the qualified biologist and submitted to the PRMD for review and approval prior to initiation of grading and construction in the "Nesting/No Disturbance Zone." The report shall either confirm the absence of any active nests or shall confirm establishment of a designated "Nesting/No Disturbance Zone" setback during the breeding season for any active nests. Supplemental reports shall be submitted to the PRMD for review and approval to allow construction to proceed within these zones after any young birds have fledged.

Mitigation Measure BIO-1c Fish and Other Aquatic Species

Any in-channel construction work within the Petaluma River shall be restricted between July 15 through October 15 when out-migrating smolts and migrating adults would most likely be absent along this reach of the Petaluma River. The USFWS and NOAA Fisheries would be involved in the review of the project application because of the potential wetland impacts as part of the Section 404 consultation process, and these agencies may impose additional restrictions to protect essential habitat for special-status species as part of the Section 7 consultation required as part of the Endangered Species Act. This would include screening of any intake for the pumping from the River, and restrictions on pumping when migrating individuals would most likely be present in the River segment bordering the site.

Mitigation Measure BIO-1d Western Pond Turtle

If required by the CDFG and USFWS as part of the permit process, a pre-construction survey shall be conducted by a qualified biologist to determine if western pond turtle is present in the vicinity of proposed in-channel improvements along the Petaluma River and slough. If required by the agencies, a qualified biologist shall be present on-site during construction of in-channel improvements to ensure that any turtles within the vicinity of proposed work are not harmed.

Mitigation Measure BIO-1e Permit Authorizations

As called for under Mitigation Measure BIO-3a, all necessary permits and authorizations shall be secured from regulatory agencies as required to allow for modifications to jurisdictional waters on the site, including any necessary consultation with the USFWS and NOAA Fisheries regarding a take determination. Evidence of permit authorization shall be submitted to the PRMD prior to issuance of any grading or building permits by the County to ensure compliance with applicable State and federal regulations. The applicant shall comply with all conditions therein that are not otherwise included as mitigation measures in this Draft EIR or as conditions of project approval by the County.

Mitigation Measure BIO-1f Special-Status Plants

Although the potential for occurrence of special-status plant species in areas of coastal salt marsh and brackish water on the site is remote, the applicant shall conduct systematic surveys to confirm absence in advance of any in-channel disturbance. The supplemental surveys for special-status plants shall include the following components and shall meet the following standards.

- Systematic surveys shall be conducted by a qualified botanist in spring and summer (April and June) to confirm absence of any special-status plant species in areas of coastal salt marsh and brackish water marsh. This shall include the segment of Area A along the shoreline of the Petaluma River and portions of Areas B, C, and D along the drainage ditch on the west side of the railroad right-of-way.
- If populations of any special-status plant species area encountered, a mitigation program shall be prepared by the qualified botanist for any listed species or those maintained on Lists A, 1B, or 2 of the CNPS *Inventory*. The mitigation program shall be prepared in consultation with the CDFG, and shall include any appropriate authorizations from the CDFG and/or the USFWS for any species listed under the Endangered Species Acts. Measures taken in the mitigation program shall be based the life history of the species encountered, successful mitigation treatments used for this species in the past, and legal protective status. These measures shall include one or more of the following components as negotiated with agency representatives: avoidance of the population; collection of seed or vegetative material during the appropriate developmental stage of the plant; procedures for sowing, establishment, or translocation of the species; development of a maintenance and monitoring program specific to the environmental conditions necessary for survival of the new population; and identification of a funding source to provide for implementation of the plan, and for long-term management and maintenance of the mitigation area.
- Potential impacts on any species that are maintained on Lists 3 and 4 of the CNPS *Inventory* would not be considered significant and no additional mitigation would be required for these species.

Impact BIO-2 Substantial Adverse Effect on any Riparian Habitat or other Sensitive Natural Community

Most of the site, including much of the seasonal wetlands, is vegetated with non-native species, which are not considered sensitive natural community types. The one exception is the coastal brackish marsh along the shoreline of the Petaluma River, which the CDFG considers a sensitive natural community type. An estimated 0.01 acres of this habitat type was filled during the unauthorized grading in September 2005 and additional habitat could be affected during installation of the off-loading facilities on Area A.

This vegetation would not be significantly impacted during the project's start-up phase. Upon full build-out and operation, the proposed pier and pilings would be sited in the open water habitat of the River, and their construction and future shadows would not be expected to affect the emergent vegetation. The support ramp and conveyor system would overshadow an estimated 500 square feet of emergent marsh, however, and would most likely reduce cover and habitat values beneath these structures. Operation of the conveyor may lead to side-casting of gravel that could accumulate below the structure and eventually fill the marsh and open water habitat unless adequate measures are taken. Installation of the pipeline and intake structure as part of the water diversion could also affect the shoreline vegetation and open water habitat of the River, although these proposed improvements have not yet been defined or mapped.

Unless adequate controls are in place to identify sensitive wetland and buffer habitat, routine maintenance and operation of the site could lead to inadvertent fill and disturbance to additional shoreline habitat, and even the drainage and wetland mitigation areas to be preserved and enhanced. The tendency of an industrial use of this type is to maximize the available land area for on-going operations, storage, and other functions. This could lead to placement of additional gravel and fills at the edge of the marsh and drainage, as occurred during the unauthorized grading in September 2005. This would eliminate both the sensitive habitat and the adjacent upland buffer that provides important water quality filtration and other habitat functions. Maintenance of the in-channel improvements could also lead to temporary removal or disturbance to the surrounding marsh cover. Although the total area affected may be relatively small, it still represents a ***potentially significant*** impact on a sensitive natural community and contributes to a reduction in the wildlife habitat values of the site, as discussed further under Impact BIO-4.

Start-up Phase

During the start-up phase of the proposed project, impacts to the coastal brackish marsh along the shoreline of the River, which the CDFG considers a sensitive natural community type, as well as impacts to the narrow slough would be avoided as this phase would not include the construction of a barge off-loading facility nor a conveyor system at Area A.

Mitigation Measure BIO-2 Riparian Habitat

The proposed WMMP shall be revised and implemented to include restoration and enhancement of habitat along the shoreline of the Petaluma River on Area A of the site, and ensure its protection as part of long-term operations. The revised WMMP shall include the following:

1) A limited access zone shall be established within 50 feet of the High Tide Line and within 10 feet of the top of bank to the slough. Permitted improvements within this zone shall be clearly identified and mapped, including the pier, ramp, dock access, conveyor and transition support, pipeline and intake structure for pumping River water, and an access alignment along the north side of the conveyor to allow for future maintenance of these structures.

2) All areas outside the permitted improvements shall be designated for habitat restoration and enhancement. Fills shall be removed to create additional coastal brackish marsh, transitional upper-zone marsh, and upland buffer habitat.

3) The entire habitat enhancement/restoration area shall be designed, revegetated, monitored, and maintained as part of the proposed WMMP for the site.

4) A fence shall be installed along the perimeter of the habitat enhancement/restoration area to separate sensitive habitat from permitted industrial use. The fence shall consist of permanent 4-foot high wildlife friendly fencing.

5) Permanent signage shall be installed at 50 foot intervals along the perimeter fencing that reads "Sensitive Marsh Habitat/No Disturbance Zone."

Impact BIO-3 Substantial Adverse Effect on Jurisdictional Wetlands and other Waters

Potential impacts on wetlands would include direct modifications to jurisdictional waters to accommodate various aspects of the project improvements, and indirect changes associated with the increased potential for erosion and water quality degradation. Potential erosion and degradation of the wetland and riparian habitat may result from increased urban runoff volumes and degraded water quality associated with proposed development. Areas of impervious surfaces would magnify the volume of runoff and potential for urban pollutants, with potential damage resulting from increased erosion, sedimentation during the construction phase of the project, and new non-point discharge of asphalt-related products, automobile by-products, fertilizers, and herbicides, as discussed in Section V.G (Hydrology and Water Quality). The proposed WMMP has been designed to provide for pretreatment of surface runoff from the developed portions of Areas B and C before entering the wetland mitigation area on Area D.

Construction of the proposed asphalt plant and off-loading facilities would result in filling and modifications to approximately 1.76 acres of seasonal wetlands and approximately 0.02 acre of open water and marsh habitat along the shoreline of the Petaluma River. Affected seasonal wetlands are generally of low quality and are located in previously disturbed areas, including the vicinity of the former farm buildings at the southern edge of Area B and the southern portion of Area C where unauthorized grading in September 2005 scraped approximately 0.53 acre of wetlands.[34] Waters along the Petaluma River affected by the project would include an estimated 0.01 acre of coastal marsh filled during the unauthorized grading in September 2005, and additional marsh and open water habitat.

The proposed support ramp and conveyor system would overshadow an estimated 500 square feet of emergent marsh and would most likely reduce cover and habitat values beneath these structures. The location of the pipeline and intake structure have not been defined, but would have to cross the band of marsh vegetation. The barge would occupy an estimated 1,250 square feet of River habitat when present. This would be a permanent impact but would occur on a periodic basis, and would not directly affect existing vegetation. Operation of the conveyor during off-loading may lead to side-casting of gravel that could accumulate below the structure and eventually fill the marsh and open water habitat over the life of the project unless adequate measures are taken to contain this debris between the pier and transition support. On-going operations could inadvertently result in fill to sensitive wetland habitat unless the limits of authorized work areas and buffers along wetlands and drainage are clearly fenced and signed, as discussed further under Impact BIO-4.

The proposed WMMP provides a comprehensive approach to mitigating potential impacts on jurisdictional wetlands. The WMMP proposes to enhance approximately 8.48 acres of seasonal wetlands, create 2.71 acres of new tidal marsh and seasonal wetlands, and enhance 2.11 acres of uplands. Of these totals, 0.67 acre of tidal marsh and 2.04 acres of seasonally inundated wetlands would be created. The 8.48 acres of enhancement would consist of 0.51 acre of seasonal wetland to tidal marsh, 5.47 acres of seasonally inundated wetland, and 2.50 acres of seasonal wetland to emergent marsh (see Figure V.C-2). The PAWI assumes that wetland-related impacts resulting from the project would be mitigated at approximately a 3:1 ratio, with full credit for creation of 2.71 acres of new wetland habitat and 50% credit for restoration/enhancement of 8.48 acres of existing low quality wetlands. The WMMP includes success criteria for establishment of minimum vegetative cover standards and appropriate salinity ranges, as well as monitoring requirements and

[34] *Lucy Macmillan, 2005, Ibid.*

maintenance provisions during the minimum 5-year monitoring period. The entire WMMP is available for review in Appendix E of this Draft EIR.

The proposed approach to mitigating potential impacts on wetlands defined in the WMMP appears adequate. However, four aspects require further refinement to ensure successful implementation of created, restored, and enhanced habitat.

First, the WMMP contains no provisions for control of invasive exotics, which can severely limit the establishment of native cover and prevent the mitigation program from reaching intended habitat improvement goals. A number of invasive species are already problems in the southern portion of the site where the mitigation is proposed. These include French broom, sweet fennel, and yellow star thistle, among others. Maintenance and monitoring should include an aggressive program to control any invasive exotics from wetland and upland habitat addressed in the WMMP.

The second issue of concern is functioning of the partially obstructed culvert under the railroad right-of-way. This culvert provides the only hydrologic connection between the entire mitigation area and the Petaluma River. Its functioning is critical to the successful creation and enhancement of the tidal and brackish marsh on this portion of the site. Replacement of the existing partially blocked culvert would allow sufficient tidal flows to enter the site and provide one of the essential conditions necessary to restore the tidally influenced wetlands. The preliminary hydrologic evaluation for the mitigation plan includes a recommendation to replace the culvert, but this was not specifically identified in the text of the WMMP.[35] The long-term functioning and success of the created and enhanced tidal and brackish marsh could be further compromised if the proposed water diversion structure is located on the west side of the railroad right-of-way. Under worst-case conditions, if taken from this location and not properly monitored, the water draw for dust control purposes may be of such a high volume and limited duration during daily high tides that little surface water remains in the created tidal and brackish marsh areas. If sufficient surface water does not reach the proposed marshland habitat, successful establishment of emergent vegetation may not be possible and the area may function more as a seasonal wetland with lower habitat values and limited biological functions.

The third issue relates to the establishment of enhancement plantings, and need to provide appropriate growing substrate and short-term irrigation to ensure successful establishment. Most of the existing substrate through the proposed mitigation area contains very little organic matter, deposited as part of berm construction and siltation from the former quarry wash water deposition. Soil amendments may be required to ensure an adequate growing medium for enhancement plantings. If water drawn from the Petaluma River is used for irrigation, higher salinity levels during the summer months could adversely affect plantings, particularly in upland areas. The WMMP does not specify any soil testing or source of irrigation water, although these would typically be defined as part of the landscape plan.

Finally, based on the expanded wetland delineation conducted for the site in 2006,[36] additional brackish marsh and uplands occur on the site along the west side of the railroad right-of-way that were not identified in the WMMP as this drainage was originally believed to be off-site. Refinement of the WMMP to include this area would provide for additional habitat enhancement opportunities and could serve to improve circulation in the southeastern edge of the proposed wetland mitigation area. This expanded wetland and upland habitat would

[35] *Balance Hydrologics, Inc., 2004, Ibid.*

[36] *Lucy Macmillan, 2006, Ibid*

serve to offset the additional approximately 0.05 acres of potential seasonal wetlands to be filled along the southern edge of Area B that had not been mapped when the WMMP was prepared. Impacts to jurisdictional wetlands and other waters would be ***potentially significant***.

Start-up Phase

During the start-up phase of the proposed project, impacts to approximately 1.76 acres of seasonal wetlands and approximately 0.02 acre of open water and marsh habitat along the shoreline of the River at Area A would be avoided as this phase would not include the construction of a barge off-loading facility nor a conveyor system at Area A.

Mitigation Measure BIO-3a Jurisdictional Wetlands and Other Waters

The proposed WMMP shall be refined and implemented to address potential impacts on jurisdictional waters and to enhance the habitat values along the Petaluma River. The final WMMP shall be prepared by a qualified wetland consultant, and must be approved by Sonoma County PRMD, the Regional Water Quality Control Board, the San Francisco Bay Conservation and Development Commission (BCDC), the Corps, and the California Department of Fish and Game. The plan shall clearly identify the total wetlands and other jurisdictional waters affected by the project and provide for re-establishment, enhancement, and/or replacement of wetlands. Revisions to the WMMP shall include the following:

1) Expand the proposed wetland mitigation area to include the additional habitat protection and creation specified under Mitigation Measure BIO-2 as well as enhancement of the drainage channel along the west side of the railroad right-of-way, a portion of which was previously believed to be off-site when the draft WMMP was prepared. This may provide options to increase the acreage of created or enhanced brackish marsh wetlands and adjacent uplands habitat, and possibly improve circulation in the southeastern portion of the proposed wetland mitigation area.

2) Incorporate provisions for the control of invasive exotic species from the wetland and upland enhancement mitigation area in Sections 5, 6, and 8 of the WMMP, based on input from the Corps, RWQCB, and CDFG. This shall include monitoring and maintenance provisions that call for periodic inspection and removal in spring and summer, and a success criteria that specifies successful control of target species within five years of initial construction of the wetland mitigation area. Target species to be controlled in the wetland mitigation area include: sweet fennel, poison hemlock, Italian thistle, pampas grass, French broom, Scotch broom, eucalyptus, and acacia, among others.

3) Provide appropriate soil testing and amendment as part of the landscape plan and revise the maintenance measures in Section 8 to include additional provisions related to upland habitat created and enhanced as part of the WMMP. Soil amendment shall be provided as necessary to ensure successful establishment of desirable native species, as reflected in on-going monitoring and maintenance requirements of the WMMP.

4) Require repair or replacement of the existing partially blocked culvert under the railroad right-of-way as part of the WMMP to improve tidal circulation in the proposed wetland mitigation area. The size and design of the new culvert shall be based on a detailed hydrologic assessment conducted by the applicant’s consulting hydrologist, as reviewed and approved by the permitting agencies and the property owner. Sizing of the culvert replacement shall consider any possible water diversion

demand proposed for dust control and its affect on surface water levels in the mitigation area, and the affects of possible sedimentation on the long-term viability of the created wetlands.

5) Ensure that any proposed water diversion for dust control does not adversely affect the feasibility and success of tidal and brackish marsh to be created in Area D. This shall be demonstrated on an annual basis as part of on-going monitoring and maintenance defined in Sections 8 and 9 of the WMMP. Diversion shall be curtailed or an alternative method secured if performance standards and success criteria defined in the WMMP for areas of tidal and brackish marsh are not met due in part or wholly because of the proposed water diversion.

6) Include minimum setbacks from the top of bank to the drainage channels to be retained in Areas C and D where they border proposed industrial uses. A minimum 5 foot setback shall be provided from the top of each bank to provide for improved enhancement and prevent inadvertent fill of these features. A fence shall be installed along the perimeter of the top-of-bank setback to separate sensitive habitat from permitted industrial use. The fence shall consist of a permanent 4-foot high wildlife friendly fencing that shall be open in nature to allow for passage of wildlife through or under the structure with a minimum six inch clearance at the bottom. Permanent signage shall be installed at 100 foot intervals along the perimeter fencing that reads "Sensitive Marsh Habitat/No Disturbance Zone."

Mitigation Measure BIO-3b Containment System

A containment system shall be designed and installed to catch and collect any side-cast gravels from the conveyor between the pier and transition support near the high tide line of the Petaluma River to prevent inadvertent fill of the jurisdictional waters. The containment system shall be regularly maintained as part of normal operations during the life of the project.

Mitigation Measure BIO-3c Stormwater Pollution Prevention Plan

As recommended in Section V.G (Hydrology and Water Quality), a Stormwater Pollution Prevention Plan shall be prepared and implemented using Best Management Practices to control both construction-related erosion and sedimentation and project-related non-point discharge into waters on the site. The plan shall contain detailed measures to control erosion of exposed soil, provide for revegetation of graded slopes before the start of the first rainy season following grading, address non-point source pollutants to protect wetlands and water quality in the drainage, and specify procedures for monitoring of the effectiveness of the plan.

Mitigation Measure BIO-3d Permit Authorizations

All necessary permits shall be secured to allow for modifications to wetlands, drainage channels, and the shoreline of the Petaluma River on the site. Evidence of permit authorization from the Corps, RWQCB, the BCDC, and CDFG shall be submitted to the PRMD prior to issuance of any grading or building permits by the County to ensure compliance with applicable State and federal regulations.

Impact BIO-4 Interfere Substantially with the Movement of Native Fish or Wildlife, Established Wildlife Corridors, or Impede the Use of Native Wildlife Nursery Sites

The proposed project would result in both negative and beneficial impacts on wildlife habitat, established corridors and movement opportunities, and wildlife nursery sites. Construction and operation of the proposed processing plant would eliminate existing vegetative cover in the southern portion of Area B, much of Area

C, and portions of Area A. Implementation of the WMMP would also eliminate much of the existing cover and associated wildlife habitat values on Area D. However, this habitat consists of primarily low quality ruderal grasslands and seasonal wetlands. The enhanced and expanded habitat provided by the WMMP, together with additional provisions for habitat preservation and enhancement recommended in mitigation measures above, would address the short-term impact of grading on existing habitat and improve the collective habitat values on the site. Impacts would be ***less than significant***.

Development along the shoreline of the Petaluma River and the location of improvements in the vicinity of the egret/heron colony would impinge on existing wildlife movement opportunities and could impede use of these features. As noted previously, colonial breeding sites (or rookeries) of egrets and herons are considered sensitive by the CDFG, and these species tend to be highly sensitive to human intrusion and disturbance of nesting colonies. Nesting, roosting, and foraging birds tend to be sensitive to human and vehicle intrusion, and other disturbance factors such as loud noises, night-time illumination, or other sudden factors to which they are not acclimated. Repeated disturbance resulting in flushing of adults during the nesting season could disrupt egg incubation and feeding routines, and could possibly result in abandonment of the nests depending on the magnitude, frequency, and duration of the disturbance factor. While it is difficult to predict how individual birds in the colony on the site may react to construction and on-going operations at the proposed facility, it is likely that intrusion closer than the existing road on Area B and the railroad tracks to the east of the colony would be disruptive, particularly during the nesting season.

Proposed improvements near the colony include the conveyor to the east and the fire station and parking to the west. The alignment of the proposed conveyor would turn less than 125 feet from the edge of the colony. Rock would presumably drop at this change in the conveyor system, generating noise slightly beyond just the routine operational noises. The conveyor structure would also be constructed between the River and the colony, creating an obstacle between major foraging areas to the east and southeast. While this new structure would not form a barrier to movement, it would disrupt current flight patterns and visibility to the southeast from the nesting birds. It would also generate noise during operation, which could be very disruptive if operated at night during the nesting season. In addition, construction of the fire station and parking would require removal of at least four mature blue gum eucalyptus, which could indirectly affect the colony. The trees to be removed are not currently used for nesting or roosting by egrets and herons, but they most likely provide important visual screening of the Highway 101 freeway and serve to buffer easterly winds. This colony has obviously acclimated to the noise generated by the freeway traffic, but this is a constant source with little modulation in average noise levels. Although it is not possible to accurately predict the impact of removing these trees on the viability of the colony, these direct changes on visibility and wind exposure may be a greater threat than construction of the nearby conveyor.

The Petaluma River provides fish and wildlife habitat of regional significance and any modifications to the shoreline and open waters of the River must be carefully evaluated to address both direct and indirect potential impacts. Additional assessment of the potential impacts of the project on special-status species, sensitive natural communities, and jurisdictional waters associated with the River system is provided above under Impact BIO-1, Impact BIO-2, and Impact BIO-3, respectively.

One aspect of proposed operations not addressed previously is the proposed off-loading at night, including the associated lighting and noise generation. This night-time light and noise would be sporadic depending on demand, but could disturb nesting and roosting wildlife, particular diurnal species that may flush and become disoriented as they attempt to flee and locate secure habitat. As indicated in Section III (Project Description), any night-time lighting would be prevented from dispersing to surrounding residential areas and the open space across the River. However, the nature of the proposed operation, and need to illuminate the barge, pier, and unloading conveyor, make containment of light difficult on this exposed river front location. Startup of operations at night, which would not be prohibited as currently proposed, would be particularly disruptive to any wildlife nesting, roosting, or resting in the vicinity. This includes any species utilizing the band of coastal brackish marsh along the shoreline of the River, the colony of egrets and herons on Area B, and possibly wildlife species associated with nearby Shollenberger Park.

The *Heron/Egret Rookery Impact Assessment and Recommendations*[37] (H/ERIAR) prepared for the applicant acknowledges that a number of activities associated with development and operation of the project could adversely affect nesting by egrets and herons. Options are defined in the H/ERIAR to provide compliance with the Migratory Bird Treaty Act, Fish and Game Code 3503, and to minimize potential impacts under CEQA. These consist of implementing a number of operational and design standards to minimize possible disruptive activities or attempting to relocate the rookery to a more remote and secure location. The operation and design standards include restrictions associated with construction and use of the segment of the conveyor belt near the rookery, providing a solid roof and partial west wall along the conveyor, running the conveyor system daily when herons and egrets first arrive at the rookery, restricting human access to the covered area along the conveyor during the nesting season, directing all lights in the barge unloading area into the work area and not at the rookery, turning night lights on several times for a couple of hours during the nest selection/pair bonding (typically mid-February to mid-March), relocating the entrance parking lot to the southeast a minimum of 110 feet from the closest rookery nest tree, retaining the row of eucalyptus trees in the proposed parking area to provide visual separation, installing signs along the perimeter of a buffer zone around the rookery, and periodic monitoring. A proposed replacement rookery includes recommendations for short-term establishment on artificial nesting platforms in the wetland mitigation area in the southwestern portion of the site until trees planted as part of habitat enhancement are large enough to support nesting and roosting activity. Nest platforms would be attached to transmission poles at least 20 feet in height, or shorter poles in dense low-growing vegetation. A complete copy of the H/ERIAR report is available in Appendix E in Volume II of this DEIR.

Many of the recommendations from the H/ERIAR would serve to partially mitigate or minimize potential disturbance to the heron/egret colony. These include restrictions on timing of construction, use of a roof and partial wall over the conveyor, restricting human access to the covered portion of the conveyor during the nesting season, controls on night-time lighting for the barge off-loading area, preservation of the eucalyptus on the west side of the colony and adjustments to the proposed parking area, installation of signs around the perimeter of the nesting colony to control human access, and monitoring and further adjustments to operations based on egret and heron responses. However, the suggestion that night-time lighting be turned on several times for a couple of hours during the nesting selection/pair bonding period, to be increased if herons and egrets adversely react to tests, is inadvisable. Birds and wildlife often acclimate to routine disturbance factors, as demonstrated by the proximity of the existing colony on the site to the nearby Highway 101 and other human activity in the area. But trying to acclimate nesting birds to the sporadic, short-term operation of the conveyor system and lighting would be disruptive to the egrets and herons in the on-site colony.

[37] *LSA, ibid.*

In addition, successful replacement of the existing colony by construction of artificial nesting platforms would be speculative, at best. These nesting platforms would be completely exposed, with little or no protective vegetative screening between the artificial rookery and the nearby freeway and the aggregate operations on the site. It would seem more likely that if the herons and egrets currently nesting on the site were to relocate and establish a new rookery, a location with protective cover for wind and other visual screening purposes would be selected rather than an exposed artificial set of platforms. Vegetation planted as part of the upland enhancement associated with the WMMP may eventually provide additional or alternative nesting substrate for herons, egrets, and other birds.

Collectively, the proposed improvements and project operations could significantly disturb the egret/heron colony on the site, which is a known wildlife nursery, and impede its future viability. Similarly, improvements and operations on the Petaluma River could significantly affect the habitat values along this segment of the River, particularly the night-time operations during the nesting and breeding season of terrestrial and aquatic-dependent wildlife. Therefore, impacts to sensitive nesting habitat are considered to be ***significant***.

Start-up Phase

During the start-up phase of the proposed project, various impacts described under Impact BIO-4 would be reduced because the start-up phase would not involve construction of a barge off-loading facility or a conveyor, and project operation during this phase would not include the use of barges to unload materials along the bank of the Petaluma River. As a result, the start-up phase of the project would not result in the elimination of vegetative cover at Area A, and would reduce impacts to wildlife movement near or through Area A. The elimination of project facilities and operations at Area A under the start-up phase would also reduce impacts to the egret/heron colony and would minimize disturbance to nesting and roosting wildlife.

Mitigation Measure BIO-4a Sensitive Nesting Habitat

The egret/heron colony in the stand of blue gum eucalyptus shall be protected from disturbance associated with construction and future operations, particularly during the nesting season (February 15 through August 31). Proposed improvements at the entrance to the site and vicinity of the fire station shall be redesigned to retain most of the existing blue gum eucalyptus trees that provide visual screening of the existing egret/heron colony, including the row of three existing trees in the parking lot between the proposed fire station and the parking stalls to the south. Proposed roadway and building improvements shall be located no closer to the stand of trees supporting the colony than currently proposed. These trees and the blue gum eucalyptus comprising the stand currently used by nesting egrets and herons shall be retained as a condition of project approval unless and until the colony is no longer viable in the future.

Mitigation Measure BIO-4b Sensitive Nesting Habitat

Proposed construction shall be restricted away from the known egret/heron colony and from potential nesting habitat along the shoreline of the Petaluma River during the general nesting season to prevent possible nest abandonment and ensure compliance with the Migratory Bird Treaty Act during the active nesting season. Construction activities in Areas A and north of the cross-site access road on Area B shall be restricted to the non-nesting season (September 1 and February 14), unless surveys indicate that nesting has been completed before that time period. This includes installation of all improvements on Area A (pier, ramp, pilings, conveyor, access and parking, and wetland enhancement) and the septic leachfield, fire station and associated parking improvements in the north portion of Area B.

Mitigation Measure BIO-4c Sensitive Nesting Habitat

Project operations associated with off-loading the barge, running the conveyor, and illumination beyond that necessary for essential security purposes shall be restricted to the minimum necessary for critical tide dependent operations at night between sunset and sunrise during the nesting season (February 15 through August 31) to protect the sensitive nesting habitat in the egret/heron colony and the on-site marshland habitat along the shoreline of the Petaluma River.

Barges may be docked during the restricted hours, but no off-loading activities or operation of the conveyer shall be allowed. Lighting as necessary for safety and security purposes during barge docking shall be allowed. If a barge is anticipated to arrive on a particular night during the nesting season, the lighting shall be turned on at dusk and remain on until the barge has docked to minimize the potential for disturbing birds if lights were to be suddenly turned on in the middle of the night. Lighting shall be turned off after docking is complete. Otherwise, night-time lighting during the nesting season shall remain off, with the exception of that necessary for essential security purposes. All lighting shall be designed to minimize light intrusion beyond the operation areas on the site, to protect sensitive wildlife habitat areas along the Petaluma River, the egret/heron colony, and the proposed wetland mitigation area.

Note that sunset and sunrise times change with the seasons, and will range from approximately 5:30 PM to 7 AM in early February, to 8:30 PM to 6 AM in mid-June, to 7:30 PM to 6:30 AM in late August. Official sunrise and sunset times shall be obtained from a reputable source, such as the National Weather Service. During the non-nesting season, night-time work restrictions shall also apply as per Mitigation Measure NOISE-8 (Section V.I Noise).

Mitigation Measure BIO-4d Sensitive Nesting Habitat

The conveyor used to transport gravel from Area A to the processing plant shall be designed to minimize disturbance to the nearby egret/heron colony. The conveyor shall be designed as close to the ground as possible within 300 feet of the colony. A solid roof (metal, fiberglass, or opaque plastic) shall be constructed over the conveyor system, and a walkway/maintenance access be provided along the conveyor from the railroad crossing to the existing access road across Area B on the site. The covering shall extend down at least the upper half of the west wall facing the egret/heron colony to provide additional visual screening. Human access shall be restricted to the covered area along the conveyor during the nesting season (February 15 through August 31).

Mitigation Measure BIO-4e Sensitive Nesting Habitat

An employee education program shall be prepared and implemented to prevent inadvertent disturbance to the egret/heron colony during the nesting season (February 15 through August 31). Permanent signs shall be installed around the perimeter of a setback zone around the egret/heron colony at a minimum 100-foot interval to alert workers and the public that access to the area is restricted during the nesting season. Signs shall extend along the northern boundary of the site, east edge of the fire station improvements, north side of the cross-site access road, and west side of the railroad right-of-way. The signs shall read “Nesting Colony/No Disturbance Zone/February 15 through August 31.”

Impact BIO-5 Conflict with Local Policies and Ordinances

The extent of proposed development associated with the start-up phase and full build out phase and its effect on biological and wetland resources would conflict with a number of the relevant objectives, policies and programs in the Sonoma County General Plan. These policies call for protection of sensitive biological and wetland resources. These include: Policies RC-2e and RC-5c regarding protection of native vegetation and trees; Objective RC-5.1 to identify and protect areas with important wildlife habitat and woodland resources; and Goal RC-6, Objectives RC-6.1 and RC-6.2, and Policy RC-6c regarding protection of "rare and endangered species." The few policies regarding wetlands and riparian corridors relate specifically to locations designated under the Biotic Resource combining district in the General Plan that do not extend over the site, although the review and permitting by trustee agencies would serve to provide additional protection of these resources. The magnitude of the potential impacts associated with the project start-up phase and full build out phase on sensitive resources would conflict with the intent of the relevant goals, objectives, and policies. However, mitigation required by this Draft EIR and as part of the consultation process with the Corps, USFWS, NOAA Fisheries, CDFG, and RWQCB would ensure that adverse impacts are adequately mitigated and general compliance with applicable policies is provided by the project. Refer to Section V.H (Land Use), Table V.H-2, for a detailed analysis of relevant policies.

The southeast portion of Area D includes a relatively small area mapped within the Valley Oak Habitat (VOH) combining district. However, no trees within the on-site VOH community district would be removed because this area is also a part of the WMMP. Most of the trees on the site are not native. Enhancement tree plantings provided as part of the WMMP and as landscaping screen plantings along the western frontage of the site would serve to greatly expand the limited habitat value provided by the existing trees to be removed as part of the project. Impacts would be ***less than significant***.

Impact BIO-6 Conflict with Habitat Conservation Plan

No habitat conservation plans have been prepared addressing the site and surrounding lands. Therefore, the start-up phase and full build out phase of the project would not conflict with any adopted habitat conservation plans. Impacts would be ***less than significant***.

CUMULATIVE IMPACTS

The overall cumulative effect of development depends on the degree to which significant vegetation and wildlife resources are protected or mitigated. This includes preservation of areas of sensitive natural communities such as valley oak woodland, riparian woodland, and native grasslands, protection of essential habitat for special-status plant species, and avoidance of wetland. Further environmental review of any specific development proposals in the vicinity of the site (listed in Section III.B) should serve to ensure that important biological and wetland resources are protected and properly managed, and to prevent any significant adverse development-related impacts.

Cumulative development contributes to an incremental reduction in the amount and connectivity of existing wildlife habitat. The proposed project would include construction and improvements along the sensitive Petaluma River corridor, which could disrupt terrestrial and aquatic wildlife use. Diversion of water from the Petaluma River would reduce the available surface water, and could result in loss of fish and aquatic life unless adequate controls are implemented. Disturbance associated with the conveyor and processing at the plant could disrupt continued use of the egret and heron roosting colony on the site, which is of local importance as part of the larger ecology of the Petaluma River estuary system. However, the proposed project includes a considerable wetland mitigation program that would greatly improve existing habitat values and functions over a large portion of the site. Together with the measures recommended in this Draft EIR and conditions required as part of permit authorization from jurisdictional agencies, the project's contribution to cumulative impacts would be ***less than significant***.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the mitigation measures listed above, all potential impacts on biological and wetland resources would be mitigated to a level of ***less than significant***.

V. ENVIRONMENTAL IMPACT ANALYSIS
D. CULTURAL RESOURCES

INTRODUCTION

The information and analysis in this section is based primarily on the following reports, which are included in Volume II Appendix F of this DEIR:

- *Phase I Cultural Resources Study Review*, prepared by Tom Origer & Associates, January 27, 2006.
- *Phase I Cultural Resources Study for Haystack Landing, Petaluma, California*, prepared by Archaeor Archaeological Consultants, May 2004.

ENVIRONMENTAL SETTING

Prehistoric and Historic Overview

During prehistoric times, the project area was known to have been inhabited by the Coast Miwok group of Native Americans. The Coast Miwoks occupied an area along the California Coast from Duncan's Point in Marin County, south to Point Bonita, and east to the Sonoma River. The Coast Miwoks were hunter-gatherers who usually inhabited one or more permanent villages, although archaeological evidence suggests most sites were occupied seasonally in association with resource availability and climate patterns. Permanent villages tended to be located where fresh water, ample food resources and other key resources were most abundant year round, including areas adjacent to shores, lagoons, and sloughs. Permanent Coast Miwok village sites have been found along the Petaluma River and along the shores of the Tomales and San Francisco Bays, in areas that supported large populations of wild game and edible plant species. Areas with harsher climates and less available resources tended to support seasonal occupation with less population density. Many seasonally inhabited campsites were utilized to take advantage of a seasonally available resource. Geographic and ecological factors resulted in cultural contrasts based on the differences between the coastal, interior valley, and riverside habitats.

The Coast Miwok population suffered dislocation and cultural disintegration in association with the founding of the San Francisco Mission in 1776, and the subsequent missionization and colonization of the area in the 1800s including the settlement of Fort Ross. Colonization included the introduction of lumbering, dairying, and agriculture.

Due to its proximity to the Petaluma River, new settlers to the area used the site as a shipping center and stopping point for people and products going between Petaluma and San Francisco. In 1849 hunters' camps and trading posts were set up along the river banks to supply gold miners. The area supported waterborne commerce up until 1950. From 1968 to 1990, a portion of the project site was used for settling ponds from quarry operations. The settling ponds have since been abandoned. More recently, the project site has been used for heavy equipment storage and the stockpiling of grass, palettes, and straw wattles.

Records Search

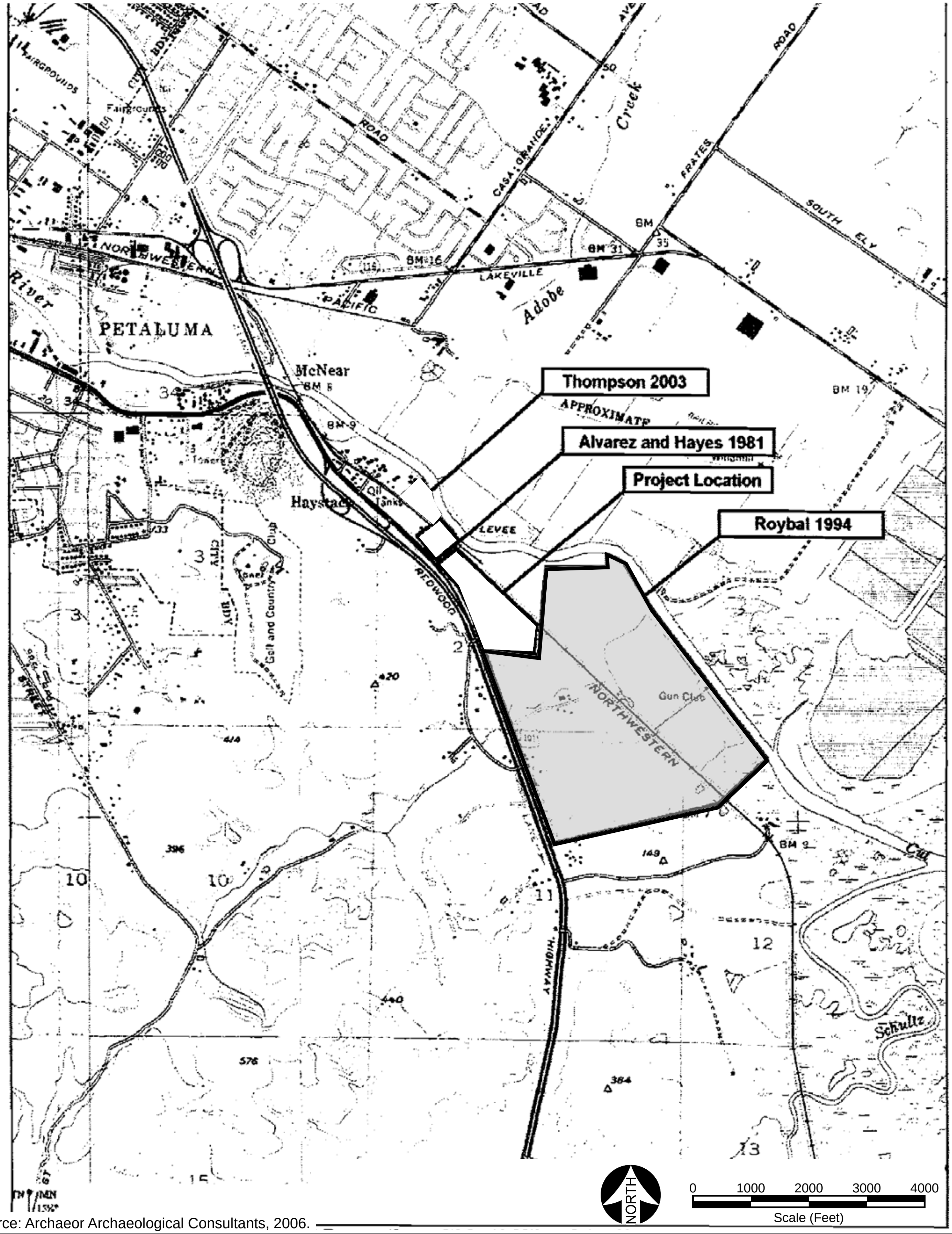
A records search of the California Historical Resources Information System (CHRIS) was conducted as part of the Phase I Cultural Resources Study (Cultural Study) for the project site at the Northwest Information Center at Sonoma State University. The search consisted of consulting the CHRIS records of previous studies and previously recorded cultural resource sites, as well as the National Register of Historic Places, the California Inventory of Historic Resources and historic maps. Additionally, a search of the Sacred Lands files maintained by the Native American Heritage Commission (NAHC) was completed and Native American individuals/organizations were contacted regarding unreported resources and areas of concern regarding the project area.

The records search indicated one prehistoric cultural resource, located approximately one-quarter mile from the project site, Ca-Son-2152, and one historic site, Ca-Son-1465H (Haystack Landing), was partially located within the project site (as Figure V.D-1 shows). Associated with these sites, three previous archaeological evaluations have been performed within one-quarter mile of the project site, as discussed below.

In April 1985, an archaeological investigation of a five-acre parcel located within the Haystack Landing project area at 3355 Petaluma Boulevard South in the City of Petaluma resulted in the identification and recordation of historic site Ca-Son-1465H. This investigation resulted in the identification of a nineteenth-century house (built before 1860) and two barns; two areas with glass and ceramic specimens; and a board-covered pit. It was recommended that if buried archaeological materials were discovered during ground-disturbing activities, work be halted in the areas of the find until a qualified archaeologist evaluated the find. A subsequent review of the Cultural Study and a field visit to the project site found that the house had burned down and the site had been impacted by fire suppression efforts, clean-up, and demolition of the two barns. The areas containing glass and ceramic artifacts were observed but the board-covered pit was not located.

In August 2003, a Phase I Cultural Resources Study of a six-acre parcel, located approximately one-quarter mile north of the project site on Landing Way in the City of Petaluma, did not identify any archaeological resources within the parcel. This study recommended that if any archaeological resources were encountered during ground-disturbing activities, work be halted in the areas of the find until a qualified archaeologist evaluated the find.

In March 1994, a reconnaissance survey of the 264.5-acre Ford Ranch, located directly south of the project site, resulted in the identification and recordation of prehistoric site Ca-Son-2152. The site consists of a high concentration of burnt rock fragments, obsidian flakes, shell fragments, and dark friable (readily crumbled; brittle) soil located on a small knoll about 30 feet in elevation. This prehistoric cultural resource site occupies an approximately 500-foot by 400-foot area.



Source: Archaeor Archaeological Consultants, 2006.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure V.D-1
Previously Surveyed Properties
Within 1/4 Mile of the
Haystack Landing Project Area

Native American Consultation

On January 9, 2004, the State of California Native American Heritage Commission (NAHC) was contacted and a search of the Sacred Lands files maintained by the NAHC for the project site was requested. On January 14, 2004, the NAHC stated that a search of the Sacred Lands files had produced negative results, provided a list of five Native American individuals/organizations that may have knowledge of unreported resources or areas of concern regarding the project area, and recommended that these individuals/organizations be contacted.

On January 15, 2004, letters requesting information about any sites or areas of concern to Native American Indians within the project area were posted via U.S. Postal Service to the five individuals and/or organizations identified by the NAHC. As of January 27, 2004, no responses had been received from any of the recipients of the January 15, 2004 mailing. On January 28, 2004, follow-up telephone calls to all five individuals and/or organizations were made.

The follow-up telephone calls resulted in a response from a representative of the Coast Miwok, Pomo indicating that there is no knowledge of any traditional site specific to the project area. There were no responses from the four other individuals/organizations.

Baseline Conditions - Site Reconnaissance

On January 6, 2004 and January 7, 2004, a general archaeological field survey was conducted on parcel APN 019-320-022. On March 2, 2004, a general archaeological field survey was conducted on parcel APN 019-320-001 and APN 019-320-023. Methodology and detailed field survey results are described in Appendix F. A summary of the results is provided below.

APN 019-320-001

On March 2, 2004, structures observed on this parcel included modern, modular housing and associated outbuildings. Based upon an examination of the soil profile exhibited within the drainage channel, this parcel was comprised of imported fill material to a depth of at least four feet. No evidence of historic or prehistoric cultural indicators was observed during the archaeological field survey of this parcel.

APN 019-320-022

This parcel appears to have been subjected to extensive modifications within the past 100 years. No evidence of historic or prehistoric cultural indicators was observed during the archaeological field survey of this parcel.

APN 019-320-023

This parcel includes a portion of historic site Ca-Son-1465H, and therefore has the Historic District Zoning overlay. This parcel has been subjected to extensive modifications over the years including road cuts, grading, and historical and modern building construction. These modifications included the construction of a nineteenth-century house and barn, and several modern buildings that were located in the southern portion of the parcel. A mobile home was located at the eastern edge of the knoll, behind the nineteenth-century house. No evidence of prehistoric cultural indicators was observed during the archaeological field survey of this parcel. Historic features observed during the field survey included the nineteenth-century house and barn, and a scatter of mid- to late 1800s glass and ceramic shards located in a garden area approximately 30 feet northeast of the rear of the house. These features characterized the major physical elements of historic site Ca-Son-1465H, Haystack Landing.

Ca-Son-1465H, Haystack Landing

Historic site Ca-Son-1465H, Haystack Landing, was initially identified and recorded in April 1985 by John Hayes and Susan Alvarez of the Cultural Resources Facility of the Anthropological Studies Center, Sonoma State University, Rohnert Park, California. At that time, Ca-Son-1465H was described as consisting of a nineteenth-century house located within the project area and at least one barn of probable mid-to-late nineteenth-century construction located below the knoll on the south side of the project area. A board-covered pit was situated below the house on the northern down slope of the knoll (Alvarez and Hayes 1985). It was also noted that "the stone foundation of the house was altered on the south and west sides."

At the time of the field survey, the house was raised off the ground and perched on large, horizontal wooden beams supported in places by upright beams placed on concrete blocks. Most of the stone foundation was removed. A modern PVC sewer line and natural gas hookup were observed protruding from beneath the house along the south side. Construction materials (five square cut nails) and construction style (i.e. imported stone foundation and Italianate architectural features) indicated that the house was built in the mid- to late 1800s.

The mid-to-late nineteenth-century barn was located across the access road which runs east to west between Petaluma Boulevard South and the railroad tracks, approximately 200 feet south of the Haystack Landing house. The barn was of typical construction for this time period and features a low, gabled roof. Square cut nails were observed throughout the exterior of the building and the stone foundation, underlying a portion of the wooden plank floor, is of the same type as that of the Haystack Landing house suggesting that these structures were built at approximately the same time.

Existing Conditions

At some point in time between the spring and autumn of 2004, the historic home was destroyed in a fire and the barns and other buildings were removed or demolished, with approval of the Landmarks Commission. However in a subsequent site visit in January of 2006, archaeologists concurred that the site remains historically significant and that there is a high probability of buried archaeological deposits on-site.

REGULATORY SETTING

Federal, State, and local governments have developed laws and regulations designed to protect significant cultural resources that may be affected by actions that they undertake or regulate. The National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and the California Environmental Quality Act (CEQA) are the basic federal and state laws governing preservation of historic and archaeological resources of national, regional, State and local significance.

Federal

Section 106 of the NHPA of 1966 governs federal regulations for cultural resources. Section 106 requires Federal agencies to consider the effects of their undertakings on historic properties and affords the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The Council's implementing regulations "Protection of Historic Properties" are found in 36 Code of Federal Regulations

(CFR) Part 800. The goal of the Section 106 review process is to offer a measure of protection to sites, that are determined eligible for listing on the National Register of Historic Places. The criteria for determining National Register eligibility are found in 36 CFR Part 60. Amendments to the Act (1986 and 1992) and subsequent revisions to the implementing regulations have, among other things, strengthened the provisions for Native American consultation and participation in the Section 106 review process. While federal agencies must follow federal regulations, most projects by private developers and landowners do not require this level of compliance. Federal regulations only come into play in the private sector if a project requires a federal permit or would use federal money.

State

State historic preservation regulations affecting this project include the statutes and guidelines contained in the CEQA (Public Resources Code Sections 20183.2 and 21084.1 and Section 15064.5 of the *CEQA Guidelines*). CEQA requires lead agencies to carefully consider the potential effects of a project on historical resources. (See the Historical Resources description below for criteria specifications.)

Several agency publications, such as the series produced by the Governor's Office of Planning and Research (OPR), provide advice on procedures to identify such resources, evaluate their importance, and estimate potential effects. OPR's technical advice series strongly recommends that agencies solicit the concerns of Native Americans and other interested persons and corporate entities, including, but not limited to, museums, historical commissions, associates and societies as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity, and provides for the sensitive treatment and disposition of those remains.

California Historic Register

The State Historic Preservation Office (SHPO) maintains the California State Register of Historic Resources (CRHR). Properties listed on the National Register of Historic Properties (NRHP) are automatically listed on the CRHR, along with State Landmarks and Points of Interest. The CRHR can also include properties designated under local ordinances or identified through local historical resource surveys.

Native American Consultation

Government Code §65352.3 (Senate Bill [SB] 18) requires local governments to consult with California Native American tribes identified by the California NAHC prior to the adoption or amendment of a general plan or specific plan. The purpose of this consultation is to preserve or mitigate impacts to cultural places.

Local

Parcel 019-320-022 has a Historical District Combining Zone, which is discussed in further detail in Section V.H. (Land Use). The applicable policies contained in the Archaeological and Historical Sites section of the County's Open Space Element are analyzed in the Sonoma County General Plan Policy Analysis, in Section V.H (Land Use), Table V.H-2. Additionally, the Petaluma Daily Belt Area Plan, of which the project site is a part, has several development policies related to Archaeological Sites and Historic Resources. These Area Plan policies are analyzed in further detail in Section V.H (Land Use), Table V.H-3.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

Based on Appendix G of the *CEQA Guidelines*, a project would have a significant impact on cultural resources if the project would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
- Disturb any human remains, including those interred outside of formal cemeteries.

To determine whether cultural resources could be significantly affected, the significance of the resource itself must first be determined. Section 15065 of the *CEQA Guidelines* mandates a finding of significance if a project would eliminate important examples of major periods of California history or prehistory.

In addition, pursuant to Section 15064.5 of the *CEQA Guidelines*, a project could have a significant effect on the environment if it "may cause a substantial adverse change in the significance of an historical resource." A "substantial adverse change" means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource is impaired." Material impairment means altering "in an adverse manner those characteristics of an historical resource that convey its historical significance and its eligibility for inclusion in the California Register of Historical Resources." Impacts to those cultural resources not determined to be significant according to the significance criteria described above are not considered significant for the purposes of CEQA.

Historical Architectural Resources

Pursuant to Section 15064.5 of the *CEQA Guidelines*, a historical resource (including both built environment and prehistoric archaeological resources) is presumed significant if the structure is listed on the CRHR or has been determined to be eligible for listing by the State Historical Resources Commission. A historical resource may also be considered significant if the lead agency determines, based on substantial evidence, that the resource meets the criteria for inclusion in the CRHR. The criteria are as follows:

1. The resource is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. The resource is associated with lives of persons important in our past;
3. The resource embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. The resource has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological Resources

Pursuant to Section 15064.5 of the *CEQA Guidelines*, archaeological resources, not otherwise determined to be historical resources, may be significant if they are unique. Pursuant to Public Resources Code Section 21083.2, a unique archaeological resource is defined as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets one of the following criteria:

1. The resource contains information needed to answer important scientific questions and there is a demonstrable public interest in that information;
2. The resource has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
3. The resource is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource means an archaeological artifact, object, or site that does not meet the above criteria. Non-unique archaeological resources receive no further consideration under CEQA.

Human Remains

According to Section 15064.5 of the *CEQA Guidelines*, all human remains are a significant resource. Section 15064.5 of the *CEQA Guidelines* also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are spelled out under Public Resources Code Section 5097.

Paleontological Resources

According to Appendix G of the *CEQA Guidelines*, a project could have a significant effect if it would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Project Impacts and Mitigation Measures

Impact CULT-1 Historical Resources

According to Section 15064.5(a)(3) of CEQA, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR as defined above. The literature review and field survey for the project site indicated that the Haystack Landing house, barn and artifact scatter described above should be considered "historically significant" by the lead agency according to the following criteria as specified in Section 15064.5(a)(3)(A)-(B) and (D) of CEQA:

Historic site Ca-Son-1465H, Haystack Landing, was "associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage." As has been indicated by historical maps, the house, and possibly the barn, had been situated within the study area prior to 1860 during which time Haystack Landing was a site of shipping and passenger travel activity. The landing was a terminus for steamboats from San Francisco, as well as stage travel north, as early as 1857. The first portion of the third railroad in California, from Haystack Landing to Petaluma, was built in the spring and summer of 1864. Haystack Landing represented the expansion of travel, commerce, and transportation from the city of San Francisco into the North Bay Area during the 1850s and 1860s.

Haystack Landing was also "associated with the lives of persons important in our past." Charles Minturn was known around the San Francisco Bay in the early 1860s as "The Ferryboat King." He first ventured on the north shore of San Francisco Bay via a steamboat that ran up Petaluma Creek to Lakeville, seven miles south of Petaluma. Mintum then had a channel dredged to Haystack Landing. In 1862, he chartered the Petaluma & Haystack Railroad. Charles Minturn was largely responsible for the expansion of travel, commerce, and transportation from the city of San Francisco into the North Bay Area during the 1850s and 1860s.

Additionally, the mid-to-late 1800s artifact scatter that was located behind the house (and the potential for other historic features such as trash dumps, privy-pits, etc. to be located within the site area) indicates that the site "has yielded, or may be likely to yield, information important in prehistory or history."

A portion of the historic Haystack Landing site is located within the project's boundaries. Though this site no longer contains any standing structures, it is nonetheless considered historically important for the reasons described above. Due to the high probability of archaeological deposits and other remaining features associated with the house, ground-disturbing activities associated with the project could result in the loss of integrity of cultural deposits, the loss of information, and the alteration of site setting to cultural resources that are eligible for listing on the CRHR. Therefore, project impacts would be ***significant***.

<u>Start-up Phase</u>

During the start-up phase of the proposed project the barge off-loading facility and the conveyor over the railroad tracks would not be in place. Trucks would be used instead of barges to transfer all materials to the project site during this phase. The start-up phase of the project includes ground-disturbing activities at the project site and thus still has the potential to result in the loss of integrity of cultural deposits, the loss of information, and the alteration of site setting to cultural resources that are eligible for listing on the CRHR. The overall significance of impacts to historical resources associated with the start-up phase would not change from that described above for Impact CULT-1.

Mitigation Measure CULT-1a

Site documentation shall be updated and brought to the level of current professional standards.

Mitigation Measure CULT-1b

Preservation through historical documentation of the former house and barns shall be completed, following the Secretary of Interior's Standards for the Treatment of Historic Properties.

Impact CULT-2 Archaeological Resources

Although no known unique archaeological resources have been identified on the project site, other it is possible that underlying soils could contain undiscovered resources. Though the project site has been previously disturbed, without proper care during the grading and excavation phases of the proposed project, unknown resources could be damaged or destroyed. Therefore, project impacts to unknown unique archaeological resources would be ***significant***.

Start-up Phase

The start-up phase of the project includes ground-disturbing activities to the project site and thus still has the potential to result in damage or destruction to unknown archaeological resources. The overall significance of impacts to archaeological resources associated with the start-up phase would not change from that described above for Impact CULT-2.

***Mitigation Measure CULT-2*a**

Prior to earth disturbing activities, archaeological deposits and other features associated with the house shall be identified using techniques including remote sensing techniques and/or searching for features with a backhoe equipped with a smooth-edged blade under the direction of a professional archeologist.

Following the conclusion of the archaeological monitoring, a Final Report of Findings shall be prepared by the archaeologist which minimally describes the monitoring process, including the final disposition of impacts to archaeological site Ca-Son-1465H and descriptions and analysis of any formal or diagnostic artifacts recovered as a result of the project. This Final Report of Findings shall be completed to the satisfaction of Sonoma County PRMD, abiding by the guidelines specified in Archaeological Resource Management Reports (ARMR) Recommended Contents and Format, developed by the California Office of Historic Preservation (OHP), February 1990.

Mitigation Measure CULT-2b

All employees shall undergo a cultural resources orientation and awareness training prior to commencing work activities on the site. Such training shall include familiarization with the stop-work restrictions, noticing, and handling procedures, and ultimate disposition of artifacts as described below. The operator shall provide PRMD with a verification list of the employees completing the orientation.

If archaeological materials are discovered any time during project implementation, activities shall cease in the immediate vicinity of the find. The shift foreman or manager at the project site shall be notified, and shall notify Sonoma County PRMD of the discovery. PRMD shall notify the Northwest Information Center and the Native American Heritage Commission. Work shall not commence until a qualified archaeologist is consulted to determine the significance of the find, and has recommended appropriate measures to protect the resource in accordance with the following standards:

- A qualified archaeologist shall prepare for the County an Assessment and Mitigation Plan, in consultation with the Native American Heritage Commission and local tribes, if appropriate;
- The Assessment shall define the extent and steps necessary to mitigate the project impacts on the find. Discovered cultural resources shall be stored in a protected environment to prevent vandalism, damage, or theft; until such time as they are examined by an archaeologist and/or Native American consultant, as appropriate. Actions may then include removing and relocating the materials to an appropriate repository based on consultation with the Native American Heritage Commission and local tribes. Any Native American artifacts discovered shall be returned to the local Native American Community, which shall be responsible for the disposition of these materials.

Further disturbance of the resource shall not be allowed until those recommendations deemed appropriate by the County have been implemented.

Impact CULT-3 Human Remains

No known human burials have been identified on the project site or vicinity. In addition, a search of the Sacred Lands file identified no culturally important areas on the project site. However, it is possible that unknown human remains could occur on the project site, and if proper care is not taken during the project's grading and excavating phases, damage to or destruction of these unknown remains could occur. Therefore, project impacts on human remains would be ***significant***.

Start-up Phase

As previously discussed, the start-up phase of the project includes ground-disturbing activities to the project site. Because there is the possibility that unknown human remains could occur on the site, if proper care is not taken during the project's grading and excavation during the start-up phase, damage to or destruction of these unknown remains could occur. The overall significance of impacts to human remains associated with the start-up phase would not change from that described above for Impact CULT-3.

Mitigation Measure CULT-3

In the event that human remains are discovered, there shall be no disposition of such human remains, other than in accordance with the procedures and requirements set forth in the California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98. These code provisions require notification of the County Coroner and the NAHC, who in turn must notify those persons believed to be most likely descended from the deceased Native American for appropriate disposition of the remains. Excavation or disturbance may continue in other areas of the project site outside the area affected by such discovery.

Impact CULT-4 Paleontological Resources

Much of the project site has been previously disturbed and upper soils layers consist largely of fill materials. Although no known paleontological resources have been identified on the project site, it is possible that deeper underlying soils could contain undiscovered resources. In addition, without proper care during the grading and excavation phases of the proposed project, unknown resources could be damaged or destroyed. Therefore, project impacts to unknown paleontological resources would be ***significant***.

Start-up Phase

Although no known paleontological resources have been identified on the project site, it is possible that deeper underlying soils could contain undiscovered resources. Ground-disturbing activities during the start-up phase of the project could result in damage or destruction to paleontological resources if proper care during grading and excavation is not taken. The overall significance of impacts to paleontological resources associated with the start-up phase would not change from that described above for Impact CULT-4.

Mitigation Measure CULT-4

If paleontological resources are encountered during the course of site development activities, work in that area shall be halted and the project paleontologist shall be notified of the find. The project paleontologist shall have the authority to temporarily divert or redirect grading to allow time to evaluate any exposed fossil material.

CUMULATIVE IMPACTS

Impacts to cultural resources tend to be site-specific and are assessed on a site-by-site basis. The extent of the cultural resources (if any) that occur at the sites of the related projects is unknown, and thus, it is not known whether any related projects would result in significant impacts to cultural resources. However, similar to the proposed project, such determinations would be made on a case-by-case basis and, if necessary, the applicants of related projects would be required to implement appropriate mitigation measures.

In addition, the applicant of the proposed project would be required to implement mitigation measures prescribed in this EIR, thereby reducing the project's impact on cultural resources to a less-than-significant level. As such, the proposed project would not contribute to any cumulative impacts on cultural resources, if any would occur. Therefore, cumulative impacts would be ***less than significant***.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project-specific impacts related to cultural resources would be ***less than significant*** with implementation of the mitigation measures listed above.

V. ENVIRONMENTAL IMPACT ANALYSIS
F. HAZARDS AND HAZARDOUS MATERIALS

INTRODUCTION

This section evaluates the potential public health impacts from exposure to hazardous materials[1] that may be encountered, brought to, or generated at the site during development and operation of the proposed project. The evaluation was based on a review of available information included with the application, published materials, and a site reconnaissance. This section evaluates information from the following site-specific technical reports (including the results of samples collected from the site):

- *Phase I Environmental Site Assessment, 37-Acre Haystack Landing Property, Petaluma, California*, prepared by Fugro West, March 2004.
- *Phase I Environmental Site Assessment Update, Haystack Landing Property, Petaluma, California*, prepared by Fugro West, February 2006.

ENVIRONMENTAL SETTING

As discussed in detail in Section III. Project Description, the Dutra Haystack Landing Asphalt and Recycling Facility project site is located in unincorporated southwestern Sonoma County directly south of the City of Petaluma. The site consists of three vacant parcels and is situated between the Petaluma River and Highway 101. With the exception of a small hill, the undeveloped site is characterized by relatively flat topography. Brush and shrub vegetation exist throughout the majority of the site and some larger trees are dispersed. Levees, drainage ditches and ephemeral channels traverse the site, and several jurisdictional wetland areas are present. Railroad tracks for the Sonoma Marin Area Rail Transit (SMART) run adjacent to the project site.

Project Site Hazardous Materials Setting

Information on previous land uses with potential hazardous materials uses, site reconnaissance observations, and regulatory agency databases reviewed in the Phase I ESA and Phase I ESA Update for the project site are summarized for hazardous materials.

Historical Land Uses

The proposed project area is generally known as Haystack Landing, which was historically a shipping center and stopping point for people and products transported between Petaluma and San Francisco.[2] A railroad corridor has been in existence since the early 1900s, bisecting the smaller 0.86-acre portion of the site

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[1] *The California Health and Safety Code defines a hazardous material as "… any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, radioactive materials, and any material which the handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety or persons or harmful to the environment if released into the workplace or the environment" (Health and Safety Code, Section 25501).*

[2] *County of Sonoma Permit and Resource Management Department, Environmental Checklist Form, Dutra Haystack Landing Asphalt and Recycling Facility, 17 February 2006.*

adjacent to the Petaluma River from the 37-acre portion of the site to the west of the railroad tracks.[3]

The 0.86-acre portion of the site has historically been largely undeveloped, with the exception of a residence observed on the property in 2004.[4] This structure is no longer present at the site.[5] Various temporary encampments, observed during a 2004 site reconnaissance of the property, have been removed from the site.[6]

The majority of the property (the larger 37-acre portion of the site) was used as a dairy farm from about 1860 until about 1968 when the farm was purchased by a local gravel and asphalt quarry operation located on the west side of Highway 101 just north of the project site.[7] Farmhouses and associated structures were located on the northwestern corner of the property since the 1860s;[8] the farm structures have since been removed from the site or have been destroyed by fire.[9] The northern 27 acres of the site were leased back to the dairy rancher in 1968 and the remaining 10 acres located in the southern portion of the site were used for the disposal of quarry wash-water.[10]

By 1968, ponds were constructed in the middle and southern portions of the site as five sedimentation and retention ponds for the quarry.[11] Cast iron pipelines were reportedly used to convey the wash-water downhill from the quarry and below the northern portion of the site before emptying into the ponds. The quarry fines were settled out from the quarrying wash-water prior to discharge to the Petaluma River. The northernmost pond was reportedly filled in 1976 with earthen material from an adjacent hill. The remaining ponds were actively used by the quarry until the mid-1970s. Two ponds were in continuous use at the site until at least 1990. None of the ponds have been reported to be used for quarry or other operations since 1990.[12]

Stockpiled soil and building material debris were observed at the time of the site reconnaissances in 2004 and 2006. The material in the stockpiles appeared to be processed building materials. Both brick and fire debris were observed, and were reported to have been illegally discarded on-site and could contain elevated concentrations of metals and/or other chemicals that are not suitable for reuse on-site. The preparers of the Phase I ESA and Update recommended that, if fill material were unsuitable, it should be removed from the site prior to redevelopment.[13]

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3 *Ibid.*

4 *Macmillan, Lucy, and Ecosystems West Consulting Group, Biological Constraints Analysis, Haystack Landing Project Site, Petaluma, California, prepared for Pagliaio Ventures, LLC, Petaluma, California, 15 October 2004.*

5 *Aerial photograph of project site, photograph provided by the client to BASELINE Environmental Consulting, photograph taken 29 December 2005.*

6 *Fugro West, Phase I Environmental Site Assessment Update, Haystack Landing Property, Petaluma, California, prepared for the Dutra Group, February 2006.*

7 *Macmillan, Lucy, Wetlands Specialist, and Ecosystems West Consulting Group, 2004, op. cit.*

8 *County of Sonoma Permit and Resource Management Department, 2006, op. cit.*

9 *Ibid.*

10 *Macmillan, Lucy, Wetlands Specialist, and Ecosystems West Consulting Group, 2004, op. cit.*

11 *Ibid.*

12 *Ibid.*

13 *Fugro West, Phase I Environmental Site Assessment, 37-Acre Haystack Landing Property, Petaluma, California, prepared for the Dutra Group, March 2004; Fugro, 2006, op. cit.*

Soil Sampling and Testing

Miller Pacific developed and implemented an on-site analytical testing program in October 2005 to characterize materials proposed for excavation during proposed site grading. Soil samples were collected at 1.5 to seven feet below ground surface (bgs) at seven locations.[14] The samples revealed the site was underlain by three to eleven feet of artificial fill. Groundwater was encountered in one of the seven borings at a depth of three feet bgs.

Sample analysis examined total petroleum hydrocarbons as gasoline (TPHg), diesel (TPHd) and motor oil (TPHmo) with silica gel cleanup, and total metals. No TPHg, TPHd, or TPHmo were reported in any of the samples analyzed. All of the sampling results for metals were reportedly well below the total threshold limit concentrations (TTLC) per Title 22 of the California Code of Regulations,[15] and would therefore not be considered a hazardous waste based on these criteria, once excavated.

With the exception of cobalt, detected metal concentrations were also below the respective Environmental Screening Levels (ESLs) established by the San Francisco Regional Water Quality Control Board[16] for commercial and construction worker exposure scenarios. Cobalt concentrations (16 to 29 mg/kg) were above the 10 mg/kg ESL, but reported to likely represent background concentration and not due to any specific source material. The preparers of the Phase I ESA and Update, however, recommended preparation of a Health and Safety Plan and implementation of dust control practices, site control procedures, and soil handling procedures to reduce exposure to soil and dust, during construction activities.

Asbestos Sampling and Testing

Hazardous Material Assessment collected samples in January 2004 from five structures on the property scheduled for demolition. The samples were analyzed for asbestos.[17] The sampling effort identified no asbestos-containing materials.[18] As stated above, the structures were removed following the survey or were burned in a fire.

Regulatory Agency Listings and Files

The project site is not included on the list of federal, state, or local regulatory agency databases of potential hazardous materials release sites.[19] The provisions in CA Government Code Section 65962.5 are commonly referred to as the "Cortese List" (after the Legislator who authored the legislation that enacted it). Organizations responsible for maintaining state agency databases of hazardous materials release sites on the Cortese List include Department of Toxic Substances Control, State Department of Health Services, State Water Resources Control Board, and California Integrated Waste Management Board. The Sonoma County Environmental Health Department and Sonoma County Fire Department have no case files for these addresses

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14 *Miller Pacific Engineering Group, Letter Regarding Environmental Sampling and Testing, Dutra Haystack Landing, Petaluma, California, prepared for Dutra Materials, 11 November 2005.*

15 *Title 22, California Code of Regulations, Section 66261.24-1 (Table II-List of Inorganic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration).*

16 http://www.waterboards.ca.gov/sanfranciscobay/esl.htm: *Accessed by BASELINE Staff*

17 *Hazardous Materials Assessment, Inc. Letter Regarding Asbestos Survey #04.017, prepared for B. Peer, Dutra Group, 30 January, 2004.*

18 *Fugro, 2006, op. cit.*

19 *Fugro, 2006, op. cit. Environmental Data Resources, Inc. (EDR) database report dated August 16, 2005 (Appendix B).*

at the time of preparation of the Phase I ESA. No sites with hazardous materials releases were located within one-quarter mile of the site in either the 2004 or 2006 Phase I ESA or Update reports.

REGULATORY SETTING

Federal/State and Regional/Local

The following section describes the federal, state, and local regulatory framework for hazardous materials and worker health and safety requirements.

Hazardous Materials

In California, the U.S. Environmental Protection Agency (U.S. EPA) has granted most enforcement authority over federal hazardous materials regulations to the California Environmental Protection Agency (Cal/EPA). In unincorporated Sonoma County, the Department of Emergency Services, Hazardous Materials Division (Sonoma County), has the responsibility for the County's Certified Unified Program Agency (CUPA) program (California Health and Safety Code Chapter 6.11), including the hazardous materials business plan, hazardous waste generators, underground tank storage, accidental release prevention and portions of the Uniform Fire Code that address hazardous materials. In the City of Petaluma, the Petaluma Fire Department is the CUPA.

In California, regional agencies are responsible for programs regulating emissions to the air, surface water, and groundwater. At the project site, the Bay Area Air Quality Management District (BAAQMD) has oversight over air emissions, and the North Coast Regional Water Quality Control Board (RWQCB) regulates discharges and releases to surface and groundwater.

Oversight for investigation and remediation of sites affected by hazardous materials releases can be performed by state agencies, such as the Cal/EPA Department of Toxic Substances Control (DTSC), regional agencies, such as RWQCB, or local agencies, such as Sonoma County.

Any business with hazardous materials storage, use, and/or disposal is required to comply with federal, state, and local requirements for managing hazardous materials. These plans include the primary hazardous materials programs administered by Sonoma County Department of Emergency Services (CUPA Plans, Programs and Permits) as well as other requirements of state and federal laws and regulations. Depending on the precise types and quantities of hazardous materials used, stored, and disposed of from the project site, these applicable hazardous materials requirements may include the preparation of, implementation of, and training in the following plans, programs, and permits.

CUPA Plans, Programs, and Permits

Hazardous Waste Generator Requirements

Facilities that generate more than 100 kilograms per month of hazardous waste, or more than 1 kilogram per month of acutely hazardous waste, must be registered in accordance with the Resource Conservation and Recovery Act (RCRA) (Title 42, U.S. Code, Sections 6901 et seq.)

Aboveground (AST) and Underground Storage Tank (UST) Permits

Facilities with ASTs or USTs must be permitted. Other plans, such as a Spill Prevention Control and Countermeasures (SPCC) Program, may be required due to the size and type of hazardous materials stored in the ASTs. The SPCC Program provides a detailed engineering analysis of the potential for release from oil-filled equipment, and describes the measures, such as secondary containment and emergency response, that must be implemented to reduce the release potential.

Hazardous Materials Business Plan (Business Plan)

Facilities that use, store, or handle hazardous materials in quantities greater than 500 pounds of solids, 55 gallons of liquid, or 200 cubic feet of compressed gas are required to prepare a Hazardous Materials Business Plan and comply with Uniform Fire Code requirements for storage of hazardous materials. The Business Plan must contain facility maps, up-to-date inventories of all hazardous materials for each shop/area, product transfer areas, emergency response procedures, equipment, and a description of employee training.

Hazardous Material Release Response Plan (Contingency Plan)

As a part of the Hazardous Materials Business Plan, all facilities that generate hazardous waste must prepare an Emergency Response Contingency Plan. The Contingency Plan identifies the duties of the facility Emergency Coordinator and location of emergency equipment, and includes reporting procedures for the facility Emergency Coordinator to follow after a hazardous materials incident.

California Accidental Release Program (CalARP)

Businesses that use significant quantities of acutely hazardous materials must prepare a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that can be implemented to reduce this accident potential. CalARP requirements typically apply to heavy industrial properties such as factories and refineries.

Non-CUPA Plans, Programs, and Permits

Injury and Illness Prevention Plan

The California General Industry Safety Order requires that all employers in California prepare and implement an Injury and Illness Prevention Plan, which should contain a code of safe practice for each job category, methods for informing workers of hazards, and procedures for correcting identified hazards.

Emergency Action Plan

The California General Industry Safety Order requires that all employers in California prepare and implement an Emergency Action Plan. The Emergency Action Plan designates employee responsibilities, evacuation procedures and routes, alarm systems, and training procedures.

Fire Prevention Plan

The California General Industry Safety Order requires that all employers in California prepare and implement a Fire Prevention Plan. The Fire Prevention Plan specifies areas of potential hazard, persons responsible for maintenance of fire prevention equipment or systems, fire prevention housekeeping procedures, and fire hazard training procedures.

Hazard Communication Plan

Facilities involved in the use, storage, and handling of hazardous materials are required to prepare a Hazard Communication program. The purpose of the Hazard Communication program is to provide methods on safe handling practices for hazardous materials, ensure proper labeling of hazardous materials containers, and ensure employee access to Material Safety Data Sheets (MSDS).

Septic Systems

The Sonoma County Permit and Resource Management Department (PRMD) requires permits for operation of sewage disposal systems. Septic systems must be designed by a qualified environmental professional and all SCPRMD requirements for soils analysis, percolation testing, groundwater testing, and design elements must be satisfied to obtain the permit.

Air Quality Permits for Stationary Sources

Facilities that emit pollutants into the air from sources other than motor vehicles and consumer products are required to be permitted by the BAAQMD. (See the Air Quality section for details on air permitting requirements and toxic air contaminants.)

Worker Health and Safety Regulations

Worker health and safety is regulated at the federal level by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). Under this jurisdiction, workers at hazardous waste sites (or workers coming into contact with hazardous wastes that might be encountered during excavation of contaminated soils) must receive specialized training and medical supervision according to the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations (29 CFR 1910.120).

Worker health and safety in California is regulated by the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA). California standards for workers dealing with hazardous materials (including hazardous wastes) are contained in CCR Title 8 and include practices for all industries (General Industrial Safety Orders), and specific practices for construction, and hazardous waste operation and emergency response (CCR Title 8, Section 5192). Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices.

Sonoma County General Plan

The Sonoma County General Plan was reviewed to ascertain policies relevant to hazardous materials. Although the plan is currently being updated, the 1981 plan is the current plan as of the date of this environmental review. Policies from the Public Health and Safety Element of the General Plan relevant to the proposed project are analyzed in Section V.H (Land Use), Table V.H-2.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G of the *CEQA Guidelines* , the proposed project could have a significant environmental impact on Hazards and Hazardous Materials if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles or a public airport or public use airport, result in a safety hazard for people residing or working in the project area;
- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Impacts Not Analyzed Further

The Hazards and Hazardous Materials impacts that were determined by the Initial Study not to rise to the level of significance are discussed below but do not require further analysis in this section, as per thresholds provided in Appendix G of the Hazards and Hazardous Materials *CEQA Guidelines.* The No Impact or Less-than-Significant determination was based on the following information.

- The project site is not near any school, so the criterion of emitting hazardous emissions or handling hazardous, or acutely hazardous material, substance, or waste within one-quarter mile of a school site is not applicable to the project.
- The project site is not listed on the list of hazardous materials sites compiled pursuant to Government Code 65962.5.[20] The criterion of a project being located on the list of hazardous materials sites with a resulting significant hazard to public health and the environment is therefore not applicable to the project.

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[20] *Fugro, 2004; op. cit.; Fugro, 2006, op. cit.*

- The project site is not located within two miles of a public or private airport/airstrip. Gnoss Field, located north of Novato, is located more than five miles from the proposed project site. The site is also outside of the Airport Land Commission boundary for the Petaluma Airport.[21] Therefore, there would be no safety hazard for people residing or working on the project site.
- The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- The project site is not located within an area designated as having a very high or high potential for wildland fires.[22] Thus, the criterion of the proposed project exposing people or structures to significant loss, injury, or death involving wildland fires is therefore not applicable to the project.

Project Impacts and Mitigation Measures

Impact HAZ-1 Improper Use, Storage, or Disposal of Hazardous Materials During Construction

Construction activities associated with the start-up phase and full build out phase of the project would require the use and transport of hazardous materials, including fuels, oils, and other chemicals (e.g., paints, adhesives) used during construction. It is likely that these hazardous materials and vehicles would be stored by the contractor(s) on-site during construction activities. Improper use and transportation of hazardous materials could result in accidental releases or spills, potentially posing health risks to workers, the public, and the environment. This is a ***significant*** impact.

Mitigation Measure HAZ-1a

The Storm Water Pollution Prevention Plan (SWPPP) required for the project (see Mitigation Measures in the Hydrology and Water Quality Section) shall include emergency procedures for incidental hazardous materials releases. The procedures shall include necessary personal protective equipment, spill containment procedures, and training of workers to respond to accidental spills/releases.

Mitigation Measure HAZ-1b

The SWPPP shall also include Best Management Practices, which shall include requirements for hazardous materials storage during construction to minimize the potential for releases to occur (See Mitigation Measures in the Hydrology and Water Quality Section). All use, storage, transport and disposal of hazardous materials during construction activities shall be performed in accordance with existing local, state, and federal hazardous materials regulations.

Impact HAZ-2 Site Grading Could Cause a Release of Potential Soil Contaminants or Creation of Safety Hazards to Construction Workers and the General Public

The proposed development for the start-up phase and full build out phase would include grading of the site for construction of the asphalt plant and stockpile areas, barge off-loading facility, conveyor system, and facilities for use by the San Antonio Volunteer Fire Department (SAVFD). Grading and leveling would be balanced (i.e., no import or export of materials) under the proposed project; approximately 36,660 yards of cut would be placed in two fills. Material would be relocated from higher elevations to the intermediate areas

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[21] *Sonoma County General Plan, 1989, op. cit.*

[22] *Figure PS-1h, Schematic Map of Area Subject to Safety Policy Requirements, Petaluma and Environs, Planning Area, Public Safety Element, Sonoma County General Plan, 1989, op. cit.*

to establish stable, level building pads. Of the total site area, approximately 28.2 acres would be disturbed as part of the grading operation. Acreage at the southeast end of the site would be preserved as open space/wetlands and could create habitat for vectors that may transmit disease (i.e., mosquitoes).

During site grading, construction workers could encounter residual contaminants (e.g., cobalt) in site soils and underground structures (septic systems, water wells, and petroleum product pipelines near the railroad tracks). These actions could result in a health and safety risk to construction workers and the off-site receptors.

Fill containing brick and fire debris was observed to have been stockpiled in a portion of one of the ponds and could potentially contain hazardous materials and present health risks to construction workers if disturbed or reused on the site. Pipelines that formerly contained quarry wash water were also observed on-site and could be damaged during construction activities, resulting in safety concerns to construction workers.

A release of potential soil contaminants or creation of hazards for construction workers or the general public by site grading activities during the start-up phase and full build out phase is considered a ***significant*** impact.

Mitigation Measure HAZ-2a

Prior to approval for any grading or construction permits at the project site, a Construction Risk Management Plan (CRMP) shall be prepared by a qualified environmental professional and implemented during the duration of construction activities at the site. The CRMP shall summarize previous environmental investigations conducted for the project site and, in accordance with State and federal laws and regulations, shall describe worker health and safety provisions for all workers potentially exposed to residual contaminants in soil, including the need for dust suppression controls, air monitoring, personal protective equipment to be worn by workers to minimize exposures, soil management procedures, management of dewatered groundwater (as applicable), site control, and emergency response procedures.

The CRMP shall also provide procedures to be undertaken in the event that previously unreported contamination or subsurface hazards (such as septic systems, wells, underground pipelines) are discovered during construction, and establish detailed procedures for the safe storage, stockpiling, sampling, reuse of fill, and off-site disposal of hazardous materials and other materials (fire debris, soil) at the project site.

The CRMP shall incorporate construction safety measures for excavation and other construction activities and procedures for abandonment of the former quarry pipelines. The CRMP shall designate personnel responsible for implementation during construction activities and shall be submitted to the Sonoma County PRMD for review and approval.

Mitigation Measure HAZ-2b

The observed fill material containing brick and fire debris shall be sampled prior to soil disturbance by an environmental professional to assess the presence of hazardous materials and the potential risk to human health and public safety from the contamination (if any). The sampling shall be conducted by a qualified environmental professional in accordance with state and local guidelines and regulations, with oversight from the Sonoma County Department of Environmental Health (SCDEH). The findings of the soil sampling investigation shall be documented in a written report and submitted to SCDEH and SCPRMD.

If the results of the soil sampling investigation indicate the presence of hazardous materials that could affect public health or the environment, remediation of this area shall be required by the applicable regulatory oversight agencies. Specific remedies would depend on the extent and magnitude of contamination. Under the direction of the SCDEH and the SCPRMD, a Site Remediation Plan shall be prepared, if required, by the project sponsor or contractor(s). The Plan shall specify: 1) measures to be taken to protect workers and the public from exposure to potential site hazards, and 2) certify that the proposed remediation measures would clean up the waste, dispose of the waste, and protect public health and the environment in accordance with local, state, and federal requirements. Any remediation required shall be completed prior to earthwork in the areas affected.

Mitigation Measure HAZ-2c

A mosquito and vector control plan shall be prepared by a qualified professional and submitted to the Marin-Sonoma Mosquito and Vector Control District for approval. The approved plan shall be submitted to SCPRMD prior to on-site earthwork activities and shall be implemented as part of the proposed project. The plan shall specify areas where mosquito larvae are likely to be present on-site (e.g., in areas with standing water) and mosquito management methods. The management methods may include the use of chemicals (i.e., pesticides), biological methods (e.g., use of mosquito fish in water bodies, or *Bacillus thuringiensis*[23]), and/or control of excess runoff and areas where water can accumulate.

Impact HAZ-3 Operational Routine Transport, Use, Production, or Disposal of Hazardous Materials and Septage, and Potential Risk of Upset Associated with These Hazardous Materials Uses

Operation of the plant during either the start-up phase or the full build out phase would require materials to be imported to the facility for use in asphalt and rubberized asphalt production including asphaltic oil, recycled asphalt products, sand, fines, aggregate, and recycled crumb rubber. Loaders would be used on-site to take material from stockpiles and place it into bins for use in the asphalt plant. In the production of asphalt, liquid asphalt would be sprayed onto the heated aggregate material and mixed to its final consistency. The asphalt would be stored in storage silos for direct loadout into a customer's truck.

The applicant proposes: a 30,000-gallon tank for asphaltic oil storage and a 500-gallon fuel storage tank for equipment usage. The asphalt would be temporarily stored in silos after it is made and before distribution to the end-user sites. The silos would be heated using natural gas; therefore, no heater fuel storage would be required on-site.

Other hazardous materials and wastes could be transported, used, and generated from on-site vehicle maintenance and equipment activities. A Storm Water Pollution Prevention Plan prepared for the previous off-site Petaluma facility, operated by the applicant, indicated that lesser quantities of other hazardous materials and hazardous wastes were stored and generated on-site, including motor oil, gear lube, automatic transmission fluid, compressed gases, waste oil, and used oil filters.[24] It is likely that similar hazardous materials and quantities of these materials would be stored and hazardous wastes generated at the proposed asphalt plant.

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[23] *The bacterium Bacillus thuringiensis infects and kills mosquito larvae. It must be consumed by the larvae and acts as a stomach poison, damaging mid-gut cells of mosquito larvae. It is highly selective, killing only mosquitoes and larvae of a few other related flies. Information reviewed on-line, http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7451.html#MANAGEMENT, 11 May 2006 accessed by BASELINE Staff.*

[24] *The Dutra Group, Petaluma Quarry, Storm Water Pollution Prevention Plan, Updated 21 May 2004.*

In addition, hazardous materials would be stored on-site for the SAVFD. The SAVFD would use the project site to conduct response drills and for equipment storage. Engine oil and other items associated with vehicle and equipment maintenance for four engines housed at the station would be stored on-site in approved storage containers.[25]

All businesses transporting, storing, using or disposing of hazardous materials (including wastes) must comply with applicable local, state, and federal regulations for hazardous materials management. These include the primary hazardous materials programs administered by Sonoma County Department of Emergency Services as well as other requirements of state and federal laws and regulations, including compliance with the Uniform Fire Code for hazardous material storage. The applicant has prepared an Emergency Response Action Plan at its San Rafael Facility, with procedures for spills, fires, or other emergencies (e.g. earthquake, flood), evacuation routes, and worker training.[26]

Numerous hazardous materials would be routinely transported, used, produced, and hazardous waste generated at the site under the proposed project. Accidental releases associated with these hazardous materials uses could adversely affect on-site workers, off-site receptors, and the environment. This is a ***significant*** impact.

Mitigation Measure HAZ-3

The applicant shall engage a Fire Protection Engineer to perform a code analysis and submit a comprehensive fire protection plan for the proposed project for review by the SCPRMD and the County Fire Marshall. The submittal shall include an evaluation of the project's compliance with the uniform fire code requirements relating to storage of hazardous materials (including aboveground tanks), the need for fire suppression system, alarm systems, storage of flammable or combustible materials, containment basins around hazardous materials, and compliance with hazardous materials regulations. Both hazardous materials at the proposed asphalt plant and those for the SAVFD shall be considered in the review.

CUMULATIVE IMPACTS

The use, generation, transport, or disposal of any hazardous substance associated with any of the projects in the vicinity of the proposed project could result in potential impacts to the public health and safety for the construction and operation phases of these projects. These potential impacts would be site-specific.

Local municipalities, like the Sonoma County Department of Emergency Services, and Petaluma Fire Department, which are the local CUPAs for Sonoma County (unincorporated Petaluma) and the City of Petaluma, implement local, state, and federal laws and regulations regarding the storage, use, transport, and disposal of hazardous materials through routine site inspections. Therefore, assuming compliance with applicable laws and regulations for nearby projects, cumulative impacts from hazardous materials during project construction and operation are considered ***less than significant***.

The project is not expected to generate significant quantities of materials requiring off-site disposal. To the extent possible, grading and leveling of the site would be balanced under the proposed plan with fill material containing brick and fire debris as the only material potentially requiring off-site disposal. Wastes requiring

[25] *Corda, Jerry, Fire Chief, San Antonio Volunteer Fire Department, Letter to Dutra Group (no subject), 24 March 2006.*

[26] *San Rafael Rock Quarry Emergency Response Action Plan, transmitted 11 May 2005.*

off-site disposal at nearby projects could include contaminated railroad right-of-way ballast for the SMART Project.[27] The off-site disposal of hazardous materials is considered a ***less-than-significant*** cumulative impact, since off-site disposal for the two projects would be limited to the duration of project construction.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Upon implementation of the above mitigation measures and compliance with applicable local, state, and federal hazardous materials regulations, hazardous materials/public health and safety impacts from the proposed project, during project construction and operation, would be ***less than significant***.

[27] *G. Helfrich, Sonoma County Planning and Resource Management Division, Letter Regarding Comments on the DEIR, Sonoma Marin Area Rail Transit (SMART) to L. Hames, SMART District Office, 23 January 2006.*

INTRODUCTION

This section describes the proposed project's geologic environment and potential impacts based on a site reconnaissance, published and unpublished geologic reports and maps, and site-specific technical reports. This section evaluates information from the following site-specific technical reports, which are included by reference or available in Volume II (Technical Appendices) of this DEIR:

- *Phase I Environmental Site Assessment 37-Acre Haystack Landing Property, Petaluma, California*, prepared for the Dutra Group, Project No. 659.009, Fugro West, Inc., March 30, 2004, updated February 2006;
- *Geotechnical Investigation Dutra Materials - Haystack Landing Asphalt and Recycling Facility, Petaluma, California*, prepared for the Dutra Materials, Project No. 209.02, Miller Pacific Engineering Group, September 3, 2004a;
- *Geotechnical Investigation, Haystack Landing Wetlands Restoration, Petaluma, California*, prepared for Ms. Lucy Macmillan, Project No. 1139.01, Miller Pacific Engineering Group, October 1, 2004b; and
- *Wetland Mitigation and Monitoring Plan - Haystack Landing Wetland Mitigation Project, Petaluma, California*, U.S. Army Corp of Engineers, April 2006.

ENVIRONMENTAL SETTING

This section assesses potential impacts from seismically-induced fault rupture, strong ground shaking, liquefaction, slope failure, lateral slope deformation, differential settlement and unstable or expansive soils. Mitigation measures for the identified significant impacts are provided, as appropriate.

Geologic and Seismic Conditions

The geology, topography, and soils of the project site and vicinity are described below.

Geology

The project site is located within the Coast Ranges Geomorphic Province, a relatively geologically young and seismically active region on the western margin of the North American plate. In general, the Coast Ranges are composed of sedimentary bedrock with layers of recent alluvium filling the intervening valleys.[1] Specifically, the project site is near the western edge of the floor of the Petaluma Valley.[2] The near-surface geology of the eastern two-thirds of the project site is mapped by the California Geologic Survey as Holocene (last 11,000 years) Bay Mud with the remainder being mapped primarily as Franciscan Complex bedrock (more than 65-190 million years old).[3]

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[1] *California Geographic Survey (CGS), 2002, California Geomorphic Provinces, Note 36.*

[2] *Fugro West, Inc.,. 2004, Phase I Environmental Site Assessment 37-Acre Haystack Landing Property, Petaluma California, Prepared for the Dutra Group, Project No. 659.009, March 30.*

[3] *Wagner, D.L., et. al., 2002, Geologic Map of the Petaluma Quadrangle, California Geologic Survey.*

Topography

The approximately 37-acre project site is located on nearly flat land and is surrounded by the rising terrain of the Coast Range to the west and the Petaluma River immediately to the east. The existing ground surface elevation of the project site varies, with a high of about 32 feet above mean sea level (msl) at a small hill at the northernmost portion of the site. The rest of the project site slopes gently to the south-southeast with elevations from about 15 feet msl to about five feet msl.[4] Several areas of the site are shallow hollows that retain water, or are jurisdictional seasonal wetlands[5] that are hydrologically connected to the Petaluma River.[6]

Soils

Surface soils at the project site are mapped by the Natural Resource Conservation Service. The southern three-fourths of the project site is primarily Reyes Silty Clay with the northern remainder being Goulding Cobbly Clay Loam. Reyes Silty Clay is rated high for linear extensibility (shrink-swell potential), and high for corrosivity. Goulding Cobbly Clay Loam is rated as moderate for linear extensibility and corrosivity.[7]

Twelve soil borings were taken on May 26, 2004 as part of the field exploration in support of the two site-specific geotechnical reports by Miller Pacific. Six borings were on the northern 26-acre portion of the site proposed for development. The samples from these six borings consisted of gravely, sandy or silty clays, or imported fill near the surface (up to eleven feet in the southern and western portions of the site), with the deeper materials being weathered bedrock or Bay Mud respectively.[8]

Seismicity

Regional Seismicity

The entire San Francisco Bay Area is located within the San Andreas Fault Zone (SAFZ), a complex of active faults forming the boundary between the North American and Pacific lithospheric plates. Movement of the plates relative to one another results in the accumulation of strain along the faults, which is released during earthquakes. The SAFZ has generated numerous moderate to strong historic earthquakes. The California Building Code classifies the area as seismic risk zone 4 (the highest risk category). The SAFZ includes numerous faults found by the California Geological Survey under the Alquist-Priolo Earthquake Fault Zoning Act (A-PEFZA) to be "active" (i.e., to have evidence of fault rupture in the past 11,000 years). Regional active faults are shown on Figure V.E-1.[9]

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4 *Miller Pacific Engineering Group, 2004a, Geotechnical Investigation Dutra Materials - Haystack Landing Asphalt and Recycling Facility, Petaluma California, Prepared for the Dutra Materials, Project No. 209.02, September 3.*

5 *U.S. Army Corp of Engineers, 2006, Wetland Mitigation and Monitoring Plan - Haystack Landing Wetland Mitigation Project, April.*

6 *Miller Pacific Engineering Group, 2004b. Geotechnical Investigation, Haystack Landing Wetlands Restoration, Petaluma California, Prepared for the Ms. Lucy Macmillan, Project No. 1139.01, October 1.*

7 *Natural Resources Conservation Service, Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov, Soil Survey Area: Sonoma County, California, Version of Data: 2.*

8 *Miller Pacific Engineering Group, 2004a. op. cit.*

9 *Hart, Earl W., Bryant, William A., Revised 1997, Supplements 1 And 2 Added 1999, Special Publication 42, Fault-Rupture Hazard Zones In California, Alquist-Priolo Earthquake Fault Zoning Act (A-PEFZA), California Department Of Conservation (CDC), Division Of Mines And Geology (CDMG).*

The U.S. Geological Survey's Working Group on California Earthquake Probabilities estimated that there is a 62 percent probability that one or more Moment Magnitude[10] (MW) 6.7 or greater earthquakes will occur in the San Francisco Bay Area between 2002 and 2031. The Group estimated the probability of a MW6.7 magnitude or greater earthquake to be 21 percent along the San Andreas Fault, 27 percent along the Hayward-Rodgers Creek Fault, eleven percent along the Calaveras Fault, four percent along the Concord-Green Valley Fault, ten percent along the San Gregorio Fault, three percent on the Greenville Fault, and three percent for the Mt. Diablo Thrust fault. In addition, there is a cumulative 14 percent chance of a background (other earthquake source, either mapped or undiscovered) event occurring. It is estimated that about three MW6.7 or greater events could occur in the next 100 years. Thus the probability of at least one MW6.7 or greater magnitude earthquake rises to the near certainty of about 96 percent when calculated for a 100-year span.[11]

Site-Specific Seismicity

The project site is not within an A-PEFZA fault zone; however, the project site is approximately 4.5 miles west of the Rodgers Creek A-PEFZA fault zone, approximately 14.5 mile east of the San Andreas Fault, and approximately 3.1 miles northeast of the potentially active Burdell Mountain Fault. Both the San Andreas and Hayward-Rodgers Creek faults are right lateral strike-slip faults[12] with a northwest-southeast axis. As noted above, the Hayward-Rodgers Creek fault has a 27 percent chance, and the San Andreas a 21 percent chance, of an MW6.7 earthquake between 2002 and 2031.

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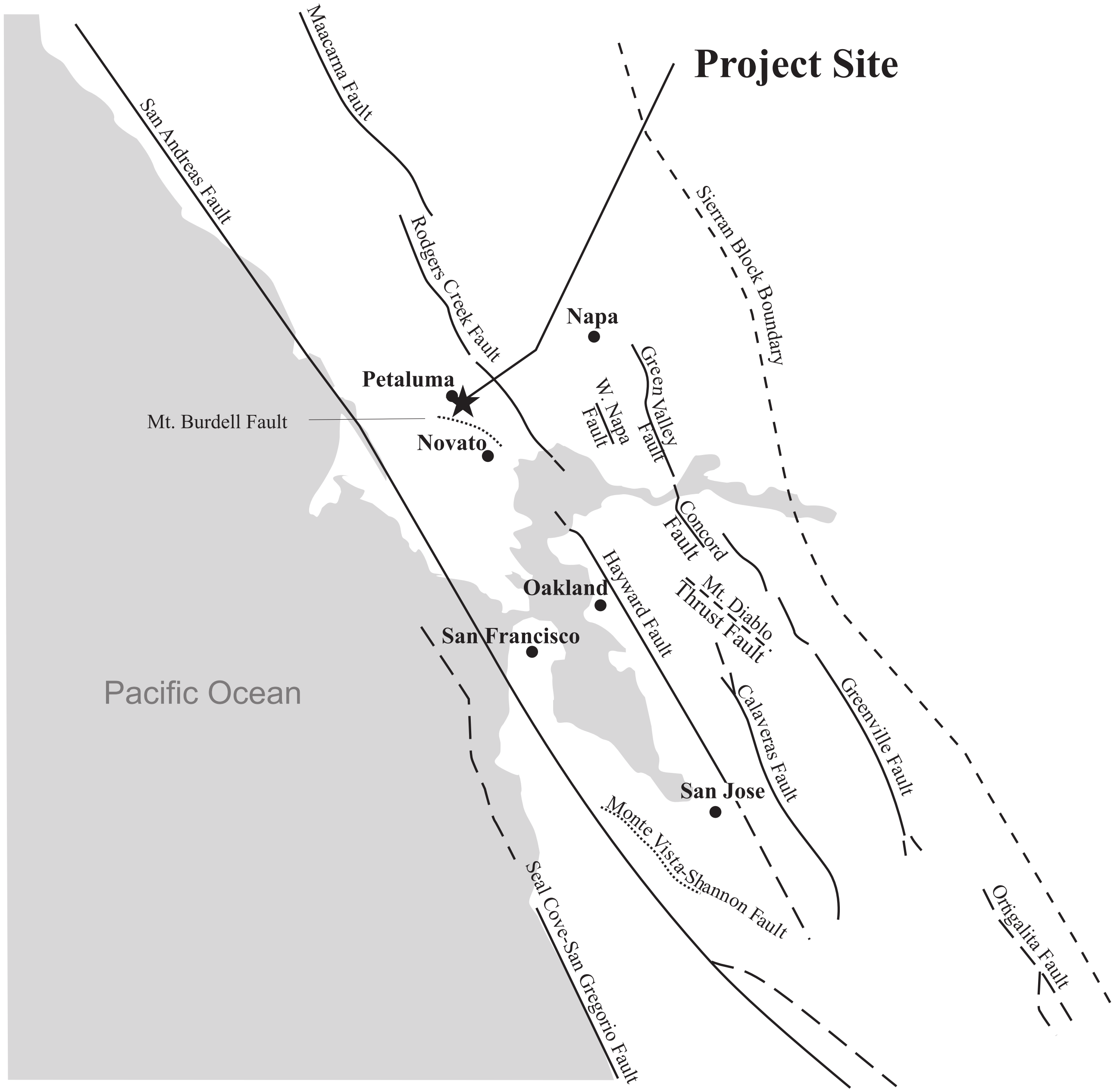
10 *Moment magnitude (MW) is now commonly used to characterize seismic events as opposed to Richter Magnitude. Moment magnitude is determined from the physical size (area) of the rupture of the fault plane, the amount of horizontal and/or vertical displacement along the fault plane, and the resistance to rupture of the rock type along the fault.*

11 *USGS, 2003, Earthquake Probabilities in the San Francisco Bay Region: 2002 to 2031 – A Summary of Findings, Open File Report 03-214.*

12 *Right-lateral: if the trace of the fault were viewed while standing on one side during an event, it would appear that the ground on the other side of the fault moved to the right. Strike-slip: the sides are moving laterally relative to each other with little or no vertical movement.*

REGIONAL FAULTS



Legend

Active Fault - Fault has evidence of surface displacement within the past 11,000 years (dashed where inferred)

Potentially Active Fault - Fault has evidence of surface displacement in the past 1.6 million years, but not within the past 11,000 years

Seismic Source without Surface Rupture

0 10 20 30 40

Scale (Miles)

Source: Baseline, 2006.

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Figure V.E-1
Regional Faults

Seismic and Geologic Hazards

Surface Rupture

Surface rupture occurs when the ground surface is broken due to fault movement during an earthquake. The location of surface rupture generally can be assumed to be along an active or potentially active major fault trace. No portion of the project site is located within an A-PEFZA fault zone and no active faults have been mapped at the site.[13] Therefore, potential for fault rupture at the project site is negligible.

Ground Shaking

Ground shaking is a general term referring to all aspects of motion of the earth's surface resulting from an earthquake, and is normally the major cause of damage in seismic events. The extent of ground shaking is controlled by the magnitude and intensity of the earthquake, distance from the epicenter, and local geologic conditions. The Modified Mercalli Intensity Scale (MMI) is the most commonly used scale for measurement of the subjective effects of earthquake intensity (Table V.E-1). A related concept, acceleration, is measured as a fraction or percentage of the acceleration under gravity (g).

The closest active fault to the project site, the Hayward-Rodgers Creek fault zone, is considered capable of generating approximately a MW 7.0 earthquake. An earthquake of this magnitude would generate strong to violent seismic shaking (MMI VII to IX) at the project site.[14] Such ground shaking is expected to result in significant structural damage, as indicated in Table V.E-1. This is a potentially significant hazard.

Peak Acceleration

Estimates of the peak ground acceleration have been made for the Bay Area based on probabilistic models that account for multiple seismic sources. Under these models, consideration of the probability of expected seismic events is incorporated into the determination of the level of ground shaking at a particular location. The California Geological Survey has estimated the expected peak horizontal acceleration (with a ten percent chance of being exceeded in the next 50 years) generated by any of the seismic sources potentially affecting the project site as 0.51.[15] This level of ground acceleration at the project site is a potentially significant hazard.

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13 *CDMG, 1983, State of California Special Studies Zones, Petaluma River Quadrangle Map.*

14 *ABAG, 2005. Earthquake Shaking Scenario Map, http://www.abag.ca.gov/bayarea/eqmaps/mapsba.html.*

15 *California Geological Survey (CGS), 2005, Probabilistic Seismic Hazards Mapping Ground Motion Page, accessed 1/10/2006, www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html.*

Table V.E-1
Modified Mercalli Scale

I	Not felt except by a very few under especially favorable circumstances.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII	Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Board fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted.

Source: California Geological Survey, 2002. How Earthquakes and Their Effects are Measured: Note 32

Liquefaction and Lateral Spreading

Liquefaction is the temporary transformation of loose, saturated granular sediments from a solid state to a liquefied state as a result of seismic ground shaking. In the process, the soil undergoes transient loss of strength, which commonly causes ground displacement or ground failure to occur. Since saturated soils are a necessary condition for liquefaction, soil layers in areas where the groundwater table is near the surface have higher liquefaction potential than those in which the water table is located at greater depths. The project site is within an area rated to have high susceptibility for seismic liquefaction, as mapped by the USGS and presented by the Association of Bay Area Governments.[16]

The site-specific geotechnical investigation concluded that there is a low potential for liquefaction to occur at the project site in sand seams stratified in Bay Mud. Depending on specifics of a seismic event, along with variables of the soil and substructure makeup, localized sand boils may occur. Sand boils may locally disrupt pavements in access roads and slabs.[17]

Lateral spreading is a form of horizontal displacement of soil toward an open channel or other "free" face, such as an excavation boundary. Lateral spreading can result from either the slump of low cohesion unconsolidated material or more commonly by liquefaction of either the soil layer or a subsurface layer underlying soil material on a slope. Earthquake shaking leading to liquefaction of saturated soil can result in lateral spreading where the soil undergoes a temporary loss of strength.

The lateral spreading hazard will tend to mirror the liquefaction hazard for the project site, and by definition needs an open channel or "free" face to expand into; this can include temporary excavations resulting from the construction process. As noted above, the site-specific geotechnical investigation concludes that the potential for liquefaction at the project site is low. This is considered a less than significant hazard.

Expansive Soils

Expansion and contraction of volume can occur when expansive soils undergo alternating cycles of wetting (swelling) and drying (shrinking). During these cycles, the volume of the soil changes markedly, and can cause structural damage to building and infrastructure if the potentially expansive soils were not considered in project site design and construction.

The site-specific geotechnical investigation did not observe any surface soils with highly expansive characteristics. It noted that though the layer of Bay Mud has moderate to high expansion potential, a layer of fill material overlying the native Bay Mud would be thick enough to deter changes in moisture content in the Bay Mud, subsequently reducing its potential for changes in volume. The site-specific geotechnical investigation concludes that the potential for structural damage due to expansive soils is low.[18]

Slope Stability

Slope failure can occur as either rapid movement of large masses of soil ("landslide") or slow, continuous movement ("creep"). The primary factors influencing the stability of a slope are: 1) the nature of the underlying soil or bedrock, 2) the geometry of the slope (height and steepness), 3) rainfall, and 4) the presence of previous landslide deposits.

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[16] *ABAG, 2005. Liquefaction Susceptibility Map, http://quake.abag.ca.gov, USGS Open File Report 00-444.*

[17] *Miller Pacific, 2004a, op. cit.*

[18] *Miller Pacific, 2004a, op. cit.*

Regional mapping shows that the easternmost portion of the project site is mapped as Category 1A, unstable areas of zero to five percent slope that include tidelands, marshlands, and swamplands that are underlain by moist unconsolidated muds. The remainder of the project site is classified as Category 1, stable areas of zero to five percent slope that are not underlain by landslide deposits.[19]

The site-specific geotechnical investigation concluded that traditional slope stability issues are not a geologic hazard for the project site. However, the soft compressible Bay Mud underlying the areas proposed for stockpiles may create a high potential for deep rotational failures within the Bay Mud. The original site-specific geotechnical investigation recommends either the relocation for the stockpiles to alleviate the risk, or the use of soil improvement methods to improve the strength properties of the Bay Mud and improve site stability.[20] Miller Pacific provided additional stability analysis of the proposed 42-foot high gravel stockpiles and supplemented and superceded its original geotechnical recommendations. Miller Pacific has recommended maintaining stability through a combination of high strength geogrid reinforcement in the underlying fill layer and staged construction of the gravel stockpiles.[21]

Settlement and Differential Settlement

Differential settlement or subsidence could occur if buildings or other improvements are built on low-strength foundation materials (including imported fill) or if improvements straddle the boundary between different types of subsurface materials (e.g., a boundary between native material and fill). Although differential settlement generally occurs slowly enough that its effects are not dangerous to inhabitants, it can cause significant building damage over time. Portions of the project site that contain loose or uncontrolled (non-engineered) fill may be susceptible to differential settlement.

Starting about 1950, the site has been altered by a variety of events. Levees were constructed along portions of the Petaluma River, and the once marshy portions of the site dried out as the marshes receded east in response to the altered river flow. The project site was partially graded in the 1950s and the nearby Highway 101 corridor was developed. Between 1968 and 1973 the currently existing ponds on the site were developed as sedimentation and retention ponds for the quarry located in the hills northwest of the site. The ponds are no longer in use for this purpose, and the northern-most pond has been filled.[22]

REGULATORY SETTING

Federal

Federal Earthquake Hazards Reduction Act

In 1997, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes through the establishment and maintenance of an effective earthquake hazards and reduction program. To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). The agencies responsible for coordinating NEHRP are the Federal Emergency Management Agency (FEMA), the National Institute of Standards and Technology (NIST), the National Science Foundation (NSF); and the United States Geological Survey (USGS). In 1990 NEHRP was amended

19 *USGS, 1970. Regional Slope Stability Map of the Northeastern San Francisco Bay Region, Professional Paper 944.*

20 *Miller Pacific, 2004a, op. cit.*

21 *Miller Pacific, 2004c, Stability of Gravel Stockpiles - Haystack Landing Asphalt and Recycling Facility, Petaluma California, Prepared for the Dutra Materials, Project No. 209.02bltr.doc, December 2.*

22 *Fugro West, Inc., 2004, op. cit.*

by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of the agency responsibilities, program goals, and objectives. The four goals of the NEHRP are as follows:

- Develop effective practices and policies for earthquake loss-reduction and accelerate their implementation;
- Improve techniques to reduce seismic vulnerability of facilities and systems;
- Improve seismic hazards identification and risk-assessment methods and their use; and
- Improve the understanding of earthquakes and their effects.

State

Alquist-Priolo Earthquake Fault Zoning Act

Alquist-Priolo Earthquake Fault Zoning Act is the State law that focuses on hazards from earthquake fault zones. The purpose of this law is to mitigate the hazard of surface fault rupture by regulating structures designated for human occupancy near active faults. As required by the Act, the California Geological Survey has delineated Earthquake Fault Zones along known active faults in California.

California Uniform Building Code

The California Code of Regulations (CCR), also known as Title 24, California Building Standards Codes contain the laws regarding the construction of buildings. Title 24, Part 2 of the California Uniform Building Code (UBC) specifies standards for geologic and seismic hazards, other than surface faulting. Chapter 23 of the California UBC addresses seismic safety, and includes regulations for earthquake-resistant design and construction.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was enacted in 1997 to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to map areas subject to seismic hazards. A geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design before development permits will be granted. Additionally, the Act requires a Standardized Natural Hazards Disclosure Statement form be completed by real estate sellers if a property is within one of the designated natural hazards areas.

Local and Regional

The applicable policies contained in the Geological Hazards Section of the Public Safety Element are analyzed in the Sonoma County General Plan Policy Analysis, in Section V.H (Land Use), Table V.H-2. Additionally, the Petaluma Daily Belt Area Plan, of which the project site is a part, includes development policies related to Slope and Geology. These Area Plan policies are analyzed in further detail in Section V.H (Land Use), Table V.H-3.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

The following criteria of significance from Appendix G of the *CEQA Guidelines* are used to establish the thresholds for determining whether an impact is significant. The project would have a significant impact related to geology, soils, or seismicity if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

    i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42.

    ii) Strong seismic ground shaking.

    iii) Seismic-related ground failure, including liquefaction.

    iv) Landslides.

- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

Project Impacts and Mitigation Measures

Impact GEO-1 Seismically-Induced Ground Shaking at the Project Site Could Result in Injuries, Fatalities, and Property Damage

All structures and improvements in the Bay Area could be affected by ground shaking in the event of an earthquake on regional active faults. Ground shaking potential is estimated on a worst-case basis by assessing the maximum expected earthquakes and designing for peak accelerations that may be generated. The project site is approximately 4.5 miles from the Rodgers Creek fault, which is likely to produce an earthquake during the life of the project.

Strong to violent ground shaking is expected at the project site during a large earthquake on the Rodgers Creek fault. Violent ground shaking corresponds to an MMI-IX, during which some masonry and frame structures would be damaged, and unbolted structures shifted off their foundations. This level of seismic shaking could cause injuries and/or fatalities and extensive structural and non-structural damage to buildings at the site during both the start-up phase and full build out phase of the project. It is acknowledged that seismic hazards cannot be completely eliminated, even with site-specific geotechnical methods and advanced building practices. However, exposure to seismic hazards is a generally accepted part of living in the seismically active areas of California. Furthermore, various mitigation measures have been included in the proposed project in order to reduce the potential hazards associated with seismic activity to a ***less-than-significant*** level.

Mitigation Measure GEO-1

Project design and construction shall be in conformance with current best standards for earthquake resistant construction in accordance with the California Building Code (Seismic Zone 4). In addition, project design shall follow the recommendations of the site-specific geotechnical investigation report. The report provides specific design criteria for construction of the project in response to expected seismic events.

Impact GEO-2 Surface Instability Could Result in Damage to Buildings, Equipment and Present a Physical Hazard to Workers

The project site consists of nearly flat slopes, and slope stability is not a geologic hazard. However, due to the presence of soft compressible Bay Mud and the proposed placement of heavy stockpile loads, the risk of deep rotational failures during both the start-up phase and full build out phase of the project within the Bay Mud are high.[23] This is a ***significant*** impact.

Mitigation Measure GEO-2

The applicant shall retain a qualified geotechnical engineering firm to fully evaluate the potential for aggregate stockpiles (both new and recycled) to cause overloading and instability of the underlying Bay Mud. The geotechnical firm shall design and construct a stockpile storage area that is stable under both static and dynamic (i.e., seismic) conditions. The geotechnical design shall include overexcavation of the Bay Mud and replacement with engineered fill, placement of geogrid reinforcement under the stockpiles, or other means to ensure that the stockpiles would not cause rotational failures or damage to the nearby railroad tracks. Controlled settlement over time at the stockpile storage area is acceptable. The design shall allow for no displacement at or adjacent to the railroad tracks. Post-construction monitoring of the performance of the geotechnical solution, including detailed measurement of settlements, shall be required and conducted on a yearly basis for five years. The applicant shall ensure that annual monitoring reports are submitted to the County for review and approval. Any unexpected failures or settlements exceeding those that were predicted shall be addressed by prompt corrective active (at no cost to the County). If at the end of five years, the geotechnical consultant and the County are in agreement, the monitoring and reporting may be terminated.

The geotechnical design shall be reviewed and approved by the County technical staff prior to approval of the grading permit for the project.

Impact GEO-3 Lurching and Ground Cracking at the Project Site Could Result in Damage to Project Buildings and Other Improvements

Lurching and ground cracking can occur during strong ground shaking. Ground cracking tends to occur at the top of slopes where stiff soils overlie soft deposits or along channel banks. Bay Mud deposits up to 15-feet in thickness underlie the southern two-thirds of the site near the River.[24] Lurching and ground cracking could result in damage to site improvements and present a hazard to workers during both the start-up phase and full build out phase of the project. This is a ***significant*** impact.

[23] *Miller Pacific, 2004a, op. cit.*
[24] *Miller Pacific, 2004a, op. cit.*

Mitigation Measure GEO-3

Reduction in the potential for damage due to soil lurching and resulting surface cracking shall be achieved by either soil improvements techniques, such as deep soil mixing, the replacement of unstable soils with engineered fill, or a minimum of 20 foot setbacks for all improvements from channel banks as recommended by the geotechnical reports.

Impact GEO-4 Differential Settlement at the Project Site Could Result in Damage to Project Buildings and Other Improvements

Soft, compressible Bay Mud ranges in thickness from 0 to 15-feet across the project site. This layer has the potential to compress under moderate foundation loads or placement of new fill or stockpiles.[25] Southern and eastern portions of the site have been identified as containing variable artificial fill and grading of the project site in preparation for construction of buildings and utilities will result in additional areas of cut and fill.

Fills of different thickness and fills adjacent to cut areas where native soils are exposed at the surface could create the potential for differential settlements if structures straddle this interface. The areas most susceptible to differential settlement are those where thick fills or fills over Bay Mud are adjacent to native soil or bedrock. If the settlement is not uniform for the fill and native materials (i.e., differential settlement), structural damage can occur. Buried utilities crossing the boundaries of different materials may also experience differential settlements along their alignments. The geotechnical investigation report for the proposed project provides specific recommendations for mitigating settlement, including replacing Bay Mud with engineered fill. The start-up phase and full build out phase of the project could result in improvements being damaged due to differential settlement; this is a ***significant*** impact.

Mitigation Measure GEO-4

The recommendations of the geotechnical investigation report regarding settlement shall be implemented. The specific recommendations for mitigation of potential settlements associated with native soil, Bay Mud and fill boundaries shall be implemented, such as excavation of the soft compressible Bay Mud and replacement with compacted fill.

CUMULATIVE IMPACTS

Other development proposed in the area of the project site could be impacted by some or all of the same issues as the proposed project. However, these issues are site-specific and there is little, if any, cumulative relationship between the development of the project as proposed, and past or future development. Therefore, cumulative geology and soils impacts would be ***less than significant***.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

All geologic and soils impacts are reduced to ***less than significant*** by implementation of required mitigation measures.

[25] *Miller Pacific, 2004a, op. cit.*

V. ENVIRONMENTAL IMPACT ANALYSIS
G. HYDROLOGY AND WATER QUALITY

INTRODUCTION

This section evaluates information from the following site-specific technical reports, which are included in Volume II, Appendix G in this DEIR:

- *Hydrology Report for Dutra-Haystack Landing Asphalt and Recycling Facility, Petaluma, California*, prepared by CSW/Stuber-Stroeh Engineering Group, Inc., April 2006.
- *Evaluation of Potential Pollutant Loading - Petaluma River, Proposed Dutra Asphalt Production Facility, Haystack Landing, Petaluma, California*, prepared by BASELINE Environmental Consulting, May 2006.

ENVIRONMENTAL SETTING

Hydrology and Flooding

Regional Conditions

The project site is located in southern Sonoma County, California and within the valley of the Petaluma River (River). The Petaluma Valley is oriented northwest-southeast and extends approximately 18 miles from north of the City of Petaluma to San Pablo Bay. The site is situated near the western margin of the valley floor. The topography of the majority of the site is relatively flat with the exception of a low hill in the northern portion. The remainder of the site is level to slightly sloping, characterizing a graded tidal marsh. The hills to the west comprise a portion of the Coast Range and rise to elevations between approximately 400 feet above mean sea level (msl) to over 1,500 feet at Mount Burdell.

The climate of the area of the project site is characterized as dry-summer subtropical (often referred to as Mediterranean). Under this temperate climatic regime, two dominant seasons occur; cool, wet winters (October through April) and relatively warm, dry summers (May through September). Sustained rainy periods can occur during the winter and coastal fog is common in summer. The temperature is moderated by proximity to San Pablo Bay and the Pacific Ocean. The average annual high temperature is 70.6º Fahrenheit (F); the average annual low is 45.2 ºF.[1]

The mean annual rainfall in the vicinity of the project site, for the period between 1948 and 2005, is approximately 25.3 inches, with the vast majority of rainfall between October and May.[2] During the period of record, annual rainfall has varied from 9.0 inches (1976) to 45.9 inches (1995). Analysis of long-term precipitation records indicates that wetter and drier cycles lasting several years are common in the region.

The project site is positioned on the western margin of the Petaluma River. The River has a drainage area of approximately 146 square miles with its headwaters in the hills between Petaluma and Sebastopol and its mouth at San Pablo Bay.[3] The lower reaches (portions) of the River function as a tidal slough. As a tidal

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[1] *Western Regional Climate Center, 2004. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6826.*

[2] *Ibid.*

[3] *Southern Sonoma County Resource Conservation District, 2004. Petaluma River Watershed Website: http://www.sscrcd.org/area/petaluma.html.*

slough, water levels in the River respond to the rise and fall of the tides. Additionally, the tidal action within the River results in variations of the salinity as more saline bay water is mixed with freshwater runoff.

Local Conditions

Topography and Drainage

The project site is located between the Petaluma River and the northeast-facing slopes which bound the western side of the River valley. As described in detail in Section III. Project Description, for purposes of this discussion, the site is divided into four areas designated in the project description for this DEIR. Figure V.G-1 shows the preliminary hydrology plan for the existing conditions. The letter designations in Figure V.G-1 indicate drainage areas, as further described in the Hydrology Report by CSW/Stuber-Stroeh Engineering Group, Inc in Volume II, Appendix G; and are not related to the four areas as described in the Project Description.

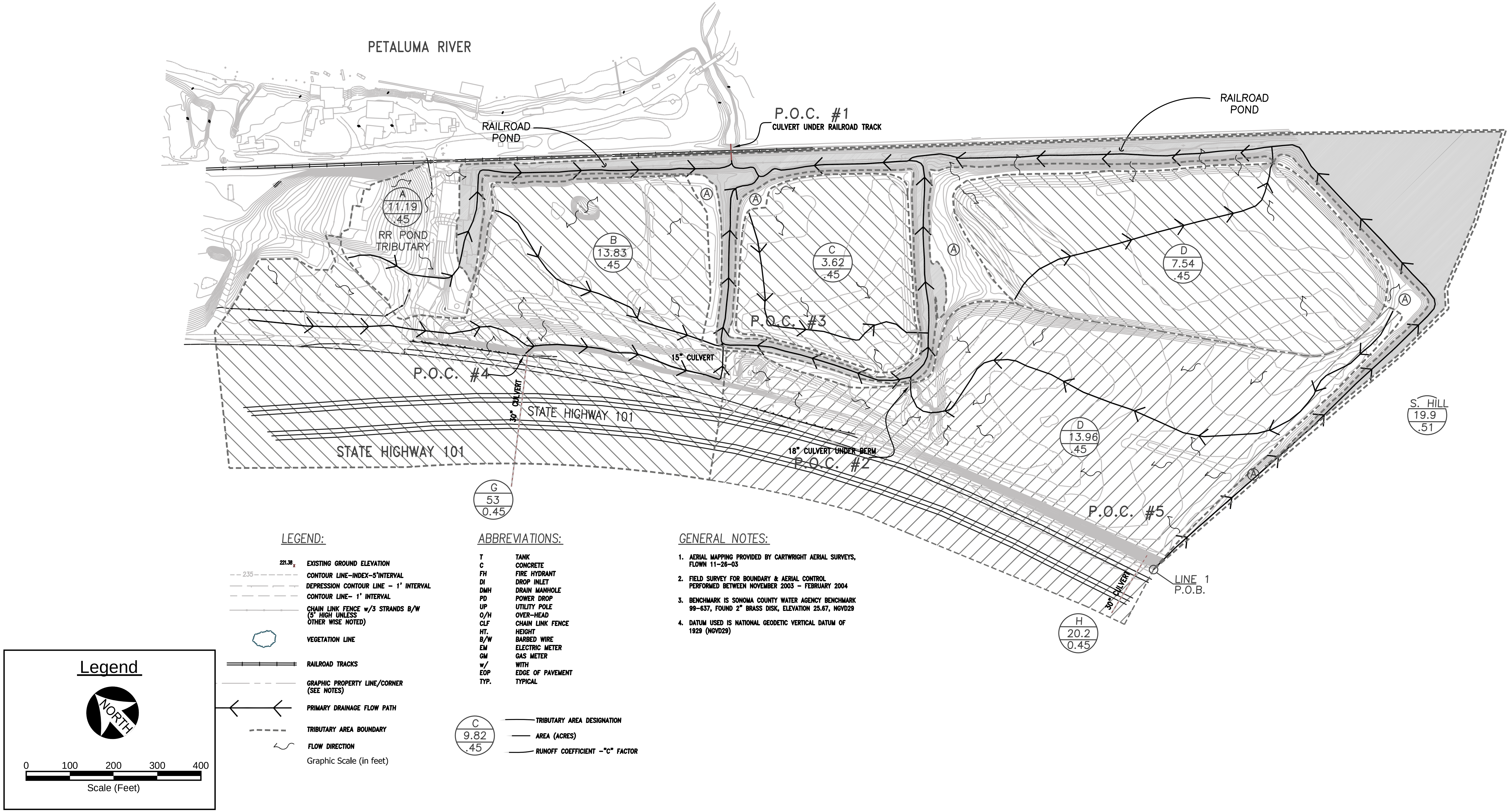
Area A is located in the northeastern portion of the site and occupies a narrow strip of land between the Petaluma River and the Sonoma Marin Area Rail Transit right-of-way (SMART-ROW). The natural topography of this area was a relatively flat tidal marsh surface prior to human development. Starting in the 1960s, the area has been graded and further leveled to a nearly flat surface. A small channel that is hydraulically connected to the Petaluma River bisects area A. Runoff drainage in the area is directed by grading to this channel.

Area B is located at the northern part of the site area west of the SMART-ROW and north of the gravel access road to Haystack Landing. The topography and geology of the uplands to the west extend into Area B to form a low hill. The top of the hill has been graded (leveled) and has a maximum elevation of the approximately 34 feet msl. The eastern slope of the hill is relatively steep (approximately 45 percent slope) and has been modified as a cut for the former Northwest Pacific Railroad (NWPRR) tracks. The western portion of Area B has been graded to a broad bench at approximate elevation 25 feet msl. Drainage from Area B occurs as sheetflow away from the top of the hill southward toward the unnamed drainage ditch along the access road and eastward to the SMART-ROW. This ditch intersects the ditch parallel to the railroad tracks within the SMART-ROW which is subsequently referred to as the "Railroad Ditch."

The remainder of the site is relatively flat with variations in elevation resulting from previous grading for the creation and operation of former quarry settling basins. The settling basins received wash water from the former Dutra quarry site located approximately 4,000 feet northwest (and across U.S. 101) of the project site. Sediment-laden water was transported from the quarry via pipelines to the settling basin. The sediment was allowed to settle in the ponds; water was evaporated, infiltrated, and occasionally discharged to the River.

Area C is located south of the gravel access road and between the western margin of the site and the SMART-ROW. One drainage ditch (DD1)[4] bisects Area C, and four more ditches are located at the margins of Area C (western margin (DD5 and DD6), southern (DD2), and eastern (Railroad Ditch). The western drainage ditches flow toward, and are intercepted by, the central ditch (DD1), which drains eastward to the

[4] *The designation of drainage features and wetlands for this section of the DEIR follows designations presented in the Wetlands Mitigation and Monitoring Plan (Lynch, et al., 2006) prepared for the project*



Source: CSW/ST, CAJA 2007.

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Environmental Planning and Research

Figure V.G-1
Preliminary Hydrology Plan, Existing Conditions

Petaluma River. The flow in the DD1 is conveyed through a culvert beneath the SMART-ROW. The culvert (referred to herein as the Railroad Culvert) is the only direct hydraulic connection between the River and the drainage ditches at the project site.

The Railroad Culvert was submerged during the site inspection in May 2006 and could not be visually observed. The condition of the culvert has been variously described by consultants for the project as a wooden box culvert, a concrete box culvert, or a corrugated metal pipe.[5] Estimates of the size of the opening of the culvert range from 24 to 30 inches. The hydraulic analysis for the project assumes the culvert to have a cross-section of 18 by 24 inches.[6]

The portion of Area C south of DD1 drains southward to DD2. The flow in DD2 is directed eastward and is intercepted by the Railroad Ditch. This channel flows northward to DD1 and through the Railroad Culvert. Runoff from the area west of DD5 and DD6 flows into these ditches and then to DD1 (Figure V.G-1).

Area D is located south of DD2 and includes several designated wetland areas. The topography of Area D is characterized by relatively flat areas surrounded by narrow embankments or "levees." A northwest-southeast trending embankment separates two separate groups of wetlands. The wetlands east of the embankment generally drain to the southeast corner of the site and through a breach in the embankment and into the Railroad Ditch. A second breach in the eastern levee was observed during the May 2006 site reconnaissance. Freshly deposited (nonvegetated) sediment within Area D indicates recent flow through the breach. Flow within the Railroad Ditch is directed northward to the Railroad Culvert.

The portion of Area D west of the northwest-southeast trending embankment drains northward as sheetflow and collects in a relatively large wetland in the northwest corner of Area D. This wetland is connected to DD2 by a breach in the levee at the north side of Area D (FigureV.G-1).

The south side of the project site is bounded by a drainage ditch (DD3) that conveys flow around the project boundary to a pond located off the site but adjacent to the southeast corner of the site. The pond is connected to the Railroad Ditch by a culvert at the southeast corner of the site. Therefore, overflow from the pond can flow into the Railroad Ditch.

A hydrology analysis prepared for the proposed project has evaluated the flow of runoff under existing conditions.[7] The analysis identifies three main watersheds, which include portions of project site. The most northerly watershed encompasses approximately 53 acres of the hillside west of Highway 101. The runoff from this area is conveyed under the highway and onto the project site through a 30-inch concrete pipe culvert (Figure V.G-1). The pipe discharges to the western ditch (DD6), then to the central ditch (DD1), and ultimately through the Railroad Culvert and into the Petaluma River.

Another small watershed (approximately 20 acres) on the hillside west of Highway 101 drains onto the southwestern corner of the site through a 30-inch concrete pipe. The discharge from the pipe flows northward through Area D and passes through the levee break, and into Ditch DD2 and then discharges to the Railroad Ditch and the Petaluma River (Figure V.G-1).

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5 *CSW-[St]2, 2006, Hydrology Report for Dutra-Haystack Landing Asphalt and Recycling Facility, Petaluma, Sonoma County, California, consulting report prepared for Dutra Materials, 4 p. + maps and appendices, April.*

6 *Ibid.*

7 *CSW-[St]2, 2006, op. cit.*

A third watershed collects runoff from the small hill south of the project site. The runoff from this area drains to the "railroad pond" (approximately three acres). Although this watershed (approximately 20 acres) does not include the project site, the railroad pond is hydraulically connected to the Railroad Ditch at the eastern edge of Areas C and D of the project site (Figure V.G-1).

Tidal Conditions

The drainage ditches of the project site are hydraulically connected to the Petaluma River through the Railroad Culvert. Therefore, tidal fluctuations within the River result in the flow of water into the ditches during high tide and out of the ditches and into the River during low tide. The constriction of the culvert mutes the tidal effect within the on-site drainage ditches. The tidal conditions at the site were investigated during a hydrologic evaluation for the proposed wetland restoration plan.[8] As part of the investigation, tidal measurements were made at three monitoring stations: at the mouth of the Railroad Ditch (Station #1), at the upstream end of the Railroad Culvert (Station #2), and in Ditch DD2 (Station #3). Water levels, specific conductance,[9] and temperature were automatically recorded from May 7 to July 26, 2004 (representing two 28-day tidal cycles).

The water level measurements indicate that the tidal effects at Station #1 were similar but somewhat suppressed relative to tidal response within the Petaluma River at the D Street Bridge. Tidal response was more muted at Stations #2 and #3, affected by the constriction presented by the Railroad Culvert. Table V.G-1 shows the average tides measured at the site and the D Street Bridge for the period June 10 through July 7, 2004. The data show that portions of the ditches at the project site are inundated during high tide. The duration of inundation when the water levels exceeded mean high tide ranged from 6 percent at Station #3 (relatively further and higher than the tidal inlet) to 18 percent at Station #2 (upstream of the partially blocked inlet).

The specific conductance measurements at the monitoring stations document seasonal variations in dissolved solids (salinity) in the Petaluma River. The specific conductance steadily increased during the May through July monitoring period as a response to the warm season migration of Bay water up the Petaluma River. At Station #1, the specific conductance increased from approximately 18 mmhos/cm in early June to 37 mmhos/cm by late July.

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[8] *Balance Hydrologics, Inc. (BHI), 2004, Preliminary Hydrologic Investigation of Wetland Restoration Potential at Haystack Landing, Petaluma, California, consulting report prepared for Lucy Macmillan, 11 p. + appendices.*

[9] *Specific conductance is a measure of the capability of water to conduct electrical current. The conductance of water is increased with the concentration of dissolved solids. The salinity of water is also a measure of the concentration of dissolved solids. Therefore, these two properties of natural waters are related. However, the conductance is dependent to a degree on the specific ions dissolved in water. Specific conductance is measured electrically and commonly recorded in the units millimhos per centimeter (mmhos/cm).*

Table V.G-1
Tidal Peaks and Percent of Time Exceeded

Station Location	Elevation Range from MHW to MHHW[1] (feet, NGVD)	Percent of Time Exceeded
Petaluma River at D Street Bridge[2]	4.44 to 5.11	9 to 4%
Mouth of slough at bridge	3.49 to 4.16	13 to 5%
Slough above train tracks culvert	3.06 to 3.47	18 to 7%
Jurisdictional area DD2[3]	3.41	6%

Notes:
1 *Elevation range of interest for pickleweed is Mean High Water (MHW) to Mean Higher High Water (MHHW) having a inundation range from 18 to 5 percent.*

2 *California Department of Water Resources Petaluma River at D Street Bridge (PTB) station is operated by the City of Petaluma. The data are reported in feet above the 1929 National Geodetic Vertical Datum (NGVD) and recorded at variable intervals. Some high water levels conceivably may have occurred between long time-interval readings.*

3 *Channel elevation of jurisdictional area DD2 is above the Mean High Water (MHW) tide and thus cannot be calculated.*

Source: Balance Hydrologics Inc., 2004.

Flood Zone Designation

The majority of the site is located on relatively low and flat topography adjacent to the Petaluma River. Flooding hazard mapping prepared by the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Mapping (FIRM) program (Figure V.G-2) indicates that the majority of the project site is within the 100-year flood hazard zone.[10] The County has established an “F2” zoning district, approximately equivalent to the 100-year flood hazard zone as mapped by FEMA. The purpose of the F2 is to provide a zoning designation that requires compliance with certain building requirements for protection of life and property. The F2 district is applied to properties that lie within the 100-year flood hazard area as shown on the most recent FEMA maps and accompanying report.[11]

The probability of a 100-year flood event in any given year is one percent. FEMA has determined that the base flood elevation of the 100-year event (i.e., water surface) to be 7 feet msl at the project site location. Therefore, areas of the site below this elevation would be expected to be inundated by flood waters of the Petaluma River during a 100-year flood. Areas of the site that would not be expected to flood are the small hill in Area B and the western margin of Areas C and D.

The project site is not located in any mapped dam failure inundation zones.[12] Due to the distance of the project site from San Pablo Bay (approximately nine miles), the potential for coastal flooding hazards, including tsunami, extreme high tides, and sea level rise is very low to negligible.

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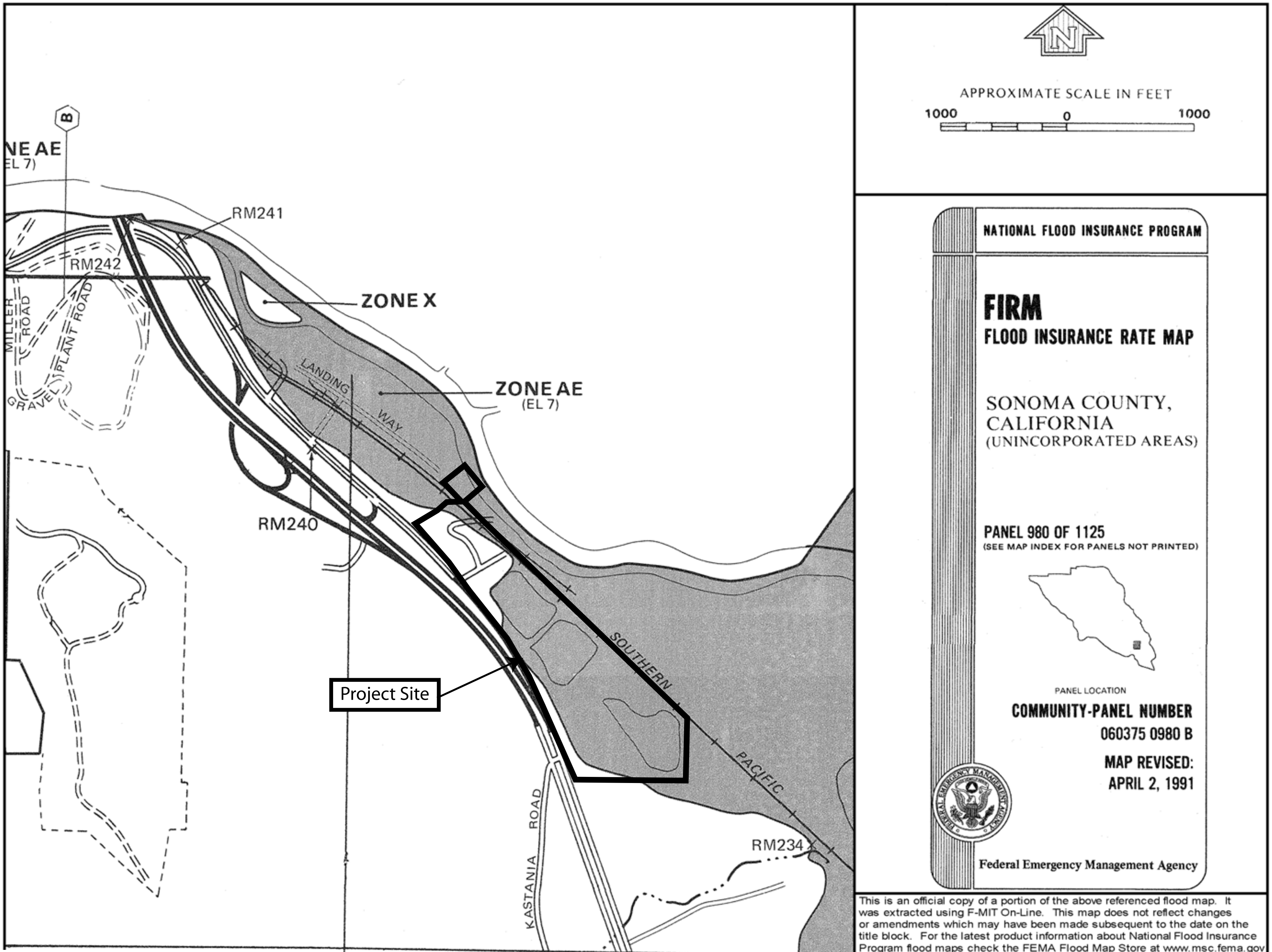
10 *Federal Emergency Management Agency (FEMA), 1991, Flood Insurance Rate Map (FIRM), Sonoma County, California (Unincorporated Areas), Community Panel Numbers 060375 0980B, 2 April.*

11 *Sonoma County Permit and Resource Department Website, Flood plain Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_58.htm#zc26-58-030*

12 *Association of Bay Area Governments, 2005, Interactive ABAG (GIS) Maps Showing Dam Failure Inundation http://www.abag.ca.gov/bayarea/eqmaps/damfailure/damfail.html.*



Source: FEMA, CAJA, 2006.

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Environmental Planning and Research

NORTH

0 500 1000 1500 2000
Scale (Feet)

Figure V.G-2
Project Vicinity Flood Map

Sea Level Rise

The earth has gone through several cycles of cooling and warming over recent geologic time, resulting in both periods of glaciation with attendant sea level drop, and warming with sea level rise. The most recent cycle, which started before the industrial revolution and the associated increase in resource consumption, of global climate change (GCC) is resulting in a warming trend of the earth's atmosphere and an associated sea level rise. Based on long term monitoring of stationary tidal gauges around the world, it is estimated that the current background rate of sea level rise is 0.07 to 0.08 inches per year. Rates vary at specific locations, as local subsidence or uplift affects the relative change in sea level between land masses and the ocean.

In the San Francisco Bay area, the background rate of sea level rise has been approximately 0.05 inches per year over the past 100 years. California recently passed AB-32, a bill designed to address the environmental issues resulting from the manmade generation of green house gases (GHG). The exact contribution of manmade effects over and above the background GCC warming cycle is still under debate; however, the planet is currently warming above and beyond the apparent natural trend, resulting in additional sea level rise. Recent research indicates that the maximum predicted rate of sea level rise over the next 50 years is 0.33 inches per year, which if realized, would result in a sea level rise of 14.4 inches by 2050.[13,14,15] One effect of sea level rise will be that receiving waters surface elevations would be higher than under existing conditions, which would decrease available coastal floodplain storage volumes and conveyance capacity, potentially exacerbating backwater flooding effects. The result would be that lesser storms may result in what are currently classified as 100-year storm events, resulting in more frequent and severe flooding. The proposed elevation of the processing and aggregate storage area would be sufficient to protect the project from foreseeable sea level rise, and associated flood pattern changes, for the duration of the life of the project (until about 2050). If sea levels rise dramatically faster than anticipated, or the project develops a significantly longer life than expected, then the proposed pads at the site protecting equipment and stock piles could be raised, or levees could potentially be erected to provide further protection to the site.

Groundwater

The physiographic setting of the project site is a tidal marsh bounded by the Petaluma River to the east and low hills to the west. The site is underlain by unconsolidated alluvial sediments. Within this setting, groundwater occurs at relatively shallow depths and fluctuates in response to changes in the water level in the River and seasonal rainfall. During subsurface investigations at the project site,[16] groundwater was encountered at depths ranging from 11.0 to 14.5 feet. The report for the investigation noted that the groundwater levels may not have stabilized during the subsurface field work and could fluctuate in response to seasonal changes.

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13 *James G. Titus and Vijay Narayanan, 1995, Washington, D.C.: The Probability of Sea Level Rise, U.S. Environmental Protection Agency. 186 pp. EPA 230-R95-008.*

14 *James G. Titus and Charlie Richman, 2001, Maps of Lands Vulnerable to Sea Level Rise: Modeled Elevations along the U.S. Atlantic and Gulf Coasts, Climate Research, CR 18:205-228.*

15 *E. Robert Thieler and Erika S. Hammar-Klose, 2000, National Assessment of Coastal Vulnerability to Sea-Level Rise: Preliminary Results for the U.S. Pacific Coast, U.S. Geological Survey Open-File Report 00-178, http://pubs.usgs.gov/of/2000/of00-178/*

16 *Miller Pacific Engineering Group, 2004, Geotechnical Investigation Dutra Materials – Haystack Landing Asphalt and Recycling Facility, Petaluma, California, report prepared for Dutra Materials, 22 p. Figures and appendices.*

BASELINE geologists observed standing water in ditches on the western margin of Areas C and D during a field inspection of the site on May 3, 2006. The water may represent groundwater discharging to the ditches. In addition, a 48-inch diameter vertical concrete pipe was identified at the western margin of Area D. Evidence that this feature may have been a well used for stock watering includes an abandoned pressure tank and electrical line post. The pipe was open and the water level was measured at 3.7 feet below ground surface. The ditch adjacent to this feature also had water with a similar surface elevation to that observed in the pipe.

Water Quality

The quality of surface water and groundwater in the vicinity of the project site is affected by past and current land uses at the site and within the watershed and the composition of geologic materials in the vicinity. The proximity of the site to the Petaluma River, a tidal slough, influences the quality of surface and ground waters at the project site. Brackish conditions in the River result from mixing of saline and fresh waters during tidal fluctuations. Limited water quality data are available for the project site. Specific conductance measurements in tidal waters at the site ranged from 17 to 38 mmhos/cm, steadily increasing from May to July 2004.[17] By comparison, sea water has a specific conductance of approximately 53 mmhos/cm.[18] Additionally, specific conductance measurements made (January 2004) in standing water throughout the site ranged from 4 to 15 mmhos/cm.[19] No data on groundwater quality are available at the project site.

REGULATORY SETTING

Federal/State and Regional/Local

The following section describes the federal, state, and local regulatory framework for hydrology and water quality requirements.

The State Water Resources Control Board and Regional Water Quality Control Boards regulates water quality in surface and groundwater bodies. The project site is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB), which is responsible for implementation of state and federal water quality protection guidelines in the area of the project site. The RWQCB implements the *Water Quality Control Plan (Basin Plan)*,[20] a master policy document for managing water quality issues in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

The Petaluma River has been identified as an "impaired waterway" by the State Water Resources Control Board in compliance with Section 303 of the Federal Clean Water Act. This designation indicates that the water quality within a waterway has been adversely affected by one or more pollutants. Listed waterways do not meet water quality objectives, even after point (individual) sources of pollution have installed the minimum required levels of pollution control. The Petaluma River (including the area of the project site) has been listed for diazinon, nutrients, pathogens, sedimentation/siltation, and nickel. The identified potential sources of these pollutants include urban runoff, agricultural operations, construction and land development,

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[17] *Miller Pacific Engineering Group, 2004, Geotechnical Investigation Dutra Materials – Haystack Landing Asphalt and Recycling Facility, Petaluma, California, consulting report prepared for Dutra Materials, 22 p. + Figures and appendices.*

[18] *Ibid.*

[19] *Ibid.*

[20] *San Francisco Bay Regional Water Quality Control Board, 1995, Water Quality Control Plan.*

and atmospheric fallout. The RWQCB is responsible for defining regulatory thresholds, or "total maximum daily loads" (TMDLs), for the listed pollutants.[21] The TMDLs for the Petaluma River are under development.

California storm water regulations control the potential for release of pollutants from the proposed project. Runoff water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Nonpoint Source Program (established through the Clean Water Act); the NPDES program objective is to control and reduce pollutants to water bodies from nonpoint discharges. The project site is under the jurisdiction of the RWQCB and the Sonoma County Storm Water Management Program (SCSWMP), which is jointly administered by the Sonoma County Permit and Resource Management Department and Sonoma County Water Agency (SCWA). The SCSWMP maintains compliance with the NPDES Storm Water Discharge Permit and promotes storm water pollution prevention within that context. Compliance with the NPDES Permit is mandated by state and federal statutes and regulations.

The SCSWMP has developed a permitting program for two classes of municipal areas of the County. As part of the SCSWMP, the County developed the Standard Urban Storm Water Mitigation Plan (SUSMP) for controlling pollutant discharges from urbanized areas of the County. Regulation of storm water runoff from the major cities within the County is managed under various City-specific municipal NPDES permits. Municipal permits (including implementation regulations) have been approved for the urbanized portions of designated Phase I areas (Santa Rosa) and smaller Phase II areas (Petaluma, Rohnert Park, Cotati, Sonoma, and unincorporated areas adjacent to these cities).

The project site lies outside the permit boundaries for these existing municipal storm water system permits. Therefore, the management of the storm water generated at the project site is regulated by the statewide general permits for control of storm water runoff associated with construction activities (Construction General Permit, 99-08-DWQ) and the permit for industrial activities (Industrial Storm Water General Permit Order 97-03-DWQ). The applicant is responsible for filing a Notice of Intent to comply with the statewide general permit for construction activities and the general permit for industrial activities. Compliance with the general permits require development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The plan must identify effective best management practices (BMP) for minimizing sources of pollution, and control measures to reduce or treat the potential pollutant loads carried by runoff from the site to receiving waters.

The County provides updated erosion prevention and sediment control notes on the county website.[22] These latest updates should be integrated into the planning and design phase of project preparation prior to submittal of plans and permit applications. Also, properties within the County defined F2 floodplain combining district should incorporate design and engineering features as defined by the County in Chapter 7B of the Sonoma County Code.

The applicable hydrology and water quality policies contained in the Sonoma County General Plan are analyzed in the Policy Analysis, in Section V.H (Land Use), Table V.H-2. Additionally, applicable policies

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[21] *On a broad level, the Total Maximum Daily Load (TMDL) process leads to a "pollution budget" designed to restore the health of a polluted body of water. The TMDL process provides a quantitative assessment of water quality problems, contributing sources of pollution, and the pollutant load reductions or control actions needed to restore and protect the beneficial uses of an individual water body impaired from loading of a particular pollutant.*

[22] *http://www.sonoma-county.org/prmd/docs/handouts/storm.htm: accessed May 15, 2007 by BASELINE staff.*

outlined within the Petaluma Daily Belt Area Plan and San Francisco Bay Plan are analyzed in further detail in Section V.H (Land Use), Table V.H-3 and Table V.H-4.

Unauthorized Grading and Equipment Storage

In September 2005, grading and equipment storage at the site occurred without permitting by regulatory agencies, including Sonoma County and the San Francisco Bay Regional Water Quality Control Board. Based on the DEIR author's review of aerial photographs and topographic maps developed prior to and subsequent to these activities, the grading did not result in significant changes to the surface water drainage at the site. However, the grading removed pickleweed and other vegetation and disturbed surface soils, potentially increasing the erosion and transport of sediment to drainage ditches. The grading primarily produced more uniform grades within Area A and the former settling ponds in Area C. In Area A, the grading created a compacted gravel surface that gently slopes northward to a small slough. Photographs taken prior to (i.e., baseline condition) and after the grading indicate that the completed surface may have encroached on the south edge on the slough, potentially disturbing existing vegetation that lined this feature. The surface was surrounded by silt fencing and fiber rolls for control of erosion and sedimentation. After the grading was completed, Area A was covered with gravel, reducing the erosion potential of the graded surface. Relative to the vegetated surface present prior to grading, the compacted gravel surface would be expected to have a higher runoff coefficient (i.e., higher rates of runoff).

In Area C, surfaces were created to provide relatively uniform sheetflow drainage toward the southwest. Runoff from these areas is directed into drainage ditches DD5 and DD6. Silt fencing and fabric rolls were installed on the downgradient margins of the surfaces to control sediment. Additionally, the surfaces were hydroseeded to promote vegetation of the exposed surfaces. During inspection of the site by BASELINE geologists in May 2006, these surfaces were primarily covered in grasses and no significant recent erosion channels were observed. However, the surfaces were freshly graded during relatively heavy rainfalls in the 2005-2006 rainy season, potentially causing transport of exposed sediments. Culverts draining DD6 (16-inch corrugated metal pipe) and DD5 (18-inch corrugated plastic pipe) to DD1 were observed to be partially filled with sediment. The source of the sediment could not be definitively identified and could have been generated by any of the areas draining to these ditches.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G of the *CEQA Guidelines*, the proposed project could have a significant environmental impact on Hydrology and Water Quality if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off the site;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off the site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Be inundated by seiche, tsunami, or mudflow.

Issues Not Analyzed Further

The Hydrology and Water Quality impacts that were determined by the Initial Study not to rise to the level of significance are not discussed further in this section, as per thresholds provided in Appendix G of the *CEQA Guidelines*. This includes the following:

- The project would not place housing within a 100-year hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- The project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
- The project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- The project would not be inundated by seiche, tsunami, or mudflow.

Project Impacts and Mitigation Measures

Impact HYDRO-1 Substantially Alter the Drainage Pattern in a Manner That Would Result in Substantial Erosion or Siltation On- or Off-Site

River Bank Erosion

The project proposes the construction and operation of an aggregate products unloading facility on the Petaluma River. Aggregate would be transported to the facility via barges. The project anticipates that deliveries would be made to the facility at a rate of approximately 125 barge trips per year. Under existing conditions, approximately 25 barge trips per year have served the applicant's aggregate facilities. Increased barge traffic and associated boat wakes can increase the potential for bank erosion along the Petaluma River, resulting in increased bank instability and increased sediment loading in the River. The design and operation of low-speed barges and tow boats present a relatively low risk of wake erosion relative to other water craft traffic on the River.

It is possible that the project could alter flow patterns within the River in the vicinity of the proposed barge off-loading facility and the adjacent tidal inlet. Substantial changes in flow patterns or velocities due to the placement of new piles supporting the off-loading facility could cause changes in scour patterns and/or bank erosion. Based on a visual inspection of the River bank upstream and downstream of the proposed off-loading facility (both land-based and boat-based inspections were conducted), no conditions were observed that would indicate that this bank is particularly susceptible to flow pattern changes. The River bank in this area is relatively straight, not undercut, and well vegetated. The off-loading facility would be supported on approximately 15 driven piles; the bulk of the facility would be supported by the piles above the high tide level. Tidal and stormflows would be expected to flow freely around the piles, which would be spaced approximately 10 feet apart. Other facilities, including other barge off-loading facilities, were inspected along the banks of the Petaluma River, and no apparent problems with bank stabilization have been caused by these existing facilities. Tidal flow in and out of the inlet adjacent to the off-loading facility would not be substantially obstructed by the proposed project.

For these reasons, the potential for bank erosion by increased barge traffic, adverse changes to scour patterns in the vicinity of the off-loading platform, and tidal flow in the vicinity of the inlet is a ***less-than-significant*** impact.

Pumping from the Petaluma River and Inland Waterways

The project proposes to include pumping 40 gallons per minute (gpm) of water from the Petaluma River and on-site inlet for dust suppression. Water for dust suppression has been estimated at 10,000 gallons per day (gpd) average, with peak days requiring 20,000 gpd. Specifically, the water for Area A would be extracted directly from the River at the barge facility, and the water for Area C would be extracted from the tidal watercourse.

Although the applicant proposes screening to prevent intake of aquatic species, it is possible that if not properly designed and constructed, entrainment of sediment and/or erosion could occur at the intake. In an extreme case, the suction could scour a depression in the channel bottom, potentially affecting bank stability, particularly at an inland waterway pumping location. Also it is possible that backflow could occur through the suction hose or piping, which could discharge water from the pumping system (which may have come into contact with pollutants) back into the River, degrading water quality. The potential impacts to erosion and sedimentation and water quality at the water supply intakes would be considered ***significant***.

Dust Control Water, On-Site Effects

As mentioned above, the project proposes to pump approximately 10,000 (with a maximum of up to 20,000) gallons of River water per day for on-site dust suppression. Water would be applied to roadways, equipment areas, and stockpiles, all within the working area of the site that drains to the proposed runoff treatment BMPs. The proponent has an economic incentive not to use more water than necessary for dust control (due to the cost associated with pumping and application of the water), or to over-water the site resulting in excessively wet conditions. Ten thousand gallons of water spread over five acres of the total 38-acre site (estimated from the preliminary landscape plan) during an eight hour work day would result in an average rate of water sprayed on the site of 250 gallons per hour per acre. The water would be applied to facilitate dust control and most will evaporate; erosion and sediment transport due to dust control operations will be minimal. The salinity of the River water varies throughout the year from brackish to nearly fresh. During the rainy season, fresh water from storm flows pushes the brackish water toward the bay. However, during the dry season, when most of the dust control water would be pumped from the River, brackish conditions dominate. It is possible that application of brackish water to the working areas of the site could result in deposition and accumulation of salt residues (as the water is evaporated and the salt left behind). However, each year, when the rains come, the salt residue would either infiltrate in the soils or be flushed from the site. During the first storms of the season, accumulated salt residue would be transported along with runoff through the water treatment system and returned to the River. The River ecosystem has adapted to substantial shifts in salinity and therefore the salts that may be included in the site runoff would not be expected to adversely affect water quality. Impacts would be ***less than significant***.

Construction Impacts

Construction and grading within the project site would require temporary disturbance of surface soils. During the construction period, grading and excavation activities would result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment and contaminants in the runoff. Soil stockpiles and excavated areas on the project site would be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation and pollutants in storm water. The potential for chemical releases is present at most construction sites given the types of materials used, including fuels, oils, paints, and solvents. Once released, these substances could be transported to the Petaluma River in storm water runoff, wash water, and dust control water, potentially reducing water quality. Excluding Area A, the proximity of the project site to the Petaluma River reduces the chances that the pollutants (e.g., sediment, petroleum hydrocarbons, and lubricants) would be naturally attenuated prior to discharge to the River. In addition, installation of concrete piles for the proposed barge off-loading facility could result in temporary disturbance of River sediments and increases in turbidity within the River. The pile-driving activities would be of short duration (on the order of days or weeks). The potential impacts to water quality would be temporary and would be considered ***significant***.

Start-up Phase

During the start-up phase of the proposed project the barge off-loading facility and the conveyor over the railroad tracks would not be in place. No construction related to the barge off-loading facility would occur along the Petaluma River at Area A of the site, which includes a small channel that is hydraulically connected to the River. Area A would not be used for material transport or for pumping of water from the River for dust suppression during this phase. As a result, impacts related to erosion and/or siltation on- or off-site would be reduced compared to erosion and/or siltation impacts associated with full build out of the project. The overall significance of impacts to erosion and/or siltation associated with the start-up phase would not change from that described above for Impact HYDRO-1.

Mitigation Measure HYDRO-1a

The River water supply intakes shall be designed and constructed to minimize agitation and entrainment of sediments. This may be accomplished by elevating the intake above the River bottom and/or providing an energy dissipation structure around the intake. Water shall not be pumped from an inland tidal waterway when the tide is low, as pumping could expose the channel bottom, potentially increasing erosion and scour. The potential for backflow to occur through the system shall be minimized by the incorporation of one or more check valves (backflow prevention devices).

Mitigation Measure HYDRO-1b

The grading of the project site shall be conducted in conformance with the approved Grading Plan. All recommendations for grading presented in the site-specific geotechnical reports shall be incorporated into the grading activities.

Mitigation Measure HYDRO-1c

Prior to construction, the owner/operator shall file a Notice of Intent to comply with the statewide General Permit for Discharges of Storm Water Associated with Construction Activities. A SWPPP shall be prepared for construction activities. The SWPPP shall include all provisions of the Erosion and Sediment Control Plan submitted by the applicant. In addition to the regulatory requirements for the SWPPP, the site-specific SWPPP shall include provisions for the minimization of sediment disturbance and production of turbidity in and adjacent to the Petaluma River during construction of the proposed barge unloading facility.

Impact HYDRO-2 Substantially Alter the Drainage Pattern or Substantially Increase the Rate or Amount of Surface Runoff in a Manner That Would Result in Flooding On- or Off-Site

Increased Storm Water Runoff Volume

Under existing and proposed conditions, drainage from Areas C and D of the project site is directed to a single discharge point, the Railroad Culvert, which connects drainage ditch DD1 to the Petaluma River. The project proposes to enhance and expand the wetland areas in the southern part of the project site, increasing storage for runoff. The proposed drainage system is designed to direct runoff from the processing and stockpile facilities to ditches DD5 and DD6. The system includes a weir that connects to the wetlands in Area D at moderate flows (i.e., when the water level in the ditches rises to elevation 3.5 feet). If water levels increase during higher runoff events, DD6 would spill to DD1 and DD5 would overflow to DD2 through culverts with inverts at elevation 4.7 and 4.0 feet, respectively. This system provides detention of storm runoff from developed areas in DD5 and DD6 and allows flow to the wetlands in higher flows. Hydraulic analysis for the project indicates that runoff discharge at the Railroad Culvert would be reduced from 6.36 cubic feet per second (cfs) to 1.38 cfs during a 100-year precipitation event, due to the proposed modifications to the floodplain morphology. Therefore, the project would not increase runoff discharge. Changes to the storm water runoff at the site would be ***less than significant***.

Wetland Maintenance

The project proposes the enhancement of existing wetlands (including drainage ditch DD4) in Area D of the site. Maintenance of existing drainage ditches DD1, DD2, DD3, DD5, and DD6 as vegetated drainage channels is also proposed. The hydraulic system for the wetland area is connected to the Petaluma River at only one point, the Railroad Culvert. As demonstrated in the hydrology report for the wetland plans, the culvert restricts tidal flow onto the project site. The condition of the culvert has not been investigated. The project also involves pumping River water from drainage ditch DD1, west of the culvert. If the culvert partially or fully collapses or becomes otherwise blocked, tidal circulation into the proposed wetlands could be reduced or eliminated. The habitat of the proposed wetlands would be dependent on tidal circulation. Therefore, potential blockage of the Railroad Culvert would be a ***significant*** impact on the proposed project.

Start-up Phase

During the start-up phase of the proposed project no development would occur at Area A of the project site. Storm water runoff conditions at Area A during this phase of the project would be similar compared to the full build out phase of the project because minimal impermeable surfaces would be added to Area A as a part of full build out.

Because the start-up phase also involves pumping River water from drainage ditch DD1, impacts related to wetland maintenance would be similar during this phase compared to the full build out phase described above.

Overall, impacts related to increased runoff and wetland maintenance during the start-up phase would be similar compared to impacts associated with full build out of the project. The overall significance of these impacts during the start-up phase would not change from that described above for Impact HYDRO-2.

Mitigation Measure HYDRO-2

As required by Mitigation Measure BIO-3a(4), the applicant would be required to repair or replace the existing partially blocked culvert under the railroad right-of-way to improve tidal circulation. The function of the culvert shall be maintain for the life of the project. A maintenance program for all culverts shall be developed and incorporated into the site's Storm Water Pollution Prevention Plan (SWPPP).

Impact HYDRO-3 Otherwise Substantially Degrade Water Quality

Long-Term Operational Impacts

Storm Water Runoff

The operation of the new and recycled aggregate storage and processing facilities and asphaltic concrete plant would introduce new potential sources of water quality degradation at the project site. The project proposes the storage of hazardous materials, including heated asphalt, which could be accidentally released to the surface and subsurface. Intensified land uses at the project site would result in increased vehicle use and potential discharge of associated pollutants. Increased numbers of vehicles and outdoor parking facilities at the project site would likely result in increased leaks of fuel, lubricants, tire wear, and fallout from exhaust, which would contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff being transported to receiving waters. Runoff from landscaped areas at the site may contain residual pesticides and nutrients.

In addition, the barge off-loading facility would include operation of a diesel-powered loader and aggregate conveyor system adjacent to and over the Petaluma River. This operation could result in the direct discharge of petroleum hydrocarbons and sediment to the Petaluma River.

Long-term degradation of water quality runoff from the site could impact local water quality in the River. The project proposes design elements that would reduce the potential for the discharge of untreated runoff from the proposed industrial facilities. According to the applicant, runoff from the asphalt plant area of the site would be directed into a below-ground catchment basin designed to provide for settlement of larger solids entrained in runoff. Discharge from the basin would pass through a sand filter prior to flowing to the vegetated drainage ditch DD6 at the western margin of the site. The ditch would serve as an extended detention basin during low and moderate runoff events. Additional settlement of suspended sediments (and associated contaminants such as hydrocarbons and metals) would occur within the ditch. Runoff from the aggregate storage area would primarily drain westward to DD5, which would also be operated as an extended detention basin. The project as proposed does not include specific measures to prevent stormwater and River water quality degradation at the barge off-loading facility. The application does not include specifications for site-specific emergency preparedness and response for the potential release of hazardous materials or a maintenance plan for operation of the storm water management system. This is a ***significant*** impact.

In addition, the proposed facility would store and process recycled asphalt and concrete. It is possible that the asphalt itself and/or the oil and other urban residues deposited on the surface of the recycled materials could represent a significant source of pollutants. The leachability of pollutants from hardened asphalt[23] has been evaluated using U.S. EPA toxicity characteristic leaching potential (TCLP) analyses.[24,25] The results of these analyses indicate that asphalt does not leach significant quantities of pollutants. Recycled asphalt materials from between the wheel paths of roadways were evaluated for leachability of metals and PAHs. The results of this study indicated that there was no difference in the leachate contaminant concentrations from the roadway centerline materials than anywhere else on the roadway.[26] It should be noted that asphalt paving materials are routinely used by water agencies (including the Metropolitan Water District of Southern California and the East Bay Municipal Utilities District) to line domestic water supply reservoirs. Therefore, leaching of pollutants from the piles of recycled materials is considered ***less than significant***.

Septic System Operation

The project design includes construction and operation of a new septic system for the proposed facilities. The application and treatment of on-site sewage, if not appropriately managed, can result in degradation of surface and subsurface water quality. The septic system would be located in the northwestern portion of Area B; the footprint of the septic system would cover approximately 6,000 square feet. The design of the septic system submitted with the application includes a leach field on gently sloping topography with an upslope groundwater interceptor trench. The system would be designed and operated in conformance with the requirements of the Sonoma County PRMD. Conformance with permitting and monitoring requirements for the proposed septic system would reduce the potential impacts on water quality to a ***less-than-significant*** level.

Release of Contaminants from Asphaltic Concrete Production

The project proposes the operation of an asphaltic concrete plant that would use a counter flow drum mix assembly. The plant would be operated under a Permit to Operate issued by the Bay Area Air Quality Management District (BAAQMD). The permit conditions would require Best Available Control Technologies (BACT) to reduce air emissions from the plant. Plant emissions could include particulate matter (PM) containing contaminants, including polynuclear aromatic hydrocarbons and metals. Some of these emissions may settle directly into the River (atmospheric fallout) or be deposited on the land surface and eventually be discharged to the River in runoff. To determine whether the pollutant emissions for the

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23 *Releases from liquid asphalt are not considered, since liquid asphalt becomes a solid under ambient conditions.*

24 *Vashisth, P ; Lee, K W; Wright, R M, 1998, Assessment of Water Pollutants from Asphalt Pavement Containing Recycled Rubber in Rhode Island, Transportation Research Record No. 1626, p. 95-104.*

25 *Townsend, T., 1998, Leaching Characteristics of Asphalt Road Wastes, Department of Environmental Engineering Sciences, University of Florida, June15.*

26 *Kriech, A., 1992, Leachability of Asphalt and Concrete Pavements, Heritage Research Group, March 5.*

proposed asphalt production process could result in project-level water quality impacts to the Petaluma River, BASELINE conducted a quantitative analysis of the potential exchange of pollutants from the air in the vicinity of the proposed plant to the water in the River. A "project-level" water quality impact would occur if the project, by itself, could result in the discharge of a new pollutant load that would impact one or more designated beneficial uses of the Petaluma River.

The U.S. EPA has estimated the proposed project's air emissions factors (after implementation of BACT) for various pollutants associated with the type of asphalt production activities, which are further described in Section V.B, Air Quality, of this Draft EIR. To evaluate the potential water quality impact associated with these air emissions, it is necessary to calculate how these emissions might affect pollutant concentrations in the Petaluma River. A conservative "worst-case" approach was used, which: 1) assumed that all the pollutants emitted from the asphalt production process were deposited in the River and 2) assumed very low flow conditions in the River. Both these assumptions tend to overestimate the pollutant concentrations in the River that may be caused by the proposed project.[27] The results indicate that none of the pollutants would be generated in quantities that would, by themselves, exceed applicable screening levels.[28]

The portion of the River adjacent to the project site has been designated as water-quality impaired for diazinon, pathogens, nutrients, and sediment. However, the project would not be expected to generate or discharge diazinon (an insecticide that has been banned except for specific agricultural uses). The project could create new sediment sources (as described under the Impact HYDRO-3 discussion above), but these potential sediment discharges would be fully mitigated by the project-level mitigation. Similarly, the project could generate a new pathogen source by installing a new septic system near the River. This is considered a ***potentially significant*** impact; however, compliance with the required project-level mitigation would reduce the potential impact of increased pathogen discharge to a less-than-significant level. Based on the air quality analysis conducted for this DEIR, the proposed asphalt plant would produce phosphorous emissions. Phosphorous is a nutrient and is discussed further below.

Even after all BACT measures are undertaken to reduce pollutant emissions, some relatively small amount of phosphorous is expected to be emitted to the air from the asphalt production process. Some of these emissions may settle directly into the River (atmospheric fallout) or be deposited on the land surface and eventually be discharged to the River in runoff. Based on a worst-case analysis conducted for this DEIR (included in Volume II, Appendix G), if all the phosphorous emissions from the plant were deposited in the River, the resulting concentration of phosphorous in the River water would be 0.091 micrograms per liter (ug/L). This concentration would be below the National Oceanic and Atmospheric Administration water quality screening level of 0.1 ug/L Therefore, the project by itself would not be expected to impact beneficial uses and the project-level impact is less than significant. However, the RWQCB has determined that the assimilative capacity of the Petaluma River system has already been exceeded for nutrients, and therefore the project may contribute to a cumulative impact. Refer to the Cumulative Impact section below for further discussion.

27 BASELINE, 2007, Revised Technical Memorandum, included in Volume II, Appendix G.

28 Water quality screening levels provide a context for evaluation of the results of the pollutant loading calculations. If the pollutant concentrations in the Petaluma River remain below the screening levels, it is unlikely that any impact to beneficial uses would occur.

Start-up Phase

During the start-up phase of the proposed project no development would occur at Area A of the project site and the barge off-loading facility would not be constructed at the edge of the River. The barge off-loading facility involves operation of a diesel-powered loader and aggregate conveyor system adjacent to and over the River. By eliminating this component of the project from the start-up phase, impacts related to potential direct discharge of petroleum hydrocarbons and sediment to the River would be reduced. However, the start-up phase would still involve the operation of new and recycled aggregate storage and processing facilities and an asphaltic concrete plant which would introduce new potential sources of water quality degradation at the project site.

The start-up phase also includes construction and operation of a new septic system for the proposed facilities. The application and treatment of on-site sewage, if not appropriately managed, can result in degradation of surface and subsurface water quality.

Similar to the full build out phase, during the start-up phase plant emissions could include particulate matter containing contaminants, including polynuclear aromatic hydrocarbons and metals. Some of these emissions may settle directly into the River or be deposited on the land surface and eventually be discharged to the River in runoff.

Overall, potential water quality impacts during the start-up phase would be less compared to impacts associated with full build out of the project. However, the overall significance of these impacts during the start-up phase would not change from that described above for Impact HYDRO-3.

Mitigation Measure HYDRO-3a

Prior to commencement of operations, the owner/operator shall prepare a site-specific SWPPP for the operational period of the project. The SWPPP shall meet all requirements of the most recent statewide Industrial Storm Water General Permit. At minimum, the SWPPP shall include design, operation, and maintenance specifications for:

- Control of sediment discharges at the loading facility on the Petaluma River that minimizes the potential for spillage of aggregate materials into the River and the disturbance of River sediments during anchorage of the barges. Barges should arrive "clean" (no sediment or aggregate materials on horizontal surfaces outside of the hold). Off-loading procedures shall include provisions for eliminating the creation of dust (e.g.. continuous misting so that newly exposed aggregate surfaces stay wet, but not so much water application that runoff is created). The conveyor system shall be enclosed and fitted with dust control devices (e.g., misting units). Aggregate exiting the conveyor system shall be moist to wet so that dust is not generated as it drops from the conveyor to the storage piles.
- Measures designed to protect River water quality at the barge off-loading facility. The loader shall not be refueled or receive major maintenance while on the over-the-water off-loading facility. The loader shall be moved to an appropriate land-based location (a minimum of 30 feet from the top of River bank) for refueling and maintenance.
- The entire parcel adjacent to the off-loading facility (Area A) shall be modified to provide enhanced water quality protection for the River and tidal inlet. A limited access zone shall be established

within 50 feet of the High Tide Line and within 10 feet of the top of bank to the slough as further described under Mitigation Measure Bio-2 in Section V.C. (Biological Resources). This will allow limited access roads to the off-loading facility and along the conveyor system to be constructed. The roads shall be placed at the maximum feasible distance (but not less than 50 feet) from the tidal inlet to provide a water quality buffer. If it is necessary for any road to be elevated above the surrounding grade, the escarpment created by the road shall be protected by riprap and/or bioengineering techniques so that the road is stable if the site is inundated during flooding. Permitted improvements within this zone shall be clearly identified and mapped, and no industrial or commercial activities other than those proposed by this project shall be permitted on this parcel. The remainder of the parcel shall be regraded so that shallow stormwater bioswales border the access roads on either side. The bioswales shall be designed and constructed in accordance with the requirements of the County PRMD. The existing baserock shall be removed from the parcel and the existing soils either amended or new planting medium imported so that vegetation can be re-established over the entire parcel (except at the road locations). The applicant shall ensure that no net fill occurs on the site (i.e. any fill imported to the site must be offset by an equal or greater volume of material export out of the floodplain).

- A pretreatment catch basin and sand filter (or multiple basins and filters) that will capture and treat all runoff from all processing and storage areas for at least the 10-year design storm event. Discharge from the catch basin and sand filter shall be visibly clear (i.e., not turbid). If turbid water is observed to be discharging from the catch basin and sand filter, the system shall be expanded and/or redesigned in coordination with the County and RWQCB so that adequate pretreatment is achieved. Only visibly clear water should be discharged to the secondary treatment system. The SWPPP shall include specifications for regular maintenance of the basin and sand filter and procedures for disposal and/or reuse of the used filtration material.

- An emergency shutoff system that will allow the plant operator to stop discharge from the catch basin should a chemical spill occur at the facility. A gate valve or similar structure that can shut off flows out of the catch basin shall be included in the basin design. The method for engaging the shutoff system shall be simple and the procedure provided to all appropriate plant employees as part of routine training.

- The secondary storm water treatment system shall use a portion of the existing network of drainage ditches to provide additional treatment and on-site residence time prior to discharge of site runoff to the Petaluma River. These drainage ditches should be redesigned to act as extended wet ponds and/or detention features. Flows for the catch basin and sand filter shall be discharged into the tidally-influenced ditches in a manner so that turbulence is not created (e.g., using an energy dissipation structure). The grading plan and drainage design shall include measures that ensure maximum residence times in the detention features.

- As required by the general permit for industrial activities, the applicant shall conduct regular inspections of the facility BMPs and collect storm water runoff samples during storm events where a discharge occurs. These data shall be reviewed for compliance with applicable published U.S. EPA benchmark values for storm water runoff. If the analytical results from the sampling events indicate that benchmark values are being exceeded, corrective action shall be implemented in coordination with the RWQCB.

All activities and operation of storm water runoff BMPs are subject to regular inspection by the County and the RWQCB. If the County inspectors observe practices that do not protect surface water quality to the maximum extent practicable, then they are empowered to and shall require the operator to implement corrective action.

Mitigation Measure HYDRO-3b

Prior to the commencement of operations, the proposed septic system shall be installed under permitting by the PRMD. Additionally, abandonment of the existing septic system shall be performed under PRMD permitting requirements.

Impact HYDRO-4 Place Within a 100-Year Flood Hazard Area Structures Which Would Impede or Redirect Flood Flows

Figure V.G-3 shows the preliminary hydrology plan for the proposed conditions for the project site. As stated previously, the letter designations in Figure V.G-3 indicate drainage areas, as further described in the Hydrology Report by CSW/Stuber-Stroeh Engineering Group, Inc in Volume II, Appendix G, and are not related to the four areas as described in the Project Description (i.e., Areas A, B, C, and D).

The majority of the developed project site, including most areas of proposed industrial facilities and the parcel adjacent to the barge off-loading facility, is located within the FEMA 100-year flood hazard zone and the County F2 (floodplain) zoning district. Therefore, the project site is expected to be inundated in the 100-year flood event. Although the project site is located within the 100-year flood zone, the elevation of the proposed processing facilities would be above the base flood elevation of 7 feet msl. Additionally, the base of the proposed aggregate storage stockpiles would also be above the base flood elevation. Therefore, the proposed facilities would not be expected to be flooded during the 100-year event. Although the proposed grading for the site would result in placement of fill within portions of the flood zone, excavation within the zone would occur as part of wetland enhancement. Analysis prepared for the project[29] indicates that the project would increase the flood storage volume below elevation 7 feet msl from 28.57 acre-feet (existing) to 32.53 acre-feet. The increases in flood storage would be expected to incrementally reduce flood hazards within the Petaluma River by retaining more water on-site during flooding events. Changes to the flood hazard conditions would be ***less than significant***.

<u>Start-up Phase</u>

During the start-up phase of the proposed project no development would occur at Area A of the project site which is located within the FEMA 100-year flood hazard zone similar to most other areas of the site proposed to be developed with industrial facilities. Although the project site is located within the 100-year flood zone, the elevation of the proposed processing facilities and aggregate stockpiles would be above the base flood elevation of 7 feet msl. Therefore, the proposed facilities would not be expected to be flooded during the 100-year event. Impacts related to the 100-year flood zone during the start-up phase would be similar compared to impacts associated with full build out of the project. The overall significance of these impacts during the start-up phase would not change from that described above for Impact HYDRO-4.

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[29] *CSW-[St]2, 2006, op.cit.*

CUMULATIVE IMPACTS

The project would generate emissions of phosphorous (a nutrient) from the asphalt plant. Some of these phosphorous air emissions may be aerially deposited in the Petaluma River. The RWQCB has determined that the Petaluma River is water-quality impaired for nutrients (mainly forms of nitrogen and phosphorous). The water-quality impairment designation indicates that the River has received excessive nutrients that have impacted beneficial uses.

The proposed project would result in an incremental increase in nutrient loading. As noted in Impact Hydro-3, the implementation of BACT measures would significantly reduce phosphorous emissions, but a relatively small amount may be emitted from the asphalt plant process. This amount would not exceed National Oceanic and Atmospheric Administration 's water quality screening criteria of 0.1 ug/L even under a worst case scenario, in which all phosphorous emissions from the plant are assumed to deposit directly into the River. The amount would nevertheless represent a contribution to nutrient loading in the River, which is likely to continue experiencing a significant cumulative impact due to the contributions from Related Projects included in Table III-1 in Section III (Project Description). Given the River's finite location and number of pollutant sources, the project's contribution is conservatively assumed to be ***cumulatively considerable***.

The project would not result in any other cumulative hydrology or water quality impacts that would not be adequately mitigated by project-level mitigation measures described above.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the mitigation measures listed above, and with the exception of cumulative nutrient impacts, all impacts to hydrology and water quality would be ***less than significant***.

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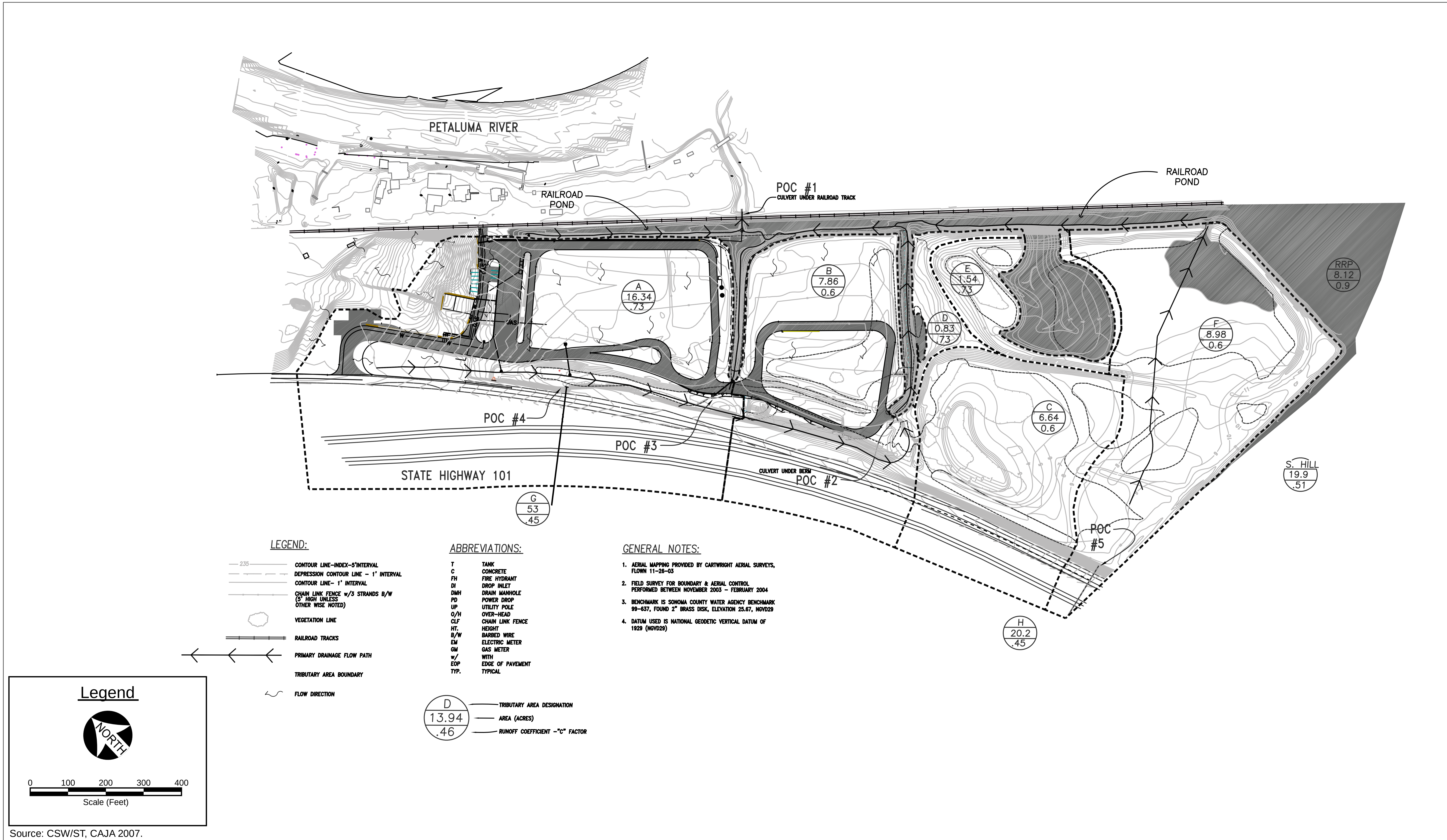

Source: CSW/ST, CAJA 2007.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure V.G-3
Preliminary Hydrology Plan, Proposed Conditions

V. ENVIRONMENTAL IMPACT ANALYSIS
H. LAND USE

INTRODUCTION

The Land Use section describes the existing land use setting and uses of the project site and adjacent areas. It includes the identification of current General Plan policies and zoning designations. The purpose of the Land Use section is to provide the environmental and regulatory background necessary to analyze potential impacts to land use associated with the proposed project.

METHODOLOGY

The impacts of the proposed project on land use were analyzed qualitatively, focusing on consistency between planned and permitted uses under applicable land use plans. The determination of compatibility is based on the anticipated environmental effects of proposed uses and the sensitivity of adjacent uses to those effects. The evaluation analyzes the proposed project with the policies of the Sonoma County General Plan, the Sonoma County Zoning Regulations, the Petaluma Dairy Belt Area Plan and the Bay Conservation and Development Commission San Francisco Bay Plan.

Existing Land Use Designation and Zoning

The project site consists of three vacant parcels (APN 019-220-001, 019-320-022, and 019-320-023), which comprise approximately 38 acres. The applicant also owns a well on adjacent APN 019-320-019 that appears to be unusable for water supply, and is not part of the proposed project.

APN 019-220-001 (also known as Area A, see Section III, Project Description) is located adjacent to the Petaluma River and has a Sonoma County General Plan land use designation of General Industrial (GI); and a zoning designation of Heavy Industrial (M2). Combining District Zoning for APN -001 includes Biotic Resources (BR), Frozen Lot Size (B8), and 100-year flood plain (F2).

APNs 019-320-022 (Areas C and D) and -023 (Area B) have a designation of Limited Commercial (LC) for both the General Plan and the Zoning District. APN 019-320-022 has Combining District Zoning for F2, Scenic District (SD), Scenic Resources (SR) and Valley Oak Habitat (VOH). APN 019-320-023 (Area B) has Combining District Zoning for F2, SR and Historic District (HD). As mentioned in Section III (Project Description), the historic 1860-era home was destroyed in a fire in the Fall of 2004 and the older barns were removed. Because the structures are now gone, the HD combining district is being proposed for removal by the County's Board of Supervisors, as part of the General Plan Update.[1]

See Figure V.H-1 for a General Plan Land Use Designation Map of the project area, and Figure V.H-2 for the Zoning Designations Map.

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[1] *Email Correspondence with Sonoma County Planning Staff, May 2, 2007.*

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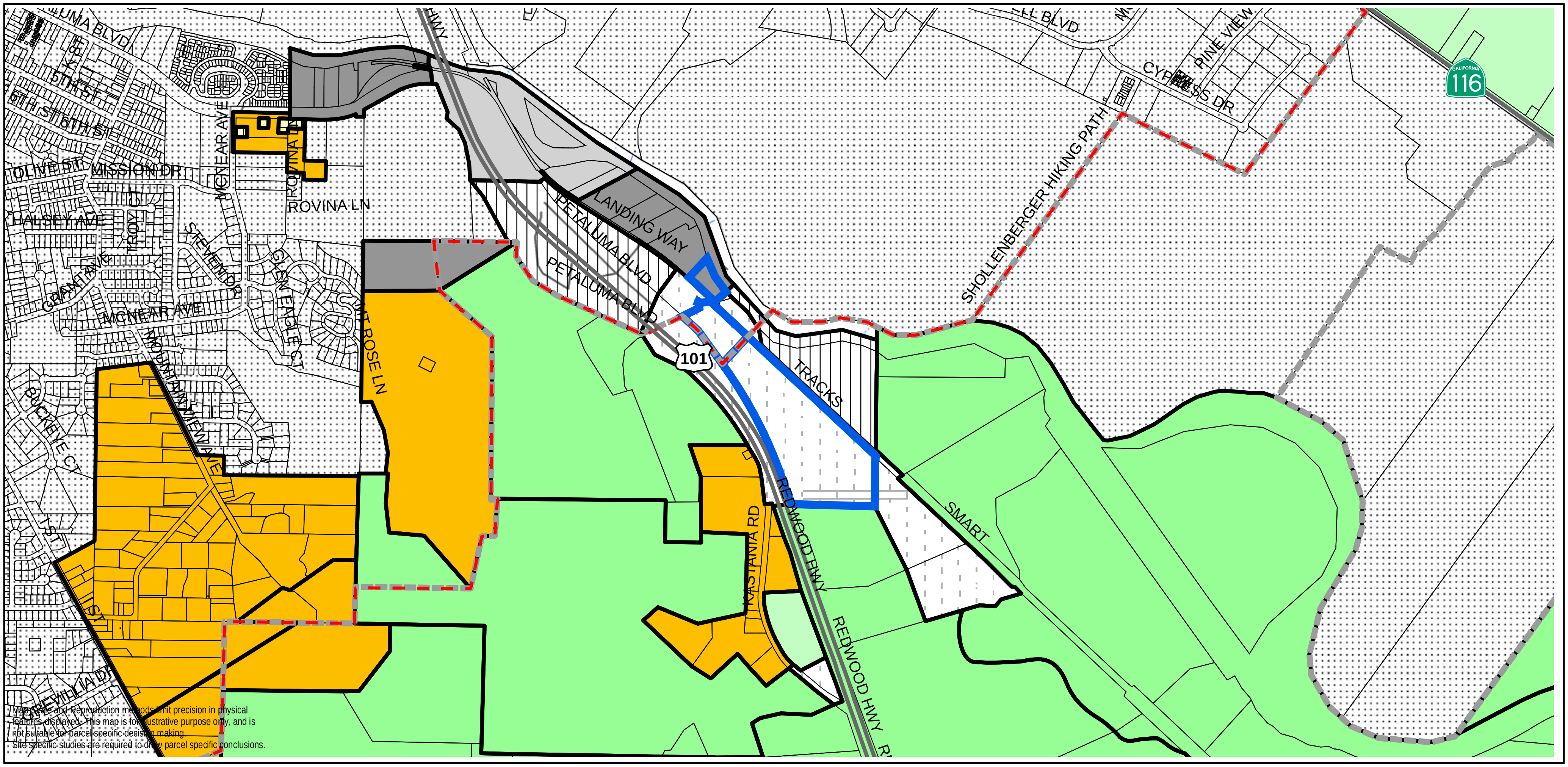


Dutra Haystack Landing Asphalt Plant 2007 General Plan Land Use Designations

Figure V.H-1

General Plan Land Use

- Diverse Agriculture
- Land Extensive Agriculture
- Land Intensive Agriculture
- Resources & Rural Development
- Rural Residential
- Urban Residential
- Recreation / Visitor-Serving Commercial
- General Commercial
- Limited Commercial
- Limited Commercial Traffic Sensitive
- General Industrial
- Limited Industrial
- Public / Quasi-Public

POI

- General Commercial
- Limited Commercial
- General Industrial
- Limited Industrial
- Park Existing
- Park-Proposed
- School Existing
- School Proposed
- Wastewater Mgt. Facilities
- Wastewater Mgt. Facilities-Proposed
- Solid Waste Disposal Facilities-Existing
- Solid Waste Disposal Facilities-Proposed
- Specific Area Policy-Applies on Parcel

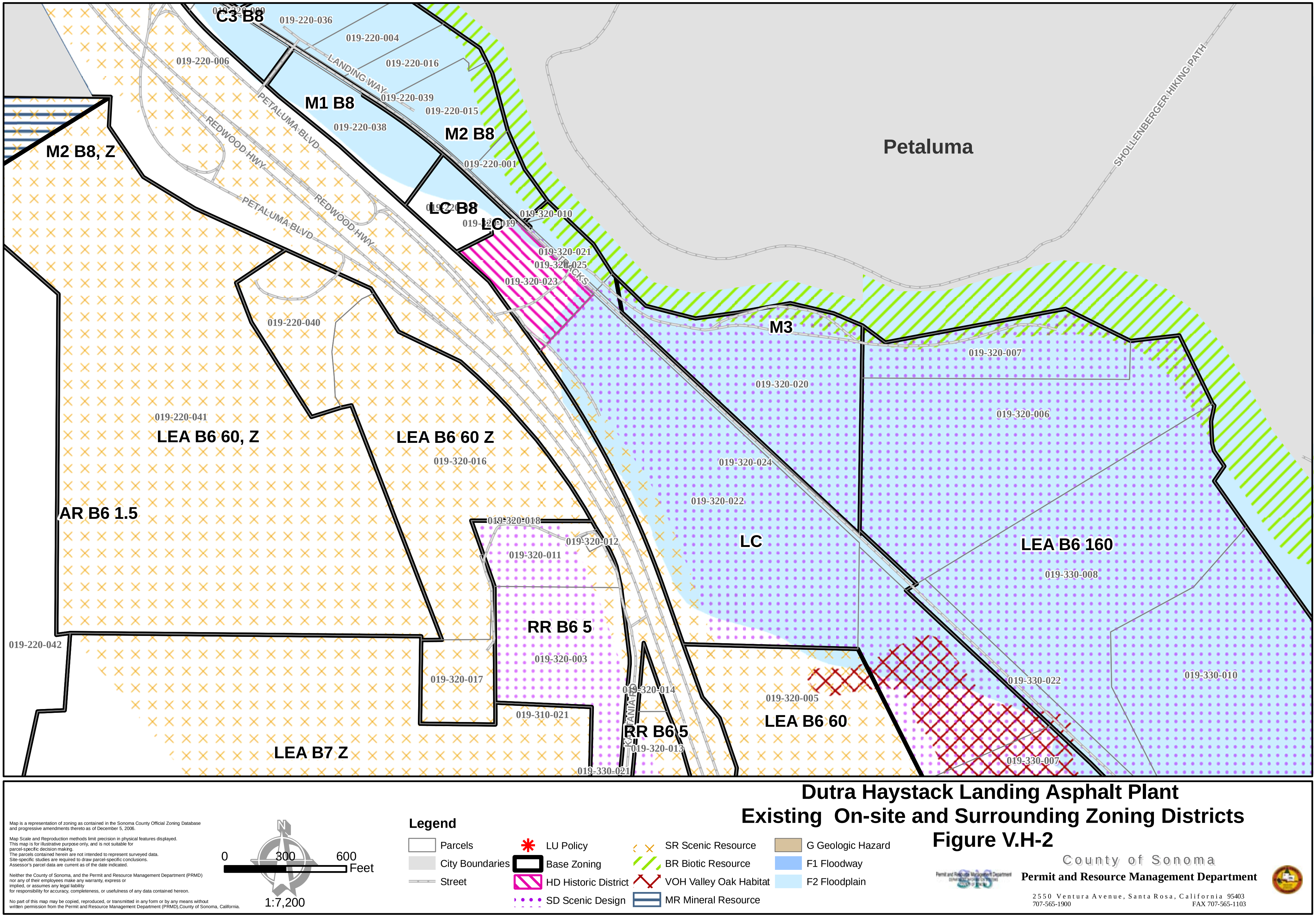
- Project Boundary
- Urban Growth Boundaries
- Urban Service Areas
- City of Petaluma
- Highways
- Street
- USGS Streams

0 750 1,500 Feet

1:18,000

County of Sonoma
Permit and Resource Management Department
2550 Ventura Avenue, Santa Rosa, California 95403
707-565-1900 FAX 707-565-1103

Author: PRMD Cartography: D. Reinier File No.: S:\GIS-DATA\PRMD_BASE\PRMD Department Projects\Environmental Review\dutra haystack landing asphalt plant G P Land Use V.H-1.mxd Date: 09/26/2007



Dutra Haystack Landing Asphalt Plant
Existing On-site and Surrounding Zoning Districts
Figure V.H-2

Surrounding Land Uses

The Petaluma River is located east of the site. Shollenberger Park is located on the River's eastern shore, directly across from the project site. A tidal marsh runs along both sides of the River to the south of Shollenberger, overlapping with the Petaluma Marsh and Wildlife area approximately 1 ½ miles southeast of the site.

Existing uses on Landing Way north of the facility are primarily industrial. Two parcels north and adjacent to the site on the Petaluma River are owned by Shamrock Materials, Inc., which operates a facility that provides aggregate storage and distribution (primarily sand and gravel) to the construction trade, and has a barge off-loading facility for receipt of materials on the Petaluma River. The parcel closest to the proposed project appears vacant and used only for storage. The County adopted a Mitigated Negative Declaration and approved a use permit allowing operation of the Shamrock facility on July 20, 2004. The Shamrock parcels are zoned Heavy Industrial (M2), along with the other properties to the northeast of the railroad tracks and north of the site. The properties to the northwest of the tracks and north of the site are zoned Limited Urban Industrial (M1).

The properties to the west and south of the site are primarily zoned for Land Extensive Agriculture (LEA); additionally there are three Rural Residential (RR) zoned properties across Highway 101 on the hill overlooking the site. The properties to the east of the site and east of the SMART railroad tracks, adjacent to the Petaluma River have mixed zoning, including Limited Commercial (LC), Limited Rural Industrial (M3), and LEA. The two permanent residential dwellings on the properties immediately east of Area B precede the current zoning designations and are considered legal, non-conforming uses.

General Plan land use designations to the north of the site, east of the railroad tracks are General Industrial, and west of the tracks are Limited Industrial and Limited Commercial. Land use designations south and west are primarily Land Extensive Agricultural, with a portion along Kastania Road to the south being Rural Residential. Additionally two parcels along the railroad tracks south of the site are designated Limited Commercial, and parcels immediately to the east of the site are designated Limited Commercial and Limited Industrial.

Figure V.H-3 shows the Existing On-site and Surrounding Land Use Map. The accompanying Table V.H-1 shows the Parcel Identifications and Land Uses. Additionally, views of the surrounding land uses are shown in Section III (Project Description), Figures III-12 through III-14.

REGULATORY SETTING

Federal and State Requirements

There are no Federal policies and/or mandates related to Land Use.

Article XI, Section 7 of the California State Constitution is the primary authority for cities and counties to regulate land use. California State Planning and Land Use Law (Government Code § 65000 *et seq.*) sets forth minimum standards to be observed in local land use regulatory practices, reserving in cities and counties the maximum degree of control in such matters.

In addition to the thresholds of significance outlined in Appendix G of the *CEQA Guidelines*, the local policies and guidelines associated with Land Use and applicable elements of the Sonoma County General Plan are utilized for this analysis.

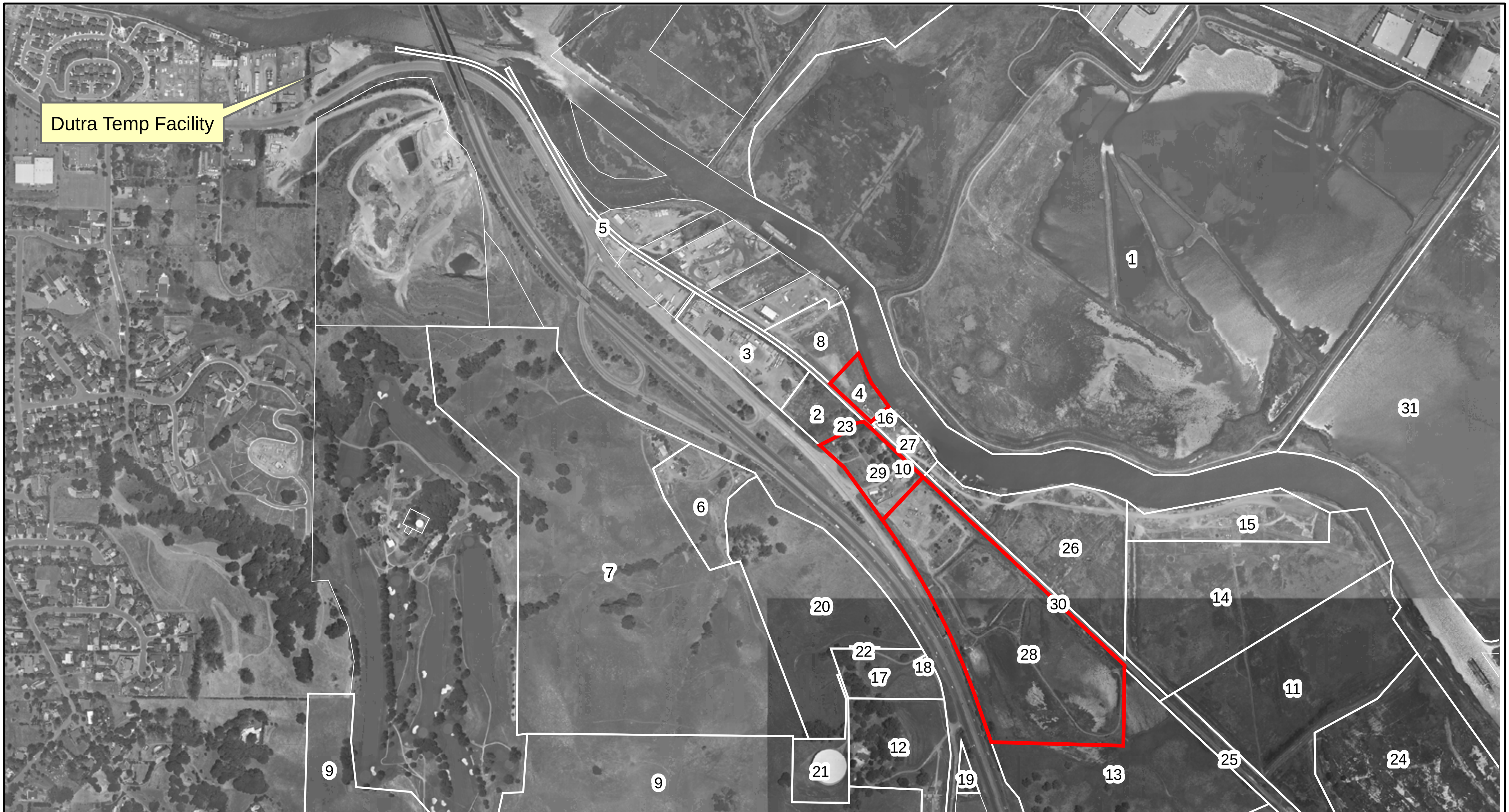
Regional and Local Requirements

Sonoma County General Plan

California State Government Code Section 65300 requires each county and city, including charter cities, to adopt a comprehensive General Plan which is an integrated and internally consistent statement of goals, objectives, policies and programs to provide for future land use decisions. Goals, objectives and policies in each element of the General Plan reflect the future needs and desires of the community.

The project site is located in Sonoma County, and is thus subject to the Sonoma County General Plan. The current Sonoma County General Plan consists of 10 elements which include: 1) Land Use; 2) Housing; 3) Open Space; 4) Agricultural Resources; 5) Resource Conservation; 6) Public Safety; 7) Circulation and Transit; 8) Air Transportation; 9) Public Facilities and Services; and 10) Noise.

Sonoma County is currently in the process of updating its 1989 General Plan. However, since the updates have not been adopted at this time, only the existing General Plan is utilized in the review of the EIR. General Plan Element policies that are relevant to the proposed project are analyzed at the end of this section, in Table V.H-2.



Dutra Haystack Landing Asphalt Plant
Existing On-site and Surrounding Land Uses
Figure V.H-3

Legend

Dutra Project Site

31 Parcel ID Numbers

0 450 900 Feet

1:10,800

Map Scale and Reproduction methods limit precision in physical features displayed. This map is for illustrative purpose only, and is not suitable for parcel specific decision making.
Site specific studies are required to draw parcel specific conclusions.
Aerials are Orthogonally corrected and in California State Plane Coordinates Zone II. North American Datum 1983.
Aircraft altitude varies and can be determind by multiplying the negative scale by 6.
Negative scale varies by area of County, and is available on request.
Aerials flown Spring 2000

County of Sonoma
Permit and Resource Management Department
2550 Ventura Avenue, Santa Rosa, California 95403
707-565-1900
FAX 707-565-1103

Author: PRMD Cartography: D. Reinier File No.: S:\GIS-DATA\PRMD_BASE\PRMD Department Projects\Environmental Review\dutra haystack landing asphalt plant_existing uses.mxd Date:05/22/2007

Table V.H-1
Dutra Haystack Landing Asphalt & Recycling Facility Existing Land Uses

ID	APN	Situs Address	City	Description	Zoning	GP Land Use
1	017-170-001	None	Petaluma	Shollenberger Park	CITY	CITY
2	019-220-037	2887 Petaluma Blvd. S.	Petaluma	Vacant, graded lot	LC	LC
3	019-220-038	2543 Petaluma Blvd. S.	Petaluma	Novato Disposal Transfer Station	M1	LI
4	019-220-001	Petaluma Blvd. S.	Petaluma	Vacant (part of project)	M2	GI
5	019-220-039	None	Unincorp County	SMART Right-of-way	N/A	N/A
6	019-220-040	None	Petaluma	Rural res/2 or more res	LEA-60	LEA-60
7	019-220-041	None	Petaluma	Pasture	LEA-60	LEA-60
8	019-220-015	222 Landing Way	Petaluma	Shamrock Materials Inc.	M2	GI
9	019-310-021	4412 Kastania Rd.	Petaluma	Rural residential	LEA	LEA
10	019-320-025	None	Unincorp County	SMART Right-of-way	N/A	N/A
11	019-330-008	4550 Redwood Hwy.	Petaluma	Tideland	LEA-60	LEA-60
12	019-320-003	3905 Kastania Rd.	Petaluma	Rural res/single res	RR-5	RR-5
13	019-320-005	4500 Hwy. 101	Petaluma	Pasture	LC, LEA-60	LC, LEA-60
14	019-320-006	4000 Hwy. 101	Petaluma	Tideland	LEA-60	LEA-60
15	019-320-007	3393 Petaluma Blvd. S.	Petaluma	Tideland	LEA-60	LEA-60
16	019-320-010	3353 Old Redwood Hwy. S.	Petaluma	Non-conforming res	LC	GC
17	019-320-011	4000 Redwood Hwy.	Petaluma	Rural res./manufactured home	RR-5	RR-5
18	019-320-012	None	CA	North Marin Water District Utility	RR-5	RR-5
19	019-320-014	Kastania Rd.	Petaluma	Flood control/Sonoma County Water Agency	RR-5	RR-5
20	019-320-016	3415 Kastania Rd.	Petaluma	Rural residential/single res	LEA-60	LEA-60
21	019-320-017	Kastania Rd.	Petaluma	Flood control/Sonoma County Water Agency	LEA	LEA
22	019-320-018	Kastania Rd.	Petaluma	Flood control/Sonoma County Water Agency prop	LEA-60	LEA-60
23	019-320-019	Petaluma Blvd. S.	Petaluma	Well site (owned by applicant)	LC	LC
24	019-330-010	4551 Redwood Hwy.	Petaluma	Field crops	LEA	LEA
25	019-330-022	None	Unincorp County	SMART Right-of-way	LEA-60	LEA-60
26	019-320-020	Petaluma Blvd. S.	Petaluma	vacant	M3, LC	LI, LC
27	019-320-021	3357 Petaluma Blvd. S.	Petaluma	Non-conforming res	LC	GC
28	019-320-022	Petaluma Blvd. S.	Petaluma	Vacant (part of project)	LC	LC
29	019-320-023	3355 Petaluma Blvd. S.	Petaluma	vacant (part of project)	LC	LC
30	019-320-024	None	Unincorp County	SMART Right-of-way	N/A	N/A
31	068-010-034	None	Petaluma	Field crops	CITY	CITY

Source: County of Sonoma Permit & Resource Management Department

General Plan Land Use Designation

The project site is designated for Limited Commercial (LC) on APNs 019-320-022 and 019-320-023, and General Industrial (GI) on APN 019-220-001.

Limited Commercial (LC)[2]

Limited Commercial land is intended to accommodate retail sales and services for the daily self sufficiency of local rural or urban neighborhoods or communities in keeping with their character. This category is also intended to provide opportunities for a mix of residential and commercial use in urban service areas and provides for consideration of a single-family residence in place of commercial uses allowed by zoning.

The permitted uses for Limited Commercial land vary by location and may be expressed in planning area policies. Zoning ordinances further define uses permitted in this category, as well as the bulk, height, coverage and other standards for such development. Residential and limited commercial uses may be combined in a single development within urban service areas.

LC Permitted Development Intensities and Criteria

New lots shall not be smaller than 1.5 acres on individual wells and septic systems or 1.0 acre on public water. Structures are not expected to cover more than 50 percent of the site or exceed thirty-five feet in height; although additional height may be considered if a reduction in coverage is provided which results in no overall increase in building intensity.

Commercial uses shall require design review approval and on-site parking. Mixed residential and commercial use may be considered where urban services are available and as part of a master plan for the site. In such cases, the residential use is a secondary use allowed only in conjunction with and compatible with the commercial use.

General Industrial (GI)[3]

General Industrial land is intended to provide sites for industrial activities and employment, which require urban services and which primarily serve an urban population. The intent of the category is to assure that industrial development is compatible with adjacent land uses, infrastructure and environmental quality.

The Permitted Uses for General Industrial include all industrial uses, with primary uses being production or assembly of products. Typical uses include manufacturing goods, warehousing, research facilities, machine shops, contractor's storage, and processing plants. Offices incidental to the primary use are also allowed. Residential uses shall be limited to one caretaker unit per lot. Secondary uses may include minor commercial services. The zoning ordinance further defines the uses permitted in this category as well as the bulk, height, coverage and other standards for such development.

GI Permitted Development Intensities and Criteria

[2] *Sonoma County Permit and Resource Department Website, General Plan Land Use Element Countywide Land Use Policy Framework, retrieved July 17, 2006 from http://www.sonoma-county.org/prmd/docs/gp/98gp-02.htm#2.3.2*

[3] *Sonoma County Permit and Resource Department Website, General Plan Land Use Element Countywide Land Use Policy Framework, retrieved July 17, 2006 from http://www.sonoma-county.org/prmd/docs/gp/98gp-02.htm#2.4.1*

Sewer and water service shall be available. Structures are generally not expected to cover more than 50 percent of the site or exceed sixty-five feet in height. Additional height may be considered if a reduction in coverage is provided which results in no overall increase in building intensity. Design review shall be required for all industrial development projects. New lots may not be smaller than 20,000 square feet. Development shall be compatible with the environment, urban services, and adjacent land uses.

Sonoma County Zoning Regulations

Limited Commercial (LC)[4]

As stated above, Areas B, C and D of the project site are zoned for Limited Commercial (LC), for which the stated purpose is to implement the provisions of the policies of Limited Commercial areas of the General Plan. Implementation includes providing areas for retail sales and services necessary for the daily self-sufficiency of urban and rural areas in keeping with their character; and by implementing the objectives of adopted redevelopment plans within redevelopment project areas in the General Plan.

Generally permitted uses in LC include neighborhood retail businesses, restaurants, financial institutions, medical clinics, professional offices, and other small business commercial uses.

The project applicant is requesting a change in zoning from Limited Commercial to Limited Industrial for APNs 019-320-022, and 019-320-023, as an Asphalt Plant and Recycling Facility is not a permitted use in Limited Commercial Districts.

Heavy Industrial (M2)[5]

APN 019-220-001 (Area A) has a Zoning Designation of Heavy Industrial (M2), for which the stated purpose is to implement the provisions of the policies for General Industrial Areas of the General Plan by providing areas within urban service areas which permit a wide range of industrial uses.

The proposed project is allowed as use permitted with a Use Permit in M2, which include the following potentially applicable uses, although all of the following uses (e.g. recycling collection facilities) are not proposed to be included at Area A of the project site:

- Manufacturing or processing of asphalt, building materials, cement, concrete, earth, fuel briquettes or similar products;
- Large recycling collection facilities, heavy and light recycling processing facilities and subject to the provisions of Section 26-88-070 (General Use and Bulk Exceptions - Building Lines for Recycling collection and processing facilities); and
- Other nonresidential industrial uses which in the opinion of the planning director are of a similar and compatible nature to those uses in this section.

[4] *Sonoma County Permit and Resource Department Website, Sonoma County Zoning Regulations, retrieved July 17, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_36.htm*

[5] *Sonoma County Permit and Resource Department Website, Sonoma County Zoning Regulations, retrieved July 17, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_48.htm*

Proposed Land Use Designations and Zoning

As stated previously, the proposed project would require a General Plan Amendment to change the land use designations of APNs 019-320-022 and 019-320-023 from Limited Commercial to Limited Industrial; an Area Plan Amendment to the Petaluma Dairy Belt Area Plan to change the land use designation from Limited Commercial to Limited Industrial, and a change to Zoning from LC (Limited Commercial) to M3 (Limited Rural Industrial). APN 019-220-001 would retain its designations.

General Plan Land Use Designation

Limited Industrial (LI)[6]

The Limited Industrial land use category provides sites for development to meet service and employment needs where the range or scale of industrial uses is limited. Factors which may limit these uses are lack of public services, incompatible adjacent land uses, and adverse environmental impacts. Industrial parks are included in this category as well as land extensive industrial development.

LI Permitted Uses

Limits on the range or intensity of industrial uses vary by location. Permitted uses may be expressed in the planning areas policies or specific plans for industrial areas. In general, this category includes resource related industrial uses not expected to need the full range of urban services, such as lumber mills and concrete and asphalt plants. Residential use shall be limited to one caretaker unit per parcel. The zoning ordinance further defines the uses permitted in the category as well as the bulk, height, coverage, and other standards for such development.

LI Permitted Development Intensities and Criteria

Structures are generally not expected to cover more than 50 percent of the site or exceed sixty-five feet in height. Additional height may be considered if a reduction in coverage is provided which results in no overall increase in building intensity. New lots shall not be smaller than 1.5 acres on individual wells and septic systems or 1.0 acre on public water. All new industrial uses shall require design review.

LI Designation Criteria

The specific criteria that must be met in order to designate land for Limited Industrial use are as follows:

- Lands shall be designated to recognize an existing permitted use or to serve the projected employment needs of the planning area.
- Lands outside urban service areas shall have adequate water and septic suitability.
- Lands shall have convenient access to an arterial or collector highway.
- Lands shall be located near population concentrations.
- Lands shall not be in environmentally sensitive or hazardous areas.
- Outside of the unincorporated communities, lands shall not be located in a scenic corridor.
- Any applicable planning area policies.

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[6] *Sonoma County Permit and Resource Department Website, General Plan Land Use Element Countywide Land Use Policy Framework, retrieved July 17, 2006 from http://www.sonoma-county.org/prmd/docs/gp/98gp-02.htm#2.4.2*

Sonoma County Zoning Regulations

Limited Rural Industrial (M3)[7]

The purpose of the Limited Rural Industrial District (M3) is to provide areas for land extensive industrial development or industrial development outside of designated urban service areas which is limited in scale by such factors as lack of public services, incompatible adjacent land use or adverse environmental impacts.

Potentially applicable Permitted Uses in M3 include:

- Other heavy commercial uses for which storage, large or heavy merchandise or commercial transportation facilities are necessary and usual to the operation;
- Administrative and business offices incidental to any other permitted use in this section;
- Accessory uses and buildings incidental and appurtenant to a permitted use that do not alter the character of the site;
- Small collection facilities as an accessory use to any permitted use; and
- Other nonresidential uses which in the opinion of the planning director are of a similar and compatible nature to those uses described in this section.

Potentially applicable M3 Uses that require a Conditional Use Permit include:

- Retail commercial and service uses incidental to and in conjunction with industrial development in the M3 district;
- Contractor's equipment storage or rental yards;
- Manufacturing or processing of asphalt, building materials, cement, concrete, earth, fuel, briquettes or similar products;
- Large recycling collection facilities, light recycling processing facilities; and
- Other nonresidential uses which are of a similar and compatible nature.

The maximum building intensity of the use of a site shall be determined by multiplying the maximum building height limit and the maximum lot coverage. The specified height or lot coverage limits may be modified if a use permit is first secured and if the maximum building intensity is not exceeded.

The maximum building height is sixty-five feet (65') provided that additional height may be permitted where special structures are required subject to building intensity.

<u>M3 Minimum Lot Size</u>

More than one building may be located on each lot under the following conditions:

- Ten thousand (10,000) square feet - where both public sewer and public water services are provided, or where public sewer service alone is provided;
- One (1) acre - where public water service alone is provided; or
- One and one-half (1.5) acres - where neither public sewer service nor public water service is provided.

[7] *Sonoma County Permit and Resource Department Website, Sonoma County Zoning Regulations, retrieved July 17, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_50.htm*

The minimum yard requirements in an M3 district shall be the same as in the LC; provided, however, that a greater yard setback may be established for certain roads, classified as collector or arterial in sections 4.4 or 4.5 of the Circulation and Transportation Element of the General Plan; or to accommodate any landscaping required pursuant to design review.

The maximum lot coverage is fifty percent (50%), provided, however, that additional coverage may be permitted subject to building intensity.

All M3 uses shall be subject to design review approval as provided in Article 82 (Design Review) except that if any regulations specified herein differ from those in Article 82, then the provisions of this section shall govern.

Combining District Zoning Overlays

The project site falls under a number of Combining Overlay Zoning Districts in Sonoma County. Combining districts are subject to all rules and regulations of the underlying applicable zoning codes, with the specific restrictions of the combining district superimposed. These Combining Zoning Districts are shown in Figure V.H-2.

Frozen Lot Size (B8)[8]

The purpose of the B8 Combining District is to specify residential density and/or minimum parcel or lot size for a particular parcel, lot or area.

The minimum parcel or lot size shall be as specified on the recorded final or parcel map and the parcels or lots shall not be further subdivided. The B8 combining district signifies that the lot has been frozen for one of the following reasons:

- The property is designated rural residential on the General Plan land use map, but is subject to a Williamson Act contract;
- The property lies within the designated urban service boundary surrounding a city where the county intends to limit urban development until annexation or similar occurrence pursuant to a General Plan area policy;
- The property is subject to a specific plan or area plan policy where the county intends to limit urban development for the reasons set forth in the applicable plan.

Biotic Resources (BR)[9]

The purpose of the BR District is to protect biotic resource communities including critical habitat areas and riparian corridors for their habitat and environmental value.

[8] *Sonoma County Permit and Resource Department Website, Frozen Lot Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_78.htm*

[9] *Sonoma County Permit and Resource Department Website, Biotic Resource Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_66.htm*

BR Development Criteria

Maximum building heights, minimum lot areas and lot widths, yard requirements and maximum percentages of lot coverage shall comply with the requirements for the districts with which the BR regulations are combined unless otherwise provided herein.

BR Critical Habitat Area

The following applicable provision could apply to the subject property:

- A biotic resource assessment to develop mitigation measures may be required where the planning director determines that a discretionary project could adversely impact a designated critical habitat area.

BR Riparian Corridors

The following applicable provisions shall apply to properties within the BR district that are designated as riparian corridors. These provisions are intended to be protective measures along selected streams that balance the need for agricultural production, urban development, timber and mining operations, and flood control, with preservation of riparian values.

The General Plan defines "Urban riparian corridors" to include those portions of designated corridors within urban residential, commercial, industrial or public/quasi-public land use categories. which would fit the description for APN 019-220-001 (Area A).

The BR district shall be applied to streamside conservation areas along designated riparian corridors. The outermost boundaries of streamside conservation areas within the BR zoning district as indicated on the zoning maps should be considered approximate in order to allow for parcel specific determinations of the appropriate classification of a riparian corridor, based upon more detailed analysis of the parcel topography. The Urban riparian corridor in Area A shall be measured from the top of the higher bank as determined by the Sonoma County Water Agency (SCWA), but not less than fifty feet (50').

Structures, roads, utility lines, parking lots, planting of lawns, grading, fill or excavation shall be prohibited within any streamside conservation area. This prohibition may be waived if:

- It makes a lot unbuildable and vegetation removal is minimized;
- No significant disturbance of riparian habitat would occur; or
- The use involves only the maintenance, restoration or minor expansion of an existing structure.

The planning director may require a biotic resource assessment prior to waiver of this prohibition so that any potentially significant adverse effects on riparian habitat can be avoided or mitigated.

Floodplain Combining District (F2)[10]

The purpose of F2 is to provide for the protection from hazards and damage that may result from flood waters. The F2 district shall be applied to properties that lie within the one hundred (100) year flood hazard area as shown on the most recent FEMA maps and accompanying report.

[10] *Sonoma County Permit and Resource Department Website, Flood plain Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_58.htm#zc26-58-030*

All uses allowed within the base district with which this district is combined shall be permitted subject to the following:

- Any structure permitted shall be constructed in accordance with the provisions of Chapter 7B of the Sonoma County Code.
- The decision-making agency may require topographic data, engineering studies or other studies as needed to determine the effects of flooding on a proposed structure, or the effect of the structure on the floodway. The applicant may be required to submit such data or studies prepared by competent engineers or other technicians.
- In combining the F2 district with one or more other zoning districts, new residential, commercial and industrial structures will be permitted if designed, constructed, and utilized so that appreciable damage will not occur from the selected flood, and provided that such structures comply with the flood protection regulations established in Chapter 7B of the Sonoma County Code.

Historic District (HD)[11]

The purpose of HD is to protect those structures, sites and areas that are remainders of past eras, events and persons important in local, state or national history, or which provide significant examples of architectural styles of the past, or which are unique and irreplaceable assets to the county and its communities.

No zoning permit shall be granted authorizing alterations (including demolition) in the exterior of a structure within the boundaries of a historic district and no zoning permits authorizing construction of a new building within the boundaries of a historic district; unless approval has been granted by the county landmarks commission. In all cases where the request for a zoning permit involves demolition alone, however, the county landmarks commission shall take action on such request within six months of the date of application for the permit.

Scenic Design Combining District (SD)[12]

The purpose of SD is to provide for the preservation of the scenic beauty of the county. The scenic beauty of the county is an economic asset whose preservation will contribute to the physical, social, cultural, recreational, aesthetic, economic and general welfare of the people by protecting the appearance of the county and encouraging its important tourist resource.

All plans for land divisions or development projects shall be reviewed and approved, conditionally approved or denied by the planning director on the basis of site planning as it relates to designated open space or design policies of adopted general, specific or area plans or other such design criteria as may have been adopted by the board of supervisors. Where a use permit is required and following design review approval, development plans shall be reviewed and acted upon by the board of zoning adjustments/planning commission. Where a local citizen's committee has been recognized by the board of supervisors, development plans shall be submitted for their review and advisory recommendation prior to approval subject to the provisions of Section 26-88-040 (General yard regulations and exceptions).

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[11] *Sonoma County Permit and Resource Department Website, Historic Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_68.htm*

[12] *Sonoma County Permit and Resource Department Website, Scenic Design Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_62.htm*

Scenic Resources Combining District (SR)[13]

The purpose of SR is to preserve the visual character and scenic resources of lands in the County and to implement the provisions of Sections 2.1, 2.2 and 2.3 of the Open Space Element of the General Plan. A slim portion of APN 019-320-022 that may be viewed along Highway 101 is designated SR, as Highway 101 is a Scenic Corridor. All land in the immediate area west of the Highway has the SR designation, as well as the adjacent parcel to the south of 019-320-022.

<u>SR Development Criteria for Scenic Landscape Units</u>

Structures shall be sited below exposed ridgelines and use natural landforms and existing vegetation to screen them from view from public roads. On exposed sites, screening with native, fire resistant plants may be required. Cuts and fills are discouraged, and where practical, driveways are screened from public view. Utilities shall be placed underground where economically practical.

In the event that compliance with these standards would make a parcel unbuildable, structures shall be sited where minimum visual impacts would result.

In addition to the criteria listed above, the following standards shall apply:

- Building envelopes shall be established for structures. Use of height limitations should be considered, if necessary to further mitigate visual impacts;
- Clustering shall be used to reduce visual impact where consistent with the applicable base district;
- Building sites and roadways shall be located to preserve trees and tree stands;
- Where development occurs on parcels located both within scenic landscape units and adjacent to scenic corridors, the more restrictive provisions set forth in this article shall apply.

<u>SR Development Criteria for Properties Along Scenic Corridors</u>

All structures located within scenic corridors established outside of the urban service area boundaries shall be subject to the setbacks of thirty percent (30%) of the depth of the lot to a maximum of two hundred feet (200') from the centerline of the road. Development within the setback shall be prohibited with the following exceptions, where such uses are allowed by the base district with which this district is combined:

Maintenance, restoration, reconstruction or minor expansion of existing structures;

Other new structures provided they are subject to design review and

(I) They are associated with existing structures,

(ii) There is no other reasonable location for the structure,

(iii) The location within the setback is necessary for the use, or

(iv) Existing vegetation and topography screen the use;

Compliance with the setback would render the parcel unbuildable.

A building setback of twenty feet (20') shall be applied along the Highway 101 scenic corridor to properties

13 *Sonoma County Permit and Resource Department Website, Scenic Resources Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_64.htm*

which are within the urban service area boundaries to be reserved for landscaping.

Where development occurs on parcels located both within scenic landscape units and adjacent to scenic corridors, the more restrictive provisions set forth in this article shall apply.

SR Design Review Approval

All plans for land divisions or development projects shall be reviewed and approved, conditionally approved, or denied by the planning director on the basis of compliance with the provisions of this article. Where a use permit is required and following design review approval, development plans shall be reviewed and acted upon by the board of zoning adjustments/planning commission.

Valley Oak Habitat Combining District (VOH)

The purpose of VOH is to protect and enhance valley oaks and valley oak woodlands and to implement the provisions of Section 5.1 (Conservation of Biotic Resources) in the Resource Conservation Element of the General Plan.

Petaluma Dairy Belt Area Plan

The Petaluma Dairy Belt Area Plan was adopted by Sonoma County in 1985, and was revised in 1993 to be consistent with the General Plan. However, in any case where there appears to be a conflict between General Plan and Area Plan policies or standards, the more restrictive shall apply. The Area Plan policies that are relevant to the proposed project are analyzed at the end of this section in Table V.H-3. The land use designation for the larger portion of the project site (Areas B, C and D) is LC (Limited Commercial), and the riverfront parcel (Area A) is designated GI (General Industrial), which is consistent with the Sonoma County General Plan.

The priorities of the Petaluma Dairy Belt Area Plan are as follows:

- To preserve and enhance agricultural resources and to protect the agricultural industry;
- To preserve the area's scenic beauty;
- To accommodate a variety of rural life styles; and
- To encourage development of an adequate transportation network which will accommodate the proposed development and projected travel needs to facilitate movement of agricultural products to the marketplace.

San Francisco Bay Conservation and Development Commission (BCDC)

The San Francisco Bay Conservation and Development Commission (BCDC) was created after the passage of the McAteer-Petris Act (Act) was enacted in 1965, which required the BCDC to prepare a plan for the long-term use of the Bay and regulate development in and around the Bay while the plan was being prepared. In 1969 the San Francisco Bay Plan was created, and the Act was amended accordingly and signed into Law. The Act has been amended numerous times subsequently to add requirements and hone provisions for conservation and development. Any person or governmental agency wishing to place fill or to dredge is required to obtain a permit from BCDC before proceeding. Fill is defined to include earth or any other substance or material placed in the Bay, including piers, pilings, and floating structures moored in the Bay for extended periods. BCDC is empowered to grant or deny permits for all Bay filling or dredging in accordance with the provisions of the McAteer-Petris Act and the standards in the San Francisco Bay Plan.

APN 019-220-001 (Area A) would include a barge off-loading facility on a fixed pier. Tugboats would be used to transport materials on barges up the Petaluma River and temporarily dock adjacent to the facility. To reduce impacts to the River, only pilings would be utilized, however the dolphins for mooring the barges are considered permanent structures and both dolphins and the pilings are considered "fill". Therefore, BCDC permits would be required.

The appropriate permits required are subject to the Joint Aquatic Resource Permit Application (JARPA) process, which facilitates permit processing by consolidating applications for federal, state and local agencies. Agencies that may require compliance include, but are not limited to: the San Francisco Regional Water Quality Control Board (RWQCB), US Army Corps of Engineers (Corps), US Environmental Protection Agency (EPA), US Fish and Wildlife Agency (FWS), National Marine Fisheries Service (NMFS), United State Coast Guard, and the California Lands Commission. As of September 1, 2006, the California Department of Fish and Game (CDFG) requires its own form FG2023 for Lake or Streambed Alteration Notification.

McAteer-Petris Act[14]

Findings and Declaration of Policy

Section 66600: The Legislature hereby finds and declares that the public interest in the San Francisco Bay is in its beneficial use for a variety of purposes; that the public has an interest in the bay as the most valuable single natural resource of an entire region, a resource that gives special character to the bay area; that the bay is a single body of water that can be used for many purposes, from conservation to planned development; and that the bay operates as a delicate physical mechanism in which changes that affect one part of the bay may also affect all other parts. It is therefore declared to be in the public interest to create a politically-responsible, democratic process by which the San Francisco Bay and its shoreline can be analyzed, planned, and regulated as a unit.

Section 66605: The Legislature further finds and declares:

(a) That further filling of San Francisco Bay and certain waterways specified in subdivision (e) of Section 66610 should be authorized only when public benefits from fill clearly exceed public detriment from the loss of the water areas and should be limited to water-oriented uses (such as ports, water-related industry, airports, bridges, wildlife refuges, water-oriented recreation, and public assembly, water intake and discharge lines for desalinization plants and power generating plants requiring large amounts of water for cooling purposes) or minor fill for improving shoreline appearance or public access to the bay;

(b) That fill in the bay and certain waterways specified in subdivision (e) of Section 66610 for any purpose should be authorized only when no alternative upland location is available for such purpose;

© That the water area authorized to be filled should be the minimum necessary to achieve the purpose of the fill;

[14] *The McAteer-Petris Act, published February 17, 2006 by the San Francisco Bay Conservation and Development Commission.*

(d) That the nature, location, and extent of any fill should be such that it will minimize harmful effects to the bay area, such as, the reduction or impairment of the volume surface area or circulation of water, water quality, fertility of marshes or fish or wildlife resources, or other conditions impacting the environment, as defined in Section 21060.5 of the Public Resources Code;

(e) That public health, safety, and welfare require that fill be constructed in accordance with sound safety standards which will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions or of flood or storm waters;

(f) That fill should be authorized when the filling would, to the maximum extent feasible, establish a permanent shoreline;

(g) That fill should be authorized when the applicant has such valid title to the properties in question that he or she may fill them in the manner and for the uses to be approved.

Section 66610: For the purposes of this title, the area of jurisdiction of the San Francisco Bay Conservation and Development Commission includes:

(a) San Francisco Bay,

(b) A shoreline band consisting of all territory located between the shoreline of San Francisco Bay and a line 100 feet landward of and parallel with that line,

(c) Saltponds consisting of all areas…,

(d) Managed wetlands consisting of all areas…,

(e) Certain waterways (in addition to areas included within subdivision (a)), consisting of all areas that are subject to tidal action, including submerged lands, tidelands, and marshlands up to five feet above mean sea level, on, or tributary to, the listed portions of the following waterway(s):

(f) Petaluma River in Marin and Sonoma Counties to its confluence with Adobe Creek, and San Antonio Creek to the easterly line of the Northwestern Pacific Railroad right-of-way.

San Francisco Bay Plan

BCDC adopted the San Francisco Bay Plan in recognition of human actions that have modified the natural functions of the Bay over the last 200 years. The Plan addresses the prevention of unjustifiable filling, water quality concerns, and maintaining wildlife refuges; while simultaneously developing the Bay to its highest potential. The San Francisco Bay Plan provides policies for the wise use of the Bay, its shorelines, and its tributaries. These polices are analyzed at the end of this section in Table V.H-4.

Bay Area Clean Air Plan

The project area is within the San Francisco Bay Area Air Basin, under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD is responsible for bringing and/or maintaining air quality in the Basin within Federal and State air quality standards. Specifically, the BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the Basin and to develop and implement attainment strategies to ensure that future emissions will be within Federal and State standards.

The BAAQMD has prepared a series of Clean Air Plans (CAPs) in response to the Federal Clean Air Act, the most recent and rigorous of which was approved in December 2000. The 2000 CAP continues the air pollution reduction strategy established by the 1991 CAP. The 2000 CAP is the third triennial update to the

1991 CAP, following previous updates in 1994 and 1997. The 2000 CAP is designed to address attainment of the State standards for ozone.

The 1997 CAP contained stationary and mobile source control measures, which included: developing rules to reduce vehicle trips to and from major residential developments, shopping centers, and other indirect sources; encouraging cities and counties to plan for high density development; and clustering development with mixed uses in the vicinity of mass transit stations. The 2000 CAP includes changes in the organization and scheduling of some existing control measures, some new stationary source control measures, revisions to previous stationary source measures, and deletion of some control measures no longer deemed feasible by District staff. The Transportation Control Measures (TCMs) are unchanged from the 1997 CAP. The 2000 CAP continues to discourage "urban sprawl," while strongly endorsing high-density mixed-use developments near transit centers that reduce the need for commuting by personal vehicles.

The analysis for this issue is discussed in full detail in Section V.B (Air Quality).

Water Quality Control Plan

As stated above, the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, would be a Responsible Agency for the proposed project. RWQCB developed a Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The Basin Plan is intended to show how the quality of the surface and ground waters in the San Francisco Bay Region should be managed to provide the highest water quality reasonably possible. Specifically, the Basin Plan lists the various water uses in the Region; describes the water quality that must be maintained to allow those uses; and describes the programs, projects, and other actions that are necessary to achieve the standards established in this plan.

The Basin Plan implements a number of state and federal laws, the most important of which are the California Porter-Cologne Water Quality Control Act and the federal Clean Water Act. The U.S. Environmental Protection Agency (U.S. EPA) has delegated responsibility for implementation of portions of the Clean Water Act to the State and Regional Boards, including water quality planning and control board programs, such as the National Pollutant Discharge Elimination System (NPDES).

The analysis for this issue is discussed in full detail in Section V.G (Hydrology and Water Quality).

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G of the *CEQA Guidelines*, the proposed project could have a significant environmental impact if it would:

- Result in a physical division of an established community;
- Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect; and
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

The following threshold of significance also applies to the proposed project:

- Physical change in the environment that would be substantially incompatible with existing land uses.

Issues Not Analyzed Further

Division of an Established Community

The project site is located in an unincorporated area of Sonoma County, outside of the southern boundary of the City of Petaluma. The primary designated use in the area is for industrial or commercial purposes. Therefore, the proposed project would not physically divide an established community. No further discussion of this issue is required.

Conflict With Any Applicable Habitat Conservation Plan or Natural Community Conservation Plan

Neither the project site nor the surrounding area is subject to a Habitat Conservation Plan or a natural Community Conservation Plan. As such, the project would not result in conflicts with any applicable Habitat Conservation Plan or natural Community Conservation Plan. Therefore, no significant impacts would occur and no further discussion is required.

Proposed Project

The following discretionary approvals pertaining to land use are requested by the project applicant:

- General Plan Amendment from Limited Commercial to Limited Industrial for APNs 019-320-022 and 019-320-023 (Areas B, C and D)
- General Plan Amendment to Land Use Policy LU-17-e that would exclude the project APNs 019-320-022 and 019-320-023.
- Area Plan Amendment to Petaluma Dairy Belt Plan to change use from Limited Commercial to Limited Industrial for Areas B, C and D
- Zone Change from LC (Limited Commercial) to M3 (Limited Rural Industrial) for Areas B, C and D
- Use Permit for the manufacturing or processing of asphalt, building materials, concrete, or other similar products in the M3 Zone
- Roiling Permit for construction in a riparian area with potential for decreasing the clarity of a waterway, as per Sonoma County Code Section 23.3

Project Impacts and Mitigation Measures

Impact LU-1 Conflict With Applicable Land Use Plans, Policies, or Regulations

CEQA requires an analysis of consistency with plans and policies as part of the environmental setting (see *CEQA Guidelines* Section 15125). An EIR uses the policy analysis as an indicator of the resources that might be affected by a project and considers the importance a policy gives a resource in determining the significance of the physical impact. Conversely, the EIR considers the potential significance of the related physical impacts when analyzing a particular policy. Inconsistency with a policy may indicate a significant physical impact, but the inconsistency is not itself an impact. Using this approach, this EIR provides a detailed analysis of policies of the Sonoma County General Plan and analyses of other applicable plans and policies so that the decision-makers may determine project consistency and any impacts of an inconsistency that is identified. The physical impacts of the proposed project are analyzed in other sections of the EIR.

The General Plan Guidelines published by the State Office of Planning and Research defines consistency as "An action, program, or project is consistent with the General Plan if, considering all its aspects, it will further the objectives and policies of the General Plan and not obstruct their attainment." Therefore, the standard for analysis used in the EIR is based on general agreement with the policy language and furtherance of the policy intent (as determined by a review of the policy context). The determination that the proposed project is consistent or inconsistent with the General Plan policies, and thus in conflict or not in conflict with the General Plan, is ultimately the decision of the County of Sonoma.

In order to determine if the proposed project would conflict with an applicable land use plan, policy or regulation, County of Sonoma General Plan Policies are analyzed in detail in Table V.H-2; the Petaluma Dairy Belt Area Plan Policies are analyzed in Table V.H-3, and the San Francisco Bay Plan Policies are analyzed in Table V.H-4. These tables are located at the end of this section.

As noted above, the applicant seeks a General Plan Amendment to change Limited Commercial to Limited Industrial for APNs 019-320-022 and 019-320-023 (Areas B, C and D). As stated in Regulatory Settings for General Plan Land Use, a list of seven specific criteria must be met before amending land use to the Limited Industrial designation. The criteria are addressed in detail below:

1. *Lands shall be designated to recognize existing permitted uses or serve projected employment needs of the planning area*

Historically, a portion of the project site was used as a dairy, and from the 1960s to the early 1990s the site had industrial use as settling "slurry" ponds for the Petaluma quarry. Sonoma County records do not indicate that either use was ever authorized or permitted. The proposed General Plan Amendment for Limited Industrial appears to be congruent with existing land use designations for properties to the north of the site that are zoned General Industrial and Limited Industrial. However, properties to the south, southeast and west are designated Land Extensive Agriculture, and Rural Residential. The properties closest to the site on the east are designated General Commercial, and Limited Industrial, with two legal non-conforming residential uses.

PRMD permit history records are accessible via their website.[15] Because these permit records do not indicate that any permitted uses for industrial purposes have existed legally, recognizing an existing industrial use would not be applicable as a basis for a change in designation from Limited Commercial (LC). The project site is designated LC because the General Plan envisions commercial uses on the site instead of other uses, such as industrial uses. While the project site is proposed to accommodate a relocated existing use from another nearby site, the project site is currently vacant, thus the proposed project does not replace an existing industrial land use on the project site. Therefore, the proposed project does not appear to meet the first part of Criterion #1.

The proposed project's industrial use would likely generate employment growth that is similar to the employment growth that would be created by the existing Limited Commercial land use designation for the project site (Areas B, C and D). The asphalt and raw aggregate from the proposed project would also serve building and road projects that would employ a considerable amount of people. Therefore, the project appears to meet the second part of Criterion #1. Overall, the project appears to meet Criterion #1 because

15 *Sonoma County PRMD Permit History Reports Website, retrieved by CAJA staff on 7/24/06 from http://prmd.sonoma-county.org/ph-search.aspx*

the project appears to meet one of the two parts of Criterion #1.

2. *Lands outside urban service areas shall have adequate water and septic suitability*

Adequate Water Supply

The project site currently has access for potable water from North Marin Water District (NMWD). The standard 5/8 inch water meter is located on the west side of the freeway, with a private water line under the freeway. NMWD has stated that only the historically entitled allotment of use will continue to be offered for the project site. The site is outside of NMWD boundaries, and it is operating under a temporary impairment agreement with Sonoma County Water Agency, which provides 80% of the District's water. As discussed in Section III (Project Description), NMWD indicated in a letter dated October 30, 2006 that up to 4,452 gallons per day (gpd) could be provided to the area, based on historical use. The NMWD letter also states that water for fire protection could potentially be brought via a water main from Landing Way for two fire hydrants capable of delivering 1,000 gallons per minute (gpm) with a residual pressure of 20 psi.

The project would require approximately 500 gpd of potable water for employees of the plant facilities, with up to an additional 100 gpd average for the fire station staff, if needed. The project would also require an average of 515 gpd for irrigation, up to 1,241 gpd during peak use during the first five years necessary to establish drought tolerant vegetation.

The project site's water has been used by residences to the east of the railroad tracks, although it appears that this is not a legal use, as sub-metering is not allowed. The existing meter serves APN 019-320-022, which legally belongs to the applicant. The applicant's allotment is sufficient to provide for additional residential uses, which are estimated at 417 gpd each,[16] bringing the total potable water needed for the area to 2,675 gpd at peak use.

In a letter dated November 21, 2006, NMWD asked the County to verify the status of the adjacent residences before agreeing to accommodate their need for water use. On May 10, 2007, PRMD provided NMWD with a letter verifying that APNs 019-320-010 and 019-320-021 have legal non-conforming status. A non-conforming unit is a legal dwelling that no longer conforms to the densities or land use designations in the Zoning Ordinance. Overall, the potable water demand from the project and for the legal non-conforming residences can be met by the existing entitlements for the project site.

The project proposes to pump 40 gallons per minute (gpm) of water from the Petaluma River, filter it, and use it for dust suppression in Areas A and C. The water for Area A would be extracted directly from the River at the barge dock. For Area C, the applicant proposes to extract water from a tidal inlet that connects a drainage area to the Petaluma River. The applicant claims a riparian right for both areas. It is possible that the SMART railroad tracks sever this riparian right for Area C, however, since a license agreement is required to cross the tracks.

The non-potable water used for misting on the conveyer, spraying aggregate stockpiles, and filling a water truck capable of holding 1,500 gallons for other dust suppression needs has been estimated at 10,000 gpd. If the applicant chooses to use water from the River on a parcel that is not adjacent to the River, then riparian rights no longer apply and the applicant would need to submit a water appropriation application to the State

[16] *Marin Countywide Plan Update, Draft EIR, Section 4.9 Water Supply and Demand. Existing single family home use for NMWD.*

Water Resource Control Board (SWRCB).

A water right is a legal entitlement authorizing water to be diverted from a specified source and put to beneficial, non-wasteful use. Water rights are property rights, but their holders do not own the water itself; they possess the right to use it. With certain exceptions, all diverters of surface water are required to file a Statement of Water Diversion and Use with the SWRCB (see Division 2 of Part 5.1 of the California Water Code).

A riparian right entitles the landowner to use a correlative share of the water flowing past his or her property. Riparian rights do not require permits, licenses, or government approval, but they apply only to the water that would naturally flow in the stream. Riparian rights do not entitle a water use to divert water to storage in a reservoir for use in the dry season or to use water on land outside of the watershed. Riparian rights remain with the property when it changes hands, although parcels severed from the adjacent water source generally lose their right to the water.[17]

Therefore, it appears the water availability criterion has been met.

Septic Suitability

The proposed septic system would be on APN 019-320-023 (Area B). The design of the septic system submitted with the application includes a leach field on gently sloping topography with an upslope groundwater interceptor trench. The system would be designed and operated in conformance with the requirements of the PRMD. Therefore, the septic suitability criterion has been met.

Overall, the project appears to meet Criterion #2.

3. Lands shall have convenient access to an arterial or collector highway

The project includes off-site transportation improvements that would provide convenient access to Petaluma Boulevard South and Highway 101. Therefore, the project appears to meet Criterion #3.

4. Lands shall be located near population concentrations

The project site is immediately south of Petaluma city limits and thus is near population concentrations. Therefore, the project appears to meet Criterion #4.

5. Lands shall not be in environmentally sensitive or hazardous areas

For the purposes of this analysis it is assumed that “environmentally sensitive lands” refers to on-site resources such as biological resources and cultural resources. It is also assumed that “hazardous areas” refers to on-site hazards such as geology and soils hazards, flood hazards, etc. A total of 11.69 acres of confirmed jurisdictional wetlands and an estimated 1.08 acres of potential jurisdictional waters yet to be confirmed by the Corps occur on the site. There is a Heron/Egret Colony that nests on APN 019-320-023 (Area B) from approximately March through August. Colonial breeding sites (or rookeries) of egrets and herons are considered sensitive by the California Department of Fish and Game, and these species tend to be highly sensitive to human intrusion and disturbance of nesting colonies.

Additionally, APN 019-220-001 (Area A) has a Biotic Resources (BR) overlay and is designated as urban

[17] *State Water Resource Control Board. Website on Water Rights: http://www.waterrights.ca.gov/. Retrieved by CAJA Staff on June 25, 2007.*

riparian corridor. The BR designation requires a Biological Constraints Analysis to be conducted, which was done in 2004, with peer review in 2006. The zoning code for BR states that parcel specific determinations of the appropriate classification of a riparian corridor be based upon more detailed analysis of the parcel topography, and for the purpose of this section, shall be measured from the top of the higher bank as determined by the Sonoma County water agency, which would be fifty feet for an urban riparian corridor. The BR overlay requires a minimum setback of fifty feet (50') from the edge of any wetlands within a designated critical habitat area before building permits will be issued.

The above mentioned issues, along with others discussed in Section V.C (Biological Resources), indicate that the proposed General Plan Amendment would include land in an environmentally sensitive area, although required mitigation measures would reduce project impacts relative to on-site resources (e.g. Biological Resources, Cultural Resources) to less-than-significant levels.

Additionally, the proposed amendment would include land in a hazardous area. Much of the project site is in the 100-year flood plain (F2). Other potential hazards include groundshaking and liquefaction from seismic activity. Section V.E (Geology and Soils) acknowledges that seismic hazards at the site; however, mitigation measures have been included in the EIR to reduce the potential hazards associated with seismic activity to a less-than-significant level. All other potentially significant impacts related to on-site hazards would be mitigated to less-than-significant levels. However, not all of the mitigation measures involve avoidance of the environmentally sensitive and hazardous areas, which appears to be the intent of Criterion #5. Therefore, the project does not appear to meet Criterion #5.

6. Outside of the unincorporated communities, lands shall not be located in a scenic corridor

The frontage of the project site in Areas B, C and D has been designated as a Scenic Corridor and zoned Scenic Resource (SR) Combining District. As stated previously, SR requires that structures located within scenic corridors established outside of the urban service area boundaries shall be subject to the setbacks of thirty percent (30%) of the depth of the lot to a maximum of two hundred feet (200') from the centerline of the road. Additionally, appropriate landscaping for visual screening from the highway and nearby residences is required. The project site plan and draft landscape plan are located outside of the setback and therefore the project appears to meet Criterion #6.

7. Applicable Planning Area Policies

Sonoma County General Plan policies are analyzed in detail in Table V.H-2. Additionally, specific General Plan policies for Petaluma and Environs that apply to the proposed project are as follows:

Policy LU-17a: Include industrial lands located along Petaluma Boulevard South of Petaluma within the city's sphere of influence.

Analysis: The majority of the project site is outside of Petaluma's sphere of influence, with the exception of APN 019-220-001 (Area A), which has a General Plan designation of General Industrial and is zoned for Heavy Industrial (M2). Area A does not require an amendment to the General Industrial GP land use designation. The project would add industrial lands outside of Petaluma's sphere of influence. Therefore, the project appears to be inconsistent with Policy LU-17a.

Policy LU-17c: Use zoning to avoid new urban uses within the Petaluma urban service area prior to annexation by Petaluma.

Analysis: Urban use pertains to uses of land typically occurring within cities, such as high density residential, commercial, and industrial uses. APN 019-220-001 (Area A) of the project site is within the Petaluma Urban Service boundary and is zoned for Heavy Industrial (M2). Although the site is not proposed to be annexed to the City of Petaluma, the project would include a new urban use within the urban service boundary. Therefore, the project appears to be inconsistent with Policy LU-17c.

Policy LU-17d: Refer to the City of Petaluma for review and comment on any application for discretionary projects within one mile of the urban service boundary.

Analysis: The City was contacted during the NOP process, and replied on March 16, 2006 which included comments regarding hydrology and water quality concerns. The City requested EIR analysis of the type and volume of potential surface water contaminants from pollution runoff in relationship to the routine transport, use, storage, and/or disposal of hazardous materials and contaminants. Therefore, the project appears to be consistent with Policy LU-17d.

Policy LU-17e: Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986.

Analysis: The applicant has requested a General Plan amendment to change APNs 019-320-022 and 019-320-023 from Limited Commercial to Limited Industrial. These APNs are not within the urban service boundary. Additionally, as stated above under Criterion #1, there were no existing permitted industrial uses of this property in 1986. The project applicant has requested to amend Policy LU-17e as follows:

LU-17e: Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986, ***except that areas designated "Limited Commercial" may be re-designated to "Limited Industrial" within the Haystack Landing Site along Petaluma Boulevard South (APNs 019-320-022 and 019-320-023) as necessary to accommodate the relocation of an asphalt and recycling plant.***

Therefore, the proposed project appears to be inconsistent with Policy LU-17e; however, approval of the proposed General Plan Amendment by the County of Sonoma would make the project consistent with this policy.

Policy LU-17f: Use the following criteria for approval of discretionary projects in the "Limited Commercial" and "Limited Industrial" category:

1. The use specifically serves the service, employment, or agricultural processing needs of local area residents or the local agricultural community.
2. The use is compatible with adjacent residential or agricultural uses.
3. The use won't adversely affect the level of service on public roadways and will not interfere with the movement of farm vehicles.
4. If the use is located within a designated scenic corridor, mitigate visual impacts by

appropriate setbacks, landscaping, and/or screening.

Analysis: As stated above, the proposed project will require discretionary approval for a General Plan Amendment to change the land use designation of the project site from Limited Commercial to Limited Industrial on APNs 019-320-022 and 019-320-023.

1. The project does not have any agricultural or residential affiliation but would serve the service needs and employment needs of local area residents in a manner similar to the current land use designation. Therefore, the project appears to be consistent with Criterion #1.

2. Both agricultural and rural residential properties are located near the project site. The project is not compatible with the adjacent residential properties located along the River, and this issue is analyzed in further detail below in Impact LU-2 (Land Use Compatibility). Therefore, the project does not appear to be consistent with Criterion #2.

3. The project would adversely affect roadway levels of service as analyzed in Section V.J (Transportation and Traffic); however these impacts would be mitigated to less-than-significant levels. The project is not anticipated to interfere with the movement of farm vehicles because there are no agricultural uses along Petaluma Boulevard South. Therefore, the project appears to be consistent with Criterion #3.

4. The frontage of the project site in Areas B, C and D has been designated as a Scenic Corridor and zoned Scenic Resource (SR) Combining District. SR requires that structures located within scenic corridors established outside of the urban service area boundaries shall be subject to the setbacks of thirty percent (30%) of the depth of the lot to a maximum of two hundred feet (200') from the centerline of the road. Additionally, appropriate landscaping for visual screening from the highway and nearby residences is required. The project site plan and draft landscape plan are located outside of the setback and therefore the project appears to be consistent with Criterion #4.

Policy NE-1c: Control non-transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table NE-2 (Noise Element of the General Plan) as measured at the exterior property line of any affected residential land use. Limit exceptions to the following:

1. If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level.
2. Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.
3. Reduce the applicable standards in Table NE-2 by 5 decibels if they exceed the ambient level by 10 or more decibels.

Analysis: The noise from both individual and combined stationary sources would exceed County Standards for nearby sensitive receptors. Noise from barge uploading would also exceed standards for both night and day. Therefore, the project does not appear to be consistent with Policy NE-1c.

Policy LU-7a: Avoid general plan amendments which would allow additional development in floodplains, unless such development is of low intensity and does not include large permanent structures.

Analysis: The proposed project requires a General Plan amendment to change the land use designation from Limited Commercial to Limited Industrial on two of the project parcels. Most of the project site is within the 100-year floodplain district (F-2) as shown in Figure V.H-2. The project would not be low intensity and would include large permanent structures. Therefore, the project does not appear to be consistent with Policy LU-7a.

Policy LU-7c: Prohibit new permanent structures within the floodway. Require that any development that may be permitted within the floodplain to be raised above the 100-year flood elevation.

Analysis: The proposed project would place Dolphins and Piles for the barge dock within the floodway. Grading plans involve moving materials from higher elevations to level developed portions of the site to 9 feet above mean sea level (msl), to raise structures above the 7 feet msl flood zone. This issue is discussed further in Section V.G (Hydrology and Water Quality). Therefore, the project does not appear to be consistent with Policy LU-7c.

As described above, the project does not appear to meet all of the required criteria (i.e., Criterion #5 and Criterion #7) for an amendment to the General Plan designation to Limited Industrial. The project also appears to be in conflict with several applicable policies listed in Tables V.H-2 through 4. Therefore, impacts related to the project's consistency with applicable land use plans, policies or regulations appear ***significant***.

Start-up Phase

During the start-up phase of the proposed project the barge off-loading facility and the conveyor over the railroad tracks would not be in place. Trucks would be used instead of barges to transfer all materials to the project site during this phase. The start-up phase of the project also does not appear to meet all of the required criteria (i.e., Criterion #5 and Criterion #7) for an amendment to the General Plan designation to Limited Industrial. The start-up phase of the project also appears to be in conflict with several applicable policies listed in Tables V.H-2 through 4. The overall significance of impacts relative to the project's consistency with applicable land use plans, policies or regulations would not change from that described above for Impact LU-1.

Mitigation Measure LU-1

There are no feasible mitigation measures known at this time that would eliminate this significant land use impact.

Impact LU-2 Land Use Compatibility

The determination of compatibility of land uses hinges on project impacts on adjacent land and any nearby sensitive receptors. An incompatible use occurs if one land use is anticipated to disrupt the existing or planned use of an adjacent property. The proposed project would result in a change to the intensity and type of use for the site, as the project site is currently vacant.

The primary land use compatibility impacts would be to several residences on the east side of the railroad tracks directly adjacent to the proposed project. These residences are legal non-conforming uses on land designated General Commercial and Limited Industrial, and zoned LC and M3, with a Scenic Design overlay. Mary Fontes of APN 019-320-020, Anastasia Fontes of APN 019-320-021, and Leang Yee of APN 019-320-010 attended the Draft EIR Scoping meeting to express their concerns regarding noise, air quality, water supply and quality, safety issues, and accessability to their property. Additionally, M. Harvey Goldberg of APN 019-320-007 and his attorneys also wrote a letter in response to the NOP to express similar concerns (See Appendix B, Responses to NOP). There are also five single-family residences on the hills west of Highway 101, although land use compatibility impacts would not be at the same level for these homes compared to the homes along the River. Shollenberger Park, located across the Petaluma River from the project site, is also considered for this analysis.

The project site has Combining District Zoning for Scenic Resources (SR) to preserve the visual character and scenic resources, and Scenic Design (SD) to provide for the preservation of the scenic beauty of the County. The project site is currently vacant, allowing views to the surrounding hills and adjacent River area. The proposed project would result in significant and unavoidable impacts relative to scenic vistas and visual character. These impacts would be experienced by residents or users of each of the sensitive receptors described above due to their proximity to the project site. This issue is discussed in detail in Section V.A (Aesthetics).

The existing noise impacts at the project site currently come from traffic on Highway 101 and the off-ramp onto Petaluma Boulevard South. The proposed project would create noise from a variety of sources, including the asphalt plant, concrete recycling plant, and barge unloading facility. Noise from the asphalt plant would exceed the County night-time noise standards for the two closest River residences, and noise from the barge unloading would exceed the daytime and night-time standards for River residences, even after the implementation of proposed mitigation measures. This impact from noise to adjacent residences would therefore be considered significant and unavoidable. This issue is discussed in detail in Section V.I (Noise).

While impacts relative to odors and light and glare can be mitigated to less-than significant levels, the adjacent residential uses may still be exposed to potential odors, and would also be subject to additional sources of light when the project is operating at night, including light from the barge and pier and associated front loader.

Although the proposed project is consistent with adjacent area zoning, the existing residential uses located along the River and, to a lesser extent, the residential uses across the highway and park users across the River would be subject to these impacts that are not currently occurring on the project site. Therefore, land use compatibility impacts would be ***significant***.

<u>Start-up Phase</u>

Land use compatibility impacts to the residences along the River and to Shollenberger Park would be less during the start-up phase compared to the land use compatibility impacts described above in Impact LU-2. This is because the start-up phase of the project does not include the barge off-loading facility or the conveyor over the railroad tracks, which would result in significant noise and aesthetics impacts, respectively. Light and glare impacts would also be less during the start-up phase because barges would not deliver materials to Area A at night. While the start-up phase of the project would result in fewer land use compatibility impacts compared to the full build out phase, the level of significance of these impacts would not change from that described above in Impact LU-2.

Mitigation Measure LU-2

Implementation of the mitigation measures listed in Sections IV.A (Aesthetics) and IV.I (Noise) would reduce but not fully eliminate the significant land use compatibility impacts described above. No other feasible mitigation measures are known at this time.

CUMULATIVE IMPACTS

The related projects are listed in Section III.B of this Draft EIR and several of them may require discretionary actions. A few of the related projects are located in the project vicinity, including Royal Petroleum Card-Lock Gasoline Service, Novato Disposal, SMART Train, Shamrock Materials, and the Novato Narrows Widening Project and associated interchange. The Shamrock project has already been approved and is operational. Several of the related projects involve improvements to existing uses (e.g. Royal Petroleum Card-Lock Gasoline Service, and Novato Disposal). These projects, in addition to the SMART Train, result in a moderate intensification of existing land uses in the project area.

With regard to potential cumulative land use compatibility impacts, implementation of the proposed project, in conjunction with the SMART Train and the Novato Narrows Widening Project and associated interchange, would exacerbate the project's land use compatibility impacts.

The SMART Train would travel within 65 feet of the nearest residence, generating additional (intermittent) noise beyond the noise from the proposed project. If proper safety precautions are not taken, the SMART train could result in potential safety impacts as the residents along the River have to cross the rail road tracks to access their homes. SMART has prefaced that access to all of the parcels east of the tracks along the waterfront may be limited, as there should only be one place where vehicles would cross the tracks for safety purposes. This may require an easement from Shamrock Materials that would allow access to the east side of the tracks.

The interchange associated with the Novato Narrows Widening Project is currently proposed to encroach upon Area B of the project site, which, depending on the final design, could ultimately require the removal or relocation of the proposed fire station, trees, and modifications to the off-site transportation improvements proposed by the project. This related project would also exacerbate the project's impacts relative to aesthetics and noise.

Therefore, given that the proposed project would result in land use compatibility impacts that can not be completely mitigated, cumulative land use compatibility impacts are considered ***significant and unavoidable***.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

There are no feasible mitigation measures known at this time for the significant land use impacts associated with the proposed project. Therefore, impacts would be ***significant and unavoidable***.

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Table V.H-2
Sonoma County General Plan Analysis

Policy	Project Analysis/Comments
LAND USE ELEMENT	
Growth Projections and Growth Policy	
LU-1a: This plan has relied extensively upon policies and designations set forth in previous specific plans. The County shall continue to use "specific plans", "area plans", and "local area development guidelines" to implement this plan... ...The following plans shall be amended as necessary to be consistent with the General plan and shall be termed "area plans" and shall be incorporated by reference herein. In any case where there appears to be a conflict between General Plan and Area Plan policies or standards, the more restrictive shall apply... 1. Petaluma Dairy Belt Plan.... Where differences are found between the general plan and an applicable specific plan or area plan, the general plan shall supersede.	**Analysis:** The Petaluma Dairy Belt Area Plan (PDBAP) is an Area Plan that is referenced in Sonoma County's 1989 General Plan Policy LU-1a. The current zoning for the project site is consistent with the General Plan (GP) and the PDBAP. The project proposes a use that is not permitted under the current General Plan designation for Limited Commercial. As a result, the project is inconsistent with both the General Plan and Area Plan and would require an amendment to both the GP and the PDBAP to change the land use designation from Limited Commercial to Limited Industrial on the primary parcels of the project site. Section V.H (Land Use) of the DEIR discusses the purpose of the PDBAP, and Table V.H-3 analyzes the PDBAP policies in further detail.
LU-1g: Evaluate land use plan amendments subject to: a) Constraints of environmental suitability, b) Protection of agriculture, c) Availability of public services, d) The County projected population and employment levels, and e) Other plan goals, objectives, and policies.	**Analysis:** As stated above, the proposed project would require an amendment to change the land use designation from Limited Commercial to Limited Industrial on the two large parcels of the project site. a) Constraints of environmental suitability - Portions of the project site are jurisdictional wetlands, and most of the site is within the 100-year flood zone. This issue is discussed in Section V.C. (Biological Resources) in further detail. b) *Protection of agriculture* - There are currently no agricultural uses on the site or in the immediate surrounding area. c) *Availability of public services* - Section V.H. (Land Use) and Section IV (Summary of Initial Study) concludes that adequate public services are available to the project site. d) *County projected population and employment levels* - The proposed project would employ approximately ten people, and would not change the County projected population calculations. e) *Other plan goals, objectives, and policies* - As discussed in further detail in Section V.H. (Land Use), there are inconsistencies with several General Plan policies regarding land use.

Table V.H-2
Sonoma County General Plan Analysis

Policy	Project Analysis/Comments
City and Community Centered Growth	
LU-2b: Evaluate all city or city/county projects which affect the unincorporated area for consistency with the County general plan. Inform the Board of any project which may be inconsistent with the general plan. Work with the applicable city to resolve any inconsistencies in a manner which is consistent with the county general plan.	**Analysis:** The project site is in an unincorporated area of Sonoma County, just south of the urban service boundary of the City of Petaluma. The proposed project is being analyzed for consistency with General Plan policies herein, as well as consistency with the Petaluma Dairy Belt Area Plan. The Board of Supervisors would have the final decision on the project consistency and suitability for the area.
Phasing of Rural and Urban Growth with Availability of Adequate Public Services	
LU-4b: Use the levels of service shown on Figures CT-2c and CT-2d on pages 289 - 291 of the Circulation and Transit Element to determine whether or not congestion is exceeding the desired level of service on the countywide highway system. Use area and/or project traffic analyses to determine whether intersection impacts or other localized congestion may also affect these desired levels of service.	**Analysis:** Sonoma County General Plan Figure CT-2c (Daily Traffic Volumes and Congestion) indicates that the project area Levels of Service (LOS) are acceptable. Sonoma County General Plan Figure CT-2d (Peak Traffic Volumes and Congestion) show Highway 101 near the site with LOS D. The EIR evaluated existing levels of service for freeway operations in the vicinity of the Hwy 101/Petaluma Boulevard South interchanges. The minimum acceptable level of service threshold applied to these facilities is LOS D. Under existing AM peak hour conditions, the southbound segment of Hwy 101 south of Petaluma Boulevard South operates at LOS F. The project would add traffic to ramp movements and to Highway 101 mainline in both directions. Under existing conditions the freeway mainline operates unacceptably in the southbound direction during the AM peak hour. Additional traffic from the project would exacerbate already unacceptable conditions; therefore this is a significant impact. Overall the project creates significant impacts to Highway 101 operations. This is discussed in Section V.J (Transportation and Traffic) in further detail.
LU-4f: Assure that new development contribute its fair share toward provision of the public services and infrastructure needed for projected growth.	**Analysis:** As discussed in Section V.J (Transportation and Traffic), the project applicant would fund proposed infrastructure improvements to mitigate traffic and safety impacts. Additional improvements that would affect public services include the inclusion of facilities for a Volunteer Fire Department on-site.
Opportunities for Diverse Rural and Urban Residential Environments	
LU-6b: Site specific environmental factors shall be considered in making decisions on development permits. Site specific factors which create health or safety problems or result in unmitigated significant environmental impacts may at times reduce densities which are allowed by the land use map and zoning.	**Analysis:** The project site is adjacent to rural residential land uses to the southwest, and legal, non-conforming residential use immediately to the east. The proposed project would affect these adjacent uses in several environmental issue areas. See Section V.I (Noise), Section V.B (Air Quality) and Section V.A (Aesthetics) for further detailed discussion. Additional environmental constraints are discussed in V.C (Biological Resources) and V.G (Hydrology and Water Quality).

Table V.H-2
Sonoma County General Plan Analysis

Policy	Project Analysis/Comments
Use of Environmental Suitability Criteria in Locating and Guiding Rural and Urban Growth	
LU-7a: Avoid general plan amendments which would allow additional development in floodplains, unless such development is of low intensity and does not include large permanent structures.	**Analysis:** The proposed project requires a general plan amendment to change the land use designation from Limited Commercial to Limited Industrial on two of the project parcels. Most of the project site is within the 100-year floodplain district (F-2) as shown in Figure V.H-2 in the Land Use Section. The project would not be low intensity and would include large permanent structures.
LU-7b: Limit development in wetlands designated on Figure OS-3 (Schematic Map of Designated Natural Resource Protection Areas) in the Open Space Element of the General Plan.	**Analysis:** The proposed project is not in designated critical habitat area according to Figure OS-3.
LU-7c: Prohibit new permanent structures within the floodway. Require that any development that may be permitted within the floodplain to be raised above the 100-year flood elevation.	**Analysis:** The proposed project would place dolphins and piles for the barge dock within the floodway. Grading plans involve moving materials from higher elevations to level developed portions of the site to 9 feet above mean sea level (msl), to raise structures above the 7 feet msl flood zone. This issue is discussed further in Section V.G (Hydrology and Water Quality).
LU-7d: Avoid commercial, industrial, and residential land use designations in areas subject to "high" or "very high" fire hazards, as identified in the Public Safety Element, unless the combination of fuel load, access, water supply, and other project design measures will reduce the potential fire-related impacts of new development to insignificant levels.	**Analysis:** The project site is not located in a "high" or "very high" fire hazard area as per the Hazards Map (Figure PS-1h) in the Public Safety Element of the Sonoma County General Plan.
Preservation of Scenic or Biotic Resources Areas	
LU-9a: Establish maximum densities and/or siting standards for development in community separators, scenic landscape units, critical habitats, riparian corridors, and scenic corridors.	**Analysis:** The project site has several combining district zoning overlays that have specific criteria for densities, siting standards, setbacks. The zones include Biotic Resources (BR), Scenic Resources (SR) Scenic Design (SD) 100-year flood plain (F2). Detailed discussion is available in Section V.H. (Land Use).
Petaluma and Environs	
LU-17a: Include industrial lands located along Petaluma Boulevard south of Petaluma within the city's sphere of influence.	**Analysis:** The majority of the project site is outside of Petaluma's sphere of influence, with the exception of proposed areas A and B. The City of Petaluma has designated the area as Special Industrial, with a small portion of the site within their urban separator area.
LU-17c: Use zoning to avoid new urban uses within the Petaluma urban service area prior to annexation by Petaluma.	**Analysis:** Urban use pertains to uses of land typically occurring within cities, such as high density residential, commercial, and industrial uses. Although the site is not proposed to be annexed to the City of Petaluma, the project would include a new industrial urban use within a small portion of the urban service boundary.

Table V.H-2
Sonoma County General Plan Analysis

Policy	Project Analysis/Comments
LU-17d: Refer to the city of Petaluma for review and comment on any application for discretionary projects within one mile of the urban service boundary.	**Analysis:** The City was contacted during the NOP process, and replied on March 16, 2006 which included comments regarding hydrology and water quality concerns (See Appendix B Responses to NOP). The City requested EIR analysis of the type and volume of potential surface water contaminants from pollution runoff in relationship to the routine transport, use, storage, and/or disposal of hazardous materials and contaminants.
LU-17e: Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986.	**Analysis:** The applicant has requested a General Plan amendment to change APNs 019-320-022 and -023 from Limited Commercial to Limited Industrial. These APNs are not within the urban service boundary. Additionally, there were no existing permitted industrial uses of this property in 1986. The project applicant has requested to amend Policy LU-17e as follows: (changes in italics) Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986, *except that areas designated "Limited Commercial" may be re-designated to "Limited Industrial" within the Haystack Landing Site along Petaluma Boulevard South (APNs 019-320-022 and 019-320-023) as necessary to accommodate the relocation of an asphalt and recycling plant.*
LU-17f: Use the following criteria for approval of discretionary projects in the "Limited Commercial" and "Limited Industrial" category: 1) The use specifically serves the service, employment, or agricultural processing needs of local area residents or the local agricultural community. 2) The use is compatible with adjacent residential or agricultural uses. 3) The use won't adversely affect the level of service on public roadways and will not interfere with the movement of farm vehicles. 4) If the use is located within a designated scenic corridor, mitigate visual impacts by appropriate setbacks, landscaping, and/or screening.	**Analysis:** As stated above, the proposed project would require discretionary approval for an amendment to change the land use designation from Limited Commercial to Limited Industrial on the two large parcels of the project site. 1) The project does not have any agricultural or residential affiliation but would serve the service needs and employment needs of local area residents. 2) Both agricultural and rural residential properties are located near the project site. The project is not compatible with the adjacent residential properties located along the River, and this issue is analyzed in further detail in Section V.H (Land Use) under Impact LU-2 (Land Use Compatibility). 3) The project would adversely affect roadway levels of service as analyzed in Section V.J (Transportation and Traffic). The project is not anticipated to interfere with the movement of farm vehicles because there are no agricultural uses along Petaluma Boulevard South. 4) The frontage of the project site in Areas B, C and D

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Policy	Project Analysis/Comments
	has been designated as a Scenic Corridor and zoned Scenic Resource (SR) Combining District. SR requires that structures located within scenic corridors established outside of the urban service area boundaries shall be subject to the setbacks of thirty percent (30%) of the depth of the lot to a maximum of two hundred feet (200') from the centerline of the road. Additionally, appropriate landscaping for visual screening from the highway and nearby residences is required. The project site plan and draft landscape plan are located outside of the setback.
OPEN SPACE ELEMENT	
Scenic Landscape Units	
OS-2b: Avoid commercial or industrial uses in scenic landscape units other than those which are permitted by the agricultural or resource land use categories.	**Analysis:** The project site is not located in a Scenic Landscape Unit (SLU).
OS-2e: Require that new structures meet the following criteria: 1) They are sited below exposed ridgelines 2) They use natural landforms and existing vegetation to screen them from view from public roads. On exposed sites, screening with native, fire retardant plants may be required. 3) Cuts and fills are discouraged and where practical, driveways are screened from public view. 4) Utilities are undergrounded where economically practical.	**Analysis:** The project site is not located in a Scenic Landscape Unit (SLU), therefore is not subject to these conditions.
OS-2i: For development on parcels located both within scenic landscape units and adjacent to scenic corridors, apply the more restrictive siting and setback policies to preserve visual quality.	**Analysis:** The proposed project is not a Scenic Landscape Unit, but is located next to a scenic corridor (Highway 101). The setback policy for structures to be 200-feet from the centerline of the highway would apply. See Section V.H. (Land Use) for detailed discussion of this issue.
Scenic Corridors	
OS-3a: Apply the Scenic Resources combining district to those portions of properties within scenic corridor setbacks.	**Analysis:** The proposed project is located next to a scenic corridor (Highway 101), with the sections along the road designated as a Scenic Resources Combining District.
OS-3c: Establish a rural scenic corridor setback of 30% of the depth of the lot to a maximum of 200' from the centerline of the road unless a different setback is provided in the planning area policies of the Land Use Element. Prohibit development within the setback with the following exceptions:	**Analysis:** The proposed project does not meet any of the exception criteria for scenic corridors, and thus would be required to comply with the setback limitations. See Section V.H. (Land Use) for detailed discussion of this issue.

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Policy	Project Analysis/Comments
1&2) New barns and similar agricultural support structures. 3) Maintenance, restoration, reconstruction, or minor expansion of existing structures. 4) Telecommunication facilities ... 5) Other new structures if they are subject to design review and a) They are associated with existing structures, b) There is no other reasonable location for the structure, c) The location within the setback is necessary for the use, or d) Existing vegetation and topography screen the use. 6) Compliance with the setback would render the parcel unbuildable. 7) Satellite dishes which are not visible from the roadway.	
Critical Habitat Areas	
OS-4e: Require building permits to have a minimum setback of 50 feet from the edge of any wetlands which are within a critical habitat area. Exempt existing farm buildings and allow them to be expanded or modified.	**Analysis:** Parcel 019-220-001 (Area A) has a Biotic Resource (BR) Combining District overlay that extends approximately 50 feet from the top of the River bank. No existing farm buildings are on-site, nor are any proposed on the site. Sonoma County PRMD would be responsible for issuing building permits.
OS-4f: Consider waiver of the setback if, after preparation of a biotic resource assessment, it is determined that applying the setback makes the parcel unbuildable or the structure is a noncommercial agricultural building and must be located adjacent to an existing farm complex for efficient farm operation.	**Analysis:** The Zoning Ordinance allows development in a BR Zone if the restriction on development makes a lot undevelopable and vegetation removal is minimized, or if no significant disturbance of riparian habitat would occur from the project. A dock for barge traffic will be placed in the River itself and the amount of riparian vegetation removed to provide access to the dock will not be significant due to the small foot print of the ramp and conveyor facilities. A biotic resource assessment was conducted for observed wetlands in all areas of the project site. However, some impacts to wetlands have already occurred. Approximately 0.01 acre of coastal marsh habitat subject to Corps jurisdiction was disturbed and filled along the shoreline of the Petaluma River in Area A. A Wetlands Mitigation and Monitoring Plan would potentially mitigate impacts to wetlands from the proposed project. This issue is discussed in detail in Section V.C (Biological Resources).
Riparian Corridors	
OS-5a: Classify riparian corridors designated in the open space element as follows: 1) "Urban Riparian Corridors" include those portions of designated corridors within urban residential, commercial, industrial, or public/quasi-public land use categories.	**Analysis:** Parcel 019-220-001, (Area A) is adjacent to the Petaluma River, therefore would be within an Urban Riparian Corridor with a 50-foot setback policy. (Parcel -001 is designated for Industrial use across from a public park.)

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2) "Russian River Riparian Corridor" includes the corridor adjacent to any part of the Russian River which is neither located within the above urban riparian corridor nor within the jurisdiction of a city. 3) "Flatland Riparian Corridors" include the corridors adjacent to any streams which flow through predominantly flat or very gently sloping land, generally with alluvial soil. This classification excludes areas covered by 1) and 2) above. 4) Upland Riparian Corridors" include the corridors adjacent to streams not included in the above three categories.	
Bikeways Network	
OS-8o: Encourage the dedication of Class I bikeways as part of open space requirements for development, when a nexus can be established between the proposed development and the need for bikeways in the affected area.	**Analysis:** A Class I bike path is proposed in conjunction with the SMART plan, along the railroad tracks adjacent to the project site. The project proposes constructing an enclosed conveyer that would transport material over the tracks. The project would be required to maintain appropriate setbacks from the tracks and any proposed adjacent pathways.
Archaeological and Historical Sites	
OS-9f: Refer applications for discretionary permits to the Northwest Information Center to determine if the project site might contain archaeological or historical resources. If a site is likely to have these resources, require a field survey and include mitigation measures if needed. Discourage paving over resources.	**Analysis:** A records search from Northwest Information Center of the California Historical Resources Information System (CHRIS) was conducted as part of the Phase I Cultural Resources Study (Cultural Study) for the project site. One historic site, Ca-Son-1465H (Haystack Landing), was partially located within the project site. As described in Section III (Project Description), a historic building was lost in a fire and grading occurred without permits. Mitigation measures are proposed for any additional resources on-site that could be significantly impacted by the project. This issue is discussed in further detail in Section V.D (Cultural Resources).
OS-9g: Use the Heritage or Landmark Tree Ordinance and the design review process to protect trees.	**Analysis:** There are no heritage or landmark trees on the project site.
RESOURCE CONSERVATION ELEMENT	
Prevention of Soil Erosion	
RC-2d: Require a soil conservation program to reduce soil erosion impacts for discretionary projects which could increase waterway or hillside erosion. Design improvements such as roads and driveways to retain natural vegetation and topography to the extent feasible.	**Analysis:** The proposed project would include approximately 28 acres that would be disturbed as part of grading operations, of which a portion would be near waterways. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared for construction activities. The SWPPP shall include all provisions of the Erosion and Sediment Control Plan submitted by the applicant. In addition to the regulatory requirements for the SWPPP, the site-specific SWPPP shall include provisions for the minimization of sediment disturbance and production of turbidity in and adjacent to the

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Policy	Project Analysis/Comments
	Petaluma River during construction of the proposed barge unloading facility.
RC-2e: Retain natural vegetation and topography to the extent economically feasible for any discretionary project improvements near waterways or in areas with a high risk of erosion as noted in the Sonoma County Soil Survey.	**Analysis:** The proposed project involves discretionary approval on and near a waterway. The project proposes cuts from a hill in Area B, changing the natural topography and vegetation. The grading would be balanced on the site, used to raise the elevation in Areas C and D. Additionally, as described above under Policy OS-4f, the natural vegetation was scraped away near waterways when grading occurred without permits. The appropriate agencies (e.g. Corps, DFG) would evaluate impacts during the permit process for the project.
RC-2g: Continue to enforce the Uniform Building Code to reduce erosion and slope instability problems.	**Analysis:** The proposed project would be required to follow Sonoma County Uniform Building Code regulations for the permit process.
Water Resources	
RC-3a: Grading, filling and construction should not substantially reduce or divert any stream flow that would affect groundwater recharge.	**Analysis:** There are six drainage ditches on the project site that drain to the Petaluma River. Although the proposed grading for the site would result in placement of fill within portions of the flood zone, excavation within the zone would occur as part of wetland enhancement. During subsurface investigations at the project site, groundwater was encountered at depths ranging from 11.0 to 14.5 feet. 19 acres of the site would be devoted to wetland mitigation; therefore, groundwater recharge would not be expected to be impacted by the proposed project. See Section V.G (Hydrology and Water Quality) for more detailed discussion.
Conservation of Biotic Resources	
RC-5b: On discretionary projects, use native or compatible non native species to the extent possible for landscaping. Discourage use of exotics, such as pampas grass and scotch broom.	**Analysis:** The draft landscape plan for the project proposes to use some native vegetation species. A complete landscape plan would be required as part of the permit process.
RC-5c: Make the preservation of significant native oaks and other native trees a primary consideration in the review of development projects.	**Analysis:** A very small portion of the project site has a Valley Oak Habitat overlay, which is in the proposed wetland mitigation area; therefore, no trees would be disturbed if they exist in the area.
Protection of Rare and Endangered Species	
RC-6b: Protection for rare and endangered species, wetlands, and other biotic resources not indicated on Figure OS-3 on page 183 of the Open Space Element shall be accomplished through compliance with applicable state and federal law.	**Analysis:** A Biological Constraints Analysis was conducted which describes special-status species suspected to occur on the site. This issue is discussed in detail in Section V.C (Biological Resources).
Protection and Conservation of Freshwater Fishery Resources	
RC-8c: Design public and private projects to minimize damage to the stream environment and to maintain instream flows.	**Analysis:** Potential impacts to the Petaluma River fisheries, along with mitigation measures are discussed in detail in Section V.C (Biological Resources) and Section V.G (Hydrology and Water Quality).

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Policy	Project Analysis/Comments
Air Resources	
RC-13a: Require that commercial and industrial development projects be designed to minimize air emissions. Reduce direct emissions by decreasing the need for space heating.	**Analysis:** The proposed project is an industrial development, and would fall under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The project is required to apply for a BAAQMD permit to operate, and has incorporated the best available control technologies (BACT) for the proposed development. There would be no need for space heating for the proposed project. Air emissions are discussed in detail in Section V.B (Air Quality).
RC-13c: Refer projects to the local air quality districts for their review.	**Analysis:** See above analysis for policy RC-13a.
RC-13d: Review proposed changes in land use designations for potential deterioration of air quality and deny them unless they are consistent with the air quality levels projected in the general plan EIR.	**Analysis:** The proposed project requires an amendment for a change in land use designation. Project impacts to Air Quality are examined in detail in Section V.B (Air Quality).
PUBLIC SAFETY ELEMENT	
Reduction of Potential Damage for Geologic Hazards	
PS-1a: Continue to utilize all available data on geologic hazards and related risks from the appropriate agencies.	**Analysis:** Geological hazards and related risks have been analyzed and are discussed in Section V.E (Geology and Soils).
PS-1b: Continue to utilize studies of geologic hazards prepared during the development review process.	**Analysis:** See Analysis under Policy PS-1a above.
PS-1f: Require and review geologic reports prior to decisions on any project which would subject property or persons to significant risks from the geologic hazards. Geologic reports shall describe the hazards and include mitigation measures to reduce risks to acceptable levels. Where appropriate, require an engineer's or geologist's certification that risks have been mitigated to an acceptable level and, if indicated, obtain indemnification or insurance from the engineer, geologist, or developer to minimize County exposure to liability.	**Analysis:** Geotechnical reports indicate that the potential impacts from seismic activity or soil instability would be less than significant with proposed mitigation. See Section V.E (Geology and Soils) for detailed discussion on this analysis.
PS-1i: Require dynamic analysis of structural response to earthquake forces prior to County approval of building permits for structures whose irregularity or other factors prevent reasonable load determination and distribution by static analysis.	**Analysis:** See Analysis for Policy PS-1f.
Reduction of Potential Damage from Flooding	
PS-2e: Use the 100-year flood event and corresponding elevations as the County measure of acceptable level of risk and protection in the consideration of any amendments of the land use plan map.	**Analysis:** The project site is located in a 100-year Flood Plain District (F-2), and the proposed project requires a General Plan amendment. The project proposes balancing grading on-site to raise the elevation for structures to be above the flood zone. See Section V.G (Hydrology and Water Quality) for detailed discussion.

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Sonoma County General Plan Analysis

Policy	Project Analysis/Comments
PS-2f: On-site and off-site flood related hazards shall be reviewed for all projects located within areas subject to known flood hazards.	**Analysis:** A development permit would be required for any structures proposed within the F-2 District, and general standards and building codes would be followed, as per Sonoma County Code on Flood Damage Prevention, Sections 7B-5 and 7B-10.
PS-2g: Regulate development, water diversion, vegetation removal, grading and fills to minimize any increase in flooding and related damage to people and property.	**Analysis:** The proposed project balances grading on-site to raise the elevation for structures to be above the flood zone. Effects from grading, vegetation removal and fill in relationship to flood control are analyzed in Section V.G (Hydrology and Water Quality).
PS-2h: Payment of costs for drainage facilities to handle the surface runoff from new development shall be the responsibility of developers and others who benefit.	**Analysis:** The project applicant has a proposed drainage system to handle surface runoff and stormwater. See Section V.G (Hydrology and Water Quality) for detailed discussion.
PS-2i: Require that design and construction of drainage facilities be subject to the review and approval of the Sonoma County Water Agency.	**Analysis:** The applicant would be responsible for filing a Notice of Intent to comply with the statewide general permit for construction activities and the general permit for industrial activities. Compliance with the general permits requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), as discussed in Section V.G (Hydrology and Water Quality).
PS-2j: Require that tentative and final subdivision maps and approved site plans show areas subject to flooding as shown on the FEMA maps.	**Analysis:** Figure III-15 in the Project Description shows the Site Constraints in regard to the location of the 100-year Floodplain.
PS-2k: Give priority to floodplain management over flood control structures for preventing damage from flooding except where the intensity of development requires a high level of protection and justifies the costs of structural measures.	**Analysis:** FEMA has determined the base flood elevation at the site to be 7 msl (mean sea level). The proposed project would include balancing on-site grading to increase the mean elevation of portions of Areas C to 9 msl. This issue is discussed in further detail in Section V.G (Hydrology and Water Quality).
PS-2l: Consider the potential risk of damage from flooding in the design and review of projects, including those which could facilitate floodplain development.	**Analysis:** See analysis under policy PS-2F.
PS-2p: Limit filling in areas which could retain a significant amount of floodwater.	**Analysis:** Areas proposed for fill would be mitigated on-site. This issue is discussed in further detail in Section V.G (Hydrology and Water Quality). The proposed mitigation plan is available in Volume II, Appendix E.
Reduction of Potential Damage from Hazardous Materials	
PS-4a: While maintaining the autonomy granted to it pursuant to State zoning laws, implement State and County requirements for the storage, transport, disposal and use of hazardous materials, including requirements for management plans, security precautions, and contingency plans.	**Analysis:** The proposed project would involve the storage, transport and disposal of hazardous materials. The impact would be less-than-significant with proposed mitigation measures. See Section V.F (Hazards and Hazardous Materials) for detailed discussion.
PS-4b: Prepare and maintain an inventory of sites with storage or use of significant quantities of hazardous materials.	**Analysis:** See analysis above for Policy PS-4a.

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Policy	Project Analysis/Comments
PS-4c: Require a use permit for any commercial or industrial use involving significant quantities of hazardous materials. Hazardous materials management plans shall be required as a condition of approval for such permits.	**Analysis:** The applicant for the proposed project would prepare an Emergency Response Action Plan that addresses procedures for hazardous material spills, fires, or other emergencies, as demonstrated at a similar facility in San Rafael.
PS-4d: Where allowed by law, regulate the transportation of hazardous materials to minimize the potential for damage. Seek regulation by other agencies consistent with adopted County policies.	**Analysis:** See analysis above for Policy PS-4a.
PS-4j: Site hazardous waste facilities which have the primary purpose of reuse, recycling, or source reduction of hazardous wastes in areas designated for industrial use in close proximity to users of hazardous materials and/or generators of hazardous wastes.	**Analysis:** The proposed project would involve the storage, transport and disposal of hazardous materials; however, it is not a hazardous waste facility.
CIRCULATION AND TRANSIT ELEMENT	
Circulation and Transit	
CT-1j: Encourage measures which will reduce the number of vehicle miles traveled during peak periods in order to reduce automobile emissions. These measures include: 1) Incentives for carpooling and vanpooling 2) HOV and transit vehicle lanes along Highway 101 from Windsor to the Marin County line 3) Incentives to increase transit ridership, including: employee transportation allowances, convenient bus turnouts and shelters, and shuttle buses from job centers to express bus stops 4) Flex-time and modified work schedules 5) Facilities for bicycle use 6) Encouraging pedestrian traffic	**Analysis:** The proposed project substantially reduces the number of truck trips that would be required by relying on barges to import materials instead of trucks. However it is possible during start up, all of the material would be trucked to the site, depending on the timing of project permit approvals. As only ten people would be permanently employed by the project, there are a limited number of (non-truck) vehicle miles traveled (VMT) during peak periods that occur as a result of the project. Therefore, measures to reduce VMT are not proposed.
CT-1n: To the extent possible, accommodate future circulation and transit demand by using existing facilities more efficiently, or improving and expanding them before building new facilities.	**Analysis**: The proposed project would use existing roadway facilities but also includes off-site improvements along Petaluma Boulevard South.
Countywide Highway System	
CT-2a: Use the levels of service shown on Figures CT-2c and CT-2d on pages 289 -291 (of the General Plan) to determine whether or not congestion is exceeding the desired level of service on the countywide highway system. Use area and/or project traffic analyses to determine whether intersection impacts or other localized congestion may also affect these desired levels of service.	**Analysis:** Sonoma County General Plan Figure CT-2c (Daily Traffic Volumes and Congestion) indicates that the project area levels of service are acceptable. Sonoma County General Plan Figure CT-2d (Peak Traffic Volumes and Congestion) show Highway 101 near the site with Level of Service (LOS) D. Project traffic was added to existing traffic and traffic from cumulative projects along Petaluma Boulevard South to evaluate near-term project impacts. Under near-term cumulative conditions, the project would add trips to congested segments of southbound Highway 101 during the AM peak hour, could potentially add traffic to

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Policy	Project Analysis/Comments
	northbound Highway 101 during the PM peak hour where traffic has been observed to break down, and would add traffic to the congested southbound ramps during the AM peak hour where operation would be LOS F without project traffic. This is a potentially significant impact. Overall the project has a significant impact on highway operations. However Mitigation Measure TRANS-3 (funding a fair share of the construction of planned HOV lanes) would address impacts. With improvements the LOS would improve from LOS F to LOS E for the southbound AM condition and the impact would be reduced to less-than-significant levels. Cumulative 2020 impacts are evaluated by considering cumulative 2020 traffic plus traffic from the proposed project. Under 2020 plus project conditions, the intersection of Petaluma Boulevard South at Highway 101 southbound ramps would operate with 150 seconds of delay at LOS F. This is a less-than-significant impact, however, because the increase in delay would be less than two seconds above conditions without the project.
CT-2e: Primary responsibility for funding intersection, right-of-way, and other needed localized improvements not identified as part of the countywide highway system belongs to individual projects.	**Analysis**: The project applicant would provide funding for all project specific improvements to site egress/ingress. As noted in Mitigation Measure Trans 3a in Section V.J, the project shall fund a fair share towards any planned interchange improvements for the Highway 101/Petaluma Boulevard South interchange project.
CT-2k: The County may require correction of potential safety deficiencies (inadequate road width, lack of traffic control devices, intersection alignment) prior to, or as part of, project approval.	**Analysis**: The path of trucks onto Petaluma Boulevard South and between the project driveway and the Highway 101 northbound on-ramp would create potential conflicts with traffic exiting on the northbound Highway 101 off-ramp. Mitigation Measures Trans-4 in Section V.J provides for correction of potential safety deficiencies.
The Primary and Secondary Arterial System	
CT-2x: Primary arterials are highway routes which carry large volumes of intercity or local traffic within urban areas and which place priority on the flow of traffic rather than on access to property. The following standards and those included in Table CT-3 {from the General Plan} apply to "primary arterials": 1) The needed number of travel lanes is indicated on Figures CT-6a through 6i. 2) Allow access from abutting parcels if it does not interfere with traffic function. Encourage consolidation of driveways. Discourage parking, especially during peak hours. 3) Provide continuous left turn lanes in urban areas, where practical. Provide turning lanes at intersections with other arterial and collector	**Analysis**: Petaluma Boulevard would be considered a secondary pararterial system.

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Policy	Project Analysis/Comments
highways. Signals shall favor the arterial. 4) Consider requiring urban improvement standards within urban service areas.	
PUBLIC FACILITIES AND SERVICES ELEMENT	
Sewer Services	
PF-1c: Require as part of discretionary project applications within a water or sewer service area written certification that either existing services are available or needed improvements will be made prior to occupancy.	**Analysis:** The proposed project includes plans for an engineered on-site septic system. This would include a disposal field, a septic tank, sump chamber, Advantex type filters and a UV disinfection unit. The applicant has submitted a permit application for the engineered septic system to Sonoma County PRMD for plan check. The permit has been reviewed and is ready for issuance pending discretionary entitlement approvals for the project and payment of the applicable septic permit fees. Water service is currently being provided to parcel -022 by the North Marin Water District (NMWD), although the area is outside of its territorial boundaries. NMWD indicated in a letter dated October 30, 2006 that up to 4,452 gallons per day could be provided to the area, based on historical use. The project would also include pumping of water from the Petaluma River to meet the projects non-potable water demands.
PF-1d: Avoid extension of sewer or water service outside of a sphere of influence or urban service area. Consider exceptions to this policy only: 1) Where necessary to resolve a public health hazard resulting from existing development, or 2) Where a substantial overriding public benefit authorized by policy OS-1c or OS-2c on pages 171 and 174 would result, unless LAFCO has adopted a "no annexation" policy. 3) Water service only may be approved for a property which is located within a water district boundary in existence as of March 1989.	**Analysis:** The majority of the project site is outside of the Urban Services area for the city of Petaluma. The project has plans for its own septic sewer facility (as described under policy PF-1c above). Existing water service provided by North Marin Water District would not be extended, with the possible exception for fire hydrants on-site. The project would not meet any of the exceptions listed in Policy PF-1d.
PF-1e: Use the following guidelines for any exception allowed by PF-1d: 1) The property must adjoin the urban service boundary, and where water service is requested, the property must be located within a water district boundary in existence as of March 1989. 2) Size facilities to serve development consistent with the general plan, 3) Include written certification that service capacity is available, 4) Give preference to out of service area agreements rather than annexations, 5) Require dedications of scenic easements to the extent allowed by law,	**Analysis:** The proposed project does not meet any of the exceptions to Policy PF-1d above.

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Policy	Project Analysis/Comments
6) Ensure that any offered term of easement is coterminus with the duration of service.	
PF-1f: Use water effectively and reduce water and wastewater system demand by: 1) Requiring water conserving design and equipment in new construction, 2) Encouraging water conserving landscaping and other conservation measures, 3) Encouraging retrofitting with water conserving devices, 4) Designing wastewater systems to minimize inflow and infiltration to the extent economically feasible.	**Analysis:** The proposed project's non-potable water demand would be met from pumping water from the Petaluma River as well as from an off-site well owned by the applicant. The draft landscape plan includes some species that have adapted to the Mediterranean climate. The project includes an irrigation system that would be fully automated.
Public Utilities	
PF-2n: Require prior to discretionary project approval written certification that fire and related services customarily provided to comparable uses are available or will be available prior to occupancy for projects within the service area of an applicable fire agency.	**Analysis:** Mitigation Measure 4a in Section V.F. (Hazards and Hazardous Materials) requires a Fire Protection Engineer to perform a code analysis and submit a comprehensive fire protection plan for the proposed project for review by the SCPRMD and the County Fire Marshall. Additionally the proposed project includes a fire station facility to be used for equipment storage and training purposes. It is a second-call facility for the San Antonio Volunteer Fire Department and would not require living facilities.
NOISE ELEMENT	
Land Use Compatibility and Project Review	
NE-1c: Control non transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table NE-2 (Noise Element of the General Plan) as measured at the exterior property line of any affected residential land use. Limit exceptions to the following: 1) If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level. 2) Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. 3) Reduce the applicable standards in Table NE-2 by 5 decibels if they exceed the ambient level by 10 or more decibels.	**Analysis:** The project involves creating new stationary noises in an area with sensitive receptors present. The ambient noise levels currently exceed the noise level standards, due to the influence of Highway 101 traffic, therefore the standards were adjusted upward as per exception 1. With implementation of proposed mitigation measures, all combinations of the asphalt plant, concrete recycling plant and barge unloading would meet the County's daytime and nighttime noise standards at the hillside homes to the west (R1 and R2). However, noise levels would still exceed the County daytime standard at receivers R3-R7. Therefore, this impact remains significant and unavoidable. Refer to Section V.I (Noise) for detailed information.

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Policy	Project Analysis/Comments
NE-1d: Consider requiring an acoustical analysis prior to approval of any discretionary project involving a potentially significant new noise source or a noise sensitive land use in a noise impacted area. The analysis shall: 1) Be the responsibility of the applicant 2) Be prepared by a qualified acoustical consultant 3) Include noise measurements adequate to describe local conditions 4) Include estimated noise levels in terms of Ldn and/or the standards of Table NE-2 for existing and projected future (20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element 5) Recommend measures to achieve compliance with this element. Where the noise source consists of intermittent single events, address the effects of maximum noise levels on sleep disturbance 6) Include estimates of noise exposure after these measures have been implemented. 7) Be reviewed by the Health Department.	**Analysis:** Acoustical noise analysis for the proposed project was conducted. Project impacts on sensitive receptors is discussed above under Policy NE-1c. Noise tables and detailed analysis with recommended mitigation measures are included in Volume I, Section V.I (Noise) of this DEIR.
NE-1m: Consider requiring the monitoring of noise levels for discretionary projects to determine if noise levels are in compliance with required standards. The cost of monitoring shall be the responsibility of the applicant.	**Analysis:** See analysis above for Policy NE-1c. Continued monitoring of the proposed project is not proposed.
Management and Transportation Related Noises	
NE-2c: Consider using truck routing, speed limits, signal timing and other traffic control measures to reduce impacts on noise sensitive uses.	**Analysis:** As stated under Policy NE-1c, the ambient noise levels currently exceed the noise level standards, due to the influence of Highway 101 traffic, therefore the standards were adjusted upward as per exception 1. Section V.J (Transportation/Traffic), Mitigation Measure Trans-4 provides for a traffic signal at the new intersection of Petaluma Boulevard South and the project driveway. Section V.I (Noise) has detailed analysis of the noise impacts from the proposed project.
NE-2d: Consider measures to reduce peak traffic volumes as a means to reduce highway related noise.	**Analysis:** Section V.J (Transportation/Traffic) provides mitigation measures to reduce traffic at peak pm hours, which would also reduce highway related noise at those times.
Source: Sonoma County 1981 General Plan.	

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Table V.H-3
Petaluma Dairy Belt Area Plan Analysis

Policy	Project Analysis/Comments
MAJOR	
3. When issuing discretionary permits or approvals, an additional criteria shall be the potential effect of the proposal upon the surrounding agricultural activities. If potential conflicts with agriculture are revealed, agricultural considerations shall prevail. This policy is advisory and not binding on the County.	**Analysis:** The proposed project requires discretionary approval for a General Plan amendment, zoning change, conditional use permit, and design review. Lands to the south, west, and east of the project site are designated Land Extensive Agriculture (LEA). LEA lands are used for dairies, sheep and cattle ranching, grazing, silage and related activities. There are no potential conflicts with agriculture in relationship to the proposed project.
DEVELOPMENT POLICIES	
Slope and Geology 1. Refer projects to a qualified geologist in order to determine when engineering geologic reports are necessary concerning the following discretionary actions: plan amendments, rezoning, use permits, minor subdivisions, design review permits, and gravel extraction permits and reclamation plans.	**Analysis:** As stated above, the proposed project requires discretionary approval. A geotechnical analysis has been conducted and is discussed in detail in Section V. E (Geology and Soils).
Rare and Endangered Species 1. Surveys for rare and endangered species shall be required for all discretionary permits in the Dairy Belt Area Plan area. Waiver of this requirement may be permitted only if it can be demonstrated that there are no rare and endangered species on the affected site.	**Analysis:** As stated above, the proposed project requires discretionary approval. A biotic resource assessment was conducted which describes special-status species suspected to occur on the site. This issue is discussed in detail in Section V.C (Biological Resources).
Noise 1. Require noise standards and conditions on all use permits issued for projects which have a potential for excessive sound levels.	**Analysis:** The proposed project would require a conditional use permit, and would create noise from the operation of the asphalt plant, the concrete recycling plant, the barge loading and unloading facilities, and the volunteer fire department. Additional traffic noise would also be related with project activities. Detailed discussion on this issue is in Volume I, Section V.I (Noise).
Air Quality 1. Both point source and cumulative traffic-generated emissions should be evaluated for potential adverse air quality impacts for any major developments and these developments should proceed only if the air quality impacts can be mitigated.	**Analysis:** The proposed project would increase emissions of nitrogen oxides (an ozone precursor), primarily from trucks hauling raw materials and asphalt product. Even with mitigation, this increase would remain above the threshold of significance established by the Bay Area Air Quality Management District and would contribute to the San Francisco Air Basin's air quality violation for ozone, and therefore, this impact would be significant and unavoidable. See Section V.B (Air Quality) for detailed discussion on this issue.
Public Services 2. All development proposals requiring discretionary approvals by the Project Review Advisory Committee (PRAC), the Board of Zoning Adjustments, or the Planning Commission will be deferred to the appropriate fire protection service for comment, and responses will be reviewed by these bodies and by the Board of Supervisors as required.	**Analysis:** As stated above, the proposed project requires discretionary approval. The project site falls within the San Antonio Volunteer Fire Department jurisdiction. The proposed project includes construction of a fire house staffed by volunteers for the Department, so services would be provided on-site. All final decisions affecting Sonoma County land uses are reviewed by the

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Petaluma Dairy Belt Area Plan Analysis

Policy	Project Analysis/Comments
	Board of Supervisors.
Archaeological Sites and Historic Resources 1. Refer all discretionary actions, zone changes, subdivisions, use permits, public projects, etc. to the Northwest Information Center, Department of Anthropology, Sonoma State University to ascertain the probability of disturbing archaeological resources.	**Analysis:** As stated above, the proposed project requires discretionary approval, and the appropriate agencies have been contacted. A records search of the California Historical Resources Information System (CHRIS) was conducted as part of the Phase I Cultural Resources Study (Cultural Study) for the project site at the Northwest Information Center at Sonoma State University. The records search indicated one prehistoric cultural resource, located approximately one-quarter mile from the project site, Ca-Son-2152, and one historic site, Ca-Son-1465H (Haystack Landing), was partially located within the project site. The Phase I Cultural Resource Study may be viewed in Appendix F and this issue is discussed in detail in Section V.D (Cultural Resources).
Archaeological Sites and Historic Resources 2. Require an archaeological field survey for projects found to have a high probability of disturbing archaeological resources.	**Analysis:** See policy 1 analysis above.
Archaeological Sites and Historic Resources 3. Require a rezoning to the HD (Historic District) zoning district on all discretionary actions, zone changes, subdivisions, use permits, public projects, etc. which involve properties listed as eligible for landmark status.	**Analysis:** The historic 1860-era home was destroyed in a fire in the Fall of 2004 and the older barns were removed. Because the structures are now gone, the HD combining district is being proposed for removal by the County's Board of Supervisors, as part of the General Plan Update.
LAND USE	
Community Form	
a. Preserve the identities of present communities.	**Analysis:** There are no existing residential communities in the project area. The proposed project would significantly alter the existing landscape, impacting the adjacent legal non-conforming residences to the east for aesthetics, noise, air quality, and odor. Properties to the west, and south are agricultural and rural.
NATURAL RESOURCES	
a. Determine the environmental suitability of land for specific types and intensities of use.	**Analysis:** The proposed project requires discretionary approval to change the land use from Limited Commercial to Limited Industrial. Environmental suitability is analyzed in Section V.E for Geology and Soils, Section V.G for Hydrology and Water Quality, and Section V.C for Biological Resources.
Historic and Archaeological Sites	
a. Preserve adequate open space around historic settlements and buildings, areas of archaeological significance, and other features important to the human history of the County, so that the natural settings of such areas are retained.	**Analysis:** The site has been analyzed to determine archaeological or historical significance. The natural settings have already been altered. This issue is discussed in detail in Section V.D (Cultural Resources), and V.H (Land Use).

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Petaluma Dairy Belt Area Plan Analysis

Policy	Project Analysis/Comments
Recreation Facilities	
a. Ensure that recreation facilities are compatible with adjacent land uses, the maintenance of environmental quality, and the protection of property rights.	**Analysis:** The proposed project is adjacent to Shollenberger Park, across the River to the east. Mitigation measures are proposed for impacts with regard to noise, aesthetics, air quality, and odors that may affect public use of the Park .
Geologic Hazards	
a. Ensure that population densities and development are kept to a minimum in areas of geologic hazards.	**Analysis:** The proposed project is not residential so populations densities are not relevant. Section V.E (Geology and Soils) discusses compliance with California building codes to mitigate the effects of seismically induced groundshaking that could occur at the project site.
b. Require geologic reports identifying unstable slopes and seismic hazards relating to building sites be written prior to the approval of a final subdivision map or the issuance of a building permit for areas identified as containing probable geologic hazards to safety.	**Analysis:** As stated previously, several geotechnical reports have been conducted and analysis is discussed in detail in Section V. E (Geology and Soils).
Fire Hazards	
b. Support coordination and cooperation among all fire fighting agencies (state, city, district, volunteer).	**Analysis:** The proposed project includes a Fire Station that will provide storage for equipment and four engines, and provide training facilities for the San Antonio Volunteer Fire Department.
Flood Hazards	
a. Restrict uses in 100 year floodplains to those that pose the least hazard to public health and safety.	**Analysis:** A large portion of the project site is located in 100-year floodplain district (F-2), however grading plans have proposed to move materials from higher elevations to level portions of the site to 9 feet above mean sea level (msl), above the 7 feet msl flood zone. This issue is discussed further in Section V.G (Hydrology and Water Quality).
b. Consider the existence of geologic hazards in locations where dams, ponds, and other water impoundments exist or are proposed.	**Analysis:** The project site has been analyzed for geological hazards and no dams, ponds, or water impoundments occur on-site. Mitigation Measure Hydro 3a suggests that 2 ditches should be redesigned to act as extended wet ponds and/or detention features for secondary stormwater treatment systems. See Section V.G (Hydrology and Water Quality) and Section V.E (Geology and Soils) for further discussion on this issue.

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Petaluma Dairy Belt Area Plan Analysis

Policy	Project Analysis/Comments
d. Consider the cumulative effect of upstream development on downstream land uses.	**Analysis:** The project would generate emissions of phosphorous (a nutrient) from the asphalt plant. Some of these phosphorous air emissions may be aerially deposited in the Petaluma River. The RWQCB has determined that the Petaluma River is water-quality impaired for nutrients (mainly forms of nitrogen and phosphorous). The water-quality impairment designation indicates that the River has received excessive nutrients, that have impacted beneficial uses. This issue is discussed in detail in Section V.G (Hydrology and Water Quality).
Water Quality Protection	
a. Maintain or enhance water quality to allow continued environmental health of natural waterway habitats.	**Analysis:** Aside from the issue discussed above under cumulative impacts, the proposed project would enhance and expand the wetlands in the southern portion of Area A. See the Wetland Mitigation Plan in Appendix E, and further discussion in Section V.G (Hydrology and Water Quality).
b. Continue to cooperate with regional and state regulatory agencies in enforcing water quality regulations.	**Analysis:** During construction, installation of concrete piles for the proposed barge off-loading facility could result in temporary disturbance of River sediments and increases in turbidity within the River. Mitigation requires that prior to construction, the applicant shall file a Notice of Intent to comply with the statewide General Permit for Discharges of Storm Water Associated with Construction Activities. This issue is discussed in detail in Section V.G (Hydrology and Water Quality).
Liquid and Solid Wastes	
a. Consider both liquid and solid wastes as resources.	**Analysis:** The proposed project would generate minimal amounts of solid waste, and would be recycling asphalt and concrete from the surrounding region.
Minerals	
a. Consider inventories of mineral resources when planning or approving development.	**Analysis:** The project site does not contain any known mineral resources.
Fisheries	
a. Support the conservation of wetland food production areas, such as estuaries and marshes.	**Analysis:** The proposed project would include a Wetland Mitigation Plan of approximately 19 acres in Area D.
Water Resources	
a. Give high priority to the protection of watersheds, aquifer recharge areas, and natural drainage systems in any consideration of land use.	**Analysis:** The project proposes to enhance and expand the wetland areas in the southern part of the project site, increasing storage for runoff. Maintenance of portions of the six existing drainage ditches as vegetated drainage channels is also proposed. A Drainage and Water Quality Plan is available for the project. This issue is discussed in detail in Section V.G (Hydrology and Water Quality).

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Petaluma Dairy Belt Area Plan Analysis

Policy	Project Analysis/Comments
b. Support construction of water reclamation facilities that provide an effective alternative to the discharge of urban and agricultural waste into Sonoma County's streams.	**Analysis:** Mitigation measures proposed in Section V.G (Hydrology and Water Quality) provide for control of sediment discharges at the Petaluma River loading facility, and a pretreatment catch basin and sand filter (or multiple basins and filters) that would capture and treat all runoff from all processing and storage areas. Additionally, the secondary storm water treatment system shall use a portion of the existing network of drainage ditches to provide additional treatment and on-site residence time prior to discharge of site runoff to the Petaluma River. See analysis above under Water Quality Protection, and discussion in Section V.G (Hydrology and Water Quality).
a. Preserve the ecological, recreational, and aesthetic benefits of significant waterways.	**Analysis:** The proposed project would have significant impacts on surrounding land uses along the Petaluma River. Shollenberger Park is immediately across the River from the site, with sensitive species. The Park is a recreational area, and visitors would be subjected to various impacts from the proposed project.
b. Preserve downstream flows sufficient to maintain the ecological balance in all watersheds.	**Analysis:** See analysis above for Water Quality Protection and Water Resources.
Plant and Animal Life	
a. Review all proposed developments with regard to possible adverse or beneficial effects on plant and animal life.	**Analysis:** A biotic resource assessment was conducted to ascertain any special-status species or sensitive habitats that might occur on the site. With proposed mitigation measures, any impacts to special status species would be less than significant. See detailed discussion in Section V.C (Biological Resources).
b. Preserve the permanent wildlife habitat areas that are representative of this Area Plan's floral and faunal communities. Human uses of these areas should be adequately regulated to protect these communities, and land uses should be restricted to those that are compatible with the perpetuation of these communities. These habitat areas shall include but not be limited to the following: (1) remaining natural stream and river courses; (2) natural fresh water and salt water marshes; and (3) habitats necessary for the preservation of rare or endangered species.	**Analysis:** See above for analysis of Policy a.
c. Minimize future damage to fisheries, fish habitats, and spawning grounds, and, as far as possible, repair past damage.	**Analysis:** The Petaluma River adjacent to the project site is a corridor for numerous species of fish, including steelhead trout, which could be inadvertently harmed during pile driving for the pier or pumping of water from the River. This issue is further discussed in Section V.C (Biological Resources).

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Policy	Project Analysis/Comments
d. Encourage the use of native plants for screening and landscaping.	**Analysis:** The proposed project would use some native species for landscape screening, including California Laurel, Western Redbud, Madrone, Arbutus Marina, Coast Live Oak, CA Black Oak, and CA Valley Oak. Other non-native species would also be utilized.
Scenic Resources	
a. Protect the visual quality of unique scenic resources.	**Analysis:** The Highway 101 frontage portion of the project site has a Scenic Resources overlay Zone (See Section V.H, Land Use). As discussed in detail in Section V.A (Aesthetics), the proposed project would have significant impacts on visual resources.
b. Protect and maintain scenic areas essential for defining community separation and community form.	**Analysis:** Areas A and B of the project site are within the City of Petaluma Urban Growth Boundary designated for Special Industrial use, and a small portion of the site is within the City urban separator area. Areas B, C and D have zoning designations for Scenic Design.
c. Protect visually vulnerable landscapes, such as ridgelines.	**Analysis:** There are no ridgelines within the project site. The site is located across the River from a public recreational area (Shollenberger Park) and the project would result in significant aesthetic impacts. See Section V.A (Aesthetics) for detailed analysis.
d. Maintain scenic resources as an attraction for tourism and recreation.	**Analysis:** The project site is located adjacent to a scenic corridor to the west (Highway 101) and a public recreational area to the east (Shollenberger Park). The proposed project would result in significant impacts on views from either area. See Section V.A (Aesthetics) for detailed analysis.
e. Review new developments to minimize their impact on scenic quality.	**Analysis:** The proposed project would require discretionary approval from the Design Review Committee. The project would have significant aesthetic impacts that are discussed in detail in Sections V.A (Aesthetics).
Soils	
a. Encourage land uses and densities most suitable to the natural characteristics of the area's soils.	**Analysis:** The southern three-fourths of the project site is mapped primarily as Reyes Silty Clay with the northern remainder being Goulding Cobbly Clay Loam with the deeper materials being weathered bedrock or Bay Mud. Areas A, B, and C are proposed for industrial development. Area D is proposed for Wetland Mitigation. Soil suitability is discussed in Section V.E (Geology and Soils).
c. Require soil conservation practices in all major developmental plans.	**Analysis:** Soil conservation is not discussed in the project description.
d. Consider the limitations of soils, as they relate to public health and safety, in the review of all proposed land divisions.	**Analysis:** Mitigation measures have been proposed for project impacts that would address soil safety limitations for the soft compressible bay mud. Detailed analysis is available in Section V.E (Geology and Soils).

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Petaluma Dairy Belt Area Plan Analysis

Policy	Project Analysis/Comments
TRANSPORTATION	
Circulation and Transit	
1c. Encourage waterway transportation, and maintain potential waterway routes.	**Analysis:** The project proposes to use the Petaluma River for loading and unloading barges with aggregate materials.
Air Quality	
a. Support a land use pattern that minimizes the number of vehicle miles traveled and the total number of trips.	**Analysis:** Vehicle trips are analyzed in Section V.J (Transportation and Circulation). Due to the fact that the proposed project is relocating from an existing site near the proposed project, there are not significant impacts with regard to miles traveled or number of trips.
Bikeways	
a. Integrate the needs of the bicycle users with transportation plans and road improvements.	**Analysis:** The proposed project would have immediate access to SMART's proposed bicycle/pathway adjacent to the railroad tracks.
Scenic Highways	
b. Control the location, size, number, and design of signs in designated scenic highway corridors. Prohibit new billboard construction in this study area.	**Analysis:** The project site currently has one billboard on the property, within the scenic corridor, which is proposed to remain in place.
c. Encourage the use of native plants for screening and landscaping in proposed development along designated scenic highway corridors.	**Analysis:** The project proposes using landscaping to screen the view of the facilities from the scenic corridor of Highway 101. This issue is discussed in detail in Section V.A (Aesthetics).
Source: Petaluma Dairy Belt Area Plan, Updated March 9, 1993.	

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Table V.H-4
San Francisco Bay Plan Analysis

Policy	Project Analysis/Comments
Dredging	
1. Dredging and dredged material disposal should be conducted in an environmentally and economically sound manner. Dredgers should reduce disposal in the Bay and certain waterways over time to achieve the LTMS goal of limiting in-Bay disposal volumes to a maximum of one million cubic yards per year. The LTMS agencies should implement a system of disposal allotments to individual dredgers to achieve this goal only if voluntary efforts are not effective in reaching the LTMS goal. In making its decision regarding disposal allocations, the Commission should confer with the LTMS agencies and consider the need for the dredging and the dredging projects, environmental impacts, regional economic impacts, efforts by the dredging community to implement and fund alternatives to in-Bay disposal, and other relevant factors. Small dredgers should be exempted from allotments, but all dredgers should comply with policies 2 through 12.	**Analysis:** The proposed project consists of the relocation of an already existing business on the Petaluma River that requires continued dredging of the River for barge/materials access. Current dredging in the Petaluma River by the Army Corp of Engineers is sufficient, no additional dredging is required for the proposed project. Dredging occurs approximately every four years, during August, September, or early October, when Steelhead Trout and Chinook Salmon are unlikely to be in the River. The City of Petaluma has an agreement with the California Department of Fish and Game and the County of Sonoma to allow the dredged spoils materials to be placed at a site in Shollenberger Park.
2. Dredging should be authorized when the Commission can find: (a) the applicant has demonstrated that the dredging is needed to serve a water-oriented use or other important public purpose, such as navigational safety; (b) the materials to be dredged meet the water quality requirements of the San Francisco Bay Regional Water Quality Control Board; important fisheries and Bay natural resources would be protected through seasonal restrictions established by the California Department of Fish and Game, the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service, or through other appropriate measures; (d) the siting and design of the project will result in the minimum dredging volume necessary for the project; and (e) the materials would be disposed of in accordance with Policy 3.	**Analysis:** As stated above for Dredging Policy 1, the proposed project would not require any change to existing dredging agreements. The project would not allow any public access at this location.
8. The Commission should encourage increased efforts by soil conservation districts and public works agencies in the 50,000-square-mile Bay tributary area to continuously reduce soil erosion as much as possible.	**Analysis:** The proposed project will utilize best management practices to prevent soil erosion during construction and reduce sedimentation from entering the waterway.
9. To protect underground fresh water reservoirs (aquifers): (a) all proposals for dredging or construction work that could penetrate the mud "cover" should be reviewed by the San Francisco Bay Regional Water Quality Control Board (RWQCB) and the State Department of Water Resources (DWR); and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir. Applicants for permission to dredge should provide additional data on groundwater conditions in the area of construction to the extent necessary and reasonable in relation to the proposed project.	**Analysis:** During construction, installation of the pilings for the proposed barge dock would penetrate the mud cover. All necessary permits required from RWQCB or DWR will be completed before construction begins. A soils survey has been done and groundwater levels and conditions have been assessed. Detailed analysis on the issue of soil is available in Section V.E (Geology and Soils) and issues concerning groundwater conditions are addressed in Section V.G (Hydrology and Water Quality).

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San Francisco Bay Plan Analysis

Policy	Project Analysis/Comments
10. Interested agencies and parties are encouraged to explore and find funding solutions for the additional costs incurred by transporting dredged materials to nontidal and ocean disposal sites, either by general funds contributed by ports and other relevant parties, dredging applicants or otherwise.	**Analysis:** As stated above for Dredging Policy 1, the proposed project would not require any change to existing dredging agreements.
11.a. A project that uses dredged material to create, restore, or enhance Bay or certain waterway natural resources should be approved only if: ... all imposed requirements are met.	**Analysis:** As stated above for Dredging Policy 1, the proposed project would not require any change to existing dredging agreements, nor will it require using any dredged materials.
Navigational Safety and Oil Spill Prevention	
1. Physical obstructions to safe navigation, as identified by the U.S. Coast Guard and the Harbor Safety Committee of the San Francisco Bay Region, should be removed to the maximum extent feasible when their removal would contribute to navigational safety and would not create significant adverse environmental impacts. Removal of obstructions should ensure that any detriments arising from a significant alteration of Bay habitats are clearly outweighed by the public and environmental benefits of reducing the risk to human safety or the risk of spills of hazardous materials, such as oil.	**Analysis:** The proposed project would include a fixed pier for off-loading of the barge. Barges would only be at the site temporarily during high tide conditions while unloading. Given the width of the River in this location, as well as the barge trips being done during high tide, and the fact that a similar operation is occurring at the Shamrock facility upstream, no navigational hazards are anticipated provided common navigational laws are followed by the barge operator.
2. The Commission should ensure that marine facility projects are in compliance with oil spill contingency plan requirements of the Office of Spill Prevention and Response, the U.S. Coast Guard and other appropriate organizations.	**Analysis:** The proposed project would be required to comply with all oil spill contingency plan requirements. Refer to Section V.F (Hazards and Hazardous Materials) for detailed discussion on this issue.
3. To ensure navigational safety and help prevent accidents that could spill hazardous materials, such as oil, the Commission should encourage major marine facility owners and operators, the U. S. Army Corps of Engineers and the National Oceanic and Atmospheric Administration to conduct frequent, up-to-date surveys of major shipping channels, turning basins and berths used by deep draft vessels and oil barges. Additionally, the frequent, up-to-date surveys should be quickly provided to the U.S. Coast Guard Vessel Traffic Service-San Francisco, masters and pilots.	**Analysis:** The proposed project is not a major marine facility, nor is Petaluma River a major shipping channel used by deep draft vessels and oil barges.
Fish, Other Aquatic Organisms and Wildlife	
1. To assure the benefits of fish, other aquatic organisms and wildlife for future generations, to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased.	**Analysis:** Pumping of water from the Petaluma River could reduce the available surface water, and could result in loss of fish and aquatic life unless adequate controls are implemented. Potential impacts to sensitive habitats from the proposed project would be less than significant with proposed mitigation measures, including the Wetlands Mitigation and Monitoring Plan. Refer to Section V.C (Biological Resources) in this EIR.

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Policy	Project Analysis/Comments
2. Specific habitats that are needed to conserve, increase or prevent the extinction of any native species, species threatened or endangered, species that the California Department of Fish and Game has determined are candidates for listing as endangered or threatened under the California Endangered Species Act, or any species that provides substantial public benefits, should be protected, whether in the Bay or behind dikes.	**Analysis:** A Biological Constraints Analysis was conducted to ascertain if special-status species or sensitive habitats occur on the site. With the exception of the Petaluma River corridor and possible nesting by raptors and other bird species protected under the Migratory Bird Treaty Act, most of the site is not expected to provide habitat for special-status animal species. There is a varying potential for a number of special-status animal species to forage and possibly nest in the small band of coastal brackish marsh along the shoreline of the Petaluma River or to seasonally occur in the open waters of the River. No special-status plant species were encountered during past surveys or are believed to occur on the site. With proposed mitigation measures, any impacts to special status species would be less than significant. See detailed discussion in Section V.C (Biological Resources). This issue is discussed in detail in Section V.C (Biological Resources).
3. In reviewing or approving habitat restoration programs the Commission should be guided by the recommendations in the Baylands Ecosystem Habitat Goals report and should, where appropriate, provide for a diversity of habitats to enhance opportunities for a variety of associated native aquatic and terrestrial plant and animal species.	**Analysis:** The proposed project includes a Wetland Mitigation and Monitoring Plan for approximately 19 acres on the southern portion of the project site.
4. The Commission should: (a) Consult with the California Department of Fish and Game and the U.S. Fish and Wildlife Service or the National Marine Fisheries Service whenever a proposed project may adversely affect an endangered or threatened plant, fish, other aquatic organism or wildlife species; (b) Not authorize projects that would result in the "taking" of any plant, fish, other aquatic organism or wildlife species listed as endangered or threatened pursuant to the state or federal endangered species acts, or the federal Marine Mammal Protection Act, or species that are candidates for listing under the California Endangered Species Act, unless the project applicant has obtained the appropriate "take" authorization from the U.S. Fish and Wildlife Service, National Marine Fisheries Service or the California Department of Fish and Game; and give appropriate consideration to the recommendations of the California Department of Fish and Game, the National Marine Fisheries Service or the United States Fish and Wildlife Service in order to avoid possible adverse effects of a proposed project on fish, other aquatic organisms and wildlife habitat.	**Analysis:** Each agency was notified of the NOP and will continue to be consulted during the EIR process. The Petaluma River adjacent to the project site is a corridor for numerous species of fish, including the federally listed steelhead trout and chinook salmon, which could be inadvertently harmed during pile driving for piers or pumping of water. This issue is further discussed in Section V.C (Biological Resources).

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San Francisco Bay Plan Analysis

Policy	Project Analysis/Comments
5. The Commission may permit a minor amount of fill or dredging in wildlife refuges, shown on the Plan Maps, necessary to enhance fish, other aquatic organisms and wildlife habitat or to provide public facilities for wildlife observation, interpretation and education.	**Analysis:** The project site is not within a wildlife refuge.
Subtidal Areas	
1. Any proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; fish, other aquatic organisms and wildlife; (d) aquatic plants; and (e) the Bay's bathymetry. Projects in subtidal areas should be designed to minimize and, if feasible, avoid any harmful effects.	**Analysis:** The Petaluma River is actually a tidewater slough that was designated a River in 1959 by Congress, which allowed the Army Corps of Engineers to permit dredging for commercial navigability access. As stated previously, this project will not require additional dredging. Fill will be minimal. The off-loading facility would be supported on approximately 15 driven piles; the bulk of the facility would be supported by the piles above the high tide level. There would also be "dolphins" in the water to be used for mooring the barges.
2. Subtidal areas that are scarce in the Bay or have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eelgrass beds, sandy deep water or underwater pinnacles) should be conserved. Filling, changes in use, and dredging projects in these areas should therefore be allowed only if: (a) there is no feasible alternative; and (b) the project provides substantial public benefits.	**Analysis:** The area of the Petaluma River adjacent to the project site is not a scarce subtidal area, however it is an impaired waterbody.
3. Subtidal restoration projects should be designed to: (a) promote an abundance and diversity of fish, other aquatic organisms and wildlife; (b) restore rare subtidal areas; establish linkages between deep and shallow water and tidal and subtidal habitat in an effort to maximize habitat values for fish, other aquatic organisms and wildlife; or (d) expand open water areas in an effort to make the Bay larger.	**Analysis:** No subtidal restoration is associated with this project, however a Wetlands Mitigation and Monitoring Plan is proposed and may be viewed in Appendix E.
4. Any subtidal restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) the scientific need for the project; (b) the effects of relative sea level rise; the impact of the project on the Bay's sediment budget; (d) localized sediment erosion and accretion; (e) the role of tidal flows; (f) potential invasive species introduction, spread and their control; (g) rates of colonization by vegetation, where applicable; (h) the expected use of the site by fish, other aquatic organisms and wildlife; and (I) characterization of and changes to local bathymetric features. If success criteria are not met, corrective measures should be taken.	**Analysis:** No subtidal restoration is associated with this project.

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Policy	Project Analysis/Comments
6. Based on scientific ecological analysis and consultation with the relevant federal and state resource agencies, a minor amount of fill may be authorized to enhance or restore fish, other aquatic organisms or wildlife habitat if the Commission finds that no other method of enhancement or restoration except filling is feasible.	**Analysis:** The minor amounts of fill associated with the proposed project is not associated with enhancing fish, aquatic organisms, or wildlife habitats.
Water Quality	
1. Bay water pollution should be prevented to the greatest extent feasible. The Bay's tidal marshes, tidal flats, and water surface area and volume should be conserved and, whenever possible, restored and increased to protect and improve water quality. Fresh water inflow into the Bay should be maintained at a level adequate to protect Bay resources and beneficial uses.	**Analysis:** Through the use of Best Management Practices during construction, and following proposed mitigation measures, most of the impacts to water quality from the proposed project would be less than significant. However, cumulative impacts associated with phosphorous emissions on water quality remains significant. See detailed discussion in Section V.G (Hydrology and Water Quality).
2. Water quality in all parts of the Bay should be maintained at a level that will support and promote the beneficial uses of the Bay as identified in the San Francisco Bay Regional Water Quality Control Board's Water Quality Control Plan, San Francisco Bay Basin and should be protected from all harmful or potentially harmful pollutants. The policies, recommendations, decisions, advice and authority of the State Water Resources Control Board and the Regional Board, should be the basis for carrying out the Commission's water quality responsibilities.	**Analysis:** See analysis above for Water Quality Policy 1.
3. New projects should be sited, designed, constructed and maintained to prevent or, if prevention is infeasible, to minimize the discharge of pollutants into the Bay by: (a) controlling pollutant sources at the project site; (b) using construction materials that contain non-polluting materials; and applying appropriate, accepted and effective best management practices, especially where water dispersion is poor and near shellfish beds and other significant biotic resources.	**Analysis:** See analysis above for Water Quality Policy 1.
4. When approving a project in an area polluted with toxic or hazardous substances, the Commission should coordinate with appropriate local, state and federal agencies to ensure that the project will not cause harm to the public, to Bay resources, or to the beneficial uses of the Bay.	**Analysis:** All appropriate agencies necessary will be consulted during the EIR process.
6. To protect the Bay and its tributaries from the water quality impacts of nonpoint source pollution, new development should be sited and designed consistent with standards in municipal stormwater permits and state and regional stormwater management guidelines, where applicable, and with the protection of Bay resources. To offset impacts from increased impervious areas and land disturbances, vegetated swales, permeable pavement	**Analysis:** The applicant would be responsible for filing a Notice of Intent to comply with the statewide general permit for construction activities and the general permit for industrial activities. Compliance with the general permits require development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The plan must identify effective best management practices (BMP) for minimizing sources of pollution and control

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Policy	Project Analysis/Comments
materials, preservation of existing trees and vegetation, planting native vegetation and other appropriate measures should be evaluated and implemented where appropriate.	measures that reduce or treat the potential pollutant loads carried by runoff from the site to receiving waters. This is discussed in detail in Section V.G (Hydrology and Water Quality).
7. Whenever practicable, native vegetation buffer areas should be provided as part of a project to control pollutants from entering the Bay, and vegetation should be substituted for rock riprap, concrete, or other hard surface shoreline and bank erosion control methods where appropriate and practicable.	**Analysis:** In September 2005, grading at the site was performed without permitting by regulatory agencies, which removed vegetation and disturbed surface soils, potentially increasing the erosion and transport of sediment to drainage ditches. See detailed discussion in Section V.G (Hydrology and Water Quality) and V.C (Biological Resources) for further analysis.
Water Surface Area and Volume	
1. The surface area of the Bay and the total volume of water should be kept as large as possible in order to maximize active oxygen interchange, vigorous circulation, and effective tidal action. Filling and diking that reduce surface area and water volume should therefore be allowed only for purposes providing substantial public benefits and only if there is no reasonable alternative.	**Analysis:** The proposed pilings and dolphins for the pier is considered fill, but would have minimal effects on tidal circulation or surface waters. Tidal and storm flows would be expected to flow freely around the piles, which would be spaced approximately 10 feet apart. Tidal flow in and out of the inlet adjacent to the off-loading facility would not be substantially obstructed by the proposed project. Detailed discussion is available in Section V.G (Hydrology and Water Quality). Pumping of water from the Petaluma River could reduce the available surface water, and could result in loss of fish and aquatic life unless adequate controls are implemented.
2. Water circulation in the Bay should be maintained, and improved as much as possible. Any proposed fills, dikes, or piers should be thoroughly evaluated to determine their effects upon water circulation and then modified as necessary to improve circulation or at least to minimize any harmful effects.	**Analysis:** See analysis above for Water Surface Area and Volume Policy 1.
Tidal Marshes and Tidal Flats	
1. Tidal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking, and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative.	**Analysis:** With proposed mitigation measures, impacts to tidal marshes would be less than significant. See Section V.G (Hydrology and Water Quality) and V.C (Biological Resources) for further analysis.
2. Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects.	**Analysis:** With proposed mitigation measures, impacts from fill would be less than significant. See Section V.G (Hydrology and Water Quality) for further analysis

Table V.H-4
San Francisco Bay Plan Analysis

Policy	Project Analysis/Comments
3. Projects should be sited and designed to avoid, or if avoidance is infeasible, minimize adverse impacts on any transition zone present between tidal and upland habitats. Where a transition zone does not exist and it is feasible and ecologically appropriate, shoreline projects should be designed to provide a transition zone between tidal and upland habitats.	**Analysis:** A small band of coastal brackish marsh occupies approximately 0.18 acres along the shoreline of the Petaluma River. The transition between marsh and uplands has been reduced by past fill activities and more recently by the unauthorized grading in September 2005, including installation of compacted gravel. See Section V.G (Hydrology and Water Quality) and V.C (Biological Resources) for further analysis.
5. Any tidal restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) the effects of relative sea level rise; (b) the impact of the project on the Bay's sediment budget; localized sediment erosion and accretion; (d) the role of tidal flows; (e) potential invasive species introduction, spread, and their control; (f) rates of colonization by vegetation; (g) the expected use of the site by fish, other aquatic organisms and wildlife; and (h) site characterization. If success criteria are not met, appropriate corrective measures should be taken.	**Analysis:** The tidal conditions at the site were investigated during a hydrologic evaluation for the proposed wetland restoration plan.
6. Non-native species should not be used in habitat restoration projects. Any habitat restoration project approved by the Commission should include a program for the periodic monitoring of the site for non-native species and a program for control and, if appropriate and feasible, eradication should an introduction occur. The use of non-native plant species in public access landscape improvements should be avoided where a potential exists for non-native plants to spread into the Bay, other waterways, or transition zones between tidal and upland habitats.	**Analysis:** The proposed Wetland Mitigation and Monitoring Plan vegetation would vary for each marsh type with cattails and tule forming the dominant cover in freshwater conditions, pickleweed and other native salt marsh species in tidal marshlands, and rushes, sedges, salt grass, brass buttons and other transitional wetlands species in the seasonal wetlands. Upland areas would be planted with native trees and shrubs, including coast live oak, California blackberry (Rubus ursinus), and toyon (Heteromeles arbutifolia). See Section V.C (Biological Resources) for detailed discussion.
8. Based on scientific ecological analysis and consultation with the relevant federal and state resource agencies, a minor amount of fill may be authorized to enhance or restore fish, other aquatic organisms or wildlife habitat if the Commission finds that no other method of enhancement or restoration except filling is feasible.	**Analysis:** The minor amounts of fill associated with the proposed project is not associated with enhancing fish, aquatic organisms, or wildlife habitats.

Source: San Francisco Bay Plan, (January 2006) Compiled by San Francisco Bay Conservation and Development Commission.

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V. ENVIRONMENTAL IMPACT ANALYSIS
I. NOISE

INTRODUCTION

In addition to providing original information on traffic noise levels, this section evaluates information from the following site-specific technical reports, which are included in Volume II, Appendix H of this Draft EIR:

- *Environmental Noise Analysis Dutra Materials Haystack Project, Sonoma County, California*, prepared by Bollard & Brennan, September 15, 2004.
- *Noise Attenuation and Mitigation Plan for the Dutra Haystack Landing Facility, Sonoma County, California*, prepared by Rosen, Goldberg, & Der, May 12, 2006.

The Rosen, Goldberg, & Der Report supplements the Environmental Noise Analysis prepared by Bollard and Brennan, by providing detailed information on the specific noise attenuation measures and the resulting sound levels at the nearest residential land uses. The Rosen, Goldberg, & Der Report also considers three additional sensitive receptors that were not included in the Bollard & Brennan Report. For this section, noise impacts are evaluated using relevant information from both reports. Each impact discussion considers the "worst case scenario," or potential project impacts on the closest sensitive receptor.

ENVIRONMENTAL SETTING

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. Possible causes of this objectionable nature are the pitch and/or loudness of a given sound. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals are perceived as louder to humans than signals with a lower pitch. Loudness is the intensity of sound waves combined with the reception characteristics of the ear. The intensity of sound may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dB represents a ten-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, etc. Technical terms are defined in Table V.I-1.

There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dB(A). This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dB(A) are shown in Table V.I-2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

Table V.I-1
Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dB(A)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. Al sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noised levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to the sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Source: Illingworth & Rodkin, Inc., January 2004.	

Table V.I-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	dB(A)	Noise Environment	Subjective Impression
	140		
Civil defense siren 100'	130		
Jet takeoff, 200'	120		Pain threshold
	110	Rock music concert	
Diesel pile driver, 100'	100		Very loud
	90	Boiler room	
Freight cars, 50'		Printing press plant	
Pneumatic drill, 50'	80		
Freeway, 100'		Kitchen with garbage disposal running	
Vacuum cleaner, 10'	70		Moderately loud
	60	Data processing center	
Light traffic, 100'	50	Department store	
Large transformer, 200'			
	40	Private business office	
Soft whisper, 5'	30	Quiet bedroom	
	20	Recording studio	
	10		Threshold of hearing
	0		

Source: Illingworth & Rodkin, Inc., January 2004.

Solid walls, berms, or elevation differences reduce outdoor noise levels by 5 to 10 dB(A). Sound levels for an outdoor noise source may also be attenuated 3 to 5 dB(A) by a first row of houses and 1.5 dB(A) for each additional row of houses. Solid walls and windows reduce interior noise levels in residential structures by 17 dB(A) (with windows open) to more than 30 dB(A) (with windows closed).

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus one dB(A). Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus one to two dB(A).

Changes in noise levels of less than three dB(A) are not typically noticed by the human ear. Changes from three to five dB(A) may be noticed by some individuals who are extremely sensitive to changes in noise. A 5 dB(A) increase is readily noticeable, and the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level (CNEL) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7 PM - 10 PM) and a 10 dB addition to nocturnal (10 PM - 7 AM) noise levels. The Day/Night Average Sound Level, L_{dn}, is essentially the same as CNEL, with the exception that the evening time period is dropped, and all occurrences during this three-hour period are grouped into the daytime period.

The thresholds for speech interference indoors are about 45 dB(A), if the noise is steady, and above 55 dB(A), if the noise is fluctuating. Outdoors these thresholds are about 15 dB(A) higher. Interior residential standards for multi-family dwellings are set by the State of California at 45 L_{dn}. The highest steady traffic noise level during the daytime is about equal to the L_{dn} and night-time levels are 10 dB(A) lower.

Fundamentals of Groundborne Vibration

Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and in the U.S. is referenced as vibration decibels (VdB).[1]

The background vibration velocity level in residential areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximately dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, and 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

The general human response to different levels of groundborne vibration velocity levels is described in Table V.I-3.

Table V.I-3
Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.
Source: Federal Railroad Administration, 1998.	

[1] *VdB - vibration velocity expressed in decibels re one micro-inch per second.*

Applicable Noise Guidelines

Sonoma County Criteria

The following policies of the Sonoma County General Plan Noise Element are applicable to the project:

> **Policy NE-1c**: Control non-transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table NE-2 as measured at the exterior property line of any affected residential land use. Limit exceptions to the following:
>
> 1) If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level.
>
> 2) Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.
>
> 3) Reduce the applicable standards in Table NE-2 by 5 decibels if they exceed the ambient level by 10 or more decibels.

Sonoma County General Plan Noise Element policies are addressed in further detail in Section V.H (Land Use).

Table V.I-4 indicates that the County's noise standards vary with the amount of time that a specific noise level would be exceeded. To meet the Category 1, noise levels must be limited to an exceedance of 50 dBA for no more than 30 minutes in an hour. This level is the L_{50}, the noise level exceeded 50 percent of the time. The L_{50} is also called the median noise level. To meet the Category 5 limit, noise levels cannot exceed 70 dBA between 0 and 1 minute. This is the L_{max} or maximum noise level.

Table V.I-4
Noise Level Performance Standards Sonoma County Noise Element
(Table NE-2 of the General Plan)

Duration of Intrusive Sound	Daytime Standard (7 AM - 10 PM)	Night-time Standard (10 PM - 7 AM)
30-60 minutes per hour	50	45
15-30 minutes per hour	55	50
5-15 minutes per hour	60	55
1-5 minutes per hour	65	60
Less than 1 minute per hour	70	65
Source: Sonoma County Noise Element		

Sonoma County PRMD has indicated that the low-frequency noise associated with the proposed asphalt plant operation should be considered in this analysis, and that the "C" weighting network emphasizes low frequency sounds. Low noise levels measured using the "C" weighting network are higher than the same source measured using the "A" weighting network. However, because the range of asphalt plant sound levels expected at the nearest residences to the project site will be within the normal range of hearing, and not of the intensity for which the "C" weighting network was developed, and because the County's noise level standards are described above in terms of the "A" weighting network, this analysis is prepared in terms of "A" weighted sound pressure levels. The low frequency components of the proposed asphalt plant have, however, been quantified and accounted for in this analysis.

Existing Noise Environment

The existing noise environment in the immediate project area is dominated by Highway 101 traffic noise. To quantify ambient noise levels in the project vicinity, Bollard & Brennan, Inc. conducted a continuous noise level measurement survey at three locations from March 17-19, 2004, for a consecutive period of 54 hours at each site. Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before and after use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4). The ambient noise measurement results are summarized in Table V.I-5 and the location of the measurements are displayed graphically on Figure V.I-1. The complete ambient noise level results are provided in Volume II, Appendix H of this Draft EIR.

As shown in Table 5, due to the influence of Highway 101 traffic, existing ambient noise levels monitored at the project site currently exceed the noise level standards shown in Table V.I-4. Since the noise sources in the area generate continuous, steady noise, the most restrictive standard relevant to the project would be Category 1, or an L_{50} of 50 dBA during the day and 45 dBA at night. According to the General Plan, the daytime and night-time standards are to be adjusted upward or downward, depending on the existing ambient noise levels. Therefore, according to exception 1 above from the Sonoma County General Plan Noise Element, the standards of Table V.I-4 should be adjusted upwards to equal the ambient in this case.

Table V.I-5
Statistical Summary of Ambient Noise Measurement Results
Dutra Haystack Project
March 17-19, 2004

Site	Date	L_{dn}, dB	Median (L_{50}, dB)		Maximum (L_{max}, dB)	
			Day	Night	Day	Night
A	March 17-18	65	59	55	72-81	68-76
	March 18-19	65	61	55	72-89	67-74
B	March 17-18	59	52	50	62-76	58-68
	March 18-19	59	54	50	62-82	58-66
C	March 17-18	72	68	60	75-91	78-83
	March 18-19	72	68	61	78-92	77-83
Source: Bollard & Brennan, Inc.						

Another source of ambient noise in the project area is the recently constructed Shamrock barge unloading facility along the Petaluma River, just north of the project's proposed barge unloading facility. Shamrock's barge unloading facility was constructed after completion of the Bollard & Brennan Report; however, Rosen, Goldberg & Der measured noise levels in the project vicinity that resulted from this source. Measurements were conducted at two locations during a barge unloading on April 20, 2006. Location 1 was just south of the northernmost residential use along the Petaluma River, about 850 feet south of the Shamrock crane, which is the same as Location B used for ambient noise monitoring in the Bollard & Brennan Report. The L^{50} was dominated by freeway noise and a nearby gas valve. The constant sound of the crane cooling fans was faintly audible. Intermittent noises from a front end loader and gravel being dumped into trucks was occasionally distinguishable. The measured L_{max} of 64 dBA was generated by the front end loader dumping gravel into a truck at the Shamrock site. The Rosen, Goldberg & Der Report concludes that small changes in ambient noise levels, due to increased traffic and barge unloading activities at the Shamrock facility, do not necessitate a re-evaluation of the ambient noise levels used in the Bollard & Brennan Report for assessing the impacts of project-generated noise with respect to the County's standards.

In the future, the SMART rail line could be an additional source of noise in the project vicinity. According to the SMART FEIR, noise levels associated with typical locomotive operations ranges from 64.5 to 82.5 L_{max} dBA at 50 feet from the railroad tracks. The railroad tracks are located adjacent to the project site, and run between Areas A and B. The tracks are approximately 120 feet away from the closest residential dwelling in the project area.

Sensitive Receptors

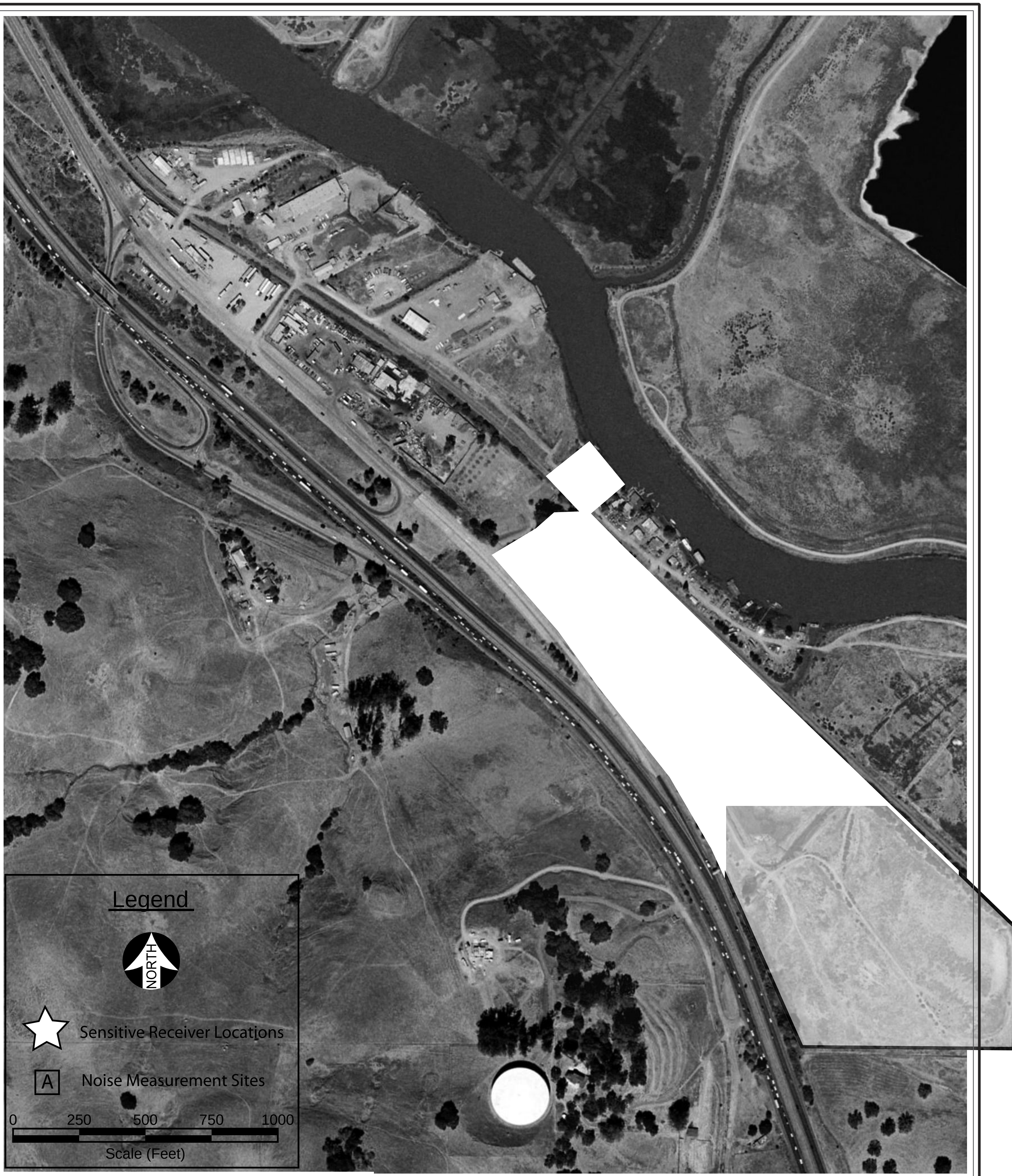
There are five existing residences in the project vicinity, indicated as R1 through R5 on Figure V.I-1. Table V.I-6 shows the ambient noise levels for existing residences along the Petaluma River, residences southwest of Highway 101, and sensitive receptor locations along the trail at Shollenberger Park across the River. (indicated as R6 and R7 on Figure V.I-1). This data is derived from the data contained in Table 5 and adjusted for the appropriate distances.

Table V.I-6
Ambient Noise Levels for Sensitive Receptors within the Project Vicinity

Receiver	Ldn, dB	Median (L50, dB)		Maximum (Lmax, dB)	
		Day	Night	Day	Night
R1 Hillside South	63	59	51	66-83	68-74
R2 Hillside North	60	55	50	67-84	62-71
R3 River North	59	53	50	62-82	58-68
R4 River Middle	59	53	50	62-82	58-68
R5 River South	59	53	50	62-82	58-68
R6 Park North	59	53	50	62-82	N/A
R7 Park South	59	53	50	62-82	N/A

Source: Bollard & Brennan, 2004.

Accordingly, the most restrictive standard relevant to the project would be an L_{50} of 53 dBA during the day and 50 dBA at night for the Riverside residences, and the users of Shollenberger Park trails.



Source: Rosen Goldberg & Der, Google Earth, CAJA, 2006.

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Environmental Planning and Research

Figure V.I-1
Noise Sensitive Receiver
Locations and Measurement Sites

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G of the *CEQA Guidelines*, the proposed project could have a significant environmental impact if it would result in:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project above levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted, within two miles of a public airport or public use airport; or
- Exposure of people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

The noise standards adopted by the County are discussed previously in this Draft EIR section. To assess the potential for sleep interference at the residences nearest to the project site, interior noise levels were calculated (in terms of L_{eq}) according to conditions when both the asphalt plant is operating and a barge is being unloaded. The World Health Organization (WHO) has established the following standards for sleep disturbance:

> *In order to avoid negative effects on REM-sleep, the equivalent continuous sound pressure level during the sleeping period should not exceed 30-35 dBA L_{eq} for continuous noise indoors. In the case of fluctuating noise, the maximum level is best correlated to sleep disturbances. For isolated exposures as low as 45 dBA L_{max}, awakenings, changes of sleep depth, etc., have been shown. An increasing number of exposures results in greater risk of adverse effects on sleep.*[2]

The *CEQA Guidelines* do not define the levels at which groundborne vibration is considered "excessive." This analysis uses the Federal Railway Administration's vibration impact thresholds for sensitive buildings, residences, and institutional land uses. These thresholds for residences and buildings where people normally sleep (e.g., nearby residences) are 80 VdB for infrequent activities (less than 70 per day) and 72 VdB for frequent events (more than 70 per day).

[2] *Community Nosie, Berglund & Lindvall, Published by World Health Organization, 1995.*

The *CEQA Guidelines* do not define the levels at which temporary and permanent increases in ambient noise are considered "substantial." As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. Based on this information, temporary increases in noise levels of 10 dBA or more at sensitive uses due to construction activities would be substantial and therefore, significant.

In terms of permanent increases in noise due to the operational characteristics of the proposed project, for the purposes of this analysis, the County standard is applied to project-generated noise only. This means that the total noise level (project plus ambient) could be up to 3 dBA greater than the existing ambient. An increase in noise of up to 3 dBA is normally considered an acceptable difference.

Noise Issues Not Analyzed Further

As discussed in the Initial Study (refer to Volume I, Appendix A of this Draft EIR), the project site is not located near a public or private airport, airstrip, an area covered by an airport land use plan, or within two miles of a public airport or public use airport, which expose people residing or working in the project area to excessive noise levels. Thus, the project would not expose people to noise levels associated with aviation uses. No further discussion of these issues is required.

Project Impacts and Mitigation Measures

Impact NOISE-1 Substantial Temporary or Periodic Increases in Noise

Project development would result in temporary increases in noise levels during construction. The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment and typical construction activities. These data are presented in Table V.I-7 and Table V.I-8, using a reference distance of 50 feet from the source. These noise levels would diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 84 dBA measured at 50 feet from the noise source to the receptor would reduce to 78 dBA at 100 feet from the source to the receptor, and reduce by another 6 dBA to 72 dBA at 200 feet from the source to the receptor.

Construction of the proposed project would require grading and excavation, installation of utilities and roadways, pile-driving, and construction and finishing of the proposed structures. These activities would involve the use of heavy equipment such as bulldozers, scrapers, pile-drivers, lavatory compaction equipment, excavators, tractors, loaders, pavers, and concrete mixers. Trucks would be used to deliver equipment and building materials. Smaller equipment, such as jack hammers, pneumatic tools, saws, and hammers, would also be used throughout the site during the construction phase. This equipment would generate both temporary steady state and episodic noise that would be heard both on and off the project site.

As shown in Figure V.I-1, the nearest residences are located between 120 to 175 feet from the proposed construction areas (between Areas A and B). Exterior construction activities that generate noise would primarily occur between the daylight hours of 7 AM and 5 PM Monday through Friday, and possibly on Saturday. Based on the construction noise levels shown in Tables V.I-7 and V.I-8, construction of the proposed project would result in temporary and periodic increases in daytime ambient noise levels in excess of the existing ambient noise standards. Therefore, temporary increases in noise levels from construction would be considered a ***significant*** impact.

Table V.I-7
Noise Range of Typical Construction Equipment

Construction Equipment	Noise Level dBA L_{eq} at 50 Feet[a]
Front Loader	73-86
Trucks	82-95
Cranes (moveable)	75-88
Cranes (derrick)	86-89
Vibrator	68-82
Saws	72-82
Pneumatic Impact Equipment	83-88
Jackhammers	81-98
Pumps	68-72
Generators	71-83
Compressors	75-87
Concrete Mixers	75-88
Concrete Pumps	81-85
Back Hoe	73-95
Pile Driving (peaks)	95-107
Tractor	77-98
Scraper/Grader	80-93
Paver	85-88

[a] *Machinery equipped with noise control devices or other noise-reducing design features does not generate the same level of noise emissions as that shown in this table.*
Source: U.S. EPA, 1971.

Table V.I-8
Typical Outdoor Construction Noise Levels

Construction Phase	Noise Levels at 50 Feet in dBA L_{eq}	Noise Levels at 50 Feet with Mufflers in dBA L_{eq}
Ground Clearing	84	82
Excavation & Grading	89	86
Foundations	78	77
Structural	85	83
Finishing	89	86

Source: U.S. EPA, 1971.

Mitigation Measure NOISE-1a

Prior to issuance of a building permit, the project developer shall provide the County with the name and telephone number of the individual empowered to manage construction noise from the project. The individual's name, telephone number, and responsibility for noise management shall be posted at the project site for the duration of construction in a location easily visible to the public. The individual shall record all noise complaints received and actions taken in response, and submit this record to the project planner upon request.

Mitigation Measure NOISE-1b

The project developer shall implement measures to reduce the noise levels generated by construction equipment operating at the project site during project grading and construction phases. The developer shall include the following requirements or measures shown to be equally effective in construction contracts:

- All construction equipment shall be equipped with improved noise muffling, and have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine isolators in good working condition.
- Stationary construction equipment that generates noise levels in excess of 65 dBA L_{eq} shall be located as far away from existing occupied residences as possible. If required to minimize potential noise conflicts, the equipment shall be shielded from noise sensitive receptors by using temporary walls, sound curtains, or other similar devices.
- All equipment shall be turned off if not in use for more than 10 minutes.

Impact NOISE-2 Excessive Construction-Related Groundborne Vibration

Construction activities that would occur at the project site have the potential to generate low levels of groundborne vibration. Table V.I-9 identifies various vibration velocity levels for the types of construction equipment that would operate at the project site during construction.

Table V.I-9
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	75 Feet	100 Feet	400 Feet
Pile Driver (impact) - upper range	112	106	102	100	88
Pile Driver (impact) - typical	104	98	94	92	80
Large Bulldozer	87	81	77	75	63
Loaded Trucks	86	80	76	74	62
Jackhammer	79	73	69	67	55
Small Bulldozer	58	52	48	46	34

Source: Federal Railroad Administration, 1998, and Christopher A. Joseph & Associates, 2006.

As stated previously, the construction of the pier for the off-loading of barges would require the installation of piles into the River. Pile-driving equipment would be employed during construction for a short duration of time (approximately 20 days or less), likely generating groundborne vibrations. Based on the information in Tables V.I-3 and V.I-9, adjacent sensitive receptors would be exposed to vibration levels in excess of the 75 VdB distinctly perceptible threshold for groundborne vibrations when pile-driving activities occur, but not at any other time of project construction. Although the pile-driving vibration would be noticeable and a possible nuisance if people are home when they occur, they would not approach levels that could potentially damage the structural integrity of the homes (e.g. 100 VdB). In addition, the construction activities that would produce groundborne vibration would be restricted to daylight hours and this would not occur during recognized sleep hours for residences. As such, groundborne vibration impacts associated with construction activities would be ***less than significant***.

Impact NOISE-3 Exposure of Persons to Existing Excessive Noise Levels

The site is currently vacant. The noise level measurement data shown in Table V.I-5, indicates that the project vicinity is currently exposed to elevated noise levels from Highway 101 traffic. However, since no residential uses are proposed, the project would not expose persons to existing excessive noise levels. Therefore, this would be considered a ***less-than-significant*** impact and no mitigation measures are required.

Impact NOISE-4 Excessive Operational Groundborne Vibration

According to the Rosen, Goldberg, & Der Report, sources of groundborne vibration associated with the project include stationary material processing/handling equipment and mobile diesel equipment. The mobile diesel equipment used at the facility (primarily trucks and front end loaders) would be rubber wheeled equipment. This type of equipment generates less groundborne vibration than similar equipment that use rolling metal tracks instead of rubber wheels.

To quantify the expected groundborne vibration levels, measurements were conducted at the existing Dutra facility located at 961 Western Drive in Richmond, CA. Groundborne vibration was measured with an accelerometer and spectrum analyzer at 200 feet from an operating concrete recycling plant that included a screen, crusher, front end loader and conveyors. This equipment represents the potential for maximum ground vibration that could be generated at the project site, since the screen is essentially a large tray that shakes to sort material.

The measured vibration levels were at least 18 decibels below the vibration perception threshold of 72 VdB reported by the American National Standards Institute (ANSI).[3] Because equipment used at the proposed project site would be similar to equipment used at the existing Dutra facility, groundborne vibration generated at the project site would be expected to be comparable to the existing facility. Therefore, based on the measurements conducted at the existing facility and the distance between operational activities and existing residences at the proposed facility, groundborne vibration generated at the project site would not be perceptible at the nearest residences. Because no operational groundborne vibration impacts were identified, impacts would be ***less than significant*** and no mitigation measures are required.

Substantial Permanent Increases in Noise

There are five main components associated with the operation of the project: traffic noise, an asphalt plant, a concrete recycling plant, barge unloading, and the volunteer fire department. The normal hours of operation for the asphalt plant and barge unloading would occur between 6 AM to 6 PM. Evening and weekend operations are proposed as needed, to allow prompt delivery of finished product for Caltrans, local agency or other construction projects, and to reduce traffic congestion and disruption that might be caused by highway paving or other construction projects during normal operating hours. Barge off-loading would be tide dependent and would generally occur at high tide during normal operating hours, but also could occur after normal operating hours. Noise levels associated with industrial operations of the temporary facility as well as the combined noise level for those times when more than one component is operating, were analyzed in the Rosen, Goldberg & Der and the Bollard & Brennan Reports. This analysis also considers the composite impact of these noise sources operating simultaneously.

[3] *Guide to the Evaluation of Human Exposure to Vibration in Buildings, ANSI S3.29-1983.*

The San Antonio Volunteer Fire Department would have facilities on-site for training, maintenance, and equipment storage. This volunteer Fire Department is a second call station that responds to approximately 150 emergency calls per year and requires no living facilities. The Fire Department would conduct training from 7 PM to 10 PM on the first and third Tuesday of each month. Training sessions may also be held on Saturdays a few times a year. The fire trucks use their flashing red lights at all times while they are on the emergency run. However, Fire Department staff indicate that it is policy and practice to only use sirens when the emergency vehicles reach vehicular traffic on a busy street or intersection.

Impact NOISE-5 Off-Site Traffic Noise

Properties in the vicinity of the project site could experience slight changes in noise levels as a result of an increase in truck trips. The majority of the project traffic would access the site via Highway 101 (75% of traffic per the Traffic and Circulation section). Current noise levels associated with Highway 101 traffic are estimated to be 53 dB Leq in the project vicinity.[4] As part of the proposed project, the facilities currently provided at the applicant's temporary facility would be relocated from the existing plant located less than a mile north on Petaluma Boulevard South. Based on the number of truck trips associated with the project, the Federal Highway Administration Traffic Noise Prediction Model predicts that the average hourly noise level during the peak hour would be approximately 53 dB Leq at a distance of 500 feet from Highway 101. Current traffic levels on Highway 101 would have to double to create a noticeable increase in traffic noise. Since existing freeway traffic levels are not expected to substantially increase due to the project, the project would not result in a significant increase in off-site traffic noise levels at existing residences within the immediate project vicinity. Therefore, potential off-site traffic noise impacts associated with the project would be considered ***less than significant*** and no mitigation measures would be required.

<u>Start-up Phase</u>

During the initial start-up phase of the proposed project, raw materials such as aggregate and sand may be imported, primarily from the San Rafael quarry, until the barge off-loading facility is completed. This would result in an increase in truck trips associated with material imports. However, during the start-up phase, the annual export rate of asphalt product, sand, and aggregate from the site would be approximately 35 percent less and import and export of RAP would be 67 percent less than the anticipated annual rates under fully operational conditions. Therefore, truck noise would be less during the initial start-up phase than estimated under fully operational conditions.

Impact NOISE-6 Asphalt Facility Equipment Noise

Both the Bollard & Brennan and the Rosen, Goldberg & Der Reports utilized noise level data collected at Dutra's existing facility and noise level data provided by the manufacturer of the proposed asphalt plant, to quantify potential plant noise emissions. Noise level data indicates that operation of the asphalt plant would be expected to generate noise levels of approximately 75 dB L_{50} and 80 dB L_{max} at a distance of 100 feet from the plant, through truck passages, asphalt drum heating and mixing, feeding of the plant hoppers by a front-loader, and departure of heavy trucks from the site. Table V.I-10 summarizes the predicted asphalt plant noise levels at the nearest sensitive receptors to the proposed asphalt concrete plant, using a 6 dB decrease per doubling of distance from the source, and an offset of -1.5 dB per thousand feet to account for excess ground attenuation and atmospheric attenuation. Receiver locations are illustrated on Figure V.I-1.

[4] *SMART FEIR, Noise and Vibration, pp. 3-129.*

Table V.I-10
Dutra Asphalt Facility Unmitigated Noise Levels at Nearest Sensitive Receptors

Receiver	Asphalt Plant	Existing Ambient (County Standard)	
	Project Noise Levels[1]	Day	Night
R1 Hillside South	**52 N**	59	51
R2 Hillside North	**53 N**	55	50
R3 River North	**53 N**	53	50
R4 River Middle	**68 D,N**	53	50
R5 River South	**67 D,N**	53	50
R6 Park North	**59 D**	53	N/A*
R7 Park South	**63 D**	53	N/A*

Notes:
1. Project generated noise levels (L_{50}, dBA) without mitigation
***D** = noise level exceeds the County's daytime standard*
***N** = noise level exceeds the County's night-time standard*
** Shollenberger Park is open during daylight hours only.*
Sources: Bollard & Brennan, 2004; Rosen, Goldberg & Der, 2006.

As shown in Table V.I-10, predicted asphalt plant noise emissions would exceed County daytime noise standards at residences R4 and R5, and at the park locations across the River. Operations of the asphalt plant would also exceed County night-time noise standards at all sensitive receptors. Therefore, this would be considered a ***significant*** impact.

Mitigation Measure NOISE-6

- **Baghouse fan stack silencer**. Install a silencer between the baghouse fan and the exhaust stack. The silencer shall be designed to reduce the A-weighted sound level of the fan exhaust by 20 dBA when the fan is operating in the range of 70-100% of maximum airflow.
- **Baghouse fan casing barrier or enclosure**. Install a barrier along the west side of the baghouse fan casing. The barrier shall be made of sound absorptive steel panels or mass-loaded quilted vinyl (1.5 pounds per square foot). The barrier shall be 12 feet tall and located within 3 feet of the fan casing. It shall return along the south and north sides of the baghouse fan casing. Alternatively, a ventilated enclosure can be used that is constructed of sound absorptive metal panels and designed to achieve an A-weighted noise reduction of 15 dBA.
- **Fiberbed fan stack silencer**. Install a silencer between the fiberbed fan and the exhaust stack. The silencer shall be designed to reduce the A-weighted sound level of the fan exhaust by 15 dBA when the fan is operating at 100% of maximum airflow.
- **Gear reducer enclosure**. Install an enclosure around the gear reducer for the asphalt burner drum to reduce its noise level by 15 dBA.
- **Air compressor enclosure**. Install an enclosure around the air compressor to reduce its noise level by 20 dBA.

- **Air cylinder silencers**. Install air cylinder silencers at the batcher and discharge gates designed to reduce the air release noise by a minimum of 20 dBA.
- **Asphalt Plant stockpiles along loop road**. The loop road included in the proposed development plan shall be relocated to the west to allow for the asphalt plant stockpiles to be placed between the loop road and railroad tracks.

Impact NOISE-7 Concrete Recycling Facility Noise

Bollard & Brennan, Inc. conducted noise level measurements at Dutra's existing facilities to quantify the noise emission data for the recycling equipment proposed for use at the project site. Those measurements indicate that the operation of the recycle facility would generate noise levels of approximately 80 dB L_{50} and 85 dB L_{max} at a distance of 100 feet from the plant, through truck passages, feeding of the plant hopper by a front-loader, and departure of heavy trucks from the site. Table V.I-11 summarizes the predicted recycle plant noise levels at the nearest sensitive receptors to the proposed recycling plant. These residences are labeled R1-R7 on Figure V.I-1.

TableV.I-11
Dutra Concrete Recycling Facility Unmitigated Noise Levels at Nearest Sensitive Receptors

Receiver	Recycling Plant (Daytime Only)	Existing Ambient (County Standard)	
	Project Noise Levels [1]	Day	Night
R1 Hillside South	**63 D**	59	51
R2 Hillside North	**56 D**	55	50
R3 River North	51	53	50
R4 River Middle	**63 D**	53	50
R5 River South	**64 D**	53	50
R6 Park North	**59 D**	53	N/A
R7 Park South	**63 D**	53	N/A

Notes:
1. Project generated noise levels (L_{50}, dBA) without mitigation
***D** = noise level exceeds the County's daytime standard*
***N** = noise level exceeds the County's night-time standard*
Source: Rosen, Goldberg & Der, 2006.

Recycling plant noise levels were analyzed using County daytime noise standards only, since the recycling plant will not operate at night. Table V.I-11 data indicates that predicted recycle plant noise could exceed daytime noise standards by approximately 1 to 9 dBA at residences R1, R2, R4 and R5. Noise levels associated with the recycling plant could also exceed County daytime noise standards at the adjacent park facilities. This potential exposure is a ***potentially significant*** impact.

Mitigation Measure NOISE-7

- **Non-metallic aggregate sorting screens**. Use non-metallic screening panels. Non-metallic materials such as neoprene, rubber or high-density polyethylene (HDPE) can significantly reduce the noise generated by the crushed concrete bouncing on the screens.

- **Hopper and chute liners**. Line all unenclosed hoppers and chutes at which aggregate materials fall onto a metal surface with a sound deadening material such as heavy neoprene, rubber or HDPE.
- **Use PG&E power instead of an engine-generator set**. Operate the recycling plant without the engine-generator commonly used to power portable concrete recycling plants.
- **Stockpiles to the north and east**. Stockpiles of processed and unprocessed materials shall be located to the north and east sites of the recycling plant. These stockpiles will help reduce noise at the homes along the River and the park across the River. Since the presence of the stockpiles is dependent on the amount of material at the site, this EIR does not rely on their noise reduction potential in mitigating noise levels at the residential receivers. The noise predictions at the Shollenberger Park include the effect of stockpiles, because the recycle yard has enough space to always maintain piles at least 15 feet high.
- **Revision of landscape plan to include 10-foot high berm**. As required in Mitigation Measure AES-1, the landscape plan shall be revised to incorporate a 10-foot high, 30-foot wide irrigated landscaped berm along the portion of the site that fronts Highway 101 and Petaluma Boulevard South, specifically south of the Caltrans right-of-way line and east of the public right-of-way that extends into the project site. The portions of the site plan affected by the 30-foot wide landscape buffer (i.e., stockpiles, access road, etc) shall be reconfigured to accommodate the landscaped buffer. Finally, the revised landscape plan shall incorporate trees with the proposed ground cover within Area C to further screen the proposed project from off-site views.
- **Windows rated for a 10 dBA exterior to interior noise reduction.** At the request of the homeowners along the River and at the hillside west of Highway 101, the applicant shall provide windows rated for a 10 dBA exterior to interior noise reduction for all habitable rooms on the side of the residence facing the project site. The applicant shall provide specifications for the windows to the homeowner. The homeowner will then be responsible for receiving 3 bids from qualified contractors to purchase and install the windows. The applicant shall promptly pay the homeowner for the cost of the lowest bid after the windows are installed and accepted by the homeowner. The applicant shall pay for normal installation of the windows but will not pay for any additional work necessary to allow installation of the window, such as repair of dry rot or termite damage.

Impact NOISE-8 Barge Unloading Facility Noise

Bollard & Brennan, Inc. conducted noise measurements at Dutra's existing Petaluma barge unloading facility to quantify the noise emissions for the proposed barge unloading equipment to be used at the project site. Those measurements indicate that barge unloading equipment (i.e., front-end loader, conveyor, hopper) generate noise levels of approximately 72 dB L_{50} and 80 dB L_{max} at a distance of 100 feet. Table V.I-12 summarizes the predicted noise levels at the nearest sensitive receptors from the barge unloading equipment. The receptor locations are labeled R1-R7 on Figure V.I-1.

Table V.I-12 data indicates that predicted barge unloading equipment noise emissions would be less-than-significant at residences R1 and R2, but would exceed County daytime and night-time noise standards at residences R3 and R5. The Rosen, Goldberg & Der Report further concludes that operations of the barge facility would exceed the County's daytime noise standards at one of the park facility locations (R6).

The alignment for the conveyor from the barge unloading facility was redesigned since the Rosen, Goldberg, and Der Report was completed, and additional analysis was conducted for residence R3, as the closest sensitive receptor. According to Rosen, Goldberg & Der, noise levels at residence R3 would be dominated by the front-end loader on the barge, and would not be affected by the realignment of the conveyor.[5]

County noise standards would be exceeded at residences R3 and R5 and one of the park facilities (R6) as a result of barge unloading operations, therefore this would be considered a ***potentially significant*** impact.

Additionally, noise from the tugboat would generate noise levels of 68 dBA[6] at a distance of 160 feet. The barge-unloading facility is approximately 120 feet from R3, the nearest residence. This would exceed both night and day County standards for the nearest residence, and the Shollenberger Park viewing platform across the River.

TableV.I-12
Dutra Barge Unloading Equipment Unmitigated Noise Levels at Nearest Sensitive Receptors

Receiver	Barge Unloading	Existing Ambient (County Standard)	
	Project Noise Levels[1]	Day	Night
R1 Hillside South	41	59	51
R2 Hillside North	44	55	50
R3 River North	**65 D,N**	53	50
R4 River Middle	47	53	50
R5 River South	**55 D,N**	53	50
R6 Park North	**65 D**	53	N/A
R7 Park South	53	53	N/A

Notes:
1. Project generated noise levels (L_{50}, dBA) without mitigation
***D** = noise level exceeds the County's daytime standard*
***N** = noise level exceeds the County's night-time standard*
Source: Rosen, Goldberg & Der, 2006.

Mitigation Measure NOISE-8

- **Enclosed Transfer Points**. Enclose the points along the conveyor system where material transfers from one belt to another by means of a hopper. The enclosure material shall have a minimum surface density of 1.5 pounds per square foot.
- The tug boat shall either turn off its engines during barge unloading operations or relocate away from the riverfront residences while unloading operations are underway.
- Noise barriers shall be placed on the southern portion of the barge to completely screen barge unloading activities in the direction of the riverfront residences.

5 *Rosen, Goldberg & Der, email correspondence with CAJA, August 11, 2006.*

6 *Illingworth & Rodkin Inc. (November 13, 2003). Noise Assessment for Shamrock Facility on Landing Way, Petaluma, CA.*

- Although the County's performance standards for non-transportation sources apply only to outdoor sound levels, consideration shall be given to improving the sound insulating properties of the affected residential structures. This mitigation measure, however, requires the cooperation of the residence owner, but could result in substantial reduction in indoor noise levels.
- Project operations associated with off-loading the barge and running the conveyor shall be prohibited at night between sunset and sunrise. Note that sunset and sunrise times change with the seasons, and will range from approximately 5:30 PM to 7 AM in early February, to 8:30 PM to 6 AM in mid-June, to 7:30 PM to 6:30 AM in late August. Official sunrise and sunset times shall be obtained from a reputable source, such as the National Weather Service.

Impact NOISE-9 San Antonio Volunteer Fire Department

The proposed project would also include facilities for use by the San Antonio Volunteer Fire Department for drills and equipment storage. Fire stations can generate a wide range of noise levels, from quiet most of the time to loud when sirens are used. The Fire Department would occupy the station every other weekend for training. The fire station employees would travel to the site for occasional training and maintenance of vehicles and equipment, and would leave the site when the training is done. This would reduce the rate of turnover of parked vehicles and the noise levels associated with the driving, starting, and stopping of vehicles in this area. The fire station would be relatively quiet when the fire fighters are at the station and when they are away from the station with the fire engine.

The noise levels in the project area and at the adjacent residences would occasionally increase on a short-term basis if a siren is used when the fire engines leave the project site in response to an emergency. Some of the truck operations (4 trucks total on-site) could occur late at night or early in the morning when nearby residents are sleeping. In this case, operation of the fire engines would increase noise levels on a temporary basis when the engine leaves and returns to the fire station. The use of sirens would represent a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. Specifically, siren noise levels can range from approximately 108-112 dBA L_{max} at 50 feet, and fire engine horn noise levels range from approximately 101-102 dBA L_{max} at 50 feet.[7]

According to the Fire Chief,[8] fire trucks from the station typically only use sirens if there is a need to and generally when traveling only on the highway. This would typically limit the use of sirens during the daytime, particularly at busy intersections, but it is possible that sirens could be used at night. Sounds generated by the fire engines during the daytime are not expected to affect many people since most of the nearby residents are either at work, away from home, or awake at home. Night-time sirens could affect most nearby residents and could wake people who are sensitive to night-time noise. However, this would be considered to be an adverse, but ***less-than-significant*** impact since night-time operations would be limited to emergency events and would not occur on a daily or even weekly basis. Also, while the County does not have a noise ordinance, siren noise is exempt in other noise ordinances in California.

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[7] *City of Fremont Corporate Yard Project Noise Study, Illingworth & Rodkin, 2000.*

[8] *Phone correspondence with Jerry Corda, San Antonio Volunteer Fire Dept. Chief, August 2006.*

Impact NOISE-10 Composite Noise Levels from Project Operations

Table V.I-13 summarizes the predicted noise levels at the nearest sensitive receptors from combined operations of the asphalt plant, barge unloading facility, and recycling plant. The concrete recycling plant and the asphalt plant each generate an L_{50} close to the daytime standard; however, when these sources are operating together, the total noise level exceeds the County daytime standard. As the data indicates, combined noise levels from operations of the barge unloading facility and the asphalt plant would also exceed County night-time noise standards at all five residences and would exceed daytime noise standards at residences R3-R5 and the two park facility locations. The combined noise levels associated with operations of all three facilities, the asphalt plant, barge unloading facility, and recycling plant, simultaneously would exceed the County daytime noise standards at all seven sensitive receptors.

TableV.I-13
Composite Noise Levels[1] that Would Result from Project Operations

Receiver	Asphalt plus Recycling (Daytime Only)	Asphalt plus Barge	Asphalt plus Recycling plus Barge (Daytime Only)	Existing Ambient (County Standard)	
				Day	Night
R1 Hillside South	**63 D**	**53 N**	**63 D**	59	51
R2 Hillside North	**58 D**	**54 N**	**58 D**	55	50
R3 River North	**55 D**	**65 D, N**	**65 D**	53	50
R4 River Middle	**69 D**	**68 D, N**	**69 D**	53	50
R5 River South	**69 D**	**68 D, N**	**69 D**	53	50
R6 Park North	**62 D**	**66 D**	**67 D**	53	N/A
R7 Park South	**66 D**	**63 D**	**66 D**	53	N/A

Notes:
1. Project generated noise levels (L_{50}, dBA) without mitigation
***D** = noise level exceeds the County's daytime standard*
***N** = noise level exceeds the County's night-time standard*
Source: Rosen, Goldberg & Der, 2006.

In addition, the Rosen, Goldberg & Der Report indicates that indoor noise levels generated by combined operations of the project would exceed the WHO recommendation for avoiding sleep interference at each of the three adjacent River residences, with the windows open. With the windows closed, only the northernmost residence would be exposed to noise levels expected to interfere with sleep. It should be noted that without mitigation the night-time noise level at the northernmost residence is generated by barge unloading activities that would occur infrequently, about one or two nights per month. Considering that combined operations of the project would exceed County and WHO noise standards, this impact would be considered ***significant***.

Mitigation Measure NOISE-10

In conjunction with the other mitigation measures above, the following mitigation measure is recommended to reduce noise impacts from the combined operations.

- **Strobe Lights**. 1) Install an OSHA approved strobe light back-up notification system on front-end loaders that are used at the asphalt plant and the barge unloading. 2) Use the strobe lights exclusively instead of the beepers during night-time hours.

CUMULATIVE IMPACTS

Construction Impacts

Construction activities could result in potentially significant short-term noise impacts on sensitive land uses in the vicinity of project sites that are being constructed concurrently. The majority of the related projects listed in Table III-1 of the Project Description are not in immediate proximity to the project site, and those that are near the project site would not be constructed at the same time as the project. As such, implementation of the proposed project in conjunction with the related projects would not result in a cumulative increase in ambient noise levels. The same condition would apply to the exposure of people to or the generation of excessive groundborne vibration in the vicinity of the project site during project construction. Therefore, the contribution of the proposed project to any cumulative construction-related noise or groundborne vibration impacts would be considered ***less than significant***.

Operational Impacts

Because no significant operational groundborne vibration impacts were identified, the project would not result in significant cumulative operational groundborne vibration impacts. Based on a historical review of Highway 101 traffic volume counts published by Caltrans, the daily highway volume increases about 5% per year. This traffic volume increase corresponds to a noise increase of less than 1 dBA. An additional increase of 1 dBA when combined with the existing 53 dbA L_{eq} at the nearest residence would not exceed County noise standards. In addition, a noticeable increase in traffic noise on the freeway would require a doubling of current traffic levels. As shown in section V.J (Traffic and Circulation), the proposed project under cumulative conditions would not result in a doubling of traffic on Highway 101. Therefore, this would not constitute a significant cumulative noise impact.

In addition to traffic noise, railroad noise from proposed SMART commuter trains and proposed freight trans could potentially affect cumulative noise levels in the project area, at least on a temporary yet periodic basis. The SMART FEIR concludes, the cumulative daily noise exposure from all rail operations, based on the above assumptions for freight operations, would be approximately 59 dBA L_{dn} at 50 feet and 54 dBA L_{dn} at 100 feet from the tracks. Cumulative noise exposure from passenger and freight rail operations at distances greater than 50 feet from the tracks would be less than 60 dBA L_{dn}, the level considered normally acceptable for outdoor use in residential areas. However, these temporary yet periodic noise levels would exceed the County daytime and night-time noise standards for residence R4. Implementation of the proposed project in conjunction with potential future commuter and freight trains would therefore result in ***significant*** cumulative operational noise impacts.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction Impacts

Noise impacts that would result from construction would be reduced to ***less than significant*** with implementation of the mitigation measures included in this section.

Asphalt Plant Impacts

After implementation of the proposed mitigation measures, noise impacts from the asphalt plant would exceed the County's daytime and night-time noise standard at two River residences (R4 and R5), and would exceed the County's daytime standard for the park at R7. Therefore, noise impacts associated with operation of the asphalt plant would remain ***significant and unavoidable***.

Recycling Plant Impacts

Recycling plant noise after implementation of the mitigation measures would still exceed daytime noise standards at residences R4 and R5. Therefore, noise impacts of the recycling plant facility would be considered ***significant and unavoidable***.

Barge Unloading Impacts

By prohibiting barge unloading at night between sunset and sunrise, noise from barge unloading activities would not exceed County night-time noise standards. Although one residence is shielded from the barge unloading noise by the intervening buildings, noise from the barge unloading would still exceed the daytime standards at the northern and southern River residences (R3 and R5) following the implementation of the mitigation measures included in this section. It would also exceed County noise standards for the park at R6. Therefore, noise impacts of the barge unloading facility would be considered ***significant and unavoidable***.

Composite Noise Level Impacts

With implementation of proposed mitigation measures, all combinations of the asphalt plant, concrete recycling plant and barge unloading would meet the County's daytime and night-time noise standards at the hillside homes to the west (R1 and R2). However, noise levels would still exceed the County's daytime standard at receivers R3-R7. Therefore, this impact remains ***significant and unavoidable***.

V. ENVIRONMENTAL IMPACT ANALYSIS
J. TRANSPORTATION AND TRAFFIC

INTRODUCTION

This section describes the results of the transportation analysis conducted by Dowling Associates to evaluate the potential transportation and traffic related impacts of the proposed project. Supporting data for this analysis is provided in Appendix I.

ENVIRONMENTAL SETTING

Figure V.J-1 illustrates the project site at 3355 Petaluma Boulevard South. The figure also shows the current aggregate plant location at 1601 Petaluma Boulevard South.

Roadways in the area include:

- Highway 101 is a four-lane highway in the immediate project vicinity. South of Petaluma Boulevard South, Highway 101 transitions to an expressway class facility. Highway 101 provides the major transportation link between Sonoma County and Marin County and to San Francisco and Oakland further to the south.
- Petaluma Boulevard South is a two lane principal arterial roadway, which parallels the Petaluma River from its origin at the Highway 101/Petaluma Boulevard South northbound off-ramp to Downtown Petaluma.
- Landing Way is a minor private roadway serving a number of riverfront parcels to the east of Petaluma Boulevard South. A record of survey provided by the County indicates that an easement has been established where Landing Way crosses the rail right-of-way. This is currently used by the Shamrock Aggregate Import facility and other users to cross the rail tracks.

Existing Traffic Conditions

Dowling Associates studied the following intersections because of the project's potential to create level of service impacts:

1. Petaluma Boulevard South at Project Driveway
2. Petaluma Boulevard South at Highway 101 Northbound (NB) On-Ramp
3. Petaluma Boulevard South at Landing Way
4. Petaluma Boulevard South at Highway 101 Southbound (SB) Ramps

Dowling derived existing traffic volumes at each of the study intersections from studies performed between 2003 and 2004 (see Volume II, Appendix I). Based on guidance from County staff, Dowling increased the volumes by two percent annually to account for traffic growth between previous counts and the baseline year of this analysis (2006). All of the study intersections are currently unsignalized.

Through movements and right turns originating along Petaluma Boulevard South were all uncontrolled at the time the existing conditions were evaluated. Left turns from Petaluma Boulevard South and movements from side streets are under STOP control. Recent improvements to the intersection of Petaluma Boulevard South at Highway 101 southbound ramps are considered under near-term cumulative conditions. Existing turning movements are illustrated in Figure V.J-1.

Traffic observations on northbound Petaluma Boulevard South indicate that about 11 percent of the total traffic consists of heavy trucks or buses. During a traffic observation made in June 2006, the 85th percentile speed on Petaluma Boulevard South, just north of the Highway 101 northbound off-ramp, was just less than 60 miles per hour.

Existing Levels of Service

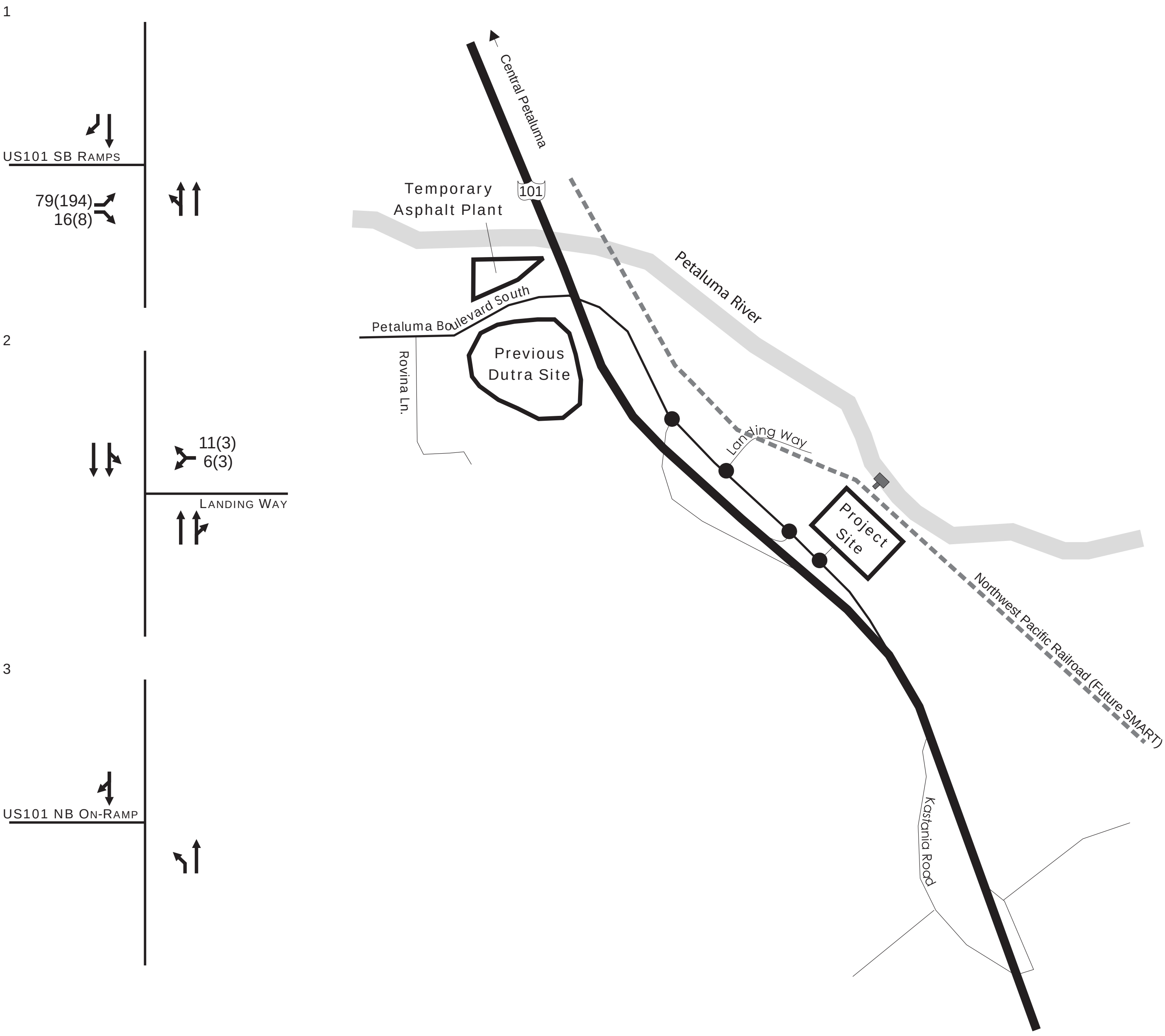
Levels of service (LOS) were calculated for existing conditions at the study intersections using the 2000 Highway Capacity Manual methodology (Transportation Research Board, 2000). The levels of service reported for all-way STOP control intersections were determined based on overall intersection average delay in seconds.

According to the Sonoma County level of service policy, the threshold for intersection level of service is LOS E. Facilities that operate at LOS E or worse are considered deficient. Table V.J-1 shows existing intersection levels of service. Downstream highway operations can affect intersection operations, but this source of congestion is addressed separately in the subsection entitled "Highway Operations."

As illustrated in Table V.J-1, all study intersections operate acceptably, and none meet peak hour warrants for signalization.

Table V.J-1
Existing Conditions Intersection LOS Summary

Location	AM		PM	
	Delay	LOS	Delay	LOS
Petaluma Blvd. South at Hwy 101 SB Ramps				
NB ThruLeft	9.2	A	7.9	A
EB Left	11.3	B	14.5	B
EB Right	9.4	A	8.9	A
Petaluma Blvd. South at Landing Way				
SB ThruLeft	7.7	A	8.8	A
WB Approach	9.7	A	12.5	A
Petaluma Blvd. South at Hwy 101 NB Ramp				
NB Left	7.7	A	7.6	A



Source: Dowling Associates, 2006.

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Environmental Planning and Research

NORTH

Figure V.J-1
Location Map and
Existing Turning Movements

Queuing

Table V.J-2 shows existing queues. The eastbound (EB) approach of the southbound (SB) Highway 101 off-ramps to Petaluma Boulevard South is assumed to serve primarily left turns, so the "short" lane is the right turn lane, although there is no clear marking dividing the two. Estimates are rounded to the nearest 25 feet reflecting the storage requirements for a passenger vehicle. Existing storage is adequate to accommodate expected queues.[1]

Table V.J-2
Existing Queues

Location	Estimated Storage (feet per lane)	95th Percentile Queue (feet per lane)	
		AM Peak Hour	PM Peak Hour
Petaluma Blvd. South / Highway 101 SB Ramps			
NB Left Turn	600	25	25
EB Left Turn	>1000	25	50
EB Right Turn	50	25	25
Petaluma Blvd. South / Landing Way			
SB Left Turn	600	25	25
Petaluma Blvd. South / Highway 101 NB On-Ramp			
NB Left Turn	450	25	25

Accident History

Collision records indicate that 22 accidents occurred along Petaluma Boulevard South from the northbound off-ramp to the southbound ramps in the period from 2003 to 2005. The primary factor in nine of these accidents was stated as failure to yield the right-of-way. This could be taken as an indication of inadequate controls at several of the study intersections. Three of the collisions, each at the intersection of Petaluma Boulevard South and Highway 101 southbound ramps, were caused by vehicles traveling the wrong way on the ramps. Four of the collisions involved trucks; one of these was at the same intersection with Highway 101 southbound ramps.

Highway Operations

Table V.J-3 summarizes existing highway operations in the vicinity of the Highway 101/Petaluma Boulevard South interchanges. The minimum acceptable level of service threshold applied to these facilities is LOS D. Under existing AM peak hour conditions, the southbound segment of Highway 101 south of Petaluma Boulevard South operates at LOS F. The merge of the southbound on-ramp operates at LOS F based on the principle that traffic merging with a facility that is over-saturated is typically, by definition, over-saturated. The other ramp merges and diverges operate acceptably at LOS C or better. Observations of northbound PM

[1] *The distances provided adequately account for the likelihood that at the 95th percentile any queued vehicles would be a truck because trucks are converted to passenger car equivalents (and i.e. requiring up to 75 feet of storage).*

peak hour traffic on Highway 101 indicate that this traffic is subject to break down in flow. As a result, the computed levels of service on northbound Highway 101 may be better than what drivers experience because the counts are attenuated by stop and go traffic. This is noted throughout this EIR section.

The northbound on-ramp from Petaluma Boulevard South to Highway 101 is non-standard with a radius of roughly 60 feet. Although this acceptably allows trucks to turn around the curve onto the ramp, the ramp speeds are impeded. Given the grade of the ramp, it is assumed that trucks would not begin to approach the merge at more than 20 miles per hour. At this speed, the AASHTO Greenbook recommends an acceleration distance of 1,100 feet to merge with traffic traveling 60 miles per hour.

The distance from the gore point of the ramp and the end of the lane taper is 650 feet. The merge area is only 300 feet before the acceleration lane is reduced to less than one vehicle width. This represents a serious safety concern. Trees on the east side of Highway 101 as it approaches this ramp exacerbate this problem by partially obscuring lines of site. Existing truck trips from Dutra's temporary facility located north of the project site, including 23-ton trucks, are currently using this interchange, and project truck trips would continue to do so.

Table V.J-3
Existing Highway Operations

Location	**LOS**	
	AM	**PM**
Mainline Segments		
Highway 101 SB-North of Petaluma Blvd South	F	B
Highway 101 SB-South of Petaluma Blvd South	F	B
Highway 101 NB-South of Petaluma Blvd South	B	D*
Highway 101 NB North of Petaluma Blvd South	B	C*
Ramp Merge and Diverge		
SB Off-Ramp	C	B
SB On-Ramp	F	A
NB Off-Ramp	B	B
NB On-Ramp	A	B

**Level of Service may be worse because traffic flow volumes are attenuated by congestion.*

Existing Access and Circulation

Direct access from southbound Petaluma Boulevard South to the project site has involved illegal turns across the road on to the site. In 2007, bollards were placed in the median, preventing this maneuver. For vehicles traveling south towards the site, to avoid this substandard access condition, it is necessary for them to travel further south to Kastania Drive, then turn north on Highway 101 at the Highway 101/Kastania Drive at-grade intersection.

Several residential properties along the Petaluma River have limited access easements across the project site, allowing access to Petaluma Boulevard South. An existing access road crosses the Sonoma Marin Area Rail Transit (SMART) railroad right-of-way, providing access to the River.

Waterborne Traffic

An existing dock in use at Dutra's temporary facility north of the proposed project site currently serves barge trips. Another landing exists immediately north of the project site, at the Shamrock Aggregate site. Recreational boating facilities are located nearby in Petaluma. Existing barge traffic has been estimated at 40 trips per month on the Petaluma River. The Coast Guard regulates traffic on the Petaluma River.[2]

Cumulative Setting

Near-Term Cumulative Setting

Near-term cumulative conditions are existing conditions plus conditions resulting from approved and foreseeable development along Petaluma Boulevard South. Traffic from these projects has been added to existing traffic to establish near-term cumulative traffic conditions. The following background projects were considered in this scenario:

<u>Royal Petroleum Card-Lock Gasoline Service</u> - development of card-lock fueling stations at an existing truck stop and fueling station at 2645 Petaluma Boulevard South. This project would relocate existing Royal Petroleum operations from a site 0.5 miles north on Petaluma Boulevard South.

<u>Shamrock Aggregate Import Facility</u> - construction of aggregate storage, processing and conveyor systems, and replacement of existing docking facilities at an existing site at 210 and 222 Landing Way.

<u>Novato Disposal Service</u> - development of recycling facilities at an existing refuse sorting and transfer station at 2543 Petaluma Boulevard.

In addition to these approved projects, the background scenario evaluates foreseeable redevelopment of the quarry and the existing, temporary facility (Cumulative Impacts Evaluation, Whitlock & Weinberger Transportation, Inc., June 2004). This would consist of a residential development with 182 single family homes and 152 townhouses. Although this development is not approved[3], it is included in the background scenario to provide a conservative assessment of background and background plus project conditions.

Table V.J-4 summarizes the trip generation for the background land use projects. The trip generation estimates background development projects generate 212 AM and 280 PM peak hour trips measured in passenger car equivalents (i.e. with trucks counting as three passenger cars). Figure V.J-2 shows near-term cumulative turning movements. These represent passenger car equivalents.

The County has proposed to modify Petaluma Boulevard South from the Highway 101 southbound ramps to the 101 northbound on-ramp to include a single through lane, bike lanes in each direction, and a center

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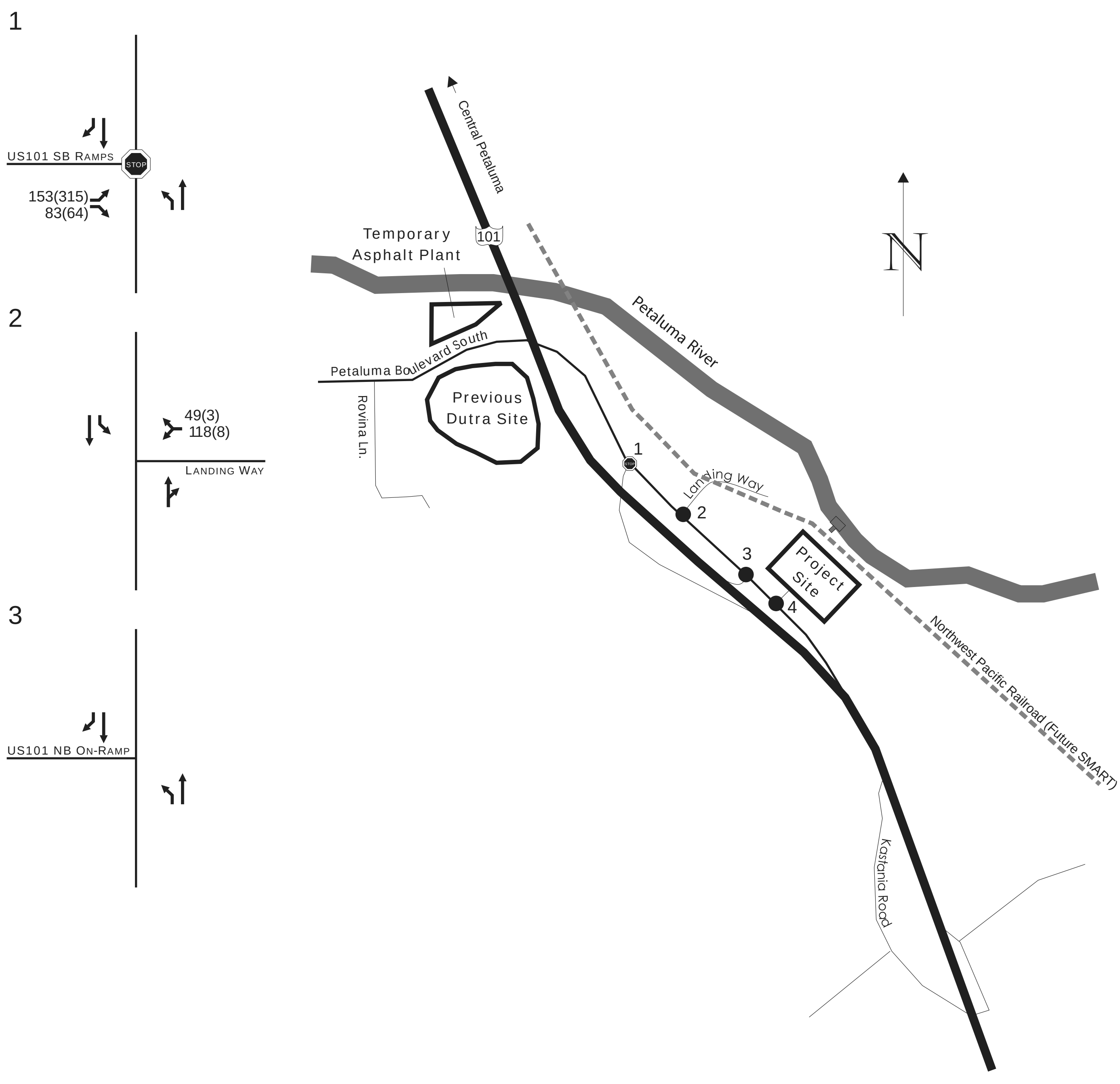
[2] *Steve Hart. "Black Point Bridge - Bridge Battle: Barge Company Rail Authority in Fight that could hinder River Traffic," The Press Democrat. June 25, 2005.*

[3] *The Petaluma City Council approved the Quarry Heights (Lomas) Residential Subdivision in February 2005, and development is underway. (Petaluma Major Development Projects List. April 2007.)*



Source: Dowling Associates, 2007.

Figure V.J-2
Near-Term Cumulative without
Project Turning Movements

two-way left turn lane. The County recommended these modifications in previous studies to address safety concerns related to travel speeds and driveway access along Petaluma Boulevard South.

Table V.J-4
Near-Term Cumulative Trip Generation

Land Use	AM Peak Hour	PM Peak Hour
Royal Petroleum	124	124
Shamrock Aggregate	91	3
Novato Disposal	80	80
Existing Site Redevelopment	106	139
Total	**401**	**346**
Source: Fehr and Peers, 2004.		

Since the initiation of the study, the County has installed all-way stop control at the intersection of Petaluma Boulevard South/Highway 101 Southbound ramps and re-striped the northbound lanes to include one through and one left turn lane. South of the northbound on-ramp bollards have been installed in the median of Petaluma Boulevard South to prevent all left turns. These improvements are considered with the Near-term Cumulative as opposed to the existing (2006) scenario.

Table V.J-5 shows near-term cumulative intersection levels of service. Under such conditions LOS becomes deficient at the intersections of Petaluma Boulevard South at Highway 101 southbound ramps during the PM peak period and for the westbound left turn from Landing Way during the AM peak period.

Table V.J-5
Near-Term Cumulative Without Project Intersection LOS

Location	Near-Term Without Project			
	AM		PM	
	Delay	LOS	Delay	LOS
Petaluma Blvd. South at Highway 101 SB Ramps	30.1	D	88.9	F
Petaluma Blvd. South at Landing Way				
SB Thru Left	8.9	A	9.7	A
WB Approach	39.3	E	20.6	C
Petaluma Blvd. South at Highway 101 NB On-Ramp				
NB Left	8.5	A	8.0	A

Table V.J-6 shows intersection queues at the 95th percentile. Note that with the modifications to Petaluma Boulevard South, northbound through movement queues would extend 800 feet, which is beyond Landing Way.

Table V.J-6
Near-Term Cumulative Without Project Queuing

Location	Estimated Storage (feet per lane)	95th Percentile Queue (feet per lane)	
		AM Peak Hour	PM Peak Hour
Petaluma Blvd. South / Highway 101 SB Ramps			
NB Left Turn	500	25	25
NB Through	500	50	800
SB Right Turn	>1000	250	50
SB Through	>1000	50	25
EB Left Turn	>1000	25	75
EB Right Turn	50	25	25
Petaluma Blvd. South / Landing Way			
SB Left Turn	200	25	25
Petaluma Blvd. South / Highway 101 NB On-Ramp			
NB Left Turn	450	25	25

Table V.J-7 shows near-term cumulative highway operations. Under near-term cumulative conditions, highway operations on the mainline section of Highway 101 southbound, south of Petaluma Boulevard, degrade from LOS E to LOS F. The southbound on-ramp continues to operate at LOS F whereas other facilities appear to operate acceptably.

Table V.J-7
Near-Term Cumulative Highway Operations

Location	LOS	
	AM	PM
Mainline Segments		
Highway 101 SB-North of Petaluma Blvd South	F	B
Highway 101 SB-South of Petaluma Blvd South	F	B
Highway 101 NB-South of Petaluma Blvd South	C	D*
Highway 101 NB North of Petaluma Blvd South	C	C*
Ramp Merge and Diverge		
SB Off-Ramp	F	B
SB On-Ramp	F	A
NB Off-Ramp	B	C
NB On-Ramp	A	B

**Level of Service may be worse because traffic flow volumes are attenuated by congestion*.

2020 Cumulative Conditions

The cumulative analysis was performed for a horizon year of 2020 to reflect conditions with foreseeable General Plan growth. Dowling obtained 2020 traffic from the Sonoma County model for the highway segments. The model incorporates a number of transportation and land use projects that comprise the cumulative setting. The 2020 model includes widening of Highway 101 north and south of the Petaluma Boulevard South interchanges to include High Occupancy Vehicle (HOV) lanes. The 2020 forecasts do not anticipate any interchange improvements as this was not included in the forecasting model and the Marin Sonoma Narrows (MSN) project was not fully funded at the time of the circulation of the Notice of Preparation. Considerations relating to completion of the MSN project are considered under the subheading "Marin Sonoma Narrows Project" incorporated at the end of the discussion of impacts and mitigations below.

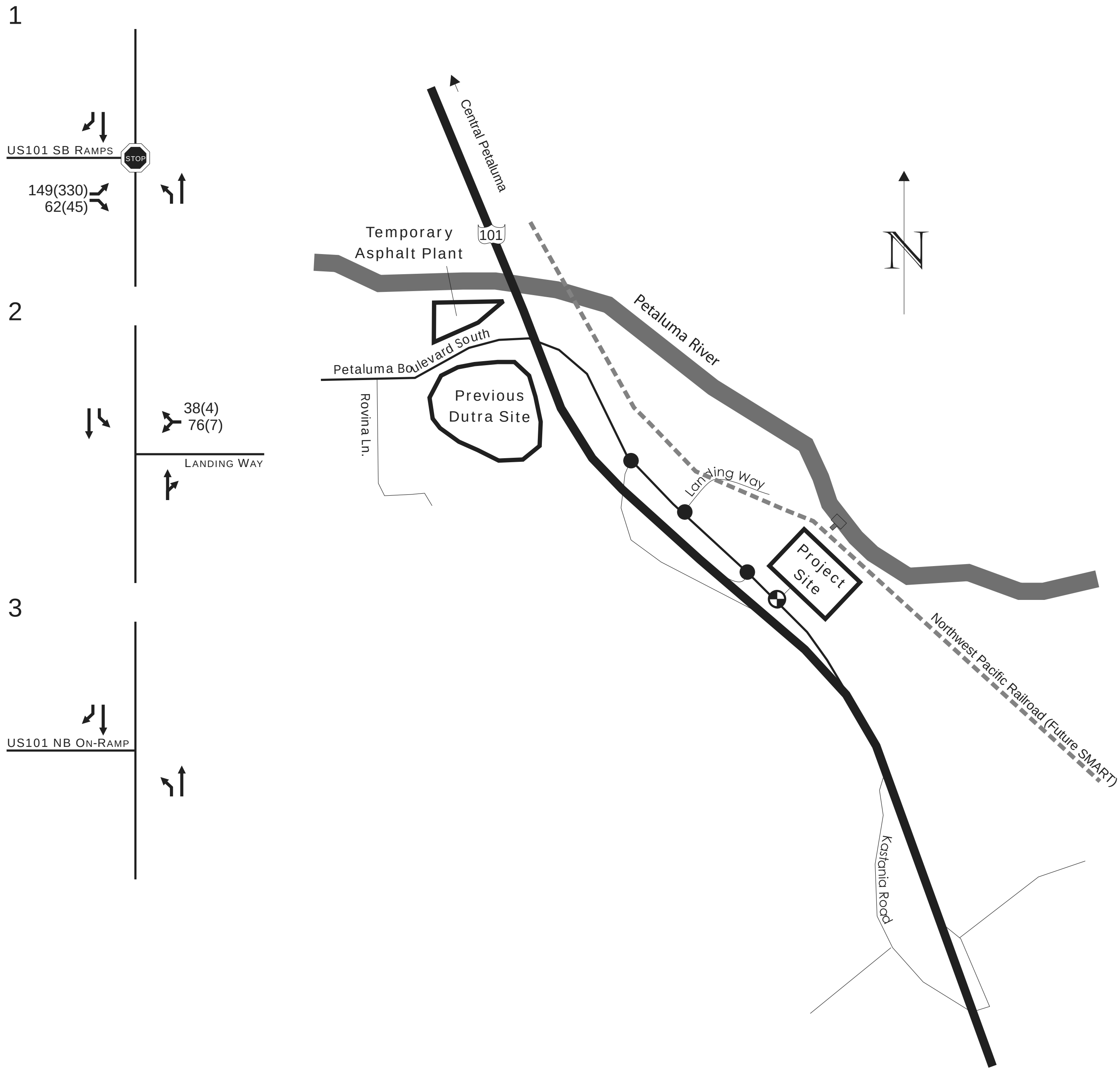
On Petaluma Boulevard South, the results of the model did not reflect substantial background traffic growth. As a result, existing and near-term project traffic were increased by a growth factor of two percent per year. This is consistent with growth trends.

SMART Passenger Rail - The Sonoma-Marin Area Rail Transit District (SMART) proposes to use the tracks for commuter rail service from Cloverdale to Larkspur. Nearby stations would be located in Downtown Petaluma and Novato. Peak hour service is expected to run on 30-minute headways. The right-of-way would incorporate a pedestrian/bike path along its entire length. SMART has primary jurisdiction over the Northwest Pacific Railroad right-of-way, including air rights. The forecasts do not assume that any travel is taking place on the SMART railroad. No reductions have been made to the vehicle forecasts on the basis of rail ridership. The SMART railroad is only addressed to evaluate the project impact on the rail right-of-way.

Other Background Development - In addition to the projects specified under near term cumulative conditions the model also includes growth consistent with minor land use proposals throughout Sonoma County. The official travel demand forecasting model, the 2020 Sonoma County Model, includes all foreseeable background growth and transportation improvements throughout the region.

Figure V.J-3 shows projected lane configurations and peak hour intersection turning movements at the study intersections.[4] Table V.J-8 shows 2020 cumulative intersection levels of service. Under cumulative 2020 conditions, Petaluma Boulevard South/Highway 101 southbound ramps would operate unacceptably at LOS F during the PM peak hour while the westbound left turn from Landing Way onto Petaluma Boulevard South would operate at LOS F during the AM peak period. Peak hour signal warrants would not be met at any of the unsignalized intersections.

[4] *Minor adjustments to volumes have been made to account for links not included in the model; in this case the interchange proposal includes fronting roadways along the highway to provide access to properties south of Petaluma Boulevard South. For cumulative analysis a minimum peak hour volume of 10 vehicles per hour is used for all permissible turning movements.*



Source: Dowling Associates, 2007.

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Figure V.J-3
Cumulative 2020 without Project
Turning Movements

Table V.J-8
Cumulative 2020 Without Project Intersection LOS

Location	Near-Term Cumulative Without Project			
	AM		PM	
	Delay	LOS	Delay	LOS
Petaluma Blvd. South at Highway 101 SB Ramps	53.3	F	148.7	F
Petaluma Blvd. South at Landing Way				
SB Thru Left	11.1	B	10.2	B
WB Approach	108.4	F	23.6	C
Petaluma Blvd. South at Highway 101 NB On-Ramp				
NB Left	83.3	A	8.0	A

Table V.J-9 illustrates queuing conditions under cumulative 2020 conditions. Note that the northbound queues at the Petaluma Boulevard South/Highway 101 southbound ramps intersection would extend beyond the available storage during the PM peak period.

Table V.J-9
Cumulative 2020 Without Project Queuing

Location	Estimated Storage (feet per lane)	95th Percentile Queue (feet per lane)	
		AM Peak Hour	PM Peak Hour
Petaluma Blvd. South / Highway 101 SB Ramps			
NB Left Turn	500	25	25
NB Through	500	50	1275
SB Right Turn	>1000	525	50
SB Through	>1000	50	25
EB Left Turn	>1000	25	75
EB Right Turn	50	25	25
Petaluma Blvd. South / Landing Way			
SB Left Turn	200	25	25
Petaluma Blvd. South / Highway 101 NB On-Ramp			
NB Left Turn	450	25	25

Under cumulative conditions the highway would be expanded to include an HOV lane in each direction. Under cumulative conditions the southbound segments north and south of Petaluma Boulevard South would operate unacceptably during the AM peak hour. The southbound on-ramp would operate unacceptably during the AM peak period. Table V.J-10 summarizes highway operations analysis.

Table V.J-10
Cumulative 2020 Highway Operations

Location	LOS	
	AM	PM
Mainline Segments		
Highway 101 SB-North of Petaluma Blvd South	D	B
Highway 101 SB-South of Petaluma Blvd South	F	B
Highway 101 NB-South of Petaluma Blvd South	B	D*
Highway 101 NB North of Petaluma Blvd South	B	C*
Ramp Merge and Diverge		
SB Off-Ramp	C	B
SB On-Ramp	F	A
NB Off-Ramp	B	B
NB On-Ramp	A	B

**Level of Service may be worse because traffic flow volumes are attenuated by congestion.*

REGULATORY SETTING

Federal and State

No Federal policies and/or regulations would supersede local transportation guidelines. The Caltrans' Guidelines for the Preparation of Traffic Impact Studies establishes the methodologies for the evaluation of impacts to State facilities. These are consistent with the thresholds of significance outlined in Appendix G of the CEQA Guidelines, the local policies and guidelines associated with circulation and transportation as defined by Sonoma County.

Regional and Local

The applicable transportation and traffic policies contained in the Sonoma County General Plan are analyzed in the Policy Analysis in Section V.H (Land Use). Additionally, applicable policies outlined within the Petaluma Daily Belt Area Plan are analyzed in further detail in Section V. H (Land Use).

The U.S. Coast Guard has jurisdiction over waterborne traffic along the Petaluma River. The Coast Guard's policy is to refer changes to traffic along the San Francisco Bay and tributary waterways before the Harbor Safety Committee for a hearing before issuing findings. The Harbor Safety Committee is the body mandated by the State to adopt and review a Harbor Safety Plan for the San Francisco Bay and tributary waterways. The Harbor Safety Committee works with the Coast Guard in an advisory role to propagate guidelines for safe navigation of tankers, barges and other commercial vessels.

ENVIRONMENTAL IMPACTS

Proposed Project

The proposed project consists of relocating an existing asphalt facility from a site approximately one mile north of the proposed Haystack Landing site. The proposed facility would produce asphalt, recycled asphalt and concrete products, and general aggregate construction materials such as sand and rock, accessible by truck for public works and private construction projects in southern Sonoma County and Marin County. Figure V.J-4 shows the project site layout and major circulation paths.

The project site is located adjacent to the Highway 101 northbound off-ramp and is divided by the SMART railroad tracks. A barge off-loading facility would be constructed in the Petaluma River (Area A) for use in the delivery of raw materials for aggregate processing on-site.

The new asphalt plant would operate similarly as it currently does at the nearby existing site, with little change in the hours of operation or number of employees. This consists of operation from 6 AM to 6 PM, Monday through Friday with ten employees on site. The proposed facility is anticipated to process 664,175 tons of material annually.

As discussed in Section III (Project Description), the site would receive 500,000 tons of material annually by barge. This would result in roughly 125 annual barge trips along the Petaluma River. Material would be transported from the barge onto the new dock and then to the processing areas on-site by way of an elevated conveyor. This conveyor would be constructed 24 feet above the ground in order to clear the SMART railroad tracks and on-site truck circulation paths.

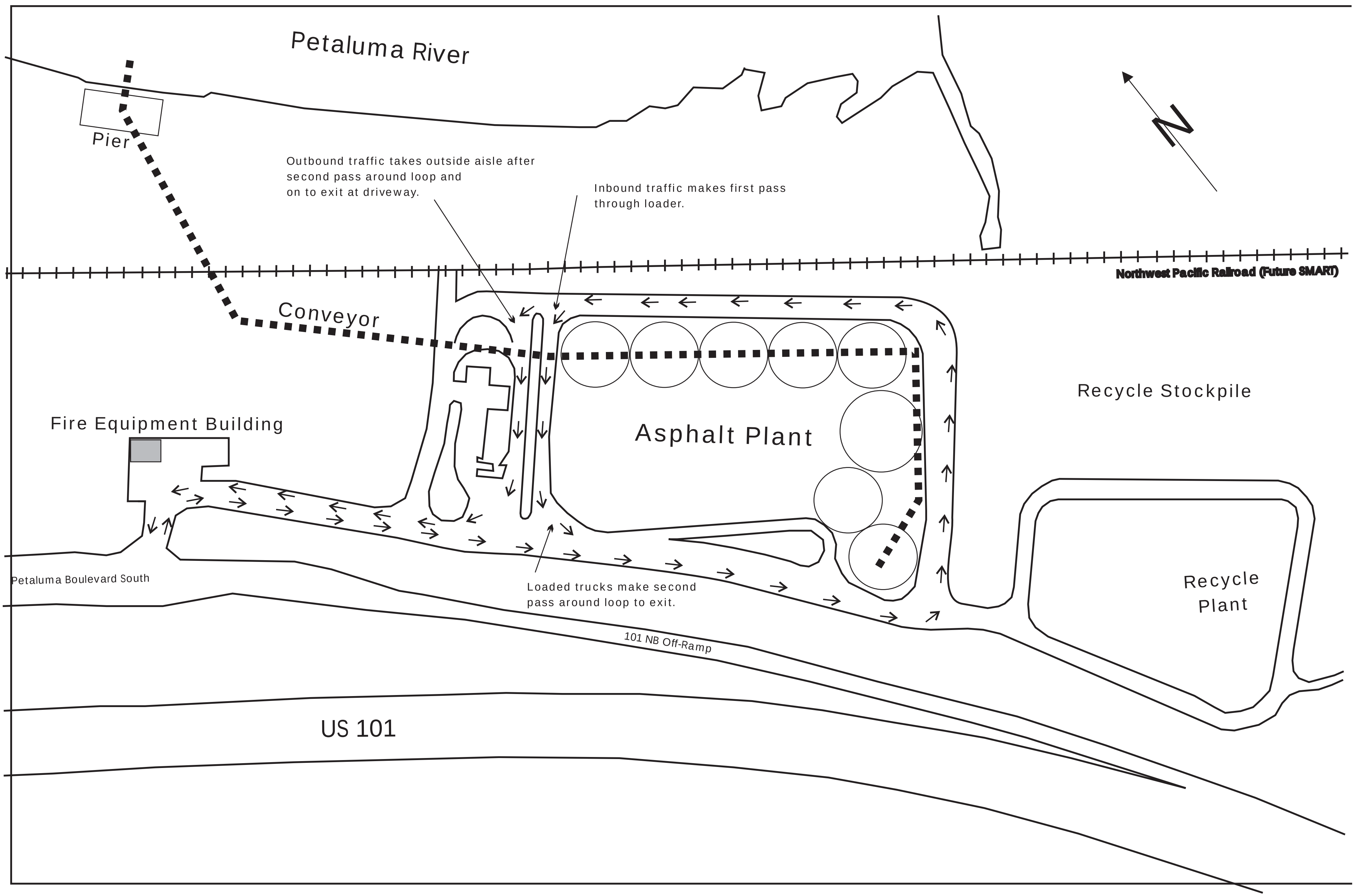
Recycled asphalt product (RAP) and concrete, derived from construction and demolition projects in the region, would be imported and processed on the site. Materials coming in via truck would include approximately 150,000 tons of RAP and concrete.

The proposed project also includes the relocation of the San Antonio Volunteer Fire Department to the project site.

Improvements to Petaluma Boulevard South

As described in Section III (Project Description), the project would make improvements to Petaluma Boulevard South. The applicant has committed to reconstructing the road to bring the northbound and southbound lanes of Petaluma Boulevard South to the same level. The preliminary plans provided by the applicant include a cross-section between the project site and the northbound on-ramps providing one southbound lane, one northbound left turn lane, one northbound through lane, and one northbound acceleration lane extending 560 feet north of the project driveway. Barriers would be installed opposite of the project driveway as no access points would be provided south of the project site.

The proposed driveway would be elevated above the existing driveway, and a vegetation-free buffer has been required for a minimum setback of 20 feet from the public right-of-way. As a result of these improvements a clear line-of-sight would exist between the project driveway and the gore point of the northbound off-ramp 1,200 feet further to the south. This is adequate site distance for off-ramp traffic.



Source: Dowling Associates, 2006.

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Figure V.J-4
Project Site Layout

According to the Caltrans Highway Design Manual, a stopping distance of 600 feet is adequate at 60 miles per hour. The safety of inbound left turns would benefit from stopping distances in excess of the minimum, as they would be visible from the gore point of the ramp.

The County would require that the project driveway meet its standard commercial driveway standards. The final requirements would be consistent with the Highway Design Manual and any design requirements of the San Antonio Volunteer Fire Department. The Northbound (inbound) right turn lane would be served by a deceleration lane with 575 feet of deceleration distance. Figure V.J-5 shows the preliminary site access condition with the proposed improvements to Petaluma Boulevard South. Note that in the final design the northbound and southbound approach lanes would need to be designed for transition to eliminate the existing offset.

As a condition of approval for the project the County expects to require an asphalt overlay from Highway 101 northbound exit ramp (within Caltrans right-of-way) to north of northbound Highway 101 hook ramp intersection for lane striping continuity.

Start-Up Phase

The project may undergo a start-up period where aggregate production at the site would draw material primarily from the San Rafael quarry prior to completion of the barge off-loading facility. The applicant has indicated that this phase would entail temporarily trucking in aggregate to sustain a scaled down level of production. Potential impacts related to this start-up period are considered under the subheading entitled "Start-up Phase" below.

As mentioned above, the project also includes an equipment building and training facility for the San Antonio Volunteer Fire Department. The building would provide storage for four vehicles. It is anticipated that up to 150 emergency calls would occur per year in addition to training activities scheduled during non-peak commute hours.

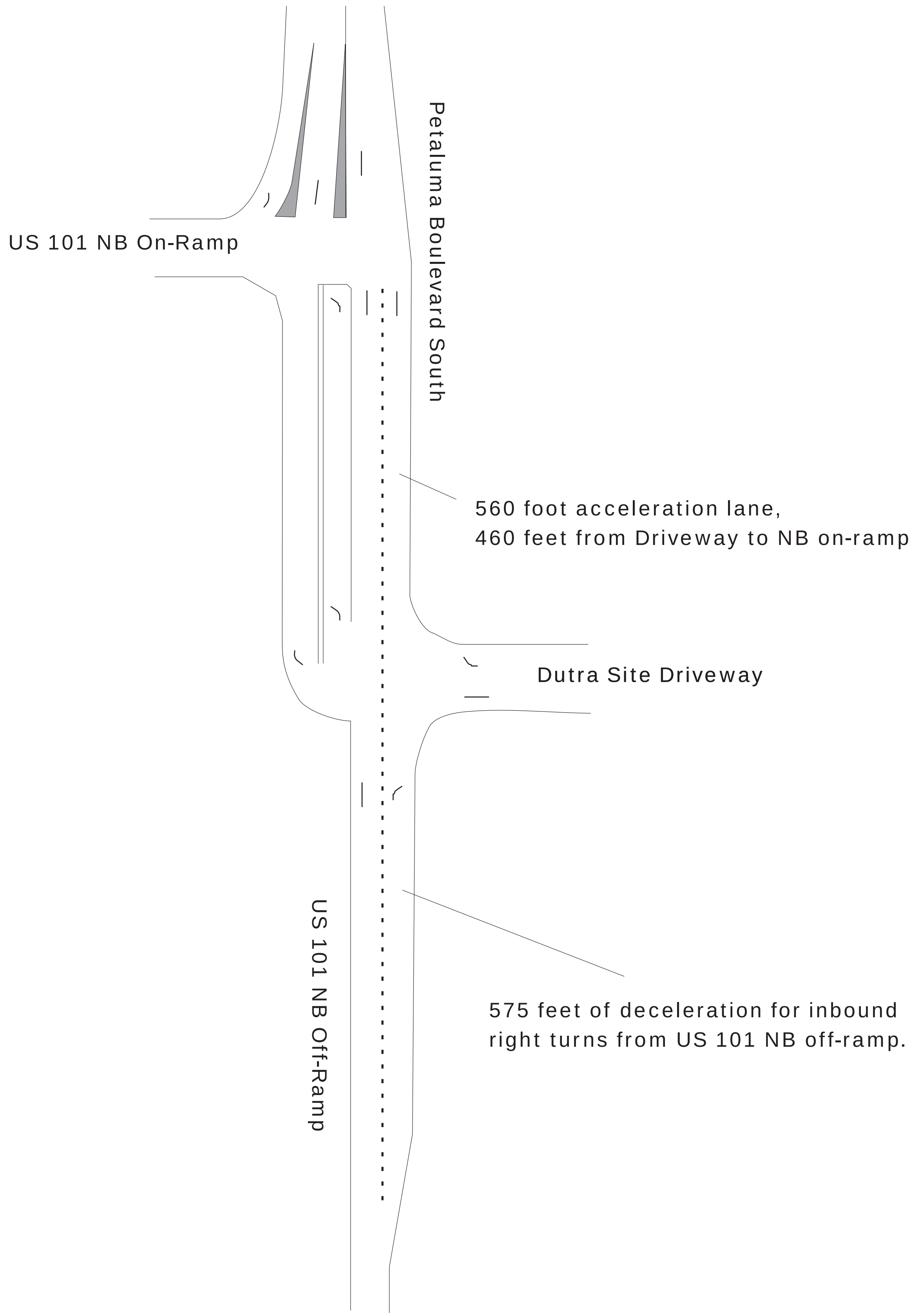
Trip Generation

Project traffic impacts are evaluated by adding project trip generation to background levels of traffic. Project trip generation is established by converting the amounts of material imported and exported to the site into trips based on the capacity of each conveyance.

The methodology for calculating project traffic is described below and illustrated in Table V.J-11. The contribution of miscellaneous traffic is also described and shown. After project trip generation is determined these trips must be assigned to the study network for analysis. At the traffic assignment stage, it is important to remove traffic that currently is generated at the temporary facility.

New Truck Traffic Assumptions

The truck and barge trip generation is established by converting loads into trips based on load capacity. The annual throughput of material through the site is obtained from the project description. It is assumed that all importing conveyances leave the site empty and that all exporting conveyances arrive at the site empty. In the next step, the annual traffic is converted to average daily traffic by dividing the annual traffic generation by 250 working days per year. The truck traffic is then adjusted to include a seasonal peaking factor. Based on previous studies, the County has set the factor at three (3.0). This adjustment results in the average peak daily traffic. Daily truck traffic is converted into hourly truck traffic by dividing the peak daily traffic by ten hours, which assumes hauling occurs from 6 AM to 4 PM and that no hauling occurs from 4 PM to 6 PM. This assumption is consistent with the observations provided by Fehr and Peers at the existing temporary facility (see Appendix I). Each truck trip is evaluated as three passenger car equivalents, as is consistent with other County Studies. Note that exhibits in the study reflect trips in terms of actual vehicles and not passenger car equivalents.



Source: Dowling Associates, 2006.

Figure V.J-5
Preliminary Site Access Proposal

The project description indicates that the material importation would be conducted using a mix of barges and 23 ton trucks, while exportation would be conducted using a mix of trucks from 1-ton light pickups to 23-ton trucks, with an average of 12-tons per truck assumed.

Non-Truck Vehicle Traffic Assumptions

Additional traffic would be generated by the San Antonio Volunteer Fire Department's vehicle trips to and from the fire facility proposed on-site. It is assumed that vehicle trips to and from the San Antonio Volunteer Fire Department facility would not occur during peak hours.

Total New Trip Generation at Project Site

The total new trip generation is obtained by adding the truck and non-truck vehicle traffic assumptions summarized above. Table V.J-11 summarizes total new project trip generation. On the basis of the trip generation, assessment of an aggregate fee consistent with Sonoma County's Aggregate Resource Management (ARM) Plan would be required. The applicant would be required to pay the ARM fee on the basis of the increment of new truck traffic generated by the project.

Table V.J-11
New Project Trip Generation

Description	Amount	Mode and Capacity		Barge Trips			Trips		
				In	Out	TOT	In	Out	TOT
IMPORT									
Aggregate	425,000 tons	Barge	4,000 tons	106	106	213			
Sand	75,000 tons			19	19	38			
Crumb Rubber	675 tons	Truck	23 tons				29	29	59
Recycled Asphalt & Concrete	150,000 tons						6,522	6,522	13,043
Water Tank	3,250,000 gals	Tanker Truck	10,000 gallons				325	325	650
Asphalt Oil*	*3,172,000 gals						317	317	634
Subtotal	**650,675 tons** **6,422,000 gals**			**125**	**125**	**250**	**7,193**	**7,193**	**14,387**
EXPORT									
Aggregate	245,800 tons	Truck	12 tons				20,483	20,483	40,967
Sand	43,375 tons						3,615	3,615	7,229
Recycled Asphalt	150,000 tons						12,500	12,500	25,000
Asphalt	225,000 tons						18,750	18,750	37,500
Subtotal	**664,175 tons**			**0**	**0**	**0**	**55,348**	**55,348**	**110,696**
Total Annual Trips							***62,541***	***62,541***	***125,082***
Average Annual Daily Traffic (AADT) (= Annual / 250 work days per year)				0.5	0.5	1	250	250	500
Adjusted Daily Trips (with Peaking Factor = AADT x3.0)				2	2	3	750	750	1501
AM Peak Hour Truck Trips (= Daily Trips / 10 hours per day)							75	75	150
PM Peak Hour Truck Trips (none based on existing pattern)							0	0	0
AM Peak Hour Passenger Care Equivalents (= Truck Trips x 3)							225	225	450
PM Peak Hour Passenger Care Equivalents (= Truck Trips x 3)							0	0	0
Peak Hour Non-Truck Vehicle Trips									
AM Peak Trips (Employee Trips only)							10	0	10
PM Peak Trips (Employee Trips only)							0	10	10
Total Peak Hour Trip Generation									
Total Trips AM							235	225	460
Total Trips PM							0	10	10

** 3,172,000 gallons of oil equals 13,500 tons*
Source: Fehr and Peers, 2004.

Calculation of ARM Fee

The County has determined that the basis for calculating the ARM fee for the proposed project will be the difference between the annual asphalt production from the proposed project and the baseline asphalt production from the existing temporary site. This allows the applicant to receive the appropriate level of credit for the baseline level of production.

Under the proposed project the site would export 225,000 tons of asphalt per year. County staff has determined that the baseline condition is best represented by the five-year average asphalt production at the temporary facility. This five-year average has been calculated to be 131,500 tons of asphalt per year. The difference, which represents the project increment, is therefore 93,500 tons per year.

As established under the section on trip generation above, the average capacity of vehicles used to export asphalt from the site is 12 tons. Therefore, the annual increment of asphalt production traffic will be 7,792 vehicles. The ARM fee can be assessed upon the proposed project based on a net increment of 93,500 tons per year and 7,792 annual truck trips.

Trip Distribution

The distribution of project trips was based upon existing travel data, information contained in the Fehr and Peers Study, and information supplied by the applicant. Table V.J-12 shows the project's estimated macro distribution. It should be noted that this distribution is subject to some fluctuation given the distribution of customers for the asphalt material.

Table V.J-12
Project Trip Distribution

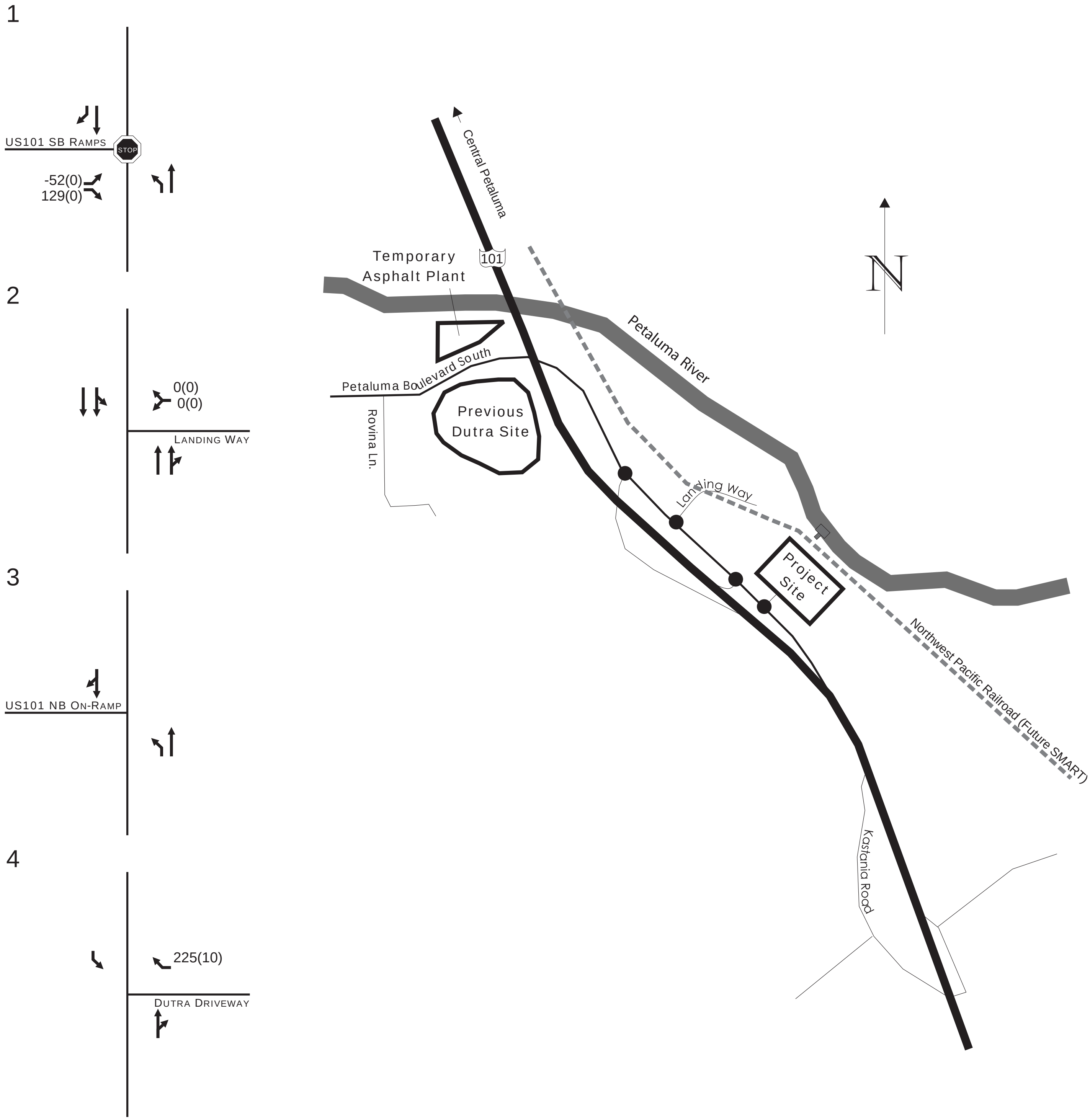
Distribution	To / From
55%	Highway 101 to / from the North
25%	Petaluma Blvd South to / from the West
20%	Highway 101 to / from the South

Figure V.J-6 shows the micro distribution, or assignment, of project trips. Trips are shown as passenger car equivalents, so truck trips are represented as three passenger car trips each. As trips are assigned, new project trip generation is added to the network at study locations, while traffic from the temporary facility is deducted from turning movements.

Baseline Peak Hour Traffic

Peak hour baseline traffic was counted at the driveway of the temporary site and recorded in the 2004 Fehr and Peers Study, Dutra Asphalt Relocation Project. Baseline peak hour traffic is 130 AM and 10 PM peak hour passenger car equivalents (PCE). When the temporary facility is eliminated, this traffic will be shifted to the new site and is already reflected in the project trip generation.

Figure V.J-7 shows the final existing plus project turning movements. This represents the peak hour "delta" or increment between the baseline and the project conditions. The peak hour baseline as represented by the observed driveway volumes is assumed to be representative of the average asphalt production activity at the temporary site.



Source: Dowling Associates, 2007.

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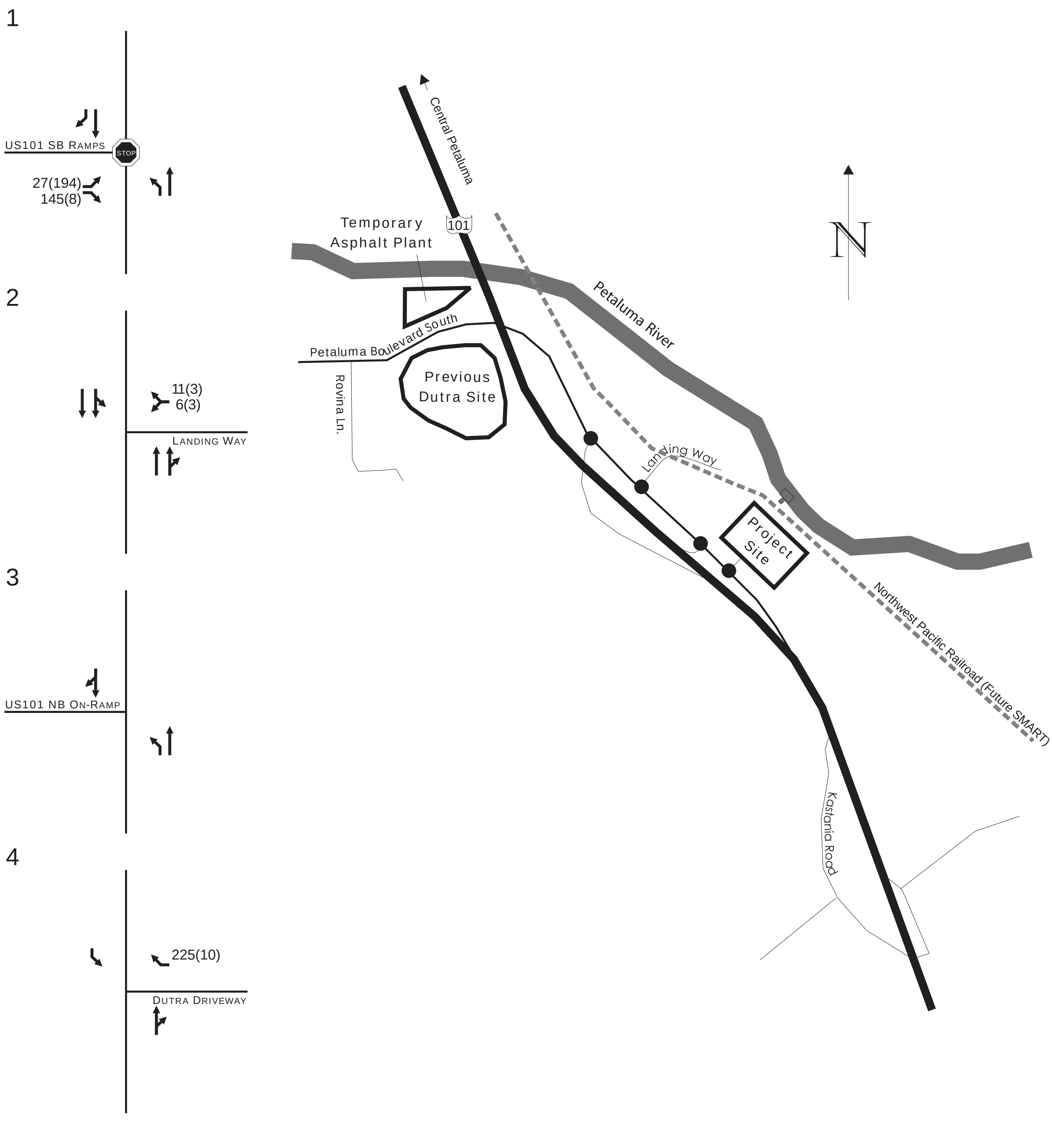
Figure V.J-6
Project Traffic Assignment



Source: Dowling Associates, 2007.

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Figure V.J-7
Existing Plus Project
Turning Movements

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, a project would have a significant transportation/traffic impact if it would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number or vehicle trips, the V/C ratio on roads, or congestion at intersections);
- Exceed, either individually or cumulatively, a LOS standard established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access;
- Result in inadequate parking capacity; or
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

The following are Sonoma County criteria:

Intersection LOS Criteria

Intersection LOS criteria apply to all signalized, all-way stop controlled, and side street controlled intersections with project traffic volumes over 30 vehicles per hour on any approach or exclusive left turn movement.

The thresholds apply to unsignalized intersections only where peak hour signal warrants are satisfied. This incorporates the evaluation of warrants at unsignalized intersections between public roads and private driveways. This represents a refinement of the Sonoma County Traffic Assessment Guidelines, particularly in that the guidelines do not explicitly contemplate the evaluation of signal warrants at private driveways. It is appropriate in this case given the nature of the traffic along Petaluma Boulevard South and the volume of traffic at the proposed project driveway and at Landing Way.

The County level of service standard for intersections is LOS D or better. A project would have a significant traffic impact if the project's traffic would cause an intersection currently operating at an acceptable level of service (LOS D or better) to operate below standard (LOS E or F).

If an intersection currently operates, or is projected to operate below the County standard at LOS E, an impact is identified if the project causes the LOS to further degrade to LOS F. If an intersection is already operating at LOS F, the project's impact is significant and cumulatively considerable if it causes the delay to increase by five seconds or more. The delay would be determined by comparing intersection operations with and without the project's traffic for both the existing baseline and project future conditions.

Delay on side streets where traffic does not satisfy peak hour warrants is considered a less-than-significant impact.

Highway LOS Impact Criteria

Highway facilities, including highway mainline segments and ramp merge and diverge areas, would normally be evaluated based on Caltrans urban area level of service threshold which is LOS D. A project would result in a significant impact if it would cause degradation from LOS D to LOS E. For facilities already operating at LOS E, significant impacts would result if the project would cause the level of service to degrade to LOS F. Where facilities already operate at LOS F, a significant impact would result if the project adds any additional peak hour traffic.

Queuing Impact Criteria

The project would cause significant intersection queuing impacts if it would cause queues to extend beyond available storage or contribute to existing queues that already extend beyond the available storage area.

Traffic Impact Safety Criteria

The project would cause a significant impact to traffic safety if it would cause traffic movements that are unsafe, or includes design features that conflict with established standards.

Transportation Policy Impact Criteria

The project would cause a significant impact if it would cause conditions that are not consistent with the adopted plans and policies of state or local agencies, or agencies with planning jurisdiction over transportation routes and facilities.

Issues Not Analyzed Further

Section IV (Summary of the Initial Study) of the Draft EIR discusses the use of the Initial Study to scope the potential impacts evaluated in this Draft EIR. The Transportation and Traffic impacts that the Initial Study determined would not to rise to the level of significance are discussed below but do not require further analysis in this section. This includes the following:

- The project would not result in inadequate emergency access.
- The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- The project would not result in inadequate parking capacity.
- The project would not conflict with adopted policies, plans, or programs supporting alternative transportation.

Start-up Phase

Depending on the timing of project approvals, there may be a period where some production would take place on the site prior to completion of the barge off-loading facility. In this situation, all of the material would be trucked to the site, with 80 percent expected to come from the San Rafael quarry. The applicant has established that the amount of production during start-up would be reduced in comparison to the build out production levels and has supplied figures for the amount of import and export activity at the site during the temporary start up-period. Table V.J-13 shows the level of import and export activity at the site and converts this into AM peak hour trips. Since PM peak hour trips only consist of employee trips, and these are not expected to change, PM trips are not considered in the start-up condition.

Table V.J-13
Start-up Production and AM Peak Hour Traffic

Material	Amount	Capacity/ Vehicle	Vehicles	Trips per day @ 250 work days per year	Adjusted AADT[1] (w/Peaking factor=3.0)	Peak Hour Trips @ 10 hrs/day	PCE[2]	In	Out	Total
IMPORT										
Asphalt Oil*	*3,172,000 gals	10,000 gals	317	1	4	0	3	3	3	6
Aggregate	260,000 tons	23 tons	11,304	45	136	14	42	42	42	84
Sand	47,000 tons	23 tons	2,043	8	25	2	9	9	9	18
Crumb Rubber	675 tons	23 tons	29	0	0	0	3	3	3	6
							Total Import	***57***	***57***	***114***
EXPORT										
Aggregate	155,000 tons	12 tons	12,197	52	155	16	48	48	48	96
Sand	28,175 tons	12 tons	2,348	9	28	3	9	9	9	18
RAP**	50,000 tons	12 tons	4,167	17	50	5	15	15	15	30
Asphalt	138,000 tons	12 tons	11,500	46	138	17	42	42	42	84
							Total Export	***114***	***114***	***228***
							Subtotal	**171**	**171**	**342**
AM Peak Hour Employee Trips								10	0	10
							Total AM Peak Hour Trips	**181**	**171**	**352**

[1] Annual Average Daily Traffic
[2] Passenger Car Equivalents
**3,172,000 gallons of oil equals 13,500 tons*
*** Recycled Asphalt Product*

The total traffic, 352 peak hour trips, is less than the 460 AM peak hour trips expected for the full build out production conditions.[5] The distribution of the traffic is slightly different under the two situations. The delivery of aggregate during the start-up phase would follow a pattern of 80 percent from the San Rafael quarry from the south, and 20 percent from the north on Highway 101 (rather than the 20 percent from the south, 55 percent from the north and 25 percent from the west for all other traffic). As a result, traffic on the Highway 101 northbound off-ramp, the Highway 101 southbound off-ramp and at the northbound left turn

5 *Note also that for the Start-up condition, the rate of traffic assumed for raw aggregate import is within the allowable limit established for the San Rafael Quarry of 30 per hour (ESA, 2007, San Rafael Rock Quarry Amended Quarry Permit Initial Study).*

at Petaluma Boulevard South/Highway 101 Ramps would be 20 passenger car equivalents higher than under the full build out condition (roughly 7 trucks).

The increment additional traffic at these three locations occurring during the start-up phase has been evaluated for intersection levels of service, queuing and freeway impacts. There are no impacts resulting from the start-up phase that exceed what is anticipated for conditions with the project's production process in full operation.

Project Impacts and Mitigation Measures for Project Build Out Conditions

Project impacts are evaluated by comparing traffic conditions and measures of performance with project traffic against the significance criteria described above. Mitigation measures listed below for the project's significant traffic impacts would be required in addition to the project's proposed improvements to Petaluma Boulevard South described above and in Section III (Project Description).

Impact TRANS-1 Intersection Level of Service Impacts

Table V.J-14 shows existing plus project intersection levels of service in 2006 at the time the study was initiated. Subsequent roadway improvements and traffic from projects approved but not yet constructed at that time are included in the near-term cumulative scenario, rather than the existing (2006) conditions. All intersections operate acceptably under existing plus project conditions. None of the intersections warrants signals. Impacts related to intersection level of service would be ***less than significant*** and no mitigation measures are required.

Table V.J-14
Existing and Existing Plus Project Intersection Levels of Service

Location	Existing				Existing Plus Project			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Petaluma Blvd South at Highway101 SB Ramps								
NB Thru Left	9.2	A	7.9	A	9.5	A	7.9	A
EB Left	11.3	B	14.5	B	12.2	B	14.7	B
EB Right	9.4	A	8.9	A	10.3	B	8.9	A
Petaluma Blvd South at Landing Way								
SB Thru Left	7.7	A	8.8	A	7.8	A	8.9	A
WB Approach	9.7	A	12.5	B	10.4	B	12.6	B
Petaluma Blvd South at Highway 101 NB On-Ramp								
NB Left	7.7	A	7.6	A	8.4	A	7.6	A
Petaluma Blvd south at Project Driveway								
SB Left	-	-	-	-	8.2	A	0.0	A
WB Right	-	-	-	-	11.1	B	12.7	B

Impact TRANS-2 Queuing Impacts

Queuing is shown in Table V.J-15. At no location would the existing plus project queue longer than available storage at the 95th percentile. Although the project would add truck traffic to the northbound left turn lane from Petaluma Boulevard South to the US 101 northbound on-ramp, significant queues would not form because there is a very low volume of cross traffic headed southbound on Petaluma Boulevard South. Impacts related to queuing would be ***less than significant*** and no mitigation measures are required.

Table V.J-15
Existing Plus Project Queuing

Location	Estimated Storage (feet per lane)	95th Percentile Queue (feet per lane)	
		AM Peak Hour	PM Peak Hour
Petaluma Blvd. South / Highway 101 SB Ramps			
NB Left Turn	500	25	25
EB Left Turn	>1000	25	75
EB Right Turn	50	25	25
Petaluma Blvd. South / Landing Way			
SB Left Turn	200	25	25
Petaluma Blvd. South / Highway 101 NB On-Ramp			
NB Left Turn	450	25	25
Petaluma Blvd South / Project Driveway			
SB Left Turn	100	25	25

Impact TRANS-3 Highway Impacts

The project would add traffic to ramp movements and to Highway 101 mainline in both directions. Under existing conditions the highway mainline operates unacceptably in the southbound direction during the AM peak hour. Additional traffic from the project would exacerbate already unacceptable conditions; therefore, this is a ***significant*** impact. County staff indicate that although flow volumes are not high in the northbound direction during the PM peak hour, this is often because highway flow breaks down. Additional truck traffic would exacerbate this condition. This is a ***potentially significant*** impact. The project would also add traffic to the congested southbound ramps during the AM peak hour. This is also a ***significant*** impact. Overall, the project creates ***significant*** impacts to Highway 101 operations. Table V.J-16 summarizes highway operations.

Table V.J-16
Existing and Existing Plus Project Highway Operations

Location	Existing		Existing Plus Project	
	LOS		LOS	
	AM	PM	AM	PM
Mainline Segments				
Highway 101 SB-North of Petaluma Blvd South	F	B	F	B
Highway 101 SB-South of Petaluma Blvd South	F	B	F	B
Highway 101 NB-South of Petaluma Blvd South	B	D*	C	D*
Highway 101 NB-North of Petaluma Blvd South	B	C*	C	C*
Ramp Merge and Diverge				
SB Off-Ramp	F	B	F	B
SB On-Ramp	F	A	F	A
NB Off-Ramp	B	B	B	C
NB On-Ramp	A	B	A	B

**Level of Service may be worse because traffic flow volumes are attenuated by congestion.*

Mitigation Measure TRANS-3a

The project shall be conditioned to require a fair share contribution towards the planned construction of High Occupancy Vehicle (HOV) lanes along the highway mainline. The added HOV capacity would improve highway operations to a minimum level of service (LOS E) in the southbound direction south of Petaluma Boulevard South. This would be an improvement over the existing conditions of LOS F.

This is a planned improvement that Caltrans intends to serve existing traffic and background growth in traffic, therefore the project's fair share would be computed as a proportion of total near term cumulative traffic.

The project sponsor shall fund a fair share towards any planned interchange improvements for the Highway 101/Petaluma Boulevard South interchange project. Since improvements have been planned and are intended to address existing conditions, and not simply future growth, a fair share is calculated as the project share of total peak hour traffic on the northbound and southbound ramps. Such an interchange is planned by Caltrans as part of the Marin Sonoma Narrows Project. Participation by the project sponsor would need to be coordinated with Caltrans. The future dedication of Caltrans right-of-way situated within the project site for the Highway 101/Petaluma Boulevard South interchange project may be used in part or all of the fair share contribution.

Mitigation Measure TRANS-3b

The project shall be conditioned to prohibit material export during the PM peak period from 4 PM to 6 PM. The trip generation determination assumes that no truck traffic would occur during the PM peak hour, based on existing patterns at the temporary site. The condition would eliminate the potential for some truck traffic to slip through during the PM peak hour. County staff anticipates that Caltrans input would be required.

Impact TRANS-4 Safety Impacts

The path of trucks onto Petaluma Boulevard South and between the project driveway and the Highway 101 northbound on-ramp would create potential conflicts with traffic exiting on the northbound Highway 101 off-ramp. Because traffic exits Highway 101 at speeds around 60 miles per hour, sufficient gaps in the off-ramp traffic must be provided to allow trucks to enter. The applicant's proposed acceleration lane would allow trucks to enter Petaluma Boulevard South with smaller gaps in the northbound Highway 101 off-ramp traffic, but would create a weaving problem.

The acceleration requirements for the entering traffic can be analyzed by reference to AASHTO and other studies on the acceleration requirements of heavy trucks. Weaving is assessed by considering the space available for the weaving maneuver.

Acceleration of Northbound Trucks

The proposed acceleration lane would extend 560 feet north from the project driveway and would terminate just north of the northbound on-ramps. The American Association of State Highway and Transportation Official's (AASHTO) reference, A Policy on Geometric Design of Highways and Streets (referred to as the Greenbook) indicates that the minimum acceleration distance for a design vehicle to travel from stop to merge with 45 mile per hour traffic is 560 feet, which matches the proposal. The design vehicle is assumed to have a weight-to-power ratio of 100 pounds-to-horsepower, however, which does not represent a fully loaded 23-ton truck. When fully loaded, such larger capacity vehicles would have a substantially higher weight-to-power ratio. National Cooperative Highway Research Program (NCHRP) Report 505-Review of Truck Characteristics specifies a more appropriate ratio of 180 pounds-to-horsepower. Given this parameter, the appropriate acceleration distance would be 800 feet. The NCHRP report acknowledges that this parameter may lead to excessive acceleration distances, but given that the weight-to-power ratio of a fully loaded 23-ton capacity truck may exceed 200 pounds-to-horsepower, it is evident that 560 feet is potentially inadequate.

Weaving from Driveway to Highway 101 Northbound Ramps

The Highway Capacity Manual establishes a methodology to evaluate weaving between two high-speed highway facilities, but not to evaluate weaving between driveways and surface streets like Petaluma Boulevard South. Instead, the weave must be evaluated by judging the dimensions of the area available for it to occur.

The proposed access would force northbound project truck traffic on Highway 101 to weave across the northbound through lane to make left turns onto the on-ramp, this must occur within 460 feet neglecting any queues. So even though the modified design of Petaluma Boulevard South would result in reduced speeds, trucks would be forced to accelerate, then weave, and brake all within a distance less then the minimum recommended acceleration distance. This condition is unsafe and constitutes a ***potentially significant*** impact.

Note that the weaving and acceleration concerns are not directly related to queuing for the northbound left turn at the Petaluma Boulevard South/Highway 101 northbound ramp intersection, but are a function of the short distance to the turning lane and the speed of northbound traffic. As indicated under impact TRANS-2, queuing is not significant enough to affect the weave maneuver.

Mitigation Measure TRANS-4

The project sponsor shall install an actuated signal at the new intersection of Petaluma Boulevard South at the project driveway. The applicant shall also coordinate with Caltrans and the County to design the northbound off-ramp lane and shoulder striping to "narrow" width perception in an effort to lower driver exit speeds so they are closer to posted advisory speeds. Figure V.J-8 illustrates the proposed signal.

The levels of service with signalization would be LOS B in the AM peak hour and LOS A in the PM peak hour. Outbound right turns from the driveway shall not be permitted on red. It should be noted that the intersection does not meet peak hour warrants for signalization, and given the low volume of cross traffic there is the risk that drivers along Petaluma Boulevard South may grow complacent with the signal after becoming conditioned to approaching it without being stopped by a red light. The applicant shall get Caltrans' comments on the signalized intersection mitigation for AM/PM signal timing in order to give priority to exiting Highway 101 northbound traffic and avoid excessive queuing. Advance signal detection warning devices shall be required for off-ramp traffic combined with long green times and short recall times for the northbound through movement. Lines of site to the proposed project entrance extend to the mainline of Highway 101, so this shall mitigate the impact to less-than-significant levels.

All future maintenance costs for signal maintenance shall be borne by applicant. Agreement between Caltrans and County shall be necessary for operational control.

<u>Other Measures Considered but Rejected</u>

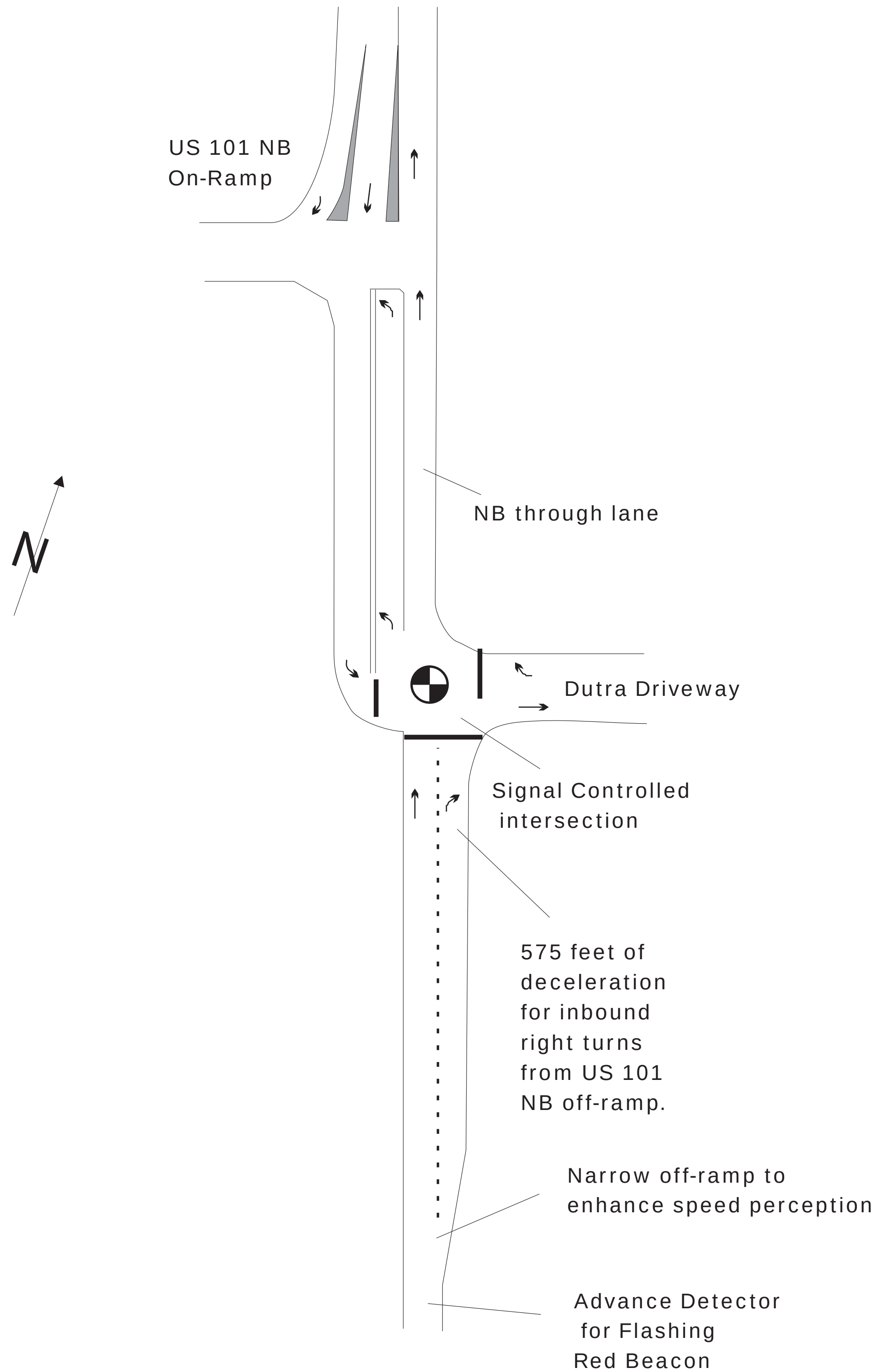
Alternative measures to address Impact TRANS-4 were considered but rejected. Elimination of the acceleration lane was considered but this would force trucks to wait for larger gaps in Highway 101 northbound off-ramp traffic. Given the speed of off-ramp traffic and the truck acceleration requirements, elimination of the acceleration lane would cause an increased risk of rear end collisions, a significant secondary safety impact. Mitigation Measure TRANS-4 (signalization of the intersection) addresses that risk by providing a gap for exiting vehicles to enter the northbound lanes.

Installation of all-way STOP signs at the new intersection of Petaluma Boulevard South and the project driveway was also considered, along with supplementing the STOP signs with a flashing red STOP beacon (per Manual of Uniform Traffic Control Devices Standard 4K.05) actuated by approaching vehicles on the project driveway. Although this would have the benefit of eliminating the need for the outbound acceleration lane from the project driveway, it would cause a PM peak hour LOS impact of F at the new intersection, a significant secondary impact.

Impact TRANS-5 Barge Operation Impacts

The project description calls for imported material to be brought to the site by barge. Dutra proposes to employ 4,000-ton-capacity barges that would be pushed up the Petaluma River from the San Pablo Bay on a rising tide. Unloading would take up to about four hours, then the tugs would push the empty barges back to be reloaded. The project would generate 125 round trips per year. Given the applicant's familiarity with barge operations in the Petaluma River as a result of the temporary asphalt facility, no significant impacts are anticipated relative to coordination with the existing barge traffic along the River. Impacts would be ***less than significant***.

Mitigation TRANS-4
Signal Control



Source: Dowling Associates, 2007

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Figure V.J-8
Mitigation Measure TRANS-4

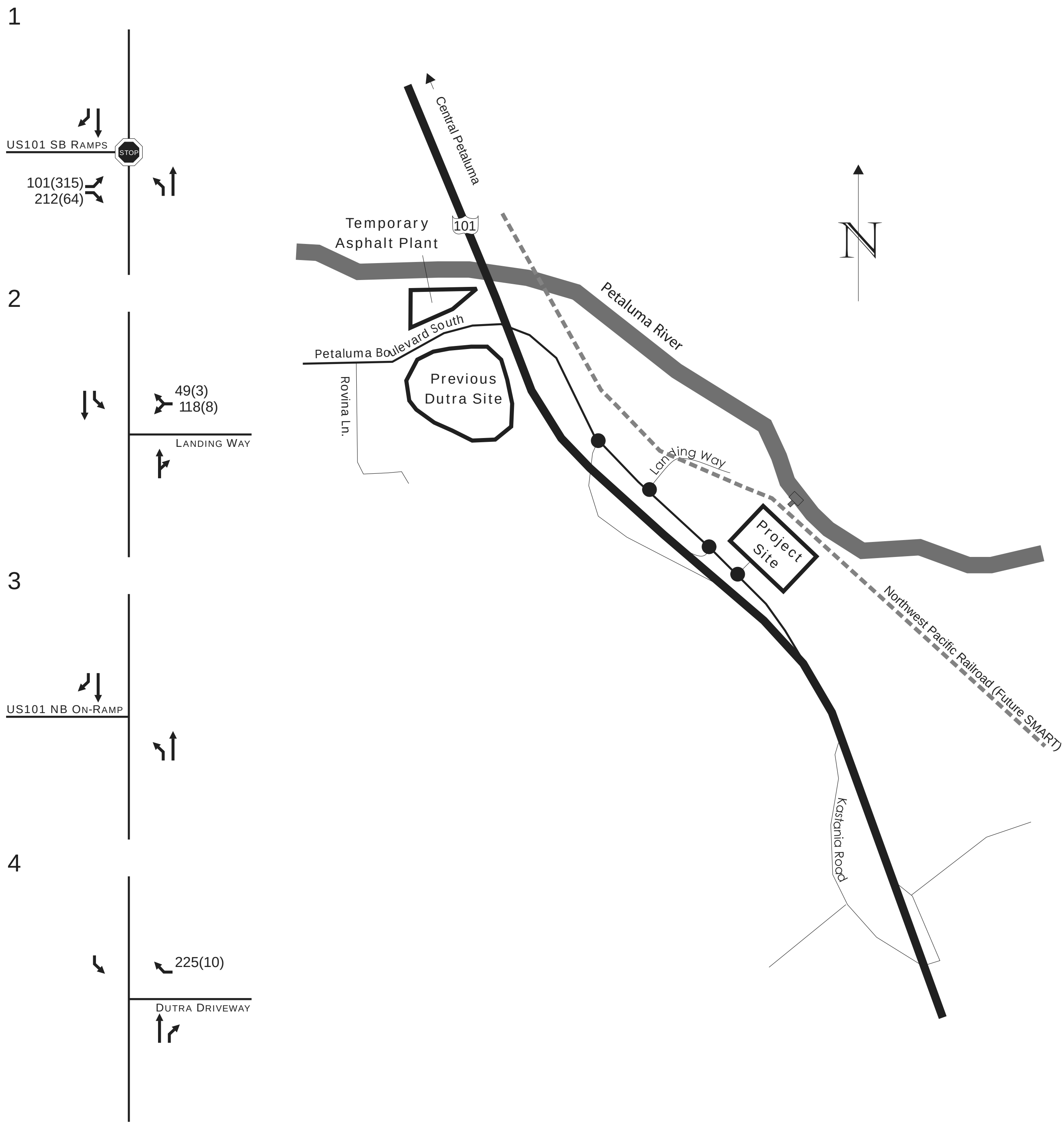
CUMULATIVE IMPACTS

Impact TRANS-6 Near-Term Cumulative Impacts

Project traffic was added to existing traffic and traffic from cumulative projects along Petaluma Boulevard South to evaluate near-term project impacts. This would include development of Shamrock Aggregate, Novato Disposal, Royal Petroleum and redevelopment of the previous Dutra Quarry site with residential uses. The roadway improvements listed under the Cumulative Setting section are not included here, but instead later under "Cumulative 2020" impacts.

Figure V.J-9 shows intersection turning movements. Table V.J-17 shows a comparison of levels of service under background with and without the proposed residential development. The intersection of Petaluma Boulevard South at Highway 101 southbound ramps would operate at LOS F with 90 seconds of delay during the AM peak hour. This is only an increase of two seconds over the no project condition; therefore, it is a ***less-than-significant*** impact (this intersection would be improved by mitigation measure TRANS-7, described under Near-Term Cumulative Queuing impacts below).

The westbound left turn from Landing Way onto Petaluma Boulevard South would operate at LOS F, with 80.9 seconds of delay degrading from LOS E during the AM peak hour under near-term conditions without project traffic. The increase in delay is due to the increase in project traffic along Petaluma Boulevard South, which would reduce the gaps available for vehicles to turn from Landing Way. The intersection of Petaluma Boulevard South at Landing Way does not meet peak hour warrants for signalization. Therefore, according to the significance criteria identified above, the impact is ***less than significant***. The finding of less than significant will not be affected if Landing Way becomes publicly dedicated in the future to accommodate crossing the rail right-of-way. However, the Sonoma County Department of Transportation and Public Works does not at this time anticipate accepting Landing Way for dedication in the future. This analysis assumes that any future traffic along Landing Way would be limited to approved development plus traffic from the private residences at Haystack Landing, with intermittent maintenance trips to service the loading dock for the proposed project.



Source: Dowling Associates, 2007.

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Figure V.J-9
Near-Term Cumulative with Project
Turning Movements

Table V.J-17
Near-Term Cumulative Without and Plus Project Intersection Levels of Service

Location	Near-Term No Project				Near-Term Plus Project			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Petaluma Blvd South at Highway 101 SB Ramps	30.1	D	88.9	F	34.4	D	89.9	F
Petaluma Blvd South at Landing Way								
SB Thru Left	8.9	A	9.7	A	9.2	A	9.7	A
WB Approach	39.3	E	20.6	C	78.8	F	20.6	C
Petaluma Blvd South at Highway 101 NB On-Ramp								
NB Left	8.5	A	8.0	A	9.5	A	8.0	A
Petaluma Blvd south at Project Driveway								
SB Left	-	-	-	-	9.3	A	0.0	A
WB Right	-	-	-	-	14.6	B	15.4	C

Mitigation Measure TRANS-6

The project sponsor shall provide a plan for the improvements within the public right-of-way to accommodate a paved right turn lane from Landing Way to Petaluma Boulevard. Improvements shall include a "keep clear" designation on the pavement to allow for left turn movements. All improvements shall be designed to County standards.

Private driveways could be widened to allow for left turn and right turn movements without becoming public right-of-way and/or publicly maintained.

Impact TRANS-7 Near-Term Cumulative Queuing Impacts

Table V.J-18 shows queuing under near-term cumulative with project conditions. The project contributes to additional queuing at the northbound through approach to Petaluma Boulevard South at Highway 101 southbound ramps where the queue without the project would already exceed available storage. This queue would already extend beyond Landing Way. Therefore, impacts would be ***potentially significant***.

Table V.J-18
Near-Term Cumulative Plus Project Queuing

Location	Estimated Storage (feet per lane)	95th Percentile Queue (feet per lane)	
		AM Peak Hour	PM Peak Hour
Petaluma Blvd South / Highway 101 SB Ramps			
NB Left Turn	500	25	25
NB Through	50	75	825
SB Right Turn	>1000	300	50
SB Through	>1000	50	25
EB Left Turn	>1000	25	75
EB Right Turn	50	25	25
Petaluma Blvd South / Landing Way			
SB Left Turn	200	25	25
Petaluma Blvd South / Highway 101 NB On-Ramps			
NB Left Turn	450	25	25
Petaluma Blvd South / Project Driveway			
SB Left Turn	100	25	25

Mitigation Measure TRANS-7

The exclusive northbound left-turn lane from Petaluma Boulevard South onto the Highway 101 southbound on-ramp shall be re-striped as a shared left turn/through lane. The exclusive lane is not necessary to avoid delay or queuing on the northbound left turn. The opposing (north) leg of the intersection already has a second receiving lane and the approach is brought to a complete stop so there are no operational constraints preventing the return to a shared left turn/through configuration. Under this configuration the intersection would have improved level of service (from LOS F with 90 seconds delay in the AM to LOS E with 35.5 seconds delay). This mitigation measure would result in queuing on the northbound approach would improve from 825 feet to 125 feet on both the through and the shared lane.

Impact TRANS-8 Near-Term Cumulative Highway Impacts

The project would add trips to congested segments of southbound Highway 101 during the AM peak hour, which is a ***potentially significant*** impact. The project could potentially add traffic to northbound Highway 101 during the PM peak hour where traffic has been observed to break down which is also a potentially significant impact. The project would add traffic to the congested southbound ramps during the AM peak hour where operation would be LOS F without project traffic. This is a ***potentially significant*** impact. Overall the project has a ***significant*** impact on highway operations. Table V.J-19 summarizes highway levels of service.

Table V.J-19
Near-Term Cumulative Without and Plus Project Highway Operations

Location	Near-Term LOS		Near-Term Plus Project LOS	
	AM	PM	AM	PM
Mainline Segments				
Highway 101 SB-North of Petaluma Blvd South	F	B	F	B
Highway 101 SB-South of Petaluma Blvd South	F	B	F	B
Highway 101 NB-South of Petaluma Blvd South	C	D*	C	D*
Highway 101 NB-North of Petaluma Blvd South	C	C*	C	C*
Ramp Merge and Diverge				
SB Off-Ramp	F	B	F	B
SB On-Ramp	F	A	F	A
NB Off-Ramp	B	C	B	C
NB On-Ramp	A	B	B	B

**Level of Service may be worse because traffic flow volumes are attenuated by congestion.*

Mitigation Measure TRANS-8a

Mitigation Measure TRANS-3 (funding a fair share of the construction of planned HOV lanes, right-of-way dedication) would also address the significant impact identified in Impact TRANS-8. With this improvement the LOS would improve from LOS F to LOS E for the southbound AM condition and the impact would be reduced to less-than-significant levels. Improvements to the highway mainline are planned to address cumulative conditions and serve existing deficiencies as well as future growth. The near-term cumulative plus project condition is the ultimate scenario where the improvement would constitute a mitigation measure as it is assumed as part of the 2020 no-project cumulative condition. Therefore, the fair share is calculated based on near-term plus project conditions. It is evaluated as the project share of total peak hour mainline traffic.

The project shall fund a fair share towards the construction of any new interchange between Highway 101 and Petaluma Boulevard South. The fair share for this improvement would be calculated under cumulative 2020 plus project impacts. Such an interchange is planned by Caltrans as part of the Marin Sonoma Narrows Project. Participation by the project sponsor would need to be coordinated with Caltrans.

The future dedication of Caltrans right-of-way situated within the project site for the Highway 101/Petaluma Boulevard South interchange project may be used in part or all of the fair share contribution.

Mitigation Measure TRANS-8b

As indicated under Mitigation Measure TRANS-3b, the project sponsor shall establish that no material export occur during the PM peak hour. Caltrans input would be required.

Impact TRANS-9 Other Near-Term Cumulative Impacts

There are no near-term cumulative safety or transportation policy impacts above those identified under the existing plus project scenario under Impact TRANS-4. Therefore, additional impacts would be ***less than significant*** and no mitigation measures are required.

Impact TRANS-10 Cumulative 2020 LOS Impacts

Cumulative 2020 impacts are evaluated by considering cumulative 2020 traffic plus traffic from the proposed project. Table V.J-20 compares the results of the intersection level of service for cumulative conditions with and without the project. Figure V.J-10 shows projected peak hour intersection turning movements at the study intersections. Under 2020 plus project conditions, the intersection of Petaluma Boulevard South at Highway 101 southbound ramps would operate with 150 seconds of delay at LOS F. This is a ***less-than-significant*** impact, however, because the increase in delay would be less than two seconds above conditions without the project.

Under 2020 plus project conditions, the project causes delay on the westbound left turn from Landing Way onto Petaluma Boulevard South to increase by more than four seconds where it is already at LOS F. However, peak hour warrants were reevaluated based on 2020 plus project conditions and were not satisfied. Therefore, according to the significance criteria the impact is ***less than significant***. As stated in the discussion under Impact TRANS-6, the finding is not affected if Landing Way becomes publicly dedicated in the future or by any easement granted to allow access to Haystack Landing. As stated before, it is assumed that Haystack Landing traffic would be limited to a few private residences and intermittent maintenance trips to service the loading dock.

Table V.J-20
Cumulative 2020 Without and Plus Project Intersection Levels of Service

Location	2020 No Project				2020 Plus Project			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Petaluma Blvd South at Highway 101 SB Ramps	53.3	F	148.7	F	59.7	F	150.0	F
Petaluma Blvd South at Landing Way								
SB Thru Left	11.1	B	10.2	B	11.6	B	10.2	B
WB Approach	108.4	F	23.6	C	221.4	F	23.6	C
Petaluma Blvd South at Highway 101 NB On-Ramp								
NB Left	8.3	A	8.0	A	9.3	A	8.0	A
Petaluma Blvd south at Project Driveway								
SB Left	-	-	-	-	9.1	A	0.0	A
WB Right	-	-	-	-	14.0	B	17.2	C

Mitigation Measure TRANS-10

Although Impact TRANS-10 was found to be less than significant, Mitigation Measure TRANS-6 requires the installation of exclusive right and left turning lanes, which would further improve conditions at the intersection to a delay of 148.4 seconds at LOS F.

Impact TRANS-11 Cumulative 2020 Queuing Impacts

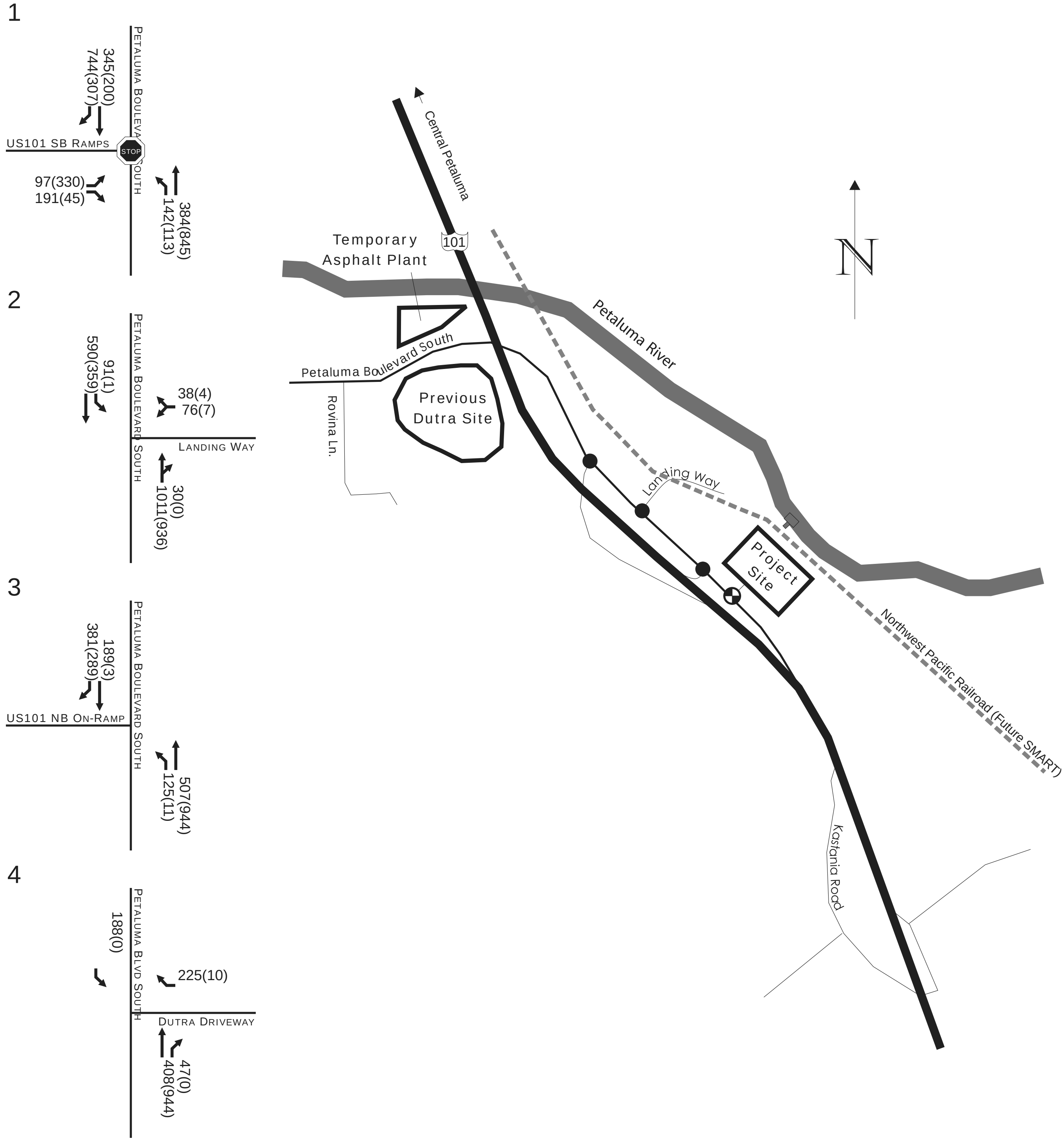
Table V.J-21 shows queuing under Cumulative 2020 with project conditions. The project would cause 95th percentile queues to grow where they already exceed available storage on the eastbound approach to the proposed Petaluma Boulevard South/Highway 101 southbound ramps intersection. The project would extend the queuing on the northbound through approach to 1,300 feet, well beyond the Landing Way intersection. This is a ***significant*** impact.

Table V.J-21
Cumulative 2020 Plus Project Queuing

Location	Estimated Storage (feet per lane)	95th Percentile Queue (feet per lane)	
		AM Peak Hour	PM Peak Hour
Petaluma Blvd South / Highway 101 SB Ramps			
NB Left Turn	500	25	25
NB Through	500	75	1300
SB Right Turn	>1000	600	50
SB Through	>1000	50	25
EB Left Turn	>1000	25	75
EB Right Turn	50	25	25
Petaluma Blvd South / Landing Way			
SB Left Turn	200	25	25
Petaluma Blvd South / Highway 101 NB On-Ramps			
NB Left Turn	450	25	25
Petaluma Blvd South / Project Driveway			
SB Left Turn	100	25	25

Mitigation Measure TRANS-11

As under near-term cumulative conditions, Mitigation Measure TRANS-7 would reduce the queuing impact to less-than-significant levels. Under 2020 plus project conditions returning to a shared left turn/through lane and an exclusive through lane on the northbound approach of Petaluma Boulevard South to the Highway 101 southbound ramps would reduce the queuing to 175 feet without adversely affecting the northbound left turn (which would also be at 175 feet). Also, the AM peak intersection level of service would improve to 60.7 seconds of delay, which is better than cumulative 2020 conditions without the project.



Source: Dowling Associates, 2007.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure V.J-10
Cumulative 2020 with Project
Turning Movements

Impact TRANS-12 2020 Cumulative Highway Impacts

Under 2020 conditions, the segments of Highway 101 being studied would already have HOV lanes in the no project condition. This is expected to improve operations in both peak commute directions. The project would add trips to congested segments of southbound Highway 101 south of Petaluma Boulevard South during the AM peak hour, but would not cause the segment to fall from LOS E to LOS F. Therefore, according to the significance criteria this is a ***less-than-significant*** impact.

The project would add traffic to the Highway 101 southbound on-ramp, which is already at LOS F. This is a ***significant*** impact similar to Impact TRANS-3. Highway facility levels of service are shown on Table V.J-22.

Table V.J-22
Cumulative 2020 Without and Plus Project Highway Operations

Location	**Near-Term**		**Near-Term Plus Project**	
	LOS		**LOS**	
	AM	**PM**	**AM**	**PM**
Mainline Segments				
Highway 101 SB-North of Petaluma Blvd South	D	B	D	B
Highway 101 SB-South of Petaluma Blvd South	E	B	E	B
Highway 101 NB-South of Petaluma Blvd South	B	D*	B	D*
Highway 101 NB-North of Petaluma Blvd South	B	C*	B	C*
Ramp Merge and Diverge				
SB Off-Ramp	C	B	C	B
SB On-Ramp	F	A	F	A
NB Off-Ramp	B	B	B	B
NB On-Ramp	A	B	A	B
**Level of Service may be worse because traffic flow volumes are attenuated by congestion.*				

Mitigation Measure TRANS-12a

The project sponsor shall contribute a fair share towards interchange improvements for the planned Highway 101/Petaluma Boulevard South interchange. Since improvements have been planned and are intended to address existing conditions, and not simply future growth, a fair share is calculated as the project share of total peak hour traffic on the northbound and southbound ramps.

The future dedication of Caltrans right-of-way situated within the project site for the Highway 101/Petaluma Boulevard South interchange project may be used in part to contribute to the fair share contribution.

Mitigation Measure TRANS-12b

As indicated under Mitigation Measure TRANS-3b, the project sponsor shall establish that no material export occur during the PM peak hour from 4 PM to 6 PM. Caltrans input would be required.

Impact TRANS-13a Transportation Policy Impacts

As indicated under the cumulative setting, the SMART railroad tracks located along the project site may be utilized for rail transit in the future. The proposed project is predicated upon obtaining permission to utilize an at-grade crossing and to construct a conveyor system above the tracks. The crossing would allow for access to Area A, off-loading facilities, and the barge. Trucks would need to use this crossing to access the docks when barges are scheduled, and for occasional maintenance and refueling. SMART sent a letter to the applicant in January 2007 conceptually agreeing to give permission (via an easement) for the conveyor system to cross the railroad tracks.

Agreement would be conditioned on limiting access to all of the parcels east of the railroad tracks along the waterfront to one crossing only for the Haystack Landing area. Specifically, the rail crossing at the project site would be terminated, leaving only one crossing in the area at Landing Way. Without SMART approval, neither the conveyor nor the rail crossing would be permissible. This would prevent the use of barges to import aggregate material, requiring that the resources instead be brought in by truck. Although the SMART Board has met with the project applicant, the final approval has not been obtained. Because the project sponsor does not yet have the entitlements necessary to service the site with material imported by barge, impacts would be ***significant***.

Mitigation Measure TRANS-13a

The project sponsor shall obtain the necessary entitlement from SMART to allow for both a rail crossing and the conveyor system.

It is assumed that SMART will allow the conveyor to be constructed on the condition that the at-grade rail crossing be closed. This could result in a secondary impact by eliminating the local access to the Area A for project traffic and for a few private residences along the River.

To address this secondary impact the applicant/owner shall make an irrevocable offer to the County of Sonoma for a 50-foot public access and utility easement parallel to the SMART railroad tracks on APN 019-220-001 for the purposes of ingress, egress and utilities. This would preserve options for a future public roadway through Landing Way to allow access to Area A and neighboring residential properties along the River if the existing railroad crossing is closed. This measure will cause a small number of passenger vehicles to be mixed with the larger volume of truck trips along the right-of-way. This is not a substantial concern, however, because most of this traffic would be from residents who are familiar with the area and currently there are employee and other passenger vehicle trips in the area so this increase will not represent a new condition for truck drivers using this route.

The closure of the at-grade rail crossing at the project site would also increase the distance for emergency vehicles to access the residences along the River in the event of an emergency. This is not anticipated to result in a significant increase in response times to the residences along the River because the current access route to these residences through the project site includes a gate at the project entrance at Petaluma Boulevard South. The project would also include relocating the San Antonio Volunteer Fire Department to the project site.

Impact TRANS-13b Access for Neighboring Residential Land Uses

Neighboring residents currently cross part of the Landing Way easement, SMART railroad tracks, and the project site to access the County's Petaluma Boulevard South. The same access route used by these residents is also used by emergency and service vehicles as well as the project proponent. Traffic circulation impacts to these existing access arrangements may occur as a result of the proposed project because SMART has expressed concern to the applicant about allowing the continued use of the existing railroad track crossing with the installation of a new overhead conveyor. In addition, mixing residential, emergency and service vehicle traffic with the proposed site plan and asphalt manufacturing activities could also affect safe traffic circulation in and around the facility. Landing Way was viewed as a possible solution to these potential traffic circulation and access impacts because it adjoins and partly crosses the project site before connecting to Petaluma Boulevard South. However, the private properties in the project area and the underlying interests that have the recorded use of the easement is unclear. Until such time that it is clear whether access to and from Petaluma Boulevard South can be provided to these residents via Landing Way, a ***potentially significant*** impact to existing and proposed traffic circulation and access could occur with the implementation of the proposed project.

Mitigation Measure TRANS-13b

The applicant shall provide neighboring residents an all-weather vehicular access route to Petaluma Boulevard South. Access shall be designed, operated, maintained and recorded to the satisfaction of SMART, DTPW, PRMD and the County Fire Marshall prior to building permit issuance.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Because the County of Sonoma does not have control over whether continued use of the railroad crossing would be allowed, impacts related to Trans-13b would be ***significant and unavoidable***. All other mitigation measures identified in this section would mitigate each of the significant impacts identified to ***less-than-significant*** levels.

Marin Sonoma Narrows Project

The Marin Sonoma Narrows Project encompasses a number of improvements to the US 101 corridor. In the project vicinity it would consist of widening of the facility and upgrading to a uniform highway class roadway. High occupancy vehicle (HOV) lanes would be added in both directions and the Petaluma Boulevard South interchanges would be consolidated into one diamond interchange served by frontage roads. On the east side, Petaluma Boulevard South would continue south of the project site as the east frontage road to Highway 101.

While the addition of HOV lanes is consistent with the 2020 Travel Demand Forecasting Model, the interchange improvement and the frontage roads were not fully funded and are not considered in the cumulative scenario. Nonetheless it is possible to consider the effect that the Marin Sonoma Narrows Project will have on project impacts and mitigations.

1) The intersections of Petaluma Boulevard South/Highway 101 Northbound Ramps and Petaluma Boulevard South/Highway 101 Southbound Ramps would both be eliminated. This would eliminate virtually all project traffic north of the new interchange. Impacts TRANS-1, 2, 4, 6, 7, 8, 9, 10 and

11 would all be obviated by this improvement as there would no longer be project truck traffic on Petaluma Boulevard South north of the interchange.

2) The highway ramp impacts would be subject to improvement due to better design of the merge conditions. This may include dual ramp lanes, auxiliary highway lanes and or extended merge areas.

3) Queuing and LOS at the ramp intersections and the frontage road intersections cannot be evaluated without additional information on the intersection configuration and control. Queuing may be a concern on the highway overcrossing given the short distance between the ramps and the frontage road. This should be addressed as a design consideration of the finalized MSN project.

4) The site access and circulation provision on the project site would need to be reconfigured to avoid outside of the boundaries for the MSN project. This would require the demolition and/or relocation of the Fire Department facilities and the rerouting of the driveway. These measures must be taken as future design considerations consistent with the MSN project and in coordination with Caltrans.

VI. GENERAL IMPACT CATEGORIES

A. SUMMARY OF SIGNIFICANT UNAVOIDABLE IMPACTS

Section 15126.2(b) of the *CEQA Guidelines* requires that an EIR describe any significant impacts which cannot be avoided. Specifically, Section 15126.2(b) states:

> *"Describe any significant impacts, including those which can be mitigated but not reduced to a level of insignificance. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reason why the project is being proposed, notwithstanding their effect, should be described."*

Based on the analysis contained in this Draft EIR, implementation of the proposed project would result in significant unavoidable project-specific impacts related to: aesthetics (scenic vistas, visual character), air quality (operational emissions and inconsistency with the Clean Air Plan), land use (conflict with applicable plans, land use incompatibility), traffic (access for neighboring residential land uses) and noise (from barge unloading facility, asphalt plant, recycling facility and operation of all equipment simultaneously). The proposed project would also result in significant and unavoidable cumulative impacts related to: aesthetics, air quality, water quality, land use, and noise.

B. GROWTH INDUCING IMPACTS OF THE PROPOSED PROJECT

Section 15126.2(d) of the *CEQA Guidelines* requires a discussion of the ways in which a proposed action could induce growth. This includes ways in which the project would foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Section 15126.2(d) of the *CEQA Guidelines* reads as follows:

> *"Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some project which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."*

The proposed project would result in the construction of an asphalt production and recycling facility. As noted in the Initial Study included as Appendix A, the proposed project would not directly induce substantial population growth in the area because it would employ only ten individuals. The ten employees are also not anticipated to result in substantial indirect population growth, as such, employees likely already live within a commuting distance from the project site. Additionally, the facility is a re-location of an existing facility that would be closed. Therefore, the project would not result in long-term employment growth in the area.

The proposed project would include the sale of raw aggregate to area contractors which would result in some economic growth. However, the proposed project would also assist in the construction of residential, commercial and industrial development as well as public infrastructure that serves growth. Overall the project would serve planned growth outlined in applicable General Plans (e.g. Sonoma County General Plan and Marin County General Plan) and would be considered growth accommodating instead of growth inducing.

Other considerations include whether the proposed project would remove an obstacle to growth. There are three existing asphalt plants in Sonoma and Marin counties, including: 1) Bodean, 1060 Maxwell Drive, Santa Rosa; 2) Syar, 260 Todd Road, Santa Rosa; and 3) Dutra, 1000 Point San Pedro Road, San Rafael. Based on these plant locations, it appears the region's needs would still be met for asphalt production and recycling without the proposed project, although implementation of the proposed project would reduce distances and costs for trucks delivering asphalt to projects in southern Sonoma County and northern Marin County.

The project would not result in population increases that would tax existing community service facilities, or require the construction of new community service facilities that could cause significant environmental effects. The project would contribute materials (e.g. asphalt and aggregate) that could be used in the construction of these facilities, however. Therefore, the project would not result in significant growth inducing impacts and project impacts on public services would be less than significant.

Potable water for the proposed project would be served by an existing water connection from the North Marin Water District (NMWD) pipeline that runs along the westerly side of the site. The project also proposes to pump water from the Petaluma River, filter it, and use it for dust suppression in Areas A and C. Other options for future water supply include purchasing Petaluma Ellis Creek Water Treatment Facility reclaimed water, which would need to be trucked to the site. The applicant proposes to install two 20,000 gallon water tanks at the southern boundary of Area C to be used as needed for dust suppression. As such, the project would not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. Sufficient water supplies are available to serve the project from existing entitlements and resources. The proposed project involves the creation of a new septic system that would only serve the project. The project would be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs. The project would comply with federal, state, and local statutes and regulations related to solid waste.

Due to the project's proposed location and scope, the proposed project could also facilitate other activities that could significantly impact the environment. Specifically, the proposed project could provide asphalt to and thus facilitate construction of the Novato Narrows/Highway 101 Widening Project and associated freeway interchange at Petaluma Boulevard South. While the environmental documentation for these highway improvements is not yet available, it is reasonable to assume that without mitigation, these cumulative or related projects would result in impacts to the environment.

C. SIGNIFICANT IRREVERSIBLE CHANGES TO THE ENVIRONMENT

Section 15126.2© of the *CEQA Guidelines* requires a discussion of the significant irreversible environmental changes of the proposed project, including the following:

- *Uses of nonrenewable resources during the initial and continued phases of the project that may be irreversible because a large commitment of such resources makes removal or nonuse thereafter unlikely;*

- *Primary impacts and, particularly, secondary impacts (such as highway improvement that provides access to a previously inaccessible area), which generally commit future generations to similar uses; and*
- *Irreversible damage that could result from environmental accidents associated with the project.*

Development of the proposed project would represent a long-term commitment to a more intensive land use of the site. The project would, therefore, involve an irreversible commitment to the use of nonrenewable resources during the construction and operation phases in the form of refined petroleum-based fuels, natural gas for space and water heating, and mineral resources used in construction materials. However, this long-term commitment of such non-renewable resources would not be sufficient to cause removal or nonuse thereafter unlikely.

The project includes constructing an asphalt production and recycling facility and restoring 19 acres of wetlands. Such development would help commit future users on the project site and other businesses off the site to similar development. However, the project site is near other industrial uses to the north, and agricultural and open space lands to the south. The project site and surrounding areas are already served by an existing roadway system. Other than the existing access to the off-site residential uses along the River, the roadway infrastructure that would be developed as part of the project would serve the project only and not any adjacent undeveloped lands.

During project construction the project applicant would follow all applicable requirements to ensure safe use, transportation, storage and disposal of any hazardous materials or wastes that could be used or generated. By conforming with existing regulations and the EIR mitigation measures, including the preparation of an Emergency Response Action Plan, the project would not result in any significant hazards to the public or the environment through the routine transport, use, storage, or disposal of hazardous materials or wastes, or through upset or accident conditions. Operational impacts related to hazards and hazardous materials would be reduced to less-than-significant levels via the recommended mitigation measures included in Section IV.F (Hazards and Hazardous Materials).

VII. ALTERNATIVES TO THE PROPOSED PROJECT

INTRODUCTION

The *CEQA Guidelines* require that EIRs identify and evaluate a reasonable range of alternatives designed to reduce the significant environmental impacts of the project while still meeting project objectives. The *CEQA Guidelines* also set forth the intent and extent of alternatives analysis to be provided in an EIR. Those considerations are discussed below.

ALTERNATIVES TO THE PROPOSED PROJECT

Section 15126.6(a) of the *CEQA Guidelines* states: "An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparable merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose it's reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason."

Purpose

Section 15126.6(b) of the *CEQA Guidelines* states, "Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment, the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of project objectives, or would be more costly."

Project Objectives

As stated above, the range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic project objectives. The ten objectives of the proposed project are to:

- Construct a replacement asphalt facility capable of receiving, processing, and providing a variety of asphalt, recycled asphalt products, and general construction materials such as sand and rock.
- Construct a facility with capacity similar to the temporary facility, capable of continuing to meet the asphalt and construction material demands of private and government projects in southern Sonoma County and Marin County.
- Reduce truck trips by locating the facility within reasonable distance of source quarries located in Sonoma County and Marin Counties, as well as within reasonable proximity of the southern Sonoma County and Marin County markets.
- Locate the facility in proximity to a naturally deep-water site along the Petaluma River where a barge and off-load facilities can accommodate deliveries of aggregate by water.

- Locate the facility in proximity to any railroad tracks for efficient distribution of material if the railroad option becomes feasible in the future.
- Provide easy access to and from Highway 101 in both the north-bound and south-bound directions to minimize the plant's effect on local traffic unless delivering a finished product for local needs.
- Locate the facility among surrounding industrial or manufacturing land uses that are compatible with the proposed asphalt and recycling operations.
- Locate the facility away from downtown areas and commercial and office land uses.
- Minimize visibility of operations occurring on the site by screening the site from the highway and nearby residences.
- Locate, design and operate the facility in a manner that will create minimal disturbance of critical habitat such as wetlands and the Petaluma River.

Selection of a Reasonable Range of Alternatives

Section 15126.6(c) of the *CEQA Guidelines* states: "The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Additional information explaining the choice of alternatives may be included in the administrative record. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts."

Overview of Selected Alternatives

The alternatives to be analyzed in comparison to the proposed project include:

Alternative A:	No Project Alternative
Alternative B:	Reduced Production Alternative
Alternative C:	Modified Site Plan Alternative
Alternative D:	Alternative Site

Alternatives Rejected as Infeasible

As described above, Section 15126.6(c) of the *CEQA Guidelines* requires EIRs to identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process, and briefly explain the reasons underlying the lead agency's determination. The following alternatives were rejected as infeasible.

Public Access

An alternative was analyzed that would construct the project as proposed and also provide the public with recreational access to the Petaluma River at Area A (beyond the current access available to the residential units located along the River). This alternative would increase the number of trips to the site and would therefore increase impacts to air quality, noise, and traffic. This alternative was rejected as infeasible because of the increased risk to public safety associated with the public crossing the railroad tracks and the project operations that would occur at Area A. A public access alternative would not necessarily be compatible with the proposed project, would not meet any of the project objectives, and would not reduce or eliminate any of the project's significant and unavoidable impacts.

Upland

An alternative was analyzed that would construct the project so that the barge off-loading facility would be developed on Area A instead of within the Petaluma River as proposed by the project. This alternative was rejected as infeasible because the differences in elevation between the barges and Area A would require the construction of a bulkhead along the River, similar to the Shamrock Facility to the north. The bulkhead could require the filling or modifications to the tidal inlet at Area A. Ultimately, this alternative would result in greater impacts to biological resources, hydrology, and water quality compared to the proposed project, and would not reduce or eliminate any of the project's significant and unavoidable impacts.

Freight

An alternative was analyzed that would develop Areas B, C, and D as proposed but would receive materials via freight train instead of barge, and would deliver materials via a combination of freight train and trucks depending on the location of the materials to be delivered. Area A would not be developed. Under this alternative, the proposed conveyor system over the railroad tracks would not be constructed. An alternative involving freight trains would both reduce and increase impacts associated with the proposed project. For example, it would reduce the visual impacts to Shollenberger Park users and residents along the River associated with the conveyor and the barge off-loading at Area A. It would also reduce the impacts to noise, biological resources and hydrology and water quality associated with the development of Area A. However, this alternative would result in an increase in freight trips with an associated increase in air quality and noise impacts. While this alternative would meet all but two of the project objectives, it would create new significant impacts, and rely on the use of railroad tracks that are currently out of service.

The North Coast Railroad Authority (NCRA) released a Notice of Preparation to prepare an EIR for the North Coast Railroad Authority Russian River Division Freight Rail Project in July of 2007. NCRA proposes to resume freight rail service along a 142-mile corridor from Willits, Mendocino County, southward to Lombard, Napa County.[1] The NCRA hopes to complete repairs on the 62-mile section of rail from Napa County to Windsor by the summer of 2008.

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1 *NCRA Website http://www.northcoastrailroad.org/index.html. Retrieved by CAJA Staff on October 3, 2007.*

Additionally, the Sonoma Marin Area Rail Transit District (SMART) is preparing a Supplemental EIR that will analyze higher levels of freight rail services as part of the cumulative context, among other changes proposed since the SMART Final EIR was certified in July 2006. Comments on the Notice of Preparation were due on October 23, 2007.

Although rail improvements are proposed, until they have been approved and completed, this would not be a feasible alternative for the distribution of materials to and from the project site. Additionally, this alternative is likely infeasible for importing materials from the Dutra quarry in San Rafael to the project site because the railroad tracks are not located near the Dutra quarry in San Rafael. Specifically, the railroad tracks are situated along Highway 101 approximately 3 miles west of the quarry, requiring trucks to haul materials to the railroad tracks via Point San Pedro Road. This would not meet the project objective to reduce truck trips, and would increase impacts to traffic, air quality, and noise due to the increased truck trips. Additionally, using current technology, this alternative would require construction of a separate railway spur line onto the project site for offloading, which would compromise the area needed for the proposed on-site facilities. This alternative could also require construction of a separate railway spur in San Rafael which could result in additional environmental impacts depending on the location of such improvements. As a result, importation and exportation of material by freight may become feasible in the future, but is not feasible now.

Below Grade Conveyor

An alternative was analyzed to construct the project as proposed with the exception that the conveyor system would be below grade beneath the railroad tracks. This alternative would have similar impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, land use, and traffic. This alternative would reduce the aesthetic, air quality, and noise impacts associated with an elevated conveyor over the railroad tracks. However, this alternative would present significant maintenance challenges and could require the construction of a railroad bridge over the below grade conveyor. This alternative was rejected as infeasible because the high groundwater table below the project site would be encountered during construction and operation of a below grade conveyor, resulting in increased hydrology and potential flooding impacts.

Shamrock River Access

An alternative was analyzed to develop Areas B, C, and D as proposed but to receive aggregate materials via barge utilizing the existing barge off-loading facility on the adjacent Shamrock property. Under this alternative, the proposed conveyor system over the railroad tracks would not be constructed and Area A would not be developed. Instead, off-loaded materials would be transported from the existing Shamrock barge facility to the site via truck. This alternative would have similar impacts to cultural resources, geology and soils, hazards and hazardous materials, and land use policy. This alternative would reduce aesthetic impacts to Shollenberger Park users and residents on the River but would increase truck trips to the existing barge off-loading facility, which would increase air quality, noise, and traffic impacts. This alternative would eliminate impacts to biological resources and hydrology and water quality associated with development of Area A. However, in a letter from Landing Way Depot (Shamrock Materials) to The Dutra Group dated February 28, 2007, Shamrock indicated that their facility is designed to maximize the storage capacity for concrete aggregates and that there is no excess capacity available for non-conforming aggregate (e.g. asphalt aggregate). Therefore, this alternative was rejected as infeasible.

Area A Only

An alternative to develop only Area A of the project site was rejected as infeasible because, as described above, Area A is not large enough to accommodate the proposed project. This alternative also would not meet the objectives of the proposed project.

Areas B, C and D Only

An alternative to develop only Areas B, C and D of the site would reduce the project's significant impacts at Area A (i.e., biological, visual, noise from tugboats). However, without using Area A, the project would have to find alternative means to provide materials for processing, therefore this alternative would not meet the project objective to reduce truck trips, which would increase impacts from traffic, noise and air quality. Additionally, this alternative was rejected as infeasible because it would not meet the applicant's primary objective: Locate the facility in proximity to a naturally deep-water site along the Petaluma River where a barge and off-load facilities can accommodate deliveries of aggregate by water.

Off-Site Relocation

The following off-site locations were analyzed as potential alternatives sites for the proposed project.

- **Downtown Petaluma**: An alternative site in downtown Petaluma was analyzed. This alternative was rejected as infeasible because no property of suitable size could be identified. Additionally, much of the waterfront in downtown Petaluma is being converted from industrial to commercial and/or residential mixed uses and the proposed asphalt facility would be incompatible with these uses. Truck traffic in the downtown area could create significant traffic congestion and safety hazards on local surface streets.
- **Shollenberger Park**: An alternative site at Shollenberger Park was analyzed. This alternative was rejected as infeasible because Shollenberger Park is dedicated open space.
- **Port Sonoma**: An alternative site at Port Sonoma was analyzed. This alternative was rejected as infeasible because it would require constant dredging to support large deep water barges, and thus would not provide barge access. Additionally, the site currently includes a recreational boating marina that raise compatibility issues for an asphalt plant with associated truck and barge traffic. This site would also increase the delivery time to the southern Sonoma County market without decreasing the time to serve the Marin County market, resulting in additional truck traffic on area highways. The visibility of this site would also require extensive screening to mitigate the plant's proximity from both east bound and west bound site lines.
- **Lakeville Highway/Highway 37**: An alternative site at Lakeville Highway/Highway 37 was analyzed. This alternative was rejected as infeasible because of traffic congestion, truck access issues, and travel times to the market. In addition, while there are some waterways and sloughs providing access to San Pablo Bay, barge access would not be feasible. Siltation rates from San Pablo Bay are very high, requiring continual dredging to maintain access. Furthermore, the north portion of San Pablo Bay is very shallow, and a mile or more of channel would need to be constructed and continually dredged in order to maintain access to the Bay.
- **Redwood Landfill Marin County**: An alternative site at the Redwood Landfill was analyzed. This site was rejected as infeasible because the Landfill has extensive habitat areas, and access to the Petaluma River would require new facilities and extensive dredging. The distance from the Petaluma

River to Highway 101 is over one mile at this site, further increasing truck miles to deliver the finished product. This alternative site would not meet the project objective to reduce truck trips, nor would it meet the objective to locate the facility near deep water for barge access. Additionally, this alternative would require cooperation from the County of Marin.

- **Existing Temporary Dutra Site:** An alternative site at Dutra's temporary facility was analyzed. The applicant recently sold this property and is leasing the property for a period of three years. The County has indicated that it is not possible for the applicant to get an extension on the lease. In addition, this alternative site was rejected as infeasible becasue it is not of sufficient size to accommodate the proposed project.

Assumptions and Methodology

The alternatives analysis is presented as a comparative analysis to the proposed project and assumes that all applicable mitigation measures proposed for the project would apply to each alternative. To develop project alternatives in this Draft EIR, the preparers reviewed the significant and unavoidable impacts in Section V of this Draft EIR and identified those impacts that could be substantially avoided or reduced through an alternative, and determined the modifications that would be needed. The modifications were then considered in light of the project objectives to ensure that the alternatives would still meet most of the basic objectives.

The following alternatives analysis compares the potential significant environmental impacts of three alternatives with those of the proposed project for each of the environmental topics analyzed in detail in Section V (Environmental Impact Analysis) of the EIR.

Significant and Unavoidable Project Impacts

Based on the analysis contained in this Draft EIR, implementation of the proposed project would result in significant unavoidable project-specific impacts related to: aesthetics (scenic vistas, visual character), air quality (operational emissions and inconsistency with the Clean Air Plan), land use (conflict with applicable plans, land use incompatibility), traffic (access for neighboring residential land uses) and noise (from barge unloading facility, asphalt plant, recycling facility and operation of all equipment simultaneously). All other project-specific impacts would either be less than significant or less than significant with mitigation.

A. NO PROJECT ALTERNATIVE

Description

As required by CEQA, this subsection analyzes a "No Project" Alternative (Alternative A). The proposed project represents the only land use application for the project site at this time. Therefore, under Alternative A, the proposed project would not be constructed, and the project site would remain in its current condition (i.e., undeveloped with several unpaved roads and varied topography, a hill, trees, wetlands, native grasses, brush, and shrubs). The analysis of Alternative A assumes the continuation of existing conditions as well as development of the related projects described in Section III.B (Related Projects). Alternative A does take into consideration the impacts in September 2005 when unauthorized grading occurred on-site, and that such impacts would still be mitigated. The potential environmental impacts associated with Alternative A are described below and are compared to the significant environmental impacts associated with the proposed project.

Aesthetics

Under Alternative A, no further development would occur on the project site and the existing aesthetic characteristics would remain unchanged. There would be no significant and unavoidable impacts to scenic views or visual character, and no mitigation would be required for the less-than-significant impacts from new sources of light and glare at the site. Therefore, Alternative A would eliminate the project's significant impacts to aesthetics.

Air Quality

Under Alternative A, no further grading would occur at the site and no facilities would be constructed. Thus, this alternative would not generate any fugitive dust or other pollutant emissions associated with construction activities at the site. Implementation of Alternative A would eliminate the project's mitigated to less-than-significant air quality impacts resulting from short-term construction activities, and would eliminate the project's significant and unavoidable operational air quality impacts. However, while Alternative A would reduce air quality impacts on a local level, such impacts would continue to occur on a regional level as a result of the use of other asphalt plants in Sonoma County and Marin County.

Biological Resources

Because the project site would not be developed under Alternative A, no new structures would be built and no human activities would potentially disturb wildlife on or near the site. Thus, this alternative would eliminate the proposed project's mitigated to less-than-significant impacts related to special-status wildlife species, riparian habitat and sensitive natural communities, and wildlife movement and corridors. However, impacts to jurisdictional wetlands have already occurred. Unauthorized grading removed vegetation, disturbed surface soils, and resulted in modifications to some of the existing jurisdictional wetlands and waters on the site. Mitigation measures for past significant impacts to wetlands would still be required under Alternative A, but the proposed enhancement of wetlands in the southern portion of the site would not occur under Alternative A. All other mitigated to less-than-significant impacts would be eliminated under Alternative A.

Cultural Resources

Under Alternative A, no ground-disturbing activities would occur. Therefore, this alternative would not have the potential to damage or destroy known and unknown archaeological resources or known and unknown paleontological resources and human remains. Thus, the proposed project's mitigated to less-than-significant impacts to cultural resources would be eliminated under this alternative.

Geology & Soils

Under Alternative A, no development would occur on the site. Therefore, this alternative would eliminate the project's impacts related to bedrock rippability and seismic groundshaking, and the project's significant but mitigatable impacts related to other soil/geologic instabilities (i.e., fault rupture; liquefaction, lateral spreading, and post-liquefaction reconsolidation; geologic and soil instabilities; soil erosion/loss of topsoil; expansive soils; differential compaction; and soils supporting stormwater and wastewater effluent embankments).

Hazards & Hazardous Materials

Under Alternative A, no hazardous materials would be stored on or transported to and from the project site. Additionally, no further grading would occur that could cause a release of potential soil contaminants or creation of safety hazards to construction workers or the general public. Therefore, this alternative would eliminate the project’s less-than-significant hazards and hazardous materials impacts with mitigation.

Hydrology & Water Quality

Under Alternative A, no development would occur on the site. Therefore, no drainage patterns would be altered, no water quality would be degraded, no structures would be placed within 100-year flood zones, and no significant cumulative impacts would occur. Therefore, this alternative would eliminate the project's significant but mitigatable impacts related to hydrology and water quality, but not the project’s cumulatively considerable impact relative to phosphorous emissions in the Petaluma River.

Land Use & Planning

Because Alternative A would not involve any development or amendments to zoning and general plan designations, this alternative would not result in any impacts related to policy inconsistencies. Additionally there would be no impacts related to land use compatibilities. As such, no significant land use impacts would occur under Alternative A.

Noise

Because Alternative A would not include any new construction, there would not be any temporary significant but mitigatable impacts related to construction noise. Additionally noises related to the on-going operations of the asphalt plant, recycling facility, and barge off-loading activities would not occur under this alternative, which would eliminate the project's significant and unavoidable impacts related to these long-term operations.

Transportation/Traffic

Under Alternative A, no development on the project site would occur. As such, there would be no increased traffic from the proposed project, and no improved infrastructure relating to project needs. Therefore, the significant but mitigatable traffic impact related to the project would not occur. Under Alternative A, all of these project-specific impacts would be eliminated. However, while Alternative A would reduce truck traffic impacts on a local level, such impacts would continue to occur on a regional level as a result of the use of other asphalt plants in Sonoma County and Marin County.

Relationship of the Alternative to the Objectives

Alternative A would not meet any of the project objectives.

B. REDUCED PRODUCTION ALTERNATIVE

Description

Alternative B would reduce the size of the recycling and production facilities by approximately 25 percent, resulting in a reduction in asphalt production capacity and recycled concrete and asphalt products similar to the start-up phase of the project described in Section III (Project Description). Under this alternative, the allowed exports of asphalt product, sand, and aggregate would be approximately 35 percent less than the project at full build out, and import and export of RAP would be 67 percent less. The total number of barge trips would be reduced commensurately. The Reduced Production Alternative would also prohibit night-time operations at Area A, including the off-loading of the barge, as well as overall night-time operations on Areas B and C.

The reduction of aggregate production would allow for smaller stockpiles and a conveyor system on Area C that would be lower in height compared to the proposed project. Roadway alignments and associated grading and drainage improvements would be similar to the proposed project. Likewise, the size, massing, height, and design of the facilities would be similar to that described in Section III, with the exception of the stockpiles and Area C conveyor system.

Except as described above, other characteristics (e.g. lighting, landscaping, and utility connections) would be similar as those of the proposed project, for the purpose of analyzing this alternative. The analysis of Alternative B assumes development of the related projects described in Section III.B (Related Projects). The potential environmental impacts associated with this alternative are described below and are compared to the significant environmental impacts associated with the proposed project. All applicable mitigation measures recommended for the proposed project are incorporated into Alternative B.

Aesthetics

The reduction in asphalt production associated with Alternative B (Reduced Production Alternative) would result in slightly lower stockpiles and conveyor system on Area C. This would result in a reduction but not an elimination of the project's significant and unavoidable impacts to scenic vistas and visual character. By prohibiting night-time operations at the project site, Alternative B would further reduce the project's significant but mitigable impacts related to light and glare.

Air Quality

As the construction footprint would be similar to the proposed project, this alternative would result in similar air quality impacts during construction as the proposed project, which were found to be potentially significant but mitigated to less-than-significant levels. Alternative B would also result in a reduction of the project's operational significant and unavoidable impacts related to air pollutant emissions. While Alternative B would reduce air quality impacts on a local level, such impacts would continue to occur on a regional level as a result of the use of other asphalt plants in Sonoma County and Marin County.

Biological Resources

Given the construction footprint under this alternative would be similar to the proposed project, biological resource impacts associated with Alternative B would be similar to the proposed project which were either found to be less than significant, or less than significant with mitigation. However, because this alternative prohibits night-time operations year-round, Alternative B would further reduce the projects's significant but mitigable impact related to wildlife movement.

Cultural Resources

Given the construction footprint under this alternative would be similar to the proposed project, cultural resource impacts (i.e. archaeological, paleontological, and human remains) associated with Alternative B would be similar to the proposed project, which were found to be less than significant with mitigation.

Geology & Soils

Alternative B includes a site plan that is similar to the proposed project. Therefore, this alternative would result in similar impacts related to geology and soils (e.g. bedrock rippability, seismic ground shaking, liquefaction, etc.) as would occur under the proposed project, which were determined to be less than significant with mitigation.

Hazards & Hazardous Materials

Given the construction footprint and operational characteristics under this alternative would be similar to the proposed project, hazards and hazardous materials impacts associated with Alternative B would be similar to the proposed project, which were found to be less than significant with mitigation.

Hydrology & Water Quality

Hydrology and water quality impacts associated with Alternative B would be similar to the proposed project, which were found to be less than significant with mitigation, with the exception of the project's cumulatively considerable impact relative to phosphorous emissions in the Petaluma River.

Land Use & Planning

Alternative B would slightly reduce the project's impacts to air quality, noise, aesthetics, and barge trips, which in turn would reduce but not fully eliminate the project's significant and unavoidable land use compatibility impacts. Elimination of night-time operations would also reduce but not eliminate the project's significant and unavoidable land use compatibility impacts. However, this alternative would not remove the project's inconsistencies with land use policies for criteria required for changing the land use designation from Limited Commercial to Limited Industrial.

Noise

Alternative B would result in a reduction of the project's significant impacts related to noise emissions from the asphalt plant and recycling facility. The Reduced Production Alternative would also reduce truck trips, which in turn would reduce the project's less-than-significant noise impacts related to vehicle emissions. However, daytime noise impacts from the barge off-loading facility would still be significant and unavoidable under this alternative, similar to the proposed project.

Transportation/Traffic

Due to the decrease in production associated with this alternative, it would require fewer barge trips and truck trips than the proposed project. However, traffic impacts would still be either significant and unavoidable, less than significant with mitigation, or less than significant under this alternative, similar to the proposed project. While Alternative B would reduce truck traffic impacts on a local level, such impacts would continue to occur on a regional level as a result of the use of other asphalt plants in Sonoma County and Marin County.

Relationship of the Alternative to the Objectives

Alternative B appears to meet all of the project objectives.

C. MODIFIED SITE PLAN ALTERNATIVE

Description

Alternative C would modify the existing site plan to reduce project impacts related to air quality, noise, aesthetics, land use compatibility, hydrology and water quality, and biological resources. The following modifications are made to the proposed project under this alternative:

- Elimination of the recycling facility and relocation of asphalt plant stockpiles to the southern portion of Area C on the project site;
- Relocation of the asphalt plant further south in Area C, with the conveyor extending across the drainage ditch to stockpiles at the originally-proposed recycle yard;
- Relocation of the barge off-loading facility slightly to the north to avoid the mouth of the tidal inlet at Area A, which would also involve moving the barge docking slightly further north; and
- Realignment of the conveyor at Area A so that it would be situated north of the tidal inlet. The conveyor would run from the pier towards the railroad tracks, turn to the south and run parallel to the tracks before crossing above the tracks and connecting to Area B.

The Modified Site Plan Alternative would also prohibit night-time operations at Area A, including the off-loading of the barge, as well as overall night-time operations on Areas B and C. The modified site plan would eliminate the project's expected production capabilities for recycled products, but would not change asphalt production. Except as described above, other characteristics would be similar to those of the proposed project. This analysis assumes development of the related projects described in Section III.B (Related Projects). The potential environmental impacts associated with this alternative are described below and are compared to the significant environmental impacts associated with the proposed project. All applicable mitigation measures recommended for the proposed project are incorporated into Alternative C.

Aesthetics

By shifting the pier and conveyor at Area A further north, and by moving the asphalt plant and stockpiles further south (associated with the elimination of the recycling facility), this alternative would be less visible from off-site locations such as Highway 101, Petaluma Boulevard South, the Petaluma River, and Shollenberger Park. Also, these site plan modifications would better preserve the views of the River, Sonoma Mountain Range and hills on the west side of Highway 101, potentially minimizing the need for landscape screening which can obstruct scenic vistas. These modifications would reduce, but not completely mitigate the project's significant and unavoidable impacts related to scenic vistas and visual character. Also, because this alternative prohibits night-time operations, it would avoid the project's significant but mitigable impacts related to light and glare.

Air Quality

The construction footprint for Alternative C would be slightly smaller than the proposed project's footprint. Thus, this alternative would result in slightly fewer air quality impacts during construction as the proposed project, which were found to be potentially significant but mitigable to less-than-significant levels. Due to the elimination of the recycle facility under this alternative, odors associated with such a facility would be eliminated, whereas the proposed project would result in less-than-significant impacts related to odors. Shifting the asphalt plant further south and the barge off-loading facility to the north would also reduce the exposure of asphalt plant and barge emissions to the residents along the River. This alternative would also reduce but not eliminate the project's significant operational air quality impacts.

Biological Resources

The prohibition of night-time operations year round as well as the relocation of the barge off-loading facility to the north would reduce the project's significant but mitigable impacts to wildlife movement. All other impacts to biological resources under this alternative would either be less than significant, or less than significant with mitigation, similar to the proposed project.

Cultural Resources

Given the construction footprint would be smaller under this alternative compared to the proposed project, cultural resource impacts associated with Alternative C would be slightly less than the proposed project, but would still be less than significant with mitigation, similar to the proposed project.

Geology & Soils

Alternative C includes a modified site plan that involves less grading compared to the proposed project. The removal of the recycling facility from this alternative could result in slightly fewer employees on the site, which is subject to seismic groundshaking, surface instability, and other geotechnical hazards. Therefore, Alternative C would result in slightly fewer impacts related to geology and soils compared to the proposed project, which were determined to be less than significant with mitigation.

Hazards & Hazardous Materials

Given the elimination of the recycle yard under Alternative B, this alternative is anticipated to result in slightly fewer impacts related to hazards and hazardous materials. These impacts would still be less than significant with mitigation, similar to the proposed project.

Hydrology & Water Quality

The reduction in the amount of new construction on-site, including the elimination of the recycling facility, would reduce the potential for sedimentation and increased runoff under Alternative C. Potential water quality impacts would be less under this alternative by relocating the barge off-loading facility and overhead conveyor away from the drainage channel at Area A of the site. Overall, Alternative C would further reduce the project's significant but mitigable hydrology and water quality impacts, with the exception of the project's cumulatively considerable impact relative to phosphorous emissions in the Petaluma River.

Land Use & Planning

Alternative C would include moving the conveyor and pier at Area A to the north, thus creating a larger buffer between operations on that parcel with the off-site residential uses along the River. The relocation of the asphalt plant and stockpiles to the south of Area C would also provide more distance between such project facilities and the homes along the River. These modifications would reduce the project's impacts to air quality, noise, aesthetics, and barge trips, which in turn would reduce but not fully eliminate the project's significant and unavoidable land use compatibility impacts. Elimination of night-time operations year round would further reduce but not eliminate the compatibility of project operations with the adjacent residences. However, this alternative would not remove the project's inconsistencies with land use policies for criteria required for changing the land use designation from Limited Commercial to Limited Industrial.

Noise

The elimination of the recycle yard under this alternative would avoid the project's significant noise impacts from this project component upon nearby sensitive receptors. Similarly, the increased buffer provided between the homes along the River and the facilities on Area A would reduce but not completely eliminate the project's significant and unavoidable noise impact from the barge off-loading facility. Moving the asphalt plant to the south would also reduce the project's significant noise impacts from the plant to nearby sensitive uses. Significant project noise impacts related operation of all facilities simultaneously would also be reduced but not eliminated under this alternative.

Transportation/Traffic

Alternative C would generate slightly fewer vehicle trips due to the elimination of the recycle yard. The decreased building intensity on-site provided under this alternative would also allow for more room for on-site circulation of trucks and other vehicles. Overall, traffic impacts under this alternative would either be significant and unavoidable, less than significant or less than significant with mitigation, similar to the proposed project.

Relationship of the Alternative to the Objectives

Alternative C appears to meet all of the project objectives with the exception that it would not meet the objective to provide recycled asphalt products.

D. ALTERNATIVE PROJECT SITE

Although access to Highway 101 is limited, and parcels east of the highway have limited development potential due to floodplains, biotic resources along the River, and Scenic Design overlay zoning, areas southeast of the site along the Petaluma River were analyzed for alternative project sites.

An alternative was analyzed to develop Areas B, C, and D as proposed but to receive aggregate materials via barge utilizing APN 019-320-020, a 15.53-acre parcel situated east of Areas C and D of the project site (along the railroad tracks) and along the Petaluma River (see Figure V.H-2). The applicant does not own this parcel and the owner is apparently not willing to sell the property to the applicant. This parcel would include barge off-loading facilities and the starting point for the overhead conveyor instead of Area A of the project site.

No development would occur on Area A, which is owned by the project applicant, under this alternative.[2] The predominantly undeveloped parcel (APN 019-320-020) is zoned M3 and includes an unpaved road along the River. The unpaved road provides access to at least two additional parcels down the River (e.g. APNs 019-320-006 and 019-320-007).

Under this alternative, the starting point of the proposed conveyor system over the railroad tracks would be relocated from Area A to APN 019-320-020, and the conveyor would extend into Area C of the project site, whereas the project requires the conveyor to extend into Areas B and C. The relocation of these various project components from Area A to APN 019-320-020 would not change production capacity.

Except as described above, other characteristics would be similar as those of the proposed project, for the purpose of analyzing this alternative. The analysis of Alternative D assumes development of the related projects described in Section III.B (Related Projects). The potential environmental impacts associated with this alternative are described below and are compared to the significant environmental impacts associated with the proposed project. All applicable mitigation measures recommended for the proposed project are incorporated into Alternative D.

Aesthetics

Under Alternative D, the barge off-loading facility and conveyor would still be highly visible by visitors to Shollenberger Park further south along the Park trail. While the barge off-loading facilities and conveyor would be less visible from Highway 101, Alternative D would still result in significant impact relative to scenic vistas and visual character. Additionally, the barge off-loading facilities would still emit new sources of light in an area that currently has no development, resulting in similar light and glare impacts compared to the project. Therefore, Alternative D would not eliminate the project's significant impacts to aesthetics.

Air Quality

As the construction footprint would be similar to the proposed project, Alternative D would result in similar air quality impacts during construction as the proposed project, which were found to be potentially significant but mitigated to less-than-significant levels. Given that production levels would be the same as the project under Alternative D, this alternative would result in similar air quality impacts associated with the operational phase of the project.

Biological Resources

By eliminating development from Area A and by not requiring the conveyor facility to be within Area B of the project site, this alternative reduces the project's significant impacts to wildlife movement with regard to the existing egret/heron colony in Area B. All other impacts to biological resources under this alternative would either be less than significant, or less than significant with mitigation, similar to the proposed project.

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[2] *An alternative involving the entire project on APN 019-320-020 was rejected as infeasible because it does not provide convenient access to the highway and ultimately would require trucks to use Landing Way and to cross the railroad tracks.*

Cultural Resources

Moving the barge off-loading facilities to APN -020 would still involve construction and ground disturbing activities. Therefore, cultural resource impacts associated with Alternative D would likely remain the same as the proposed project, but would still be less than significant with mitigation, similar to the proposed project.

Geology & Soils

Alternative D would not change the project's potential impacts from seismic groundshaking, surface instability, and other geotechnical hazards. However, these impacts were determined to be less than significant with mitigation.

Hazards & Hazardous Materials

Under Alternative D, project impacts related to hazards and hazardous materials would still be less than significant with mitigation, similar to the proposed project.

Hydrology & Water Quality

Unlike the proposed project, Alternative D would not involve any development on Area A of the project site, which includes a small tidal inlet. APN -020 does not include tidal inlets. Therefore, Alternative D would reduce the project's less-than-significant impacts related to the potential obstruction of tidal flow in and out of an inlet due to the project's barge off-loading facility proposed to be constructed at the mouth of the inlet. All other hydrology and water quality impacts associated with Alternative D would be similar to the proposed project, which were found to be less than significant with mitigation, with the exception of the project's cumulatively considerable impact relative to phosphorous emissions in the Petaluma River.

Land Use & Planning

Alternative D would include moving the conveyor and barge off-loading facilities at Area A to APN -020, thus creating a larger buffer between these operations and off-site residential uses along the River. The modifications associated with Alternative D would reduce the project's impacts to noise, which in turn would reduce but not fully eliminate the project's significant and unavoidable land use compatibility impacts. However, this alternative would not remove the project's inconsistencies with land use policies for criteria required for changing the land use designation from Limited Commercial to Limited Industrial.

Noise

Alternative D would move the barge off-loading facilities and conveyer from Area A to south of the existing residences along the River. The increased buffer provided between the homes along the River and the facilities would reduce but not completely eliminate the project's significant and unavoidable noise impacts.

Transportation/Traffic

Alternative D would not substantially change the project's impacts related to traffic. APN -020 is further south along the River, which would require maintenance vehicles for barge facilities to drive a bit further, however this would not be significant. Overall, traffic impacts under this alternative would either be significant and unavoidable, less than significant or less than significant with mitigation, similar to the proposed project.

Relationship of the Alternative to the Objectives

Alternative D appears to meet all of the project objectives.

E. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

In addition to the discussion and comparison of impacts of the proposed project and the alternatives, Section 15126.6 of the *CEQA Guidelines* requires that an "environmentally superior" alternative be selected and the reasons for such a selection disclosed. In general, the environmentally superior alternative is the alternative that would be expected to generate the least amount of significant impacts. In this case, Alternative A (No Project Alternative) would result in the least amount of significant environmental impacts (see Table VII-1). However, Section 15126.6 of the *CEQA Guidelines* requires that an environmentally superior alternative be selected other than the No Project Alternative. Based on the alternatives analysis provided above and the Alternatives Comparison Table (Table VII-1), it has been determined that Alternative D would result in the least amount of adverse impacts and thus has been chosen as the environmentally superior alternative.

Table VII-1
Alternatives Comparison

Impact Area	Impacts of the Proposed Project	Alternative A (No Project)	Alternative B (Reduced Production)	Alternative C (Modified Site Plan)	Alternative D (Alternate Site)
Aesthetics					
Scenic Vistas	SU	No Impact	SU	SU	SU
Visual Character	SU	No Impact	SU	SU	SU
Light and Glare	LTS w/Mit.	No Impact	LTS	LTS	LTS W/Mit.
Air Quality					
Construction Emissions	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS W/Mit.
Operational Emissions	SU	No Impact	SU	SU	SU
CO Hotspots	LTS	No Impact	LTS	LTS	LTS
Project Operation Emissions of TACs	LTS	No Impact	LTS	LTS	LTS
Odors	LTS	No Impact	LTS	LTS	LTS
Conflict with or Obstruct Implementation of an Applicable Air Quality Plan	SU	No Impact	SU	SU	SU
Biological Resources					
Special-Status Plant Species	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Special-Status Wildlife Species	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Riparian Habitat and Sensitive Natural Community	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Jurisdictional Wetlands and Waters	LTS w/Mit.	LTS w/ Mit. (Impact occurred Sept. 2005)	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Wildlife Movements and Corridors	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Wildlife Nursery	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Conflict with Local Policies and Ordinances	LTS	No Impact	LTS	LTS	LTS
Conflict with Habitat Conservation Plan	LTS	No Impact	LTS	LTS	LTS

Table VII-1
Alternatives Comparison

Impact Area	Impacts of the Proposed Project	Alternative A (No Project)	Alternative B (Reduced Production)	Alternative C (Modified Site Plan)	Alternative D (Alternate Site)
Cultural Resources					
Historical	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS
Archaeological	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Paleontological	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Human Remains	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Geology &Soils					
Seismic Groundshaking	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Surface Instability	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Ground Failure and Cracking	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Expansive Soils and Differential Settlement	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Hazards &Hazardous Materials					
On-site Use, Storage, and Disposal	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Release of Potential Soil Contaminants	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Creation of Safety Hazards	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Transportation	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Hydrology & Water Quality					
Alter the Drainage Pattern Resulting in Substantial Erosion or Siltation	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Alter the Drainage Pattern Resulting in Increase of Rate or Amount of Surface Runoff	LTS	No Impact	LTS	LTS	LTS
Wetland Maintenance	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Degrade Water Quality	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Structures within 100-Year Flood Zone	LTS	No Impact	LTS	LTS	LTS

Table VII-1
Alternatives Comparison

Impact Area	Impacts of the Proposed Project	Alternative A (No Project)	Alternative B (Reduced Production)	Alternative C (Modified Site Plan)	Alternative D (Alternate Site)
Land Use					
Conflict with Applicable Plans, Policies, or Regulations	SU	No Impact	SU	SU	SU
Land Use Compatibility	SU	No Impact	SU	SU	SU
Noise					
Temporary or Periodic Increases - Construction	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Exposure of Persons to Existing Excessive Noise Levels	LTS	No Impact	LTS	LTS	LTS
Construction-Related Groundborne Vibration	LTS	No Impact	LTS	LTS	LTS
Excessive Operational Groundborne Vibration	LTS	No Impact	LTS	LTS	LTS
Off-site Traffic Noise	LTS	No Impact	LTS	LTS	LTS
Operational Permanent Increase - Asphalt Plant	SU	No Impact	SU	SU	SU
Operational Permanent Increase - Recycling Plant	SU	No Impact	SU	N/A	SU
Operational Permanent Increase - Barge Unloading Facility	SU	No Impact	SU	SU	SU
Operational Permanent Increase - Fire Dept.	LTS	No Impact	LTS	N/A	LTS
Operational Permanent Increase - Combined Operations	SU	No Impact	SU	SU	SU
Transportation & Traffic					
Intersection Level of Service Impacts	LTS	No Impact	LTS	LTS	LTS
Queuing Impacts	LTS	No Impact	LTS	LTS	LTS

Table VII-1
Alternatives Comparison

Impact Area	Impacts of the Proposed Project	Alternative A (No Project)	Alternative B (Reduced Production)	Alternative C (Modified Site Plan)	Alternative D (Alternate Site)
Highway Impacts	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Safety Impacts	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Barge Operation Impacts	LTS	No Impact	LTS	LTS	LTS
Transportation Policy Impacts	LTS w/Mit.	No Impact	LTS w/Mit.	LTS w/Mit.	LTS w/Mit.
Access for Neighboring Residential Uses	SU	No Impact	SU	SU	SU

Notes: SU = Significant and Unavoidable, LTS w/Mit. = Less than Significant with Mitigation, LTS = Less than Significant, N/A = Not Applicable.

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Reg Cullen, Drainage Review
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Leigh Jordan, Coordinator

California Integrated Waste Management Board

Margo Reed Brown, Chair

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Sue O'Leary, Supervisor
Allison Spreadborough, IWMS

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John Herrick, Conservation Co-chair

California State Lands Commission

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US Army Corps of Engineers

Phillip Shannin, Regulatory Branch - San Francisco District

X. ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly Bill
ABAG	Association of Bay Area Governments
AFY	Acre Feet per Year
AHERA	Asbestos Hazard and Emergency Response Act
ANSI	American National Standard Institute
A-PEFZA	Alquist-Priolo Earthquake Fault Zoning Act
APN	Assessor Parcel Number
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ARMR	Archaeological Resource Management Report
ASTs	Above-ground Storage Tanks
B8	Frozen Lot Size
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BARCT	Best Available Retrofit Control Technologies
Basin	San Francisco Bay Area Air Basin
BCA	Biological Constraints Analysis
BCDC	San Francisco Bay Conservation and Development Commission
bgs	below ground surface
BMP	Best Management Practices
BR	Biotic Resources
BTU	British Thermal Unit
CAA	Federal Clean Air Act
CAAA	Federal Clean Air Act Amendments
CA-FID	California-Facility Inventory Database
CalARP	California Accidental Release Program

CalEPA	California Environmental Protection Agency
CalOSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDMG	California Department of Mines and Geology
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
Cf	Cubic feet
CFR	Code of Federal Regulations
CGS	California Geological Survey
CHRIS	California Historical Resources Information System
CIWMB	California Integrated Waste Management Board
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
Corps	United States Army Corps of Engineers
County	Sonoma County
CRHR	California Register of Historical Resources
CRMP	Construction Risk Management Plan
CSC	California Species of Concern
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWC	California Water Code
cy	cubic yards

dB	decibel
dB(A)	A-weighted decibel
DD	Drainage Ditch
DEIR	Draft Environmental Impact Report
DHS	California Department of Health and Services
DTSC	Department of Toxic Substances Control
DWQ	Division of Water Quality
EB	Eastbound
EIR	Environmental Impact Report
EMS	Emergency Medical Service
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ESL	Environmental Screening Levels
F2	Flood Plain
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FIRM	Flood Insurance Rate Mapping
GCC	Global Climate Change
GHG	Greenhouse Gases
GI	General Industrial
gpd	gallons per day
gpm	gallons per minute
gsf	gross square feet
H/ERIAR	Heron/Egret Rockery Impact Assessment and Recommendations
HAPs	Hazardous Air Pollutants
HAZWOPER	Hazardous Waste Operations and Emergency Response

HD	Historic District
HDPE	High Density Polyethylene
HMA	Hot Mix Asphalt
HOV	High Occupancy Vehicle
HPOZ	Historic Preservation Overlay Zone
HVAC	Heating, Ventilation and Air Conditioning
Hz	Frequency in hertz
IS	Initial Study
JARPA	Joint Aquatic Resource Permit Application
kWh	kilowatt-hours
L01	A-weighted noised levels exceeding 1%
L10	A-weighted noised levels exceeding 10%
L50	A-weighted noised levels exceeding 50%
L90	A-weighted noised levels exceeding 90%
LAFCO	Local Agency Formation Commission
lbs/day	pounds per day
LC	Limited Commercial
LDL	Larson Davis Laboratories
Ldn	average day/night level
LEA	Land Extensive Agriculture
Leq	average ambient sound level
L_{max}	maximum instantaneous noise level
L_{min}	minimum instantaneous noise level
LOS	Level of Service
LTS	Less than Significant
LTS w/Mit	Less than Significant with Mitigation

M1	Limited Urban Industrial
M2	Heavy Industrial
M3	Limited Rural Industrial
MACT	Maximum Available Control Technology
MBTA	Migratory Bird Treaty Act
MEP	Maximum Extent Practicable
MF	Multiple family residential
mgd	millions of gallons per day
mi	miles
mmhos/cm	millimhos per centimeter
MMI	Modified Mercalli Intensity Scale
MMP	Mitigation Monitoring Program
mph	miles per hour
MSDS	Material Safety Data Sheets
msl	mean sea level
msp	maximum extent practical
MW	Moment Magnitude
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NB	Northbound
NCHRP	National Cooperative Highway Research Program
NE	Not Established
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NMWD	North Marin Water District
NO_x	Nitrogen Oxides

NO_2	Nitrogen Dioxide
NOAA	National Oceanic Atmospheric Administration
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Properties
NSF	National Science Foundation
NSPS	New Source Performance Standards
NWPRR	Northwest Pacific Railroad
O_3	Ozone
OHP	Office of Historic Preservation
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PAH	Poly Aromatic Hydrocarbons
PAWI	Preliminary Assessment of Wetland Impacts
Pb	lead
PBS	Petaluma Boulevard South
PG&E	Pacific Gas and Electric
PM	Particulate Matter
PM10	Respirable Particulate Matter
PM2.5	Fine Particulate Matter
ppd	pounds per day
ppm	parts per million
ppmv	parts per million by volume
PRMD	Permit and Resource Management Department
PSD	Prevention of Significant Deterioration
psf	per square foot
psi	pounds per square inch
PST	Pacific Standard Time

PUC	Public Utilities Commission
PUD	Planned Unit Development
PVC	Polyvinyl Chloride
RAP	Recycled Asphalt Product
RCRA	Resource Conservation Recovery Act
ROG	Reactive Organic Gas
RR	Rural Residential
RWQCB	Regional Water Quality Control Board
SAAQS	State Ambient Air Quality Standards
SAFZ	San Andreas Fault Zone
SAVFD	San Antonio Volunteer Fire Department
SB	Southbound
SCDEH	Sonoma County Department of Environmental Health
SCWA	Sonoma County Water Agency
SD	Scenic Design
sf	square feet
SF	Single family residential
SHBC	State Historical Building Code
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMART	Sonoma-Marin Area Rail Transit
SMART-ROW	Sonoma-Marin Area Rail Transit right-of-way
SO_x	Sulfur Oxides
SO_2	Sulfur Dioxide
SO_4	Sulfates
SPCC	Spill Prevention Control and Countermeasures
SPL	Sound Pressure Level
SR	Scenic Resources

SRA	Source Receptor Area
SU	Significant and Unavoidable
SUSMP	Standard Urban Stormwater Mitigation Plan
SWA	Supplemental Wetland Assessment
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resource Control Board
TACs	Toxic Air Contaminants
TBACT	Toxics Best Available Control Technology
TCLP	Toxicity Characteristics Leaching Potential
TCM	Transportation Control Measures
TMDL	Total Maximum Daily Load
TPHd	Total Petroleum Hydrocarbons as diesel
TPHg	Total Petroleum Hydrocarbons as gasoline
TPHmo	Total Petroleum Hydrocarbons as motor oil
TTLC	Total Threshold Limit Concentration
UBC	Uniform Building Code
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
V/C	Volume-to-Capacity
VdB	Vibration decibels
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VOH	Valley Oak Habitat
WB	Westbound

WHO	World Health Organization
WMMP	Wetland Mitigation and Monitoring Program
WSA	Water Supply Assessment
°C	Celsius
°F	Fahrenheit
µg/l	micrograms per liter
µg/m3	micrograms per cubic meter

IX. REFERENCES CITED

Analytical Sciences. (July 2004). *Dutra Haystack Laboratory Report.* (Updated November 2005).

Analytical Sciences. (December 2005). *Dutra Haystack Property Final Report*. (Updated January 2006)

Association of Bay Area Governments. (2005). *Earthquake Shaking Scenario Map.*

Association of Bay Area Governments. (2005*). Interactive Association of Bay Area Governments, Geographic Information System - Maps Showing Dam Failure Inundation.*

Association of Bay Area Governments. (2005). *Liquefaction Susceptibility Map.*

Association of Environmental Professionals. *White Paper on Global Climate Change. (*Revised Draft April 10, 2007*).*

Astec Industries, Inc. Brochure: *Hot Mix Asphalt Facility*. Website: astecinc.com. Retrieved by CAJA Staff August 14, 2006.

Bay Area Air Quality Management District. (April 1996). *California Environmental Quality Act Guidelines*.

Balance Hydrologics, Inc. (2004). *Preliminary Hydrologic Investigation of Wetland Restoration Potential at Haystack Landing.*

Baseline Environmental Consulting. (May 2006). *Evaluation of Potential Pollutant Loading - Petaluma River*.

Beard, Vicki R., Tom Origer & Associates. (January 2006). *Letter Regarding Work Completed.*

Bollard & Brennan, Inc. (September 2004). *Environmental Noise Analysis, Dutra Materials Haystack Project.*

Bradford, G.R., Chang, A.C., Page, A.L., Bakhtar, D., Frampton, J.A., Wright, H. *(*March 1996). *Background Concentrations of Trace Metals and Major Elements in California Soils.*

California Air Resources Board. 2006. *The California Almanac of Emissions and Air Quality*.

California Code of Regulations. *Title 22, California Code of Regulations, Section 66261.24-1 (Table II-List of Inorganic Persistent and Bioaccumulative Toxic Substances and Their Soluble Threshold Limit Concentration).*

California Critical Coastal Areas Report. (June 5 2006). Website: http://www.coastal.ca.gov/nps/Web/cca_pdf/sfbaypdf/CCA92PetalumaRiver.pdf. Retrieved by CAJA Staff August 14, 2006.

California Department of Fish and Game. (2006). *Natural Diversity Data Base, Special Animals and Special Plants.*

California Division of Mines and Geology. (1983). *State of California Special Studies Zones, Petaluma River Quadrangle Map.*

California Geographic Survey. (2002). *California Geomorphic Provinces, Note 36.*

California Geological Survey. (2005). *Probabilistic Seismic Hazards Mapping Ground Motion Page.*

California Native Plant Society. (2001). *Inventory of Rare and Endangered Plants of California, Special Publication No. 1 (6th Edition).*

Chong, Daphne Y. (March 2005). *Results of Health Risk Screening Analysis for Dutra Materials.*

County of Sonoma Permit and Resource Management Department. (February 2006). *Environmental Checklist Form, Dutra Haystack Landing Asphalt and Recycling Facility*.

Corda, Jerry, Fire Chief, San Antonio Volunteer Fire Department. (March 2006). *Letter to Dutra Group.*

CSW/Stuber-Stroeh Engineering Group, Inc. (April 2006). *Hydrology Report for Dutra-Haystack Landing Asphalt and Recycling Facility*.

Dutra Group. Petaluma Quarry. (May 2004). *Storm Water Pollution Prevention Plan.*

Dutra Group. (April 2005). *Temporary Asphalt Facility Use Permit Application*.

Dutra Group. (April 2004). *Asphalt Facility Use Permit Application*.

Dyer, Norris R. (February 2005). *Concerns about Safeguarding Heron/Egret Colony on Dutra Site, memo to County of Sonoma Permit and Resource Management Department, Dutra Haystack Landing Asphalt and Recycling Facility*.

Environmental Data Resources Inc. (August 2005). *The EDR - City Directory Abstract.*

Environmental Data Resources Inc. (August 2005). *The EDR Radius Map with GeoCheck.*

Federal Emergency Management Agency. (April 1991). *Flood Insurance Rate Map.*

Fehr & Peers Transportation Consultants. (June 2004). *Draft Transportation Impact Analysis Report.*

Fugro West, Inc. (March 2004). *Phase I Environmental Site Assessment 37-Acre Haystack Landing Property.*

Fugro West, Inc. (February 2006). *Phase I Environmental Site Assessment Update, Haystack Landing Property (Petaluma).*

Ginn, Michael, Fire Marshall, Petaluma Fire Department. (May 2006). *Personal communication with J. Pettijohn, BASELINE*.

Goldberg, Harold. (May 2006). *Noise Attenuation and Mitigation Plan for the Dutra Haystack Landing Facility*.

Hammar-Klose, Erika S. and Thieler, E. Robert. (2000). *National Assessment of Coastal Vulnerability to*

Sea-Level Rise: Preliminary Results for the U.S. Pacific Coast, U.S. Geological Survey Open-File Report 00-178, http://pubs.usgs.gov/of/2000/of00-178/.

Hart, Earl W., Bryant, William A. (1999). *Special Publication 42, Fault-Rupture Hazard Zones In California, Alquist-Priolo Earthquake Fault Zoning Act (A-PEFZA), California Department Of Conservation (CDC), Division Of Mines And Geology (CDMG).*

Hart, Steve. (June 2005). *"Black Point Bridge - Bridge Battle: Barge Company Rail Authority in Fight that could hinder River Traffic". The Press Democrat.*

Hazardous Materials Assessment, Inc. (January 2004). *Letter Regarding Asbestos Survey #04.017.*

Helfrich, G., Sonoma County Planning and Resource Management Division. (January 2006). *Letter Regarding Comments on the Draft Environmental Impact Reports, Sonoma Marin Area Rail Transit (SMART) to L. Hames, SMART District Office.*

Illingworth & Rodkin Inc. (November 13, 2003). *Noise Assessment for Shamrock Facility on Landing Way, Petaluma, CA.*

Justice & Associates. (September 2004). *Application to the Bay Area Quality Management District, Barge Off-Loading Facility and Hot Mix Asphalt Plant.*

Kriech, A.,Heritage Research Group**.** (March 1992). *Leachability of Asphalt and Concrete Pavement.*

LSA Associates, Inc. (April 6, 2007). *Heron/Egret Rookery Impact Assessment and Recommendations, Haystack Landing Project, Petaluma, California*. Letter report to Brian Peer, The Dutra Group from Steve Foreman, Principal/Wildlife Biologist.

Macmillan, Lucy. *Conceptual Wetlands Mitigation Plan, Haystack Landing Project Site*.

Macmillan, Lucy. (June 2006). *Supplemental Wetlands Assessment, Haystack Landing Dutra Asphalt Plant Project Site.*

Macmillan, Lucy, and Ecosystems West Consulting Group. (October 2004). *Biological Constraints Analysis, Haystack Landing Project Site*.

Marin Countywide Plan Update. *Draft EIR, Section 4.9 Water Supply and Demand*. Website: http://www.co.marin.ca.us/depts/CD/main/comdev/eir.cfm. Retrieved by CAJA Staff June 11, 2007.

Miller Pacific Engineering Group. (September 2004). *Geotechnical Investigation, Dutra Materials - Haystack Landing Asphalt and Recycling Facility*.

Miller Pacific Engineering Group. (November 2005). *Environmental Sampling and Testing, Dutra Haystack Landing.*

Miller Pacific Engineering Group. (November 2005). *Letter Regarding Environmental Sampling and Testing, Dutra Haystack Landing.*

Miller Pacific Engineering Group. (October 2004). *Geotechnical Investigation, Haystack Landing Wetlands Restoration.*

Miller Pacific Engineering Group. (December 2004). *Stability of Gravel Stockpiles, Haystack Landing Asphalt and Recycling Facility.*

Monk & Associates. (November 2004). *Salt Marsh Harvest Mouse Trapping Study, Haystack Landing Project Site, letter report to U.S. Fish and Wildlife Service from Sarah Lynch.*

Narayanan, Vijay and Titus, James G. (1995). *Washington, D.C.: The Probability of Sea Level Rise, U.S. Environmental Protection Agency. 186 pp. EPA 230-R95-008.*

National Marin Fisheries Service, Southwest Region. (January 1996). *Juvenile Fish Screen Criteria for Pump Intakes, May 9, and 1997, Fish Screening Criteria for Anadromous Salmonids.*

Orenco Systems Website for AdvanTex Treatment System. http://www.orenco.com/ots/ots_adv_research.asp. Retrieved by CAJA staff on May 11, 2007.

Petaluma and Environs, Planning Area, Public Safety Element, Sonoma County General Plan. (1989). *Figure PS-1h, Schematic Map of Area Subject to Safety Policy Requirements.*

Pleasanton Weekly. (September 2003). *"Haggerty on asphalt plant: 'Move it or close it'".*

Richman, Charlie and Titus, James G. (2001). *Maps of Lands Vulnerable to Sea Level Rise: Modeled Elevations along the U.S. Atlantic and Gulf Coasts, Climate Research, CR 18:205-228.*

Sanborn, Sherby. (April 2004). *Haystack Landing Tree Protection Report.*

San Francisco Bay Regional Water Quality Control Board. (1995). *Water Quality Control Plan.*

San Francisco Bay Plan. (January 2006). *San Francisco Bay Conservation and Development Commission*.

San Francisco Estuary Institute. (2003). *The Pulse of the Estuary: Monitoring and Managing Contamination in the San Francisco Estuary.*

Shollenberger Park Website: http://www.petalumawetlandspark.org/HTML/Shollenberger.html. Retrieved by CAJA Staff on August 2, 2004.

Shacklette, H.T., Boerngen, J.G. (1984). *Element Concentrations in Soils and Other Surficial Materials of the Coterminous United States, US Geological Survey Professional Paper 1270.*

Sonoma County. (March 1989). *Sonoma County General Plan.*

Sonoma County. (March 1993). *Petaluma Dairy Belt Area Plan.*

Sonoma County. (1998). *Sonoma County Code, Chapter 26, The Zoning Regulations.*
Taylor, Scott. (December 12, 2004). Justice and Associates. Correspondence to Thu Bui at BAAQMD, in response to request for additional information.

Taylor, Scott. (April 23, 2007). Justice and Associates. Correspondence to Josh Kirtley of Dutra Materials, regarding EIR Analysis for Tugboat Trips.

Thompson, Richard E., Archaeor Archaeological Consultants. (May 2004). *Phase I Cultural Resources*

Study for Haystack Landing.

Townsend, T., Department of Environmental Engineering Sciences, University of Florida.. (June 1998). *Leaching Characteristics of Asphalt Road Wastes.*

U.S. Army Corps of Engineers. (November 13. 2003). *Subject: File Number 28104N.* Letter to Lucy Macmillan from Calvin C. Fong, Chief, Regulatory Branch.

U.S. Army Corp of Engineers. (April 2006). *Wetland Mitigation and Monitoring Plan - Haystack Landing Wetland Mitigation Project.*

United States Geological Survey. (1970). *Regional Slope Stability Map of the Northeastern San Francisco Bay Region, Professional Paper 944.*

United States Geological Survey. (2003). *Earthquake Probabilities in the San Francisco Bay Region: 2002 to 2031 – A Summary of Findings.*

Vashisth, P., Lee, K. W., Wright, R. M. (1998). *Assessment of Water Pollutants from Asphalt Pavement Containing Recycled Rubber in Rhode Island, Transportation Research Record No. 1626, p. 95-104.*

Wagner, D.L. (2002). *Geologic Map of the Petaluma Quadrangle, California Geologic Survey.*

World Health Organization. (1995). *Community Noise, Berglund & Lindval.*

Yolo County Planning and Public Works Department. (March 2000). *Draft Supplemental Environmental Impact Report for Granite Construction Company, Long-Term Off-Channel Mining Plan Modification.*

DRAFT ENVIRONMENTAL IMPACT REPORT
VOLUME II - TECHNICAL APPENDICES

DUTRA HAYSTACK LANDING ASPHALT AND RECYCLING FACILITY

Lead Agency:
County of Sonoma
Permit and Resource Management Department
2550 Ventura Ave.
Santa Rosa, CA 95403

SCH No. 2006022107
January 2008

DUTRA HAYSTACK LANDING ASPHALT AND RECYCLING FACILITY

DRAFT ENVIRONMENTAL IMPACT REPORT

VOLUME II

TECHNICAL APPENDICES

Lead Agency:

County of Sonoma
Permit Resource Management Department
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January 2008

VOLUME II TECHNICAL APPENDICES
DUTRA HAYSTACK LANDING ASPHALT AND RECYCLING FACILITY
DRAFT ENVIRONMENTAL IMPACT REPORT

TECHNICAL APPENDIX D:	AIR QUALITY DATA
TECHNICAL APPENDIX E:	BIOLOGICAL RESOURCES DATA
TECHNICAL APPENDIX F:	CULTURAL REPORT AND PEER REVIEW COMMENTS
TECHNICAL APPENDIX G:	HYDROLOGY DATA
TECHNICAL APPENDIX H:	NOISE DATA
TECHNICAL APPENDIX I:	TRAFFIC DATA

VOLUME I

APPENDICES

APPENDIX A

INITIAL STUDY AND NOTICE OF PREPARATION (NOP)

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

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

Project Title: Dutra Haystack Landing Asphalt and Recycling Facility

Project Applicant: Dutra Group/CSW Stuber-Stroeh

The Sonoma County Permit and Resource Management Department has received an application from Dutra Group/CSW Stuber-Stroeh for the Dutra Haystack Landing Asphalt and Recycling Project. Sonoma County will be the lead agency and will prepare an Environmental Impact Report (EIR) for the above project. We are asking for your views regarding the scope of environmental issues that should be addressed in the EIR.

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

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

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

Public Scoping Meeting: The Permit and Resource Management Department will hold a public scoping meeting from **6:30 pm to 9:30 pm** on **February 27, 2006.** This meeting will allow an opportunity for the public to express views regarding the scope of the environmental issues to be addressed in the EIR. These comments will be considered by the County during preparation of the EIR. The meeting will be held at the Petaluma Community Center, Activity Room, 320 McDowell Boulevard, Petaluma.

Date: February 17, 2006

Steve Dee

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

Attachments: Initial Study

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

ENVIRONMENTAL CHECKLIST FORM

FILE #: PLP04-0046 **PLANNER:** Steve Padovan
PROJECT: Dutra Haystack Landing Asphalt and Recycling Facility **DATE:** February 17, 2006

LEAD AGENCY: Sonoma County Permit and Resource Management Department

PROJECT LOCATION: 3357 Petaluma Boulevard South, Petaluma (shown in Figures 1 and 2)

APPLICANT NAME: Dutra Group/CSW Stuber-Stroeh

APPLICANT ADDRESS: 1000 Point San Pedro Road, San Rafael, CA 94901

GENERAL PLAN DESIGNATION: LC/GI (Limited Commercial/General Industrial)

SPECIFIC/AREA PLAN: Petaluma Dairy Belt Plan

SPECIFIC PLAN LAND USE DESIGNATION: LC (Limited Commercial) (APN 019-320-022, 023)
M2 (Heavy Industrial) (APN 019-220-001)

ZONING: LC (Limited Commercial), M2 (Heavy Industrial), SD (Scenic Design), B8 (Frozen Lot Size), SR (Scenic Resource), F2 (100-year flood plain), HD (Historic District), BR (Biotic Resources), VOH (Valley Oak Habitat)

DESCRIPTION OF PROJECT: The proposed project will require a General Plan Amendment to change the land use designation on the primary project site (APN 019-320-022, 023) from Limited Commercial to Limited Industrial, a Specific Plan Amendment to change the land use designation from Limited Commercial to Limited Industrial and a Zone Change from LC (Limited Commercial) to M3 (Limited Rural Industrial). Additionally, request for a Use Permit and Design Review to establish an asphalt batch plant, an asphalt recycling area and an aggregate materials off-loading, storage and distribution facility for Dutra Materials. The proposal includes the construction and operation of new dock facilities on the Petaluma River for the receipt of barged aggregate materials on a 24-hour basis, a conveyor and distribution system, stockpiled aggregates, sand and recycled materials, an asphalt mixing and loading facility, a portable asphalt recycling plant and related office with truck scale. The normal truck loading facilities would operate weekdays between 6:00 a.m. and 6:00 pm. with occasional nightly and weekend operations based on customer requirements.

The proposed project site is located on three parcels totaling 38 acres at 3357 Petaluma Boulevard South on the east side of Petaluma Boulevard South just outside the City of Petaluma. The proposed project would include the re-establishment of Dutra's asphalt batch plant operation currently located at 1600 Petaluma Boulevard South (on the opposite side of the freeway) and the construction of several new buildings, including the San Antonio Volunteer fire house, modular offices and equipment related to the mixing and distribution of asphalt (shown in Figure 3). A conveyor system would distribute barged materials to multiple stockpiles and a large asphalt recycling area is proposed. Additional site improvements consist of new parking areas, significant landscaping along the freeway, stormwater swales, security gates, lighting and a relocated driveway for this site.

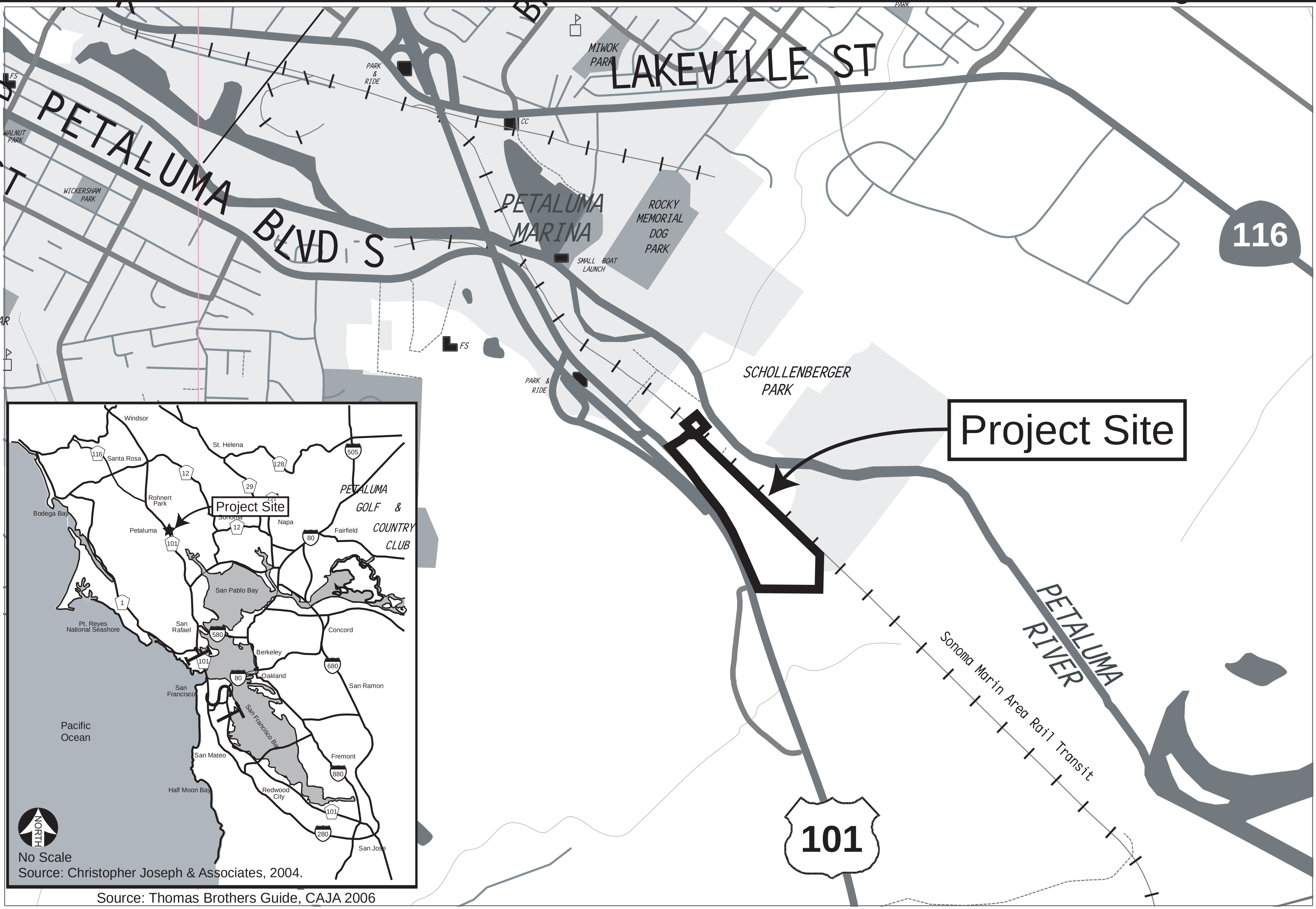

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Figure 1
Regional and Vicinty Map

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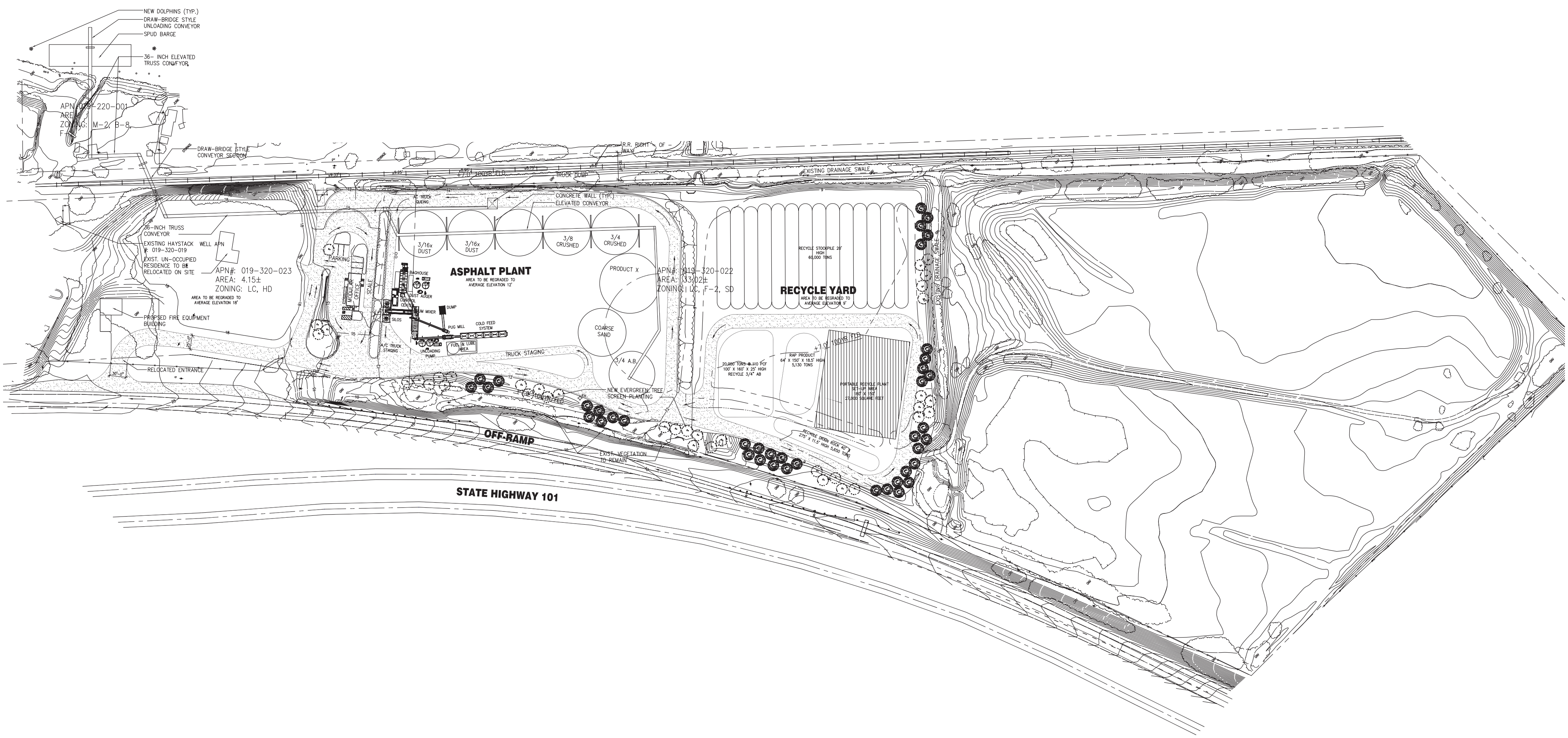
Figure 2
Aerial Photograph



Source: DCC Engineering Co, Inc. 2004

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NORTH

0 150 300 450 600
Scale (Feet)

Figure 3
Proposed Site Plan

SURROUNDING LAND USES AND SETTING: Briefly describe the project's surroundings:
The proposed project is located to the southeast of an existing industrial area between Highway 101, Petaluma Boulevard South and the western bank of the Petaluma River. The site had a number of older barns and a historic farmhouse built in 1860 that had been relocated to this site but subsequently removed or destroyed by fire. Historically, the site was a shipping center and stopping point for people and products going between Petaluma and San Francisco. Between 1968 and 1990, the southeasterly portion of the property was used by American Rock and its successor, Dutra Materials, for settling ponds from their quarry operations. Most of the pre-existing trees on the site were removed based on aerial data.

From September 12, 2005 to September 19, 2005, unauthorized grading and equipment storage occurred on the project site. The activity included installation of erosion control measures and crushed rock. The heavy equipment stored on site was removed as part of a County Code Enforcement action on December 20, 2005.

Subsequent site inspections were completed by the applicant's biologist in conjunction with the California Department of Fish and Game (CDFG) and United States Army Corps of Engineers (COE). Based on these inspections, it was determined that the unauthorized actions resulted in impacts to approximately 0.53 acres of seasonal wetland and 0.01 acre of coastal marsh habitat subject to COE and San Francisco Regional Water Quality Board (RWQCB) pursuant to Sections 404 and 401 of the Clean Water Act, respectively. To address concerns arising from these actions, a mitigation plan was developed and measures were implemented to the satisfaction of the COE, CDFG, RWQCB and other agencies.

Surrounding uses consist of a vacant parcel to the northwest, residential uses to the east and south along the Petaluma River, vacant agricultural lands to the southeast and Highway 101/residential to the west. Shamrock Materials recently received approvals for an aggregate storage and distribution facilities along the river north and adjacent to Dutra's proposed dock. All the properties to the northwest and northeast are zoned LC whereas the Shamrock site is zoned M2. The properties to the southeast and southwest are agriculturally zoned (LEA) and there are three RR zoned properties on the hill across the freeway overlooking the site. North east of the project site is the Petaluma River and Shollenberger Park, a 16-acre nature park on the eastern shore of the River.

The proposed project site is located within the jurisdiction of the Bay Conservation and Development Commission (BCDC) and is therefore subject to the Joint Aquatic Resource Permit Application (JARPA) process.

OTHER PUBLIC AGENCIES WHOSE APPROVAL MAY BE REQUIRED (e.g. permits, financing approval or participation agreement):

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife
- U.S. Coast Guard
- California Department of Fish and Game
- California Department of Transportation
- California Water Resources Control Board
- California Air Resources Board
- California State Lands Commission
- California Integrated Waste Management Board
- Regional Water Quality Control Board
- Bay Conservation and Development Commission
- Bay Area Air Quality Management District
- Sonoma County Water Agency
- Sonoma County Public Heath Department
- Sonoma County Certified Unified Program Agency
- Sonoma Marin Area Rail Transit (SMART)
- Local Enforcement Agency (LEA)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

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

CONCLUSION:

Based on the information provided in the reports submitted by the applicant (biological, traffic, archaeological, noise and hazardous materials), a visual inspection of the site and surrounding properties, and the standards and policies of the Sonoma County General Plan, the project as proposed could pose a potentially significant impact to the environment and further evaluation is warranted through the EIR process.

DETERMINATION

On the basis of this initial evaluation:

___ The proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

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

X The proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

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

___ Although the proposed project could have a significant effect on the environment, all potentially significant effects were previously analyzed in an earlier EIR or Negative Declaration pursuant to applicable standards and potential impacts have been avoided or mitigated pursuant to that earlier EIR or Negative Declaration, including revisions or mitigation measures that are imposed upon the proposed project. There are no changes in the project, no new information related to potential impacts, and no changes in circumstances that would require further analysis pursuant to Section 15162 of CEQA Guidelines, therefore no further environmental review is required.

The environmental documents which constitute the Initial Study and provide the basis and reasons for this determination are attached or referenced herein, and hereby made a part of this document.

Incorporated Source Documents

In preparation of the Initial Study checklist, the following documents were referenced/developed, and are hereby incorporated as part of the Initial Study. All documents are available in the project file or for reference at the Permit and Resource Management Department.

X Project Application and Description
X Initial Data Sheet
X County Planning Department's Sources and Criteria Manual
X 1989 Sonoma County General Plan and Associated EIR
X Sonoma County Zoning Ordinance
X Sonoma County Rare Plant Site Identification Study
X Project Referrals from Responsible Agencies
X State and Local Environmental Quality Acts (CEQA)
X Traffic Impact Analysis by Fehr & Peers (June 29, 2004)
X Environmental Noise Analysis - Bollard and Brennan, Inc. (September 15, 2004)
X Biological Constraints Analysis - Lucy Macmillan and Roy Buck (October 2004)
X Phase I Environmental Site Assessment - Fugro West, Inc. (March 2004)
X Cultural Resources Study - Archaeor Archaeological Consultants (March 2004)
X Haystack Landing Tree Protection Report - Sherby Sanborn (April 2004)
X Cultural Resources Review - Tom Origer & Associates (January 2006)

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 17 at the end of the checklist, "Earlier Analysis" may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(D). In this case, a brief discussion should identify the following:

a) Earlier Analysis Used. Identify and state where they are available for review.

b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated", describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
a) the significance criteria or threshold, if any, used to evaluate each question; and
b) the mitigation measure identified, if any, to reduce the impact to less than significance.

INITIAL STUDY CHECKLIST:

This checklist is taken from Appendix G of the State CEQA Guidelines. For each item, one of four responses is given:

No Impact: The project would not have the impact described. The project may have a beneficial effect, but there is no potential for the project to create or add increment to the impact described.

Less than Significant Impact: The project would have the impact described, but the impact would not be significant. Mitigation is not required, although the project applicant may choose to modify the project to avoid the impact.

Less than Significant with Mitigation: The project would have the impact described, and the impact could be significant. One or more mitigation measures have been identified that will reduce the impact to a less than significant level.

Potentially Significant Impact: The project would have the impact described, and the impact could be significant. The impact can not be reduced to less than significant by incorporating mitigation measures. An Environmental Impact Report (EIR) must be prepared for this project.

Each question on the checklist was answered by evaluating the project, as proposed, that is, without considering the effect of any added mitigation measures.

1. AESTHETICS

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

Comment:

1. a. Potentially Significant Impact. The 38 acre site is located at the southern end of the City of Petaluma along a scenic corridor (Petaluma Boulevard South/Highway 101) adjacent to an existing industrial area. This site is located at the southernmost gateway to the City of Petaluma on an undeveloped site. There are views across the site to the Petaluma River from Highway 101. The site abuts residential uses along the Petaluma River, is visible to the homes across the freeway, and is visible from Schollenberger Park and the Petaluma River Trail System on the east side of the river. Two hundred (200) feet from the centerline of Highway 101 is a designated scenic corridor and the ordinance has allowances for structures within the setback with design review approval if it is deemed that the encroachment is necessary. In addition, the property is within the South Petaluma Gateway Project which is a landscape plan designed by the City of Petaluma for Petaluma Boulevard South and includes curb and gutter improvements to the road along with a planting and irrigation plan.

The proposed project includes a 60-foot high asphalt batch plant and the storage of aggregate materials in large conical piles that would be up to 40 feet in height. The batch plant consists of a tower approximately 10 feet in diameter for the vertical loading of trucks, conveyance systems to the tower and mixing and loading machinery at its base. In addition, an above-grade conveyor system will be utilized from the barge dock to the storage piles that will be 20 to 24 feet above grade. These structures present a potentially significant visual impact to the freeway, to surrounding residences and to the users of the park along the river. The proposed project would landscape the Highway 101 frontage only. The equipment and materials storage could be visually intrusive and the proposed landscape screening could be inadequate. In addition, the introduction of heavy landscaping and/or berming with landscaping along the freeway could result in the elimination of the view corridors from the freeway to the river. Therefore, the EIR will address the potential for the proposed project to have a substantial adverse affect on a scenic vista in accordance with the County's Visual Assessment Guidelines.

1.b Less than Significant Impact. As noted, the proposed project is located within a scenic corridor and is not located adjacent to a state designated scenic highway. Therefore, the proposed project would not substantially degrade scenic resources within a scenic highway and project impacts related to scenic highways would be less than significant. No additional analysis of this issue is warranted in the EIR.

1.c Potentially Significant Impact. See Comment 1.a. The proposed project would have a potentially significant visual impact; therefore, the EIR will address the potential for the proposed project to substantially degrade the existing visual character or quality of the site and its surroundings.

Additionally, as noted, unauthorized actions occurred on the site in September 2005. These actions altered the aesthetic character of the site. The EIR will address the impacts of these actions.

1.d Potentially Significant Impact. The property is currently vacant and any new use or facility will introduce additional light and glare in the area. In addition, the potential for significant nighttime operations, especially night lights for parking, security, circulation and safety, could result in potentially significant impacts to the existing visual character of the area. Nighttime lighting on the river would also be necessary for barges that deliver the processed aggregate from the Petaluma River during high tide which has the potential to occur day or night. Therefore, the EIR will address the potential for the proposed project to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

2. AGRICULTURE RESOURCES

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

Comment:

2.a No Impact. The property is designated as "Other Land" and Grazing Lands" on the Sonoma County Important Farmland Map which defines properties not used or valued as farmland. This site was a dairy until 1968 but has been used for commercial/industrial uses for approximately 35 years. It is currently zoned for limited industrial and commercial uses. Therefore, the proposed project would not convert agricultural lands of significance to a non-agricultural use and no additional analysis of this issue is warranted in the EIR.

2.b No Impact. There are no Williamson Act contracts on this site. Therefore, the proposed project would not conflict with a Williamson Act contract and no additional analysis of this issue is warranted in the EIR.

2.c No Impact. The proposed project would not result in the conversion of farmland to non-agricultural use because agricultural uses have not occurred on this site in the last 35 years. Additionally, as noted, the site is currently designated "Other Land" and Grazing Lands" on the Sonoma County Important

Farmland Map which indicates that the site is not considered valuable farmland. Therefore, the proposed project would not result in the conversion of Farmlands to non-agricultural use and no additional analysis of this issue is warranted in the EIR.

3. AIR QUALITY

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

Comment:

3.a Potentially Significant Impact. The project is within the jurisdiction of the Bay Area Air Quality Management District's (BAAQMD) Air Quality Management Plan (AQMP). The BAAQMD is the regional agency responsible for overseeing compliance with State and Federal laws, regulations, and programs within the San Francisco Bay Area Air Basin. The BAAQMD has prepared and/or implements specific plans to meet applicable laws, regulations, and programs. Among them are the *Carbon Monoxide Maintenance Plan* (1994), *Bay Area Clean Air Plan* (1997), and the *Ozone Attainment Plan* (1999). The BAAQMD has also developed CEQA guidelines to assist lead agencies in evaluating the significance of air quality impacts.

In formulating compliance strategies, air quality goals, and policies, BAAQMD relies on planned land uses established by local general plans. When a project proposes to change planned uses assumed in an adopted local General Plan, the project may depart from the assumptions used to formulate BAAQMD plans in such a way that the cumulative result of incremental changes may hamper or prevent the BAAQMD from achieving its goals. The proposed project is not entirely consistent with the existing land use designation and a General Plan Amendment is required. Therefore, the EIR will address the potential for the proposed project to result in significant impacts related to conflicting with or obstructing implementation of applicable air quality plans.

3.b Potentially Significant Impact. The Bay Area is considered a non-attainment area for ozone under both the Federal Clean Air Act and the California Clean Air Act. The Bay Area is also considered a non-attainment area for PM_{10} under the California Clean Air Act but not under the Federal Clean Air Act . The Bay Area was previously a non-attainment area for carbon monoxide and is now a maintenance area under the Federal Clean Air Act. The Bay Area is considered to have attained standards for all other regulated air pollutants (nitrogen dioxide, sulfur dioxide, and lead). Attainment means the region normally does not violate air standards. Although ozone and small particulate (PM_{10}) concentrations are almost always below air quality standards in the Sonoma Valley, emissions from the area could be contributing to air quality violations in other parts of the Bay Area. To attain and maintain ambient air quality standards, the BAAQMD has established thresholds of significance for air pollutants. These thresholds are for air pollutants, ozone precursors (reactive organic gases and nitrogen oxides), and PM_{10} for which the District has not attained ambient air quality standards. Projects with substantial carbon monoxide emissions or which generate substantial traffic affecting congested intersections must undergo detailed carbon monoxide analysis to predict local concentrations of that air pollutant. These concentrations are compared with applicable State and Federal ambient air quality standards.

The proposed asphalt batch plant may produce significant stationary equipment emissions, process pollutants, odors from the mixing of the oils and tar to create asphalt and odors from the manufacturing of rubberized asphalt. Mobile sources for this project are primarily diesel truck traffic and the use of heavy equipment for the loading and sorting of aggregates as well as the barges on the river. Preliminary traffic analysis indicates that the proposed facility will generate 62 a.m peak-hour trips and five p.m. peak-hour trips based on the closing of the facility before 4:00 p.m. (a total ADT was not provided). This traffic will emit carbon monoxide, nitrogen oxides (NO_x), particulates, and Volatile Organic Compounds (VOC). Vehicles do not emit ozone directly, but ozone will form in the atmosphere from NO_x and hydrocarbons in exhaust gases. Based on the proximity of residential uses to this site, these air quality impacts could be potentially significant. Therefore, the EIR will address the potential for the proposed project to result in significant impacts related to violating any air quality standard or contributing substantially to an existing or projected air quality violation. Additionally, the facility is not proposed to close before 4:00 p.m.; therefore, the EIR will evaluate traffic impacts for the proposed hours of operation.

3.c Potentially Significant Impact. The BAAQMD CEQA Guidelines (BAAQMD, December, 1999) include screening criteria to identify projects that may have significant emissions of criteria pollutants. These criteria are based on the size of the project and the amount of vehicle traffic it would generate. Further analysis of vehicle emissions is not recommended if the amount of new traffic generated would be less than 2,000 vehicles per day. Because this project generates an average of 300 vehicle trips or less per day, vehicle related emissions would be less than significant. However, PM_{10} (fine particulate matter) in the form of dust emissions from the grading and handling of aggregate and recycled materials may occur during construction and operation of the proposed project. Therefore, EIR will address the potential for a cumulatively considerable net increase of PM_{10} during construction and operation of the proposed project.

3.d Potentially Significant Impact. See Comment 3.b. Although the proposed project will re-establish the existing asphalt facility, the proposed project will bring the facility in the vicinity of sensitive receptors, including adjacent residences along the Petaluma River. There is also the potential for on-site dust conditions associated with barge unloading, on-site distribution by conveyors, and the loading of trucks, particularly during windy periods. Residential uses are in close proximity to the project site; therefore, the EIR will address the potential for the proposed project to expose sensitive receptors to substantial pollutant concentrations.

3.e Potentially Significant Impact. The proposed project has the potential to generate objectionable odors as it is an asphalt batch plant that will manufacture rubberized asphalt. The existing facility is located away from sensitive receptors. However, the proposed project will be directly adjacent to several homes along the Petaluma River that may be impacted from the facility's emissions. Therefore, the EIR will address the potential for the proposed project to create objectionable odors affecting a substantial number of people.

4. BIOLOGICAL RESOURCES

Would the project:

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

Comment:

4.a Potentially Significant Impact. The project is proposing a new barge off-loading facility on the Petaluma River which has a number of listed fish species. The proposal is to reduce impacts to the river by utilizing only pilings to anchor barges and no permanent construction on the riverbank.

Approximately 1.73 acres of jurisdictional wetlands are proposed to be filled for the asphalt recycling operations. A preliminary biological survey and constraints analysis was completed on the proposed project site to determine if the site has the potential to affect special-status plant and animal species. No special status plant species were observed on the riverfront parcel or in the wetlands due to the nature of the site. There were originally several oaks and a California black walnut on the upland portion of the property but they were removed by the applicant in 2004. However, eight special-status animal species were identified as having the potential to occur on or within the vicinity of the project site. These species include: the California clapper rail (Rallus longirostris obsoletus) a federally and state-listed endangered species; the salt marsh harvest mouse (Reithrodontomys raviventris), a federally and state-listed endangered species and a California fully protected species; California black rail (Laterallus jamaicensis coturniculus), a federal species of concern and a state-listed threatened species; Salt-marsh common yellowthroat (Geothlypis trichas sinuosa), a federal and state species of concern; steelhead (Oncorhynchus mykiss irideus), a federal threatened species; Chinook salmon (Oncorhynchus tshawytscha), a federally and state-listed endangered species; Sacramento splittail (*Pogonichthys macrolepidotus*), a state species of concern; and the western pond turtle (*Clemmys marmorata marmorata*), a federal and state species of concern. The proposed project has the potential to have a substantial adverse effect, either directly or through habitat modifications, on these species; therefore, the EIR will address this issue.

4.b Potentially Significant Impact. The San Francisco District of the U.S. Army Corps of Engineers (Corps) completed a jurisdictional wetlands determination on the project site on November 7, 2003 and identified a total of 11.69 acres subject to Corps jurisdiction pursuant to Section 404 of the Clean Water Act. The Petaluma River is also subject to Corps jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899. However, the Corps did not review the wetlands that would be impacted along the Petaluma River. A coastal brackish marsh habitat type occupies a narrow strip in the parcel bordering the Petaluma River and extends into several drainages that traverse the site in a southwest to northeast direction. The remainder of the wetlands are seasonal as the original tidal flow from the river was reduced due to siltation of the ponds. Instead, there are seasonal fresh and brackish water wetlands.

Coastal brackish marsh is recognized as a sensitive habitat type and was formerly recognized as a "high priority" habitat type by the CDFG' s Natural Diversity Database (CNDDB). Although coastal brackish marsh is not currently recognized as a CNDDB "high priority " habitat type, the coastal brackish marsh on this site appears to have a close affinity to the Alkali Bulrush/Pickleweed association, which is recognized as a CNDDB "high priority" habitat type. The biological constraints analysis found no evidence of special status plants or animals in the existing wetlands.

The proposed project would result in the grading and filling of 1.73 acres of coastal marsh and seasonal wetlands which requires a Clean Water Act, Section 404 authorization from the US Army Corps of Engineers. Only piles will be placed in the river.

A conceptual wetlands mitigation plan is being prepared by the applicant that outlines the proposed restoration of the southern portion of the site (19 acres) into brackish marsh which was originally on the site prior to the diking of the land for siltation ponds. Historic hydrologic conditions will be restored by reintroducing tidal circulation to the entire 19 acre area.

It is anticipated that the restoration of the 19 acres of brackish wetlands would be a sufficient mitigation for the proposed loss of 1.73 acres. This would increase the total acreage of wetlands on the property by 4.3 acres which is greater than a 2 to 1 replacement for the acres lost. As the quality of the existing seasonal wetlands is not high, the conversion of the whole 19 acres to what was historically brackish marsh and improved tidal flows would be a beneficial improvement for species that live in these habitats. However, a wetlands mitigation plan has not been completed for the restored wetlands and it is unclear what impacts will occur along the river, as any construction on the river could result in potentially significant impacts to fish species and to the harvest mouse. Therefore, the EIR will address the potential for the proposed project to have a substantial adverse effect on any riparian habitat or other sensitive community.

As noted, unauthorized grading and crushed rock fill occurred on the site in September 2005. These actions resulted in impacts to 0.53 acres of seasonal wetland and 0.01 acres of coastal marsh habitat. The EIR will also address the impacts of these actions.

4.c Potentially Significant Impact. See Comment 4.b. As noted, not including wetlands along the river, there is a total of 11.69 acres of jurisdictional wetland on the site including coastal brackish marsh habitat and seasonal wetlands. As noted, the restoration of the 19 acres of brackish wetlands would be a sufficient mitigation for the proposed loss of 1.73 acres on the upland portion and potentially for the small barge loading area in the river. This would increase the total acreage of wetlands on the property by 4.3 acres which is a greater than 2 to 1 replacement for the acres lost. Concurrently, Clean Water Act Section 404 and Rivers and Harbors Act Section 10 authorizations for the installation of new pilings in the western bank of the Petaluma River will be obtained.

The proposed barge docking facility was not included in a wetland delineation, therefore a revised wetland delineation map will be required. The EIR will provide a revised wetland delineation map and include discussion of additional impacts if applicable and address the potential of the proposed project to have a substantial adverse effect on federally protected wetlands.

As noted, unauthorized grading and crushed rock fill occurred on the site in September 2005. These actions resulted in impacts to 0.53 acres of seasonal wetland and 0.01 acres of coastal marsh habitat. The EIR will also address the impacts of these actions.

4.d Potentially Significant Impact. See response to comment 4.a. The EIR will address the potential of the proposed project to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

4.e Potentially Significant Impact. The proposed pier for the project is located in a Biotic Resource Overlay Zone, which is designed to protect biological resources. Additionally, there were several trees on the site that were removed in the fall of 2004 that were protected under the County's tree preservation ordinance. The proposed project has the potential to conflict with local policies and ordinances protecting biological resources; therefore, the EIR will address this issue.

4.f No Impact. The project site does not fall within an area designated as a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state Habitat Conservation Plan nor conflict with any such provisions. No additional analysis of this issue is warranted in the EIR.

5. **CULTURAL RESOURCES** Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	X			
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		

Comment:

5.a Less than Significant Impact. The property currently has a Historic District Overlay Zone designation which recognized the 1860's farmhouse previously located at the northwestern corner of the property. This dwelling was considered historically significant and the Sonoma County Landmarks Commission was addressing the reuse of the building. Unfortunately, the structure was destroyed in a fire and all other structures on the site were demolished in fall 2004. County staff identified no other historic resources on the properties. Therefore, project impacts that would cause a substantial adverse change in the significance of a historical resource would be less than significant and no additional analysis of this issue is warranted in the EIR.

5.b Potentially Significant Impact. An archaeological report was completed on the site. A known historical site was identified on the site where the 1860's farmhouse previously stood. This site is identified as Ca-Son-1465H, Haystack Landing. Besides the structure, the area surrounding the dwelling contained glass shards and other materials that dated to the mid- to late 1800's. The site has been used for over 100 years as a trading and commercial zone and it is likely to contain additional artifacts from that time period not to mention possible Native American artifacts. Additional study of the significance of the site is required in the EIR in order to determine the potential for adverse affect on significant archaeological resources.

5.c Less than Significant Impact with Mitigation. There are no known paleontological resources on the project site. However, unknown paleontological resources could occur on the site. If care is not taken during project construction, unknown paleontological resources could be damaged or destroyed. If paleontological materials are discovered during project construction, construction will cease in the immediate vicinity of the find until a qualified archaeologist or paleontologist is consulted to determine the significance of the find, and has recommended appropriate measures to protect the resource. Further disturbance of the resource will not be allowed until those recommendations deemed appropriate by the County have been implemented. Therefore, project impacts related to unknown paleontological resources would be less than significant. No additional analysis of this issue is warranted in the EIR.

5.d Less than Significant Impact with Mitigation. see comment 5.b. Although no human remains are known to have been found on the project site, it is possible that unknown resources could be encountered during project construction, particularly during ground-disturbing activities such as excavation and grading. However, as required by state law, if human remains are discovered at the project site during construction, work at the specific construction site at which the remains have been uncovered shall be suspended, and the County coroner shall be immediately notified. If the remains are determined by a qualified archaeologist and/or paleontologist to be Native American, the Native American Heritage Commission (NAHC) shall be notified within 24 hours, and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Therefore, project impacts to unknown human remains would be less than significant. No additional analysis of this issue is warranted in the EIR.

6. GEOLOGY AND SOILS Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?	X			
iii) Seismic-related ground failure, including liquefaction?	X			
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?	X			
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	X			

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	___	___	X	___
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	___	___	X	___

Comment:

6.a.i, iv No Impact. Because the site is not in an Alquist-Priolo Special Studies Zone, there are no known active faults on the property, and the property is located on relatively flat ground away from surrounding hillsides, no impacts are anticipated. No additional analysis of these issues is warranted in the EIR.

6.a.ii, iii Potentially Significant Impact. The Sonoma County Relative Hazard from Seismic Shaking Map (California Division of Mines and Geology) shows that the majority of the site is located on unconsolidated alluvium and terrace deposits that are from 0 to 300 feet deep with increased shaking hazards depending on the thickness of the alluvium and the depth of groundwater. Additionally, the site is in a seismically active area and will accommodate tons of aggregate material. Therefore, this property has the potential to experience liquefaction and settlement during a seismic event. Therefore, the EIR will address project impacts related to strong seismic shaking and seismic-related ground failure including liquefaction.

6.b Less than Significant Impact. The zoning ordinance allows a maximum of 50 percent lot coverage for buildings. This site is currently undeveloped with wetlands and several areas of unconsolidated fill. The proposed project includes construction of an asphalt batch plant and asphalt/concrete recycling operation on approximately 15 acres, the majority of which will not be paved. The small knoll in at the northern portion of the site will be primarily undeveloped and the 19 acres in the southern portion of the site will be preserved as open space/wetlands. However, the existing topsoil on the 15 acres to be developed will be covered with large aggregate piles and roadways for circulation and loading of trucks.

The site is currently zoned for commercial and industrial use. It is not considered farmland of significance and has not been used for agricultural purposes in over 30 years. The development of this site for commercial and industrial uses was anticipated in the general plan and commercial uses typically have greater lot coverage than non-commercial uses. Therefore, the loss of topsoil will not be significant and no additional analysis of this issue is warranted in the EIR. Regarding erosion issues, the relatively flat topography of the site and proposed storm water drainage systems will limit erosion and project impacts would be less than significant. See 8.c. for discussion of erosion control measures during construction. This project is subject to the National Pollution Discharge Elimination System (NPDES) requirements, and covered under the State General Construction Permit, as set by the Regional Water Quality Control Board (RWQCB).

6.c Potentially Significant Impact. See response to 6.a.ii, iii. The EIR will address the potential for lateral spreading, subsidence, liquefaction, or collapse.

6.d Less than Significant Impact. The UBC Table 18-1-B soil expansion index for the soil in the project area is not available as soil testing has not been done. However, the Sonoma County Soil Survey (US Department of Agriculture, 1972) depicts the soils in the project area as belonging to the Haire Clay Loam series. The expansion characteristics of these soils are considered low. The actual shrink-swell characteristics of the soil would be evaluated by the soil report that is required for the building permit for any new construction. This report will establish the foundation design parameters to ensure that should there be soil expansion, it would not damage any structures. Therefore, impacts would be less than significant and no additional analysis of this issue is warranted in the EIR.

6.e Less than Significant Impact. The County's Project Review Health Specialist has reviewed the project and has required that a Registered Civil Engineer or Registered Environmental Health Specialist design a septic system that can accommodate the waste water generated by the project. Therefore, impacts would be less than significant and no additional analysis of this issue is warranted in the EIR.

7. HAZARDS AND HAZARDOUS MATERIALS

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

Comment:

7.a Potentially Significant Impact. This facility will store oils, tars, and recycled tires in crumb form related to the production of rubberized asphalt and will maintain an above ground fuel tank for the heavy equipment used to move the aggregates. These oils and fuel are considered hazardous materials and as such are regulated by state and county regulations. Therefore, the EIR will address the potential for the project to create a significant hazard to the public or the environment through the routine transport, use, storage, or disposal of hazards materials. Additionally, there may be other impacts to fire services related to use and storage of oils that will be evaluated in the EIR.

7.b Potentially Significant Impact. See Comment 7.a. The EIR will address the potential of the project to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

7.c No Impact. The site is not located within one-quarter mile of any existing or proposed school. No additional analysis of this issue is warranted in the EIR.

7.d No Impact. The site is not listed in the inventory of hazardous materials sites compiled pursuant to Government Code Section 65962.5. No additional analysis of this issue is warranted in the EIR.

7.e No Impact. The site is not within the Airport Land Use Plan (ALUP) for the Petaluma Airport. No additional analysis of this issue is warranted in the EIR.

7.f No Impact. The site is not within the vicinity of a private air strip. No additional analysis of this issue is warranted in the EIR.

7.g No Impact. The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. No additional analysis of this issue is warranted in the EIR.

7.h Less than Significant Impact. Although the property is adjacent to grasslands and open space, the threat posed by wildland fires is minimal. The developed area will be completely cleared of vegetation and will consist of large aggregate piles and machinery with few habitable structures. The offices are located at least 50 feet from the storage silo and there will be adequate clearance around the structure as it is surrounded by access roads. Additionally, buildings will be designed to current codes and the County Fire Marshal's fire safety requirements will ensure the project would reduce the exposure of people and property to fire hazards to a degree the risk of injury or damage is less than significant. No additional analysis of this issue is warranted in the EIR.

8. HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?			X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or				

	river, in a manner which would result in substantial erosion or siltation on- or off-site?	X			
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	X			
e)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?			X	
f)	Otherwise substantially degrade water quality?	X			
g)	Place housing within a 100-year hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	X			
I)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?			X	
j)	Inundation by seiche, tsunami, or mudflow?			X	

Comment:

8.a Less than Significant Impact. The proposed project includes the construction of a new septic system. Based on preliminary analysis, there is adequate septic capacity of the property to accommodate a septic system for the six employees. The County's Project Review Health Specialist has reviewed the project and required that a Registered Civil Engineer or Registered Environmental Health Specialist design the septic system to accommodate the waste water generated by the project. Development of the project also requires an application for waste discharge permits from the Bay Area Regional Water Quality Control Board and an NPDES permit. The Board will assess all aspects of waste water discharge to insure that there is no failure to the subsurface. This will insure that there will not be a violation of any water quality standards or waste discharge requirements. All standards must be met through this process. Therefore, the project impacts related to water quality standards or waste discharge requirements would be less than significant and no additional analysis of this issue is warranted in the EIR.

8.b Less than Significant Impact. The site will be served by an existing water connection from the North Marin Municipal Water District pipeline that runs along the westerly side of the property. The proposed project will increase impervious surface, however, as noted, a large portion of the project site will remain unpaved. Therefore, project impacts related to depletion of groundwater supplies or interference with groundwater recharge would be less than significant and no additional analysis of this issue is warranted in the EIR.

8.c Potentially Significant Impact. The area is subject to very minor localized flooding due to its proximity to the tidal action along the Petaluma River, the existence of the settling ponds and previous improper grading of the site. During construction, potential erosion and sediment transfer may result due to the removal of ground cover and the grading process. Erosion control measures are necessary to minimize the impact of development. Any permits for grading will be reviewed by the Drainage Review Section of PRMD who will insure that erosion control methods are incorporated into the project. Any new facilities will be designed to the required capacity during drainage review and existing facilities will be checked for adequacy. Additionally, a Streambed Alteration Notification will need to be submitted to CDFG to evaluate impacts to the Petaluma River associated with construction of the proposed off-loading facility. The proposed project may result in impacts that would substantially alter the existing drainage pattern of the site and therefore this issue will be further addressed in the EIR.

Additionally, as noted, unauthorized grading and crushed rock fill occurred on the site in September 2005. These actions included implementation of erosion control measures. The EIR will address the impacts of these actions.

8.d Potentially Significant Impact. The grading for the project would alter the natural topography of the land and may alter the drainage pattern. Introduction of impervious surfaces would increase the rate and the amount of storm water runoff. In order to reduce the impacts to a less than significant level, the project will be designed in accordance with the Sonoma County Water Agency (SCWA) Guidelines. Collection of the runoff and analysis of existing and proposed runoff conditions shall be performed under a hydrology study completed in accordance with SCWA Guidelines and submitted with Grading and Building permits. The run-off from the project shall not worsen existing drainage conditions on adjacent downstream properties. In addition, the finished floor of all buildings within the flood plain shall be one foot above the 100-year flood elevation. The proposed project may result in impacts that would substantially alter the existing drainage pattern of the site and therefore the EIR will address this issue.

8.e Less than Significant Impact. The project will be required to provide drainage swales along the perimeter of the property to filter and retain contaminants that are present in any stormwater before they enter the drainage ditches or the wetlands. Therefore, impacts would be less than significant and no additional analysis of this issue is warranted in the EIR.

8.f Potentially Significant Impact. See response to 8.a. The EIR will address the potential of the proposed project to substantially degrade water quality.

8.g No Impact. The project involves no new housing units and would therefore not place housing within a 100-year flood hazard area. No additional analysis of this issue is warranted in the EIR.

8.h Potentially Significant Impact. The proposed project will place within a 100-year flood hazard area structures which may impede or redirect flood flows; therefore, the EIR will address this issue.

8.i Less Than Significant Impact. All structures will have finished floors at least one foot above the 100 year flood elevation. Therefore, impacts would be less than significant and no additional analysis of this issue is warranted in the EIR.

8.j Less than Significant Impact. The site may be subject to inundation by a tsunami or seiche as it is along the Petaluma River estuary. However, the likelihood of a tsunami or seiche occurring is rare and due to the distance from the open ocean, there likely will be adequate warning to allow employees to leave the property and seek high ground in the hills immediately to the west. As noted, the property is located on relatively flat ground away from surrounding hillsides, and therefore it is not likely that the project site would be inundated by mudflow. No additional analysis of this issue is warranted in the EIR.

9. LAND USE AND PLANNING

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

Comment:

9.a No Impact. The project is located in an unincorporated industrial area outside but near the southern end of the City of Petaluma. It would not alter ownership, nor reconfigure existing parcels or roadways. However, a new driveway is proposed north of the existing entrance to the site. There are several residential dwellings that would be impacted by the development of this parcel, however, the primary designated uses in this area are industrial or commercial in nature. Therefore, the project would not divide an established community and no additional analysis of this issue is warranted in the EIR.

9.b Potentially Significant Impact. As noted, one portion of the site (APN 019-220-001) located along the Petaluma River has a General Plan land use designation of General Industrial with the remainder of the site (APN 019-320-022, 23) designated Limited Commercial. An asphalt batch plant is permitted with a Use Permit in the zone district associated with Limited Commercial and the owner/developer is seeking to amend the Limited Commercial designation to Limited Industrial on the main developed area of the property to allow for the new use. The General Plan has specific criteria which must be met in order to amend a land use designation to Limited Industrial. These are as follows:

1. lands shall be designated to recognize an existing permitted use or to serve the projected employment needs of the planning area.
2. lands outside urban service areas shall have adequate water and septic suitability.
3. lands shall have convenient access to an arterial or collector highway.
4. lands shall be located near population concentrations.
5. lands shall not be in environmentally sensitive or hazardous areas.
6. outside of the unincorporated communities on Figure LU-2 on page 33, lands shall not be located in a scenic corridor.
7. any applicable planning area policies.

This project potentially conflicts with criteria 1, 5 and 7. Approximately 40 years ago, the site was a dairy with no industrial operations. From the late 1960's to the early 1990's, the site had been used as settling ponds for the Petaluma quarry, however, there are no county records that indicate that the use of the property for this purpose was ever authorized. Other than its use for settling ponds, there is no record of any industrial operations ever taking place on the site. Therefore, recognizing an existing industrial use would not be a basis for a change in the land use designation. As for serving the employment needs of the area, this operation will only have six employees. Of greater consequence is the fact that the site is located within the Highway 101 scenic corridor at the gateway to the Petaluma Valley and there are significant wetlands on the site and along the Petaluma River. In addition, it conflicts with the Petaluma Dairy Belt Specific Plan Land Use designation (Limited Commercial) although the proposed development and preservation of wetlands would comply with the open space policies by restoring the 19 acres of marsh which the plan designates as a community separator. Based on these issues, the project appears to have a potentially significant impact on land use and therefore, the EIR will address this impact.

9.c No Impact. The project is not located within any habitat conservation plan or natural community conservation plan area. No additional analysis of this issue is warranted in the EIR.

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

Comment:

10.a,b No Impact. The Sonoma County General Plan shows that the project is not located within a known mineral resource deposit area. In fact, this facility will provide another source of aggregate materials for the construction industry in South Sonoma County and is a replacement for the loss of an aggregate resource that is just across the freeway from this site. No additional analysis of this issue is warranted in the EIR.

11. NOISE

Would the project result in:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	X			
b) Exposure of persons to or generation of excessive groundborne vibration or ground borne noise levels?	X			
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	X			
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	X			
e) For a project located within an airport land use plan or, where such plan has not been adopted,				

within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	_____	_____	_____	X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	_____	_____	_____	X

Comment:

11.a Potentially Significant Impact. The proposed asphalt plant and recycling operation will generate potentially significant noise impacts above the current ambient sound levels at this site and at adjacent residential uses along the river. These noise sources result from barge off-loading of aggregates at any time of the day, the conveyance of these materials to stockpiles, the production of asphalt and recycling operations, the loading of trucks with aggregates and asphalt, and the movement of trucks and equipment on the site. The proposed project will include 24 hour operations in order to accommodate future highway construction projects or other road projects that may need asphalt supplies for night construction. The existing noise generating sources in the area consist of Highway 101 and several industrial uses to the north including a residential recycling facility and the sand and aggregate distribution facilities for Shamrock Materials. Ambient daytime noise levels at the site are generally above those stated in the General Plan due to the slightly elevated freeway grade, the traffic levels, and the prevailing winds that carry freeway noise over the site.

Additionally, the proposed project will include facilities for the San Antonio Volunteer Fire Department for response drills and equipment storage. Sirens used when responding to emergencies will also generate potentially significant noise impacts.

Based on the physical proximity of the residences along the river, off-loading of aggregates by barge, batch plant, recycling, truck loading, and truck idling, noise impacts may not be adequately mitigated through simple sound barriers and noise attenuation measures on the equipment. Therefore, the EIR will address the potential for the proposed project to expose persons to or generate noise levels in excess of established standards.

11.b Potentially Significant Impact. No operational activities are proposed that would create excessive groundborne vibration or groundborne noise. However, the construction of the pier for the off-loading of barges requires the installation of piles into the river. Pile-driving equipment will be employed during construction for a short duration of time (approximately 20 days or less). This will likely generate ground vibration. Therefore the EIR will address the potential for the proposed project to expose persons to or generation of excessive groundborne vibration or groundborne noise.

11.c Potentially Significant Impact. See response to 11.a. The proposed project will have a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; therefore, this issue will be addressed in the EIR.

11.d Potentially Significant Impact. As noted, the construction of the proposed project will result in a significant temporary increase in noise levels due to pile driving operations associated with the construction of the barge pier in the river.

Additionally, as noted, the off-loading of aggregates from barges during any time of the day or night and the subsequent use of the conveyor system during regular operations would result in a potentially significant periodic noise impact to the residences directly adjacent to this site. Therefore the EIR will address these issues.

11.e,f No Impact. The project is not located in the vicinity of the Airport Land Use Plan for the Petaluma Municipal Airport which is over 2 miles to the north. No additional analysis of this issue is warranted in the EIR.

12. POPULATION AND HOUSING

Would the project:

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

Comment:

12.a No Impact. The proposed project will not directly nor indirectly induce substantial population growth in the area because there will be only six employees and the new facility is a re-establishment of an existing facility that will be closed. No additional analysis of this issue is warranted in the EIR.

12.b No Impact. The project would not displace any housing units. No additional analysis of this issue is warranted in the EIR.

12.c No Impact. The project would not displace any housing units and therefore would not displace any persons. No additional analysis of this issue is warranted in the EIR.

13. PUBLIC SERVICES

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i. Fire protection?			X	
ii. Police protection?			X	
iii. Schools?				X

iv. Parks?				X
v. Other public facilities?			X	

Comment:

13.a.i, ii, v Less than Significant Impact. The project would not have a significant impact on existing public services nor require new or physically altered governmental facilities. Existing police and fire services are adequate. The County Fire Marshal has reviewed the project and required that all buildings comply with fire safe standards, including a number of fire protection measures such as building sprinklers, extinguishers and hydrants that are appropriate for a project of this magnitude. The proposed project may require an on-site water storage tank and pump for use in fire suppression operations. These standard fire protection measures would be required to be installed before the new buildings are finalized. No other public facilities have been identified that would be substantially adversely affected by the proposed project. Therefore, project impacts related to police and fire protection services, and other public facilities would be less than significant and no additional analysis of these issues is warranted in the EIR.

Note that the proposed project will include facilities for use by the San Antonio Volunteer Fire Department for response drills and equipment storage. This volunteer Fire Department is a second call station and requires no living facilities. The Fire Department will occupy the station every other weekend for training. Approximately five volunteer personnel are on the site at these training sessions. The station facility itself will be approximately 2,500 to 3,000 square feet.

13.a.iii, iv Less than Significant Impact. See response to 8.a regarding the proposed Septic system. The project would have sufficient water supplies available to serve the project from existing entitlements and resources, and new or expanded entitlements would not be needed. Potable water needs for project employees and irrigation needs would be served by an existing water connection from the North Marin Municipal Water District (NMWD). Although the site is outside of its territorial boundaries, NMWD has agreed to continue to supply the volume shown as the historical entitlement when the water meter was connected. The projected demand for non-potable water would be 10,000 to 20,000 gallons per day, and would be provided by pumping from the River. Non-potable water demands would not require expansion of existing entitlements from NMWD, therefore would have a less-than-significant impact for Utilities.

14. RECREATION

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

Comment:

14.a,b No Impact. This project involves no new housing units and proposes only six employees. Furthermore, the new facility is a re-establishment an existing batch plant. Therefore, the proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. Additionally, the proposed project does not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. No additional analysis of this issue is warranted in the EIR.

15. TRANSPORTATION/TRAFFIC

Would the project:

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

Comment:

15.a Potentially Significant Impact. Based on a preliminary traffic analysis, the proposed operations will generate 62 a.m. and five p.m. peak hour trips and all studied intersections and roadway segments would continue to operate at Level of Service (LOS) A or B. However, there is an existing access road through the project site for the dwellings and properties along the Petaluma River. Due to the significant increase in truck traffic associated with the proposed asphalt and recycling facility and the San Antonio Fire Department at the new driveway, there is the possibility that there could be safety issues between trucks, emergency vehicles, and the passenger vehicles associated with the off-site residences. Therefore, on-site circulation patterns will be analyzed in the EIR to identify potential conflicts with large trucks, passenger cars, and emergency vehicles.

Regarding cumulative traffic impacts, several other permit applications were filed for other projects in the immediate vicinity of the subject site. When future plus project conditions were studied, the southbound 101 ramp intersection dropped to LOS F. The traffic study recommended no mitigations to this intersection because the study concluded that the proposed project would not contribute to the drop in LOS, as the new site is not adding trips to this intersection, only redistributing them.

Based on this cumulative analysis, it was determined that a restriping of the four lanes into two through lanes with a two-way left turn lane on Petaluma Boulevard South from near the Petaluma River Bridge to the northbound 101 off-ramp onto Petaluma Boulevard South would improve traffic circulation on the main road and reduce traffic hazards by creating a dedicated turn lane. The study also concluded that the added traffic volumes would lower the service levels on the southbound 101 ramp intersection with Petaluma Boulevard South to LOS F during the peak A.M. hour at build-out of Petaluma's General Plan (2030). The study noted that Caltrans may propose to reconfigure the interchange with the Highway 101 widening project which would improve LOS in the future. However, the study concluded that there is a need for interim improvements until such time as the interchange is reconstructed. These improvements consist of the re-striping of Petaluma Boulevard South and the signalization of the southbound 101 ramp intersection with Petaluma Boulevard South. The owner/developer will be required to pay their fair share of the above stated improvements.

15.b Potentially Significant Impact. The intersections and roadway in the vicinity of the project site are currently operating at LOS of B/C. Since the proposed project will result in additional a.m and p.m peak trips, the developer will be required to construct improvements at the northbound Highway 101/Petaluma Boulevard South intersection prior to commencement of operations. In addition, the applicant/developer will be required to pay their fair share of restriping Petaluma Boulevard South to create two lanes with a dedicated left turn lane between the northbound and southbound 101 ramps and to pay their fair share of the cost of intersection improvements at the southbound 101 on-ramp with Petaluma Boulevard South. The proposed project may result in substantial impacts that will be evaluated in the EIR.

15.c No Impact. The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. No additional analysis of this issue is warranted in the EIR.

15.d Less than Significant Impact. According to the traffic study and the project proposal statement, the existing driveway will be relocated approximately 300 feet to the north to provide a longer deceleration lane for trucks exiting the freeway and to place the driveway as far as possible from the freeway exit gore point. The new driveway will require that the existing roadway on the southbound direction of Petaluma Boulevard South be regraded to eliminate the grade difference between the two sections of road. In addition, a 35 foot wide driveway will be provided with large diameter turning radii to allow for the smooth entry and exit of large trucks. Sonoma County Transportation and Public Works has determined that the new driveway intersection standards shall be and have included these improvements in the TPW conditions. Therefore, impacts would be less than significant and no additional analysis of this issue is warranted in the EIR.

15.e No Impact. The project is conditioned on a requirement that the existing driveway must meet the minimum requirements for commercial driveways. This requirement insures that there will be adequate emergency access. In addition, the gate will be set back to allow a vehicle to park in front of it while not blocking traffic on Petaluma Boulevard South. No additional analysis of this issue is warranted in the EIR.

15.f No Impact. The site will provide adequate parking for 11 vehicles which meets the requirements for the total number of employees (six) on-site. No additional analysis of this issue is warranted in the EIR.

15.g No Impact. The project would not conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks). No additional analysis of this issue is warranted in the EIR.

16. UTILITIES AND SERVICE SYSTEMS

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

Comment:

16.a Less than Significant Impact. See response to 8.a. The project was reviewed by the County Environmental Health Officer who, as previously described, will require the submittal of an approved wastewater discharge permit from the Bay Area Regional Water Quality Control Board. This permit will be required before the issuance of any building permit to ensure the project complies with the Board's wastewater treatment requirements. There is no evidence that the project will exceed wastewater treatment requirements. No additional analysis of this issue is warranted in the EIR.

16.b No Impact. See response to 8.a. Waste water generated by the project will go into an approved septic system. No additional analysis of this issue is warranted in the EIR.

16.c Less than Significant Impact. The grading and paving of the site will alter the natural topography of the land and may alter the drainage pattern. Introduction of impervious surfaces will increase the rate and the amount of storm water runoff and require the construction of storm water drainage facilities located around the site. The proposal includes a drainage swale on the perimeter of the site to capture and filter run-off from the pavement and processing areas. In addition, the site is less than 300 feet to the river and there is adequate carrying capacity in the drainage ditches to accommodate the increase in runoff. This should result in a less than significant impact to existing storm water systems and no additional analysis of this issue is warranted in the EIR.

16.d No Impact. Potable water needs for project employees and irrigation needs would be served by an existing water connection from the North Marin Municipal Water District (NMWD). Although the site is outside of its territorial boundaries, NMWD has agreed to continue to supply the volume shown as the historical entitlement when the water meter was connected. The projected demand for non-potable water would be 10,000 to 20,000 gallons per day, and would be provided by pumping from the River. Non-potable water demands would not require expansion of existing entitlements from NMWD, therefore would have a less-than-significant impact for Utilities.

16.e No Impact. See response to 16.b. No additional analysis of this issue is warranted in the EIR.

16.f No Impact. This facility will generate little solid waste. The facility is an asphalt batch plant and recycling operation which deals primarily with aggregates. Sonoma County has a solid waste management program in place that provides solid waste collection and disposal services for the entire County. The program can accommodate the permitted collection and disposal of the waste that will result from the proposed project. No additional analysis of this issue is warranted in the EIR.

16.g No Impact. See response to 16.f. No additional analysis of this issue is warranted in the EIR.

17. MANDATORY FINDINGS OF SIGNIFICANCE

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

<u>Comment:</u>

17.a Potentially Significant Impact. The proposed project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory; therefore, this issue will be addressed in the EIR.

17.b Potentially Significant Impact. The proposed project has impacts that are individually limited, but that may be cumulatively considerable; therefore, the EIR will address this issue.

17.c Potentially Significant Impact. The project will result in changes to the existing environment that could result in significant visual, air quality, biological resource, noise and land use impacts. The studies provided do not adequately mitigate the potential impacts and further analysis is needed. In addition, alternatives to the proposed project should be analyzed to determine if impacts can be reduced through the relocation of the proposed project. Therefore, the EIR will address the potential of the proposed project to cause substantial adverse affects on human beings, either directly or indirectly.

APPENDIX B

RESPONSES TO NOP AND COMMENTS FROM EIR SCOPING MEETING

Arnold
Schwarzenegger
Governor

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Sean Walsh
Director

Notice of Preparation

February 22, 2006

RECEIVED

FEB 27 2006

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT SONOMA

To: Reviewing Agencies

Re: Dutra's Haystack Landing Asphalt Batch Plant and Asphalt / Concrete Recycling Facility
SCH# 2006022107

Attached for your review and comment is the Notice of Preparation (NOP) for the Dutra's Haystack Landing Asphalt Batch Plant and Asphalt / Concrete Recycling Facility draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

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

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

J. Driemeyer

for Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# **2006022107**
Project Title Dutra's Haystack Landing Asphalt Batch Plant and Asphalt / Concrete Recycling Facility
Lead Agency Sonoma County Permit and Resources Management Department

Type **NOP** Notice of Preparation

Description General Plan Amendment / Rezone from Limited Commercial to Limited Industrial with a Use Permit and Design Review to establish a proposed rubberized asphalt batch plant, asphalt/concrete recycling facility, stockpiled aggregates, new dock facilities for off-loading barge operation, volunteer fire station, and related conveyor systems, truck scale and office space. On-site storage and handling of sands, aggregates, oils, tars and recycled tires in crumb form will be used in the manufacturing of rubberized asphalt.

Lead Agency Contact

Name Steve Dee
Agency Sonoma County Permit and Resources Management Department
Phone (707) 565-8350 ***Fax***
email
Address 2550 Ventura Avenue
City Santa Rosa ***State*** CA ***Zip*** 95403

Project Location

County Sonoma
City Petaluma
Region
Cross Streets State Hwy. 101
Parcel No. 019-220-001
Township ***Range*** ***Section*** ***Base*** MDB&M

Proximity to:

Highways 101
Airports
Railways SMART
Waterways Petaluma River
Schools
Land Use Vacant industrial and commercially designated / zoned parcels located between State Hwy. 101 and the Petaluma River in the County of Sonoma. Site is bisected by SMART tracks; nearby mixed land uses include aggregate processing, park, residential, river and highway.

Project Issues Aesthetic/Visual; Air Quality; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Noise; Septic System; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Water Supply; Wetland/Riparian; Landuse; Cumulative Effects; Other Issues

Reviewing Agencies Resources Agency; Department of Boating and Waterways; Department of Parks and Recreation; Department of Water Resources; San Francisco Bay Conservation and Development Commission; Native American Heritage Commission; Department of Fish and Game, Region 3; Public Utilities Commission; State Lands Commission; California Highway Patrol; Caltrans, District 4; Air Resources Board, Major Industrial Projects; State Water Resources Control Board, Division of Water Rights; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 2

Date Received 02/22/2006 ***Start of Review*** 02/22/2006 ***End of Review*** 03/23/2006

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List **County:** Sonoma **SCH#** [illegible]

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [x] **Dept. of Boating & Waterways**
  David Johnson
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [ ] **Dept. of Conservation**
  Roseanne Taylor
- [ ] **California Energy Commission**
  Roger Johnson
- [ ] **Dept. of Forestry & Fire Protection**
  Allen Robertson
- [ ] **Office of Historic Preservation**
  Wayne Donaldson
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **Reclamation Board**
  DeeDee Jones
- [x] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [x] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou
- [ ] ______________
  Conservancy

Fish and Game

- [ ] **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Game Region 1**
  Donald Koch
- [ ] **Fish & Game Region 2**
  Banky Curtis
- [x] **Fish & Game Region 3**
  Robert Floerke
- [ ] **Fish & Game Region 4**
  Mike Mulligan
- [ ] **Fish & Game Region 5**
  Don Chadwick
  Habitat Conservation Program
- [ ] **Fish & Game Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- [ ] **Fish & Game Region 6 I/M**
  Tammy Allen
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M**
  George Isaac
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- [ ] **Depart. of General Services**
  Public School Construction
- [ ] **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- [ ] **Dept. of Health Services**
  Veronica Rameriz
  Dept. of Health/Drinking Water

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Debby Eddy
- [ ] **Office of Emergency Services**
  Dennis Castrillo
- [ ] **Governor's Office of Planning & Research**
  State Clearinghouse
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [x] **Public Utilities Commission**
  Ken Lewis
- [x] **State Lands Commission**
  Jean Sarino
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [x] **California Highway Patrol**
  John Olejnik
  Office of Special Projects
- [ ] **Housing & Community Development**
  Lisa Nichols
  Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Katherine Eastham
- [x] **Caltrans, District 4**
  Tim Sable
- [ ] **Caltrans, District 5**
  David Murray
- [ ] **Caltrans, District 6**
  Marc Birnbaum
- [ ] **Caltrans, District 7**
  Cheryl J. Powell
- [ ] **Caltrans, District 8**
  Dan Kopulsky
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Mario Orso
- [ ] **Caltrans, District 12**
  Bob Joseph

Cal EPA

Air Resources Board

- [ ] Airport Projects
  Jim Lerner
  - [ ] Transportation Projects
    Kurt Karperos
  - [x] Industrial Projects
    Mike Tollstrup
- [ ] **California Integrated Waste Management Board**
  Sue O'Leary
- [ ] **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [x] **State Water Resouces Control Board**
  Steven Herrera
  Division of Water Rights
- [x] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [x] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Jonathan Bishop
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)
- [ ] **Other** ______________

Last Updated on 08/10/05

NORTH MARIN WATER DISTRICT

999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133 • FAX (415) 892-8043

March 9, 2006

Mr. Steve Dee, Senior Environmental Specialist
Sonoma County Permit and Resource
Management Department
2550 Ventura Ave.
Santa Rosa, CA 95403

RE: Dutra Haystack Landing Asphalt and Recycling Facility – County of Sonoma
APNs 019-220-01, 019-330-22, -23

Dear Mr. Dee:

The purpose of this letter is to respond to the Notice of Preparation of a Draft Environmental Impact Report for the above referenced project. The North Marin Water District (District) currently provides domestic service through a 5/8" meter to 3355 Petaluma Blvd. So. (aka Redwood Highway), APN 019-330-22. Please note that service to this parcel is outside the District's territorial boundaries. The District provides water generally to the City of Novato and adjacent Marin County area only. The District's policy (see attachment) is to import water to Novato and preserve usage for customers within the District's boundaries without additional distribution along the Hwy. 101 corridor. This policy provides an exception, however, for lands within the South Petaluma Specific Plan area which receive land use approval from the City of Petaluma.

It should also be noted that the District is operating under a temporary impairment agreement with the Sonoma County Water Agency (SCWA) for importing of water to the city of Novato. Limitations currently exist within the existing SCWA water delivery system which may jeopardize reliable service to our existing customers. Consequently, any expansion of service to customers outside District boundaries must be in strict compliance with said District policy and not impact water deliveries to current and future customers within the District's service territory. Under no circumstances will an expansion of water service to 3355 Petaluma Blvd. So. be allowed beyond the limited historical entitlement as determined at the sole discretion of the District.

On a separate but related matter, the District is interested in transferring ownership of North Marin Water District water facilities in the South Petaluma Blvd. area to the City of Petaluma. By copy of this letter to the Petaluma City Manager, we are hereby declaring our intent to initiate discussion on service responsibility in this area and facilities ownership transfer.

If you have further questions, please contact me at 897-4133, extension 8510.

Sincerely,

Drew McIntyre
Chief Engineer

Attachments

cc: Brian Peer, Materials General Manager
Dutra Materials
1600 Petaluma Blvd. South
Petaluma, CA 94952

Al Cornwell
CSW/Stuber-Stroeh
790 DeLong Ave.
Novato, CA 94945

Mike Bierman, City Manager
City of Petaluma
11 English St.
Petaluma, CA 94952

Steve Sharpe, Executive Officer
LAFCO, Sonoma County
575 Administration Dr, 104A
Santa Rosa, CA 95403

DM\Jedb
Z:\CHIEF ENG\MCINTYRE\Dutra Haystack ltr 2_06.doc

REVISED RESOLUTION 1230

RESOLUTION OF THE BOARD OF DIRECTORS OF NORTH MARIN WATER DISTRICT INDICATING SUPPORT OF COOPERATIVE PLANNING EFFORT FOR NOVATO-PETALUMA CORRIDOR AND INTENT TO COMMUNICATE WITH ALL AFFECTED AGENCIES REGARDING ANY PROPOSED NEW WATER SERVICE CONNECTIONS IN THE CORRIDOR

WHEREAS, it is the common goal of the Counties of Marin and Sonoma, and the Cities of Novato and Petaluma, to protect and maintain the agricultural open space nature and use of the lands located adjacent to Highway 101 on both sides of the Sonoma-Marin County line between the Cities of Novato and Petaluma and known as the Novato-Petaluma Corridor; and

WHEREAS, in 1975 the Cities of Novato and Petaluma adopted agreements in support of cooperative planning between the two cities; and

WHEREAS, the adopted general plans of the Counties of Marin and Sonoma, and the Cities of Novato and Petaluma, encourage the preservation of the agricultural open space character of the Novato-Petaluma Corridor; and

WHEREAS, the efforts of Marin and Sonoma Counties and the Cities of Novato and Petaluma to preserve and maintain the agricultural open space nature of the Petaluma-Novato corridor are of importance to and deserve the support of other public agencies also having jurisdiction, or other interest in the Novato-Petaluma Corridor; and

WHEREAS, it is in the mutual interest of all affected agencies to monitor land use activities within the Novato-Petaluma Corridor and communicate with each other relative to any proposed changes in land use, services or facilities regarding same; and,

WHEREAS, the North Marin Water District owns, operates and maintains a major water aqueduct traversing the length of the Novato-Petaluma Corridor,

NOW, THEREFORE, THE BOARD OF DIRECTORS OF NORTH MARIN WATER DISTRICT DOES HEREBY RESOLVE, DETERMINE AND FIND AS FOLLOWS:

1. This District does hereby endorse and support the joint efforts of the Counties of Marin and Sonoma and the Cities of Novato and Petaluma in developing and implementing cooperative land use policies and regulations in the Novato-Petaluma Corridor.

2. This District does hereby declare its intention to cooperate in this bi-county effort.

3. This District in recognition of its support and cooperation does hereby declare its intention to advise all affected agencies, particularly the Counties of Marin and Sonoma, their respective Local Agency Formation Commissions, and the Cities of Novato and Petaluma of any proposed new connections to the North Marin Aqueduct within said Novato-Petaluma Corridor; and will refrain from taking any action upon any such proposal until all affected agencies have been notified thereof and given the opportunity to comment thereon.

4. This District finds that the specific affected agencies referred to in this Resolution include: The County of Marin (Planning Department); the County of Sonoma (Planning Department and Fire Chief); the City of Novato; the City of Petaluma; the Sonoma County Local Agency Formation Commission; the Marin County Local Agency Formation Commission; the Sonoma County Water Agency; the Novato Sanitary District, the Marin County Open Space District; the Marin County Flood Control and Water Conservation District; and the Novato Fire Protection District.

* * * * *

Originally Adopted: July 1, 1975

Date of First Revision: January 21, 1992

I hereby certify that the foregoing is a true and complete copy of a revised resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the 21st day of January, 1992 by the following vote:

AYES:	Directors Amaroli, Baker, Fritz, Schoonover, Wright
NOES:	None
ABSENT:	None
ABSTAINED:	None

Joyce S. Reed

Joyce S. Reed, Secretary
North Marin Water District

(SEAL)

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

March 17, 2006

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

Dear Mr. Dee:

Dutra's Haystack Landing Asphalt Batch Plant
and Asphalt/Concrete Recycling Facility
Petaluma, Sonoma County
SCH 2006022107

The Department of Fish and Game (DFG) has reviewed the document for the subject project. Please be advised this project may result in changes to fish and wildlife resources as described in the California Code of Regulations, Title 14, Section 753.5(d)(1)(A)-(G). Therefore, if you are preparing an Environmental Impact Report or an Initial Study and Negative Declaration for this project, a de minimis determination is not appropriate, and an environmental filing fee as required under Fish and Game Code Section 711.4(d) should be paid to the Sonoma County Clerk on or before filing of the Notice of Determination for this project.

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

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

For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of SAAs is subject to CEQA. DFG, as a responsible agency under CEQA, will consider the CEQA document for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. To obtain information about the SAA notification process, please access our website at www.dfg.ca.gov/1600; or to request a notification package, contact the Streambed Alteration Program at (707) 944-5520.

If you have any questions, please contact Mr. Greg Martinelli, Environmental Scientist, at (707) 944-5570; or Mr. Scott Wilson, Habitat Conservation Supervisor, at (707) 944-5584.

Sincerely,

Robert W. Floerke
Regional Manager
Central Coast Region

cc: State Clearinghouse

CITY OF PETALUMA

POST OFFICE BOX 61
PETALUMA, CA 94953-0061

March 16, 2006

Steve Dee
Senior Environmental Specialist
County of Sonoma
2550 Ventura Avenue
Santa Rosa, CA 95403

MAR 21 2006

Re: NOP—Dutra Haystack Landing Asphalt and Recycling Facility

Dear Mr. Dee:

On March 9, 2006, I received the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the above-referenced project. Based upon my review of this NOP, I offer the following comments regarding the scope of environmental issues to be address in the EIR:

<u>Hydrology and Water Quality</u>

Due to the proposed land use and the plan for routine transport, use, storage, or disposal of hazardous materials and other contaminants, this project appears to provide substantial sources of polluted runoff. Due to this potential, and the proximity of the project less than 300 feet from the Petaluma River, the drainage swales along the perimeter of the property do not seem adequate to filter and retain contaminants before they enter the drainage ditches or the wetlands. The EIR should include proper analysis of the type and volume of surface water contaminants expected to be generated by the project and identify all necessary mitigation measures to ensure the proper handling of polluted runoff. These measures may include a range of source-control and treatment-control best management practices designed to address the expected pollutants. The EIR should also address the design, construction, operation, and maintenance concerns of each proposed measure.

Thank you for the opportunity to comment on this NOP. If you have any questions regarding my comments, please call me at (707) 778-4583.

Sincerely,

Dean Eckerson, P.E.
Engineering Manager

DHE/dr

S:\Staff Folders\Dean Eckerson\LETTERS\Dee--Dutra Haystack 3-16-06.doc

Water Resources & Conservation
202 N. McDowell Boulevard
Petaluma, CA 94954

Phone (707) 778-4392
Fax (707) 778-4508
E-Mail:
dwrc@ci.petaluma.ca.us

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

PAUL D. THAYER, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
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Contact Phone: **(916) 574-1890**
Contact FAX: **(916) 574-1885**

March 24, 2006

File Ref: SCH#2006022107

Ms. Nadell Gayou
The Resources Agency
901 P Street
Sacramento, CA 95814

RECEIVED
MAR 27 2006
PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT
COUNTY OF SONOMA

Mr. Steve Dee
Sonoma Co. Permit and Resources Mgmt. Dept.
2550 Ventura Avenue
Santa Rosa, CA 95403

Dear Ms. Gayou and Mr. Dee:

Subject: Dutra's Haystack Landing Asphalt Batch Plant and Asphalt/Concrete Recycling Facility

Staff of the California State Lands Commission (CSLC) has received the above referenced Notice of Preparation. Under the California Environmental Quality Act (CEQA), Sonoma County is the Lead Agency and the CSLC is a Responsible and/or Trustee Agency for any and all projects which could directly or indirectly affect sovereign lands, their accompanying Public Trust resources or uses, and the public easement in navigable waters.

The State acquired sovereign ownership of all tidelands and submerged lands and beds of navigable waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all the people of the State for statewide Public Trust purposes which include waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. The landward boundaries of the State's sovereign interests in areas that are subject to tidal action are generally based upon the ordinary high water marks of these waterways as they last naturally existed. In non-tidal navigable waterways, the State holds a fee ownership in the bed of the waterway between the two ordinary low water marks as they last naturally existed. The entire non-tidal navigable waterway between the ordinary high water marks is subject to the Public Trust. The State's sovereign interests are under the jurisdiction of the State Lands Commission.

The Petaluma River is navigable waterway under the jurisdiction of the CSLC, and a lease for the new docking facilities is required. Please contact Nanci Smith, Public Land Management Specialist at (916) 574-1862 should you have any questions regarding the application process.

Sincerely,

Dwight E. Sanders

Dwight E. Sanders, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, CA 95812-3044

Nanci Smith

Secretary for Environmental Protection

California Integrated Waste Management Board

Margo Reid Brown, Chair
1001 I Street • Sacramento, California 95814 • (916) 341-6000
Mailing Address: P. O. Box 4025, Sacramento, CA 95812-4025
www.ciwmb.ca.gov

Arnold Schwarzenegger
Governor

March 28, 2006

Mr. Steve Dee, Senior Environmental Specialist
Sonoma County Permit and Resources Management Dept.
2550 Ventura Avenue
Santa Rosa, California 95403

Subject: **State Clearinghouse No. 2006022107** – Notice of Preparation (NOP) of a draft Environmental Impact Report (EIR) for the establishment and operation of the *Dutra Haystack Landing Asphalt and Recycling Facility* (DHLA&RC) on a previously undeveloped site between the Petaluma River and U.S. Highway 101 in Sonoma County.

Dear Mr. Dee:

Thank you for allowing the Permitting and Inspection (P&I) Branch staff of the California Integrated Waste Management Board (CIWMB or Board) to comment on the NOP for the proposed *DHLA&RC*. P&I Branch utilized the description in the NOP to determine whether the project proposals are subject to the Construction and Demolition (C&D) and Inert Debris (CDI) regulatory requirements in Title 14, California Code of Regulations, Article 5.9 et. sec., Sections 17380 through 17390. Crumb rubber is assumed to be imported to the site according to the NOP, and therefore this material would be considered to be a feedstock/commodity and therefore not covered by CIWMB Regulations unless the transfer/processing of waste tires to produce the crumb rubber on site would be proposed as part of the project. P&I Branch staff's intent in responding to the NOP is to determine whether there is sufficient information provided by the lead agency to determine the appropriate level of regulatory oversight for each operation, if any, and identify the operations that may, or may not, require a Solid Waste Facility Permit (SWFP) for the facility(ies) to operate.

Following is P&I Branch staff's understanding of the project [for Board staff's referral] as the proposal applies to the CIWMB permitting and regulatory oversight process; the CIWMB's role as a responsible agency and comments intended by P&I Branch staff to assist the lead agency in the draft EIR preparation, review and approval process for the project. The following project description is very brief and incomplete, and therefore more information and data is needed to allow a complete and thorough evaluation of any proposal(s) being considered by the CIWMB and the Sonoma County Local Enforcement Agency (LEA) for permitting purposes.

PROJECT DESCRIPTION

"The proposed project will require a General Plan Amendment to change the land use designation on the primary project site (APN 019-320-022, 023) from Limited Commercial to Limited Industrial, a Specific Plan Amendment to change the land use designation from Limited Commercial to Limited Industrial and a Zone Change from LC (Limited Commercial) to M3 (Limited Rural Industrial). Additionally, request for a Use Permit and Design Review to establish an asphalt batch plant that will manufacture rubberized asphalt, an asphalt recycling area and an aggregate materials off-loading, storage and distribution facility for Dutra Materials. The proposal includes the construction and operation of new dock facilities on the Petaluma River for the receipt of barged aggregate materials on a 24-hour basis, a conveyor and distribution system, stockpiled aggregates, sand and recycled materials, an asphalt mixing and loading facility, a portable asphalt recycling plant and related office with truck scale. The normal truck loading facilities would operate weekdays between 6:00 a.m. and 6:00 p.m. with occasional nightly and weekend operations based on customer requirements.

The proposed project site is located on three parcels totaling 38 acres at 335~~1~~5 Petaluma Boulevard South on the east side of Petaluma Boulevard South just outside the City of Petaluma. The proposed project would include the re-establishment of Dutra's asphalt batch plant operation currently located at 1600 Petaluma Boulevard South (on the opposite side of the freeway) and the construction of several new buildings, including the San Antonio Volunteer fire house, modular offices and equipment related to the mixing and distribution of asphalt. A conveyor system would distribute barged materials to multiple stockpiles and a large asphalt recycling area is proposed. Additional site improvements consist of new parking areas, significant landscaping along the freeway, stormwater, swales, security gates, lighting and a relocated driveway for this site."

AGENCY BACKGROUND INFORMATION

CIWMB Role as a Responsible Agency in the CEQA Process

The CIWMB operates in cooperation with local government to assure protection of the public health and safety and the environment from the potentially detrimental effects of improper municipal solid waste (MSW) management and recycling. The CIWMB concurs in the issuance of new or revised solid waste operations permits with LEAs to assure that solid waste facilities (SWFs) operate in a manner consistent with all applicable laws and regulations which apply to the handling, processing, transforming, or disposal of MSW. P&I Branch staff have determined that the proposed DHLA&RC **may not require** an operations permit based on the description of the asphalt batch recycling and crumb tire use in asphalt process as proposed in the NOP at this time. Therefore, the CIWMB may not be a responsible agency for the proposed draft EIR and offer the following comments as a commenting agency.

P&I BRANCH STAFF'S COMMENTS on the PROPOSED PROJECT AND draft EIR

Section 17381.1. Activities That Are Not Subject to the CDI Regulatory Requirements.

The CIWMB is keenly interested in the recycling aspects of the proposed facility – specifically the reclaimed asphalt product(s) and the use of crumb rubber in asphalt road material. At this time, if the recycling operation meets certain criteria, it will not fall under the Board's regulatory jurisdiction. To be excluded, the material used in the recycling operation must meet all of the following requirements. The material (concrete, broken asphalt and clean dirt) must meet the definition of 'Inert Debris' as defined in 14 CCR §17380.1(k) as follows:

(k) "Inert Debris" means solid waste and recyclable materials that are source separated or separated for reuse, do not contain hazardous waste (as defined in 22 CCR §66261.3 et. seq.) or soluble pollutants at concentrations in excess of applicable water quality objectives and do not contain significant quantities of decomposable waste. Inert debris may not contain more than 1% putrescible wastes by volume calculated on a monthly basis and the putrescible wastes shall not constitute a nuisance, as determined by the LEA. Gravel, rock, soil, sand and similar materials, whether processed or not, that have never been used in connection with any structure, development, or other human purpose are not inert debris and may be commingled with inert debris that would be counted.

(1) "Type A Inert debris" includes, but is not limited to, concrete (including fiberglass or steel reinforcing bar embedded in the concrete), fully cured asphalt, glass, fiberglass, asphalt or fiberglass roofing shingles, brick, slag, ceramics, plaster, clay and clay products. Type A Inert debris is waste that does not contain soluble pollutants at concentrations in excess of water quality objectives and has not been treated in order to reduce pollutants. The Board, upon consultation with the State Water Resources Control Board, will determine on a case by case basis whether materials not listed in this subdivision qualify as Type A Inert debris.

- Source Separated and Separated for Reuse Material. The material must be separated at the source and not at the batch plant and stored separately.
- The material must be <10% residual material by weight. The material must be free from waste or foreign material – there can be <10% residual or waste included in the material.
- The material must be <1% putrescible by volume. The material must have <1% material that can become putrid or decompose, such as food or green waste.

(2) "Type B Inert debris" is solid waste that is specifically determined to be inert by the applicable Regional Water Quality Control Board (RWQCB), such as treated industrial wastes and de-watered bentonite-based drilling mud, but excluding Type A inert debris.

If the asphalt batch plant can not, or does not, want to meet the three-part test and receives 1,500 tons per day or more of recyclable material, it will be necessary for DHLA&RC to obtain a Solid Waste Facilities Permit from the Local Enforcement Agency which is concurred on by the CIWMB.

If the site does not pass the three-part test and receives less than 1,500 tons per day of recyclable material it will be necessary for DHLA&RC to provide notification documentation to the LEA.

If the batch plant does not pass the three part test it will be subject to the Construction and Demolition and Inert Debris (CDI) Processing Regulations and the operator can not store material unprocessed on site for more than 30 days or processed material more than 1 year. The LEA, at their discretion, can extend the time restrictions for processing and storage.

For more information please refer to: http://www.ciwmb.ca.gov/regulations/title14/ch3a59a.htm#c3a5_9 and http://www.ciwmb.ca.gov/regulations/title14/ch3a595a.htm#c3a5_95.

If DHLA&RC desires to process/recycle material other than the inert material described, there may be additional requirements including, obtaining a Solid Waste Facilities Permit.

Please include P&I Branch staff and LEA staff on your distribution list for the draft EIR. The LEA contact is Mr. Bob Swift – his address will appear at the end of the letter in the cc section.

CDI Regulations can be Accessed at the Following URLs

The CDI Regulations are located at the following URLs:
http://www.ciwmb.ca.gov/Regulations/Title14/ch3a59a.htm;
http://www.ciwmb.ca.gov/Regulations/Title14/ch3a59b.htm
http://www.ciwmb.ca.gov/Regulations/Title14/ch3a59c.htm

Permit Regulatory Parameters

The project proposal in the draft EIR should clearly define and analyze the scope of the project as the document will be relied upon by agencies should the issuance of a permit from the LEA/CIWMB becomes necessary for project approval. For example, based on the proposal in the NOP, the following questions should be addressed in the draft EIR:

- What is the approximate distance to the nearest sensitive receptor(s)?
- What are the components of each waste type that will be handled, processed and stored at the proposed DHLA&RC? What are the sources of these materials/waste types that are to be handled, processed and stored at the proposed DHLA&RC?
- How long will materials be stored before transport off-site? Will stored materials be covered from infiltration of rain water from a storm event? Please provide a site plan and indicate where the asphalt, concrete, clean fill dirt, and construction materials will be processed, and stored?
- What is the approximate size and location of the outdoor operational activities and storage areas?
- Will the facility(ies) boundary(ies) include any maintenance buildings or maintenance activities?
- Will the parking area for vehicles and equipment be paved? Will these parking areas require the issuance of a National Pollution Discharge Elimination System permit?
- What will be the operating hours for accepting recyclable materials, for processing recyclable materials, and for transporting recyclable materials off-site?

Cumulative Impacts

It is important that the draft EIR identify potentially significant cumulative impacts resulting from the proposed project and any combined projects within the project vicinity as well as those incremental impacts resulting from any proposed project(s) implemented within the immediate vicinity of the DRC.

Water and (Paved & Unpaved) Land Traffic and Related Transportation System Impacts

A Streambed Alteration Notification will need to be submitted to CDFG to evaluate impacts to the Petaluma River associated with construction of the proposed off-loading facility. How many barges will be transporting material to and from the off-loading facility daily? How many barges will be moored overnight at the off-loading facility?

Potential issues involving traffic, noise, air quality, and public health and safety resulting from construction and operations activities, moving and processing of materials, and sending of finished products to market, as well as, the corresponding increases in traffic volumes per day, due to possible increases in production, should be considered in the draft EIR. The draft EIR should identify the proposed maximum daily throughput in tons per day (tpd) and/or cubic yards (cu. yds.) per day together with a conversion factor for tonnage; as well as the respective traffic volumes in trucks and other vehicles per day that transport the materials to and from the facility(ies) daily. Additionally, the site is in a seismically active area and will accommodate tons of aggregate material. Therefore, this property has the potential to experience liquifacton and settlement during a seismic event. What are proposed peak tonnage traffic levels on surface streets on the proposed site and in the vicinity of the project during peak hours and what percentage is estimated to be project traffic? What impacts will the number of trucks/vehicles proposing to access Highway 101 have on the current traffic on/off ramp? What will the impact be upon the local transportation infrastructure (e.g. level of service [LOS] at nearby intersections), if any? How many trucks per hour will travel down the dirt/paved roads on site in each direction per hour/day?

A traffic study may be necessary to determine whether the existing and planned infrastructure can handle the projected vehicular movement, and whether improvements may be necessary to accommodate increased traffic; including the repair and maintenance on existing roads, paving of dirt roads, additional lighting, turn lanes, and pedestrian walk-ways; as well as cumulative impacts (one lane or two) on the circulation within the DHLA&RC vicinity (i.e. ingress and egress stacking). The local district for Cal/Trans should be contacted regarding traffic on throughways and intersections that are within their jurisdiction.

Air Quality

Local and regional impacts on air quality from direct and indirect source emissions both for facility operations and equipment and vehicles accessing the facility and equipment used in the processing of the Asphalt Batch Plant and Asphalt/Concrete Recycling Facility, respectively, should be analyzed in relative detail in the draft EIR, including the potential impact on local and regional air quality management and attainment plans. If the facility is located in a 'nonattainment' air basin, cumulative impacts affecting the projected attainment dates may be significant. Does the local Air Quality Management District (AQMD) have project thresholds of significance? Mitigation measures which will be employed to address impacts for the DHLA&RC should be incorporated into the draft EIR with a brief description of the 'attainment' plan for the air basin(s) air quality. The local Air Pollution Control District (APCD) should be contacted regarding air pollution permits which may be required to ensure compliance with ambient air quality standards.

Noise

Activities associated with the proposed project may result in significant on-site and/or off-site noise levels from use of on-site equipment and transport vehicles. What are the City and/or County noise ordinance parameters for new projects and where are the noise levels to be measured? How will the proximity of Highway 101 affect these noise impacts? Will the use of outdoor equipment affect the ambient noise levels at the facility boundary, at the nearest sensitive receptor? A noise study may be necessary to determine if local receptors may be impacted, and should be analyzed and included in the draft EIR. What is the approximate distance to the facility boundary and thereon to the nearest sensitive receptor? Appropriate noise-attenuating mitigation measures, which can be implemented to reduce noise levels, or which naturally attenuate noise levels, should be incorporated into the draft EIR. Short term and cumulative impacts should be assessed as well as operations related noise.

Risk of Upset/Human Health

In the event of an accident, explosion, fire, or the release of hazardous substances due to upset conditions or mechanical malfunctions, an Emergency Response Preparedness Plan (ERPP) should be prepared and available at the facility. Personnel should be properly trained to handle emergency situations, including identification, location and use of fire suppression equipment, procedures for evacuation of the premises, and notice for contacting the appropriate authorities in the event of such an occurrence. What is the response time for the nearest Sonoma County Fire Department location? What is the distance to the nearest hospital? A brief description of the ERPP should be described or referenced in the draft EIR with the appropriate mitigation measures, if applicable, in the event of such an occurrence.

Please describe the proposed hygienic facilities on site as well as first aid equipment accessibility and employee safety and fire prevention training. What will be the provisions for the permanent potable and/or non-potable water supply? Finally, please include in the draft EIR a description of the security on the DHLA&RC site and surrounding property, including fencing, lighting, gates, and lock-down doors on buildings not operating 24 hour per day (if any). A facility site map (to scale) with the location of all facilities and access roads is also requested to be included in the draft EIR.

CONCLUSION

P&I Branch staff are available upon request to assist the lead agency in the scoping of the proposed project for analysis in the draft EIR. In addition, P&I Branch staff requests that the proposed draft EIR be circulated through the State Clearinghouse and that the CIWMB be informed of any public hearing(s) regarding the project proposal. Board staff have no further comments on the project as proposed at this time. Thank you for the opportunity to comment on this NOP early in the planning process. If you have any questions regarding these comments, please contact me at 916.341.6327, by facsimile at 916.319.7213 or e-mail me at jloane@ciwmb.ca.gov .

Sincerely,

Original Signed by:

John Loane, Integrated Waste Management Specialist (IWMS)
Permitting and Inspection Branch, North Central Region III
Permitting and Enforcement Division
California Integrated Waste Management Board

cc: Sue O'Leary, Supervisor
Allison Spreadborough, IWMS
Permitting and Inspection Branch, Region III
California Integrated Waste Management Board

Mr. Robert Swift
Department of Health Services
475 Aviation Blvd Ste 220
Santa Rosa, CA 95403

Steve Dee - Petaluma Blvd. South interchange

From:	Michael Healy <mthealy@sbcglobal.net>
To:	Sean Charles <sean_charles@dot.ca.gov>
Date:	02/24/2006 10:45 AM
Subject:	Petaluma Blvd. South interchange
CC:	Mike Kerns <mkerns@sonoma-county.org>, Suzanne Wilford <swilford@sctainfo.org>

Sean,

The County of Sonoma is processing an application for a new heavy industrial use (asphalt batch plant, etc.) on the "Dutra Haystack Landing" site on Petaluma Blvd. South. This includes the property where the old white house burned a couple years back. I can't tell for certain from the materials how much conflict there is in terms of adding buildings and other facilities on property that would need to be taken for the eastern side of the new interchange you are proposing, but the overlap appears to be substantial. I'd hate to see anyone investing in stuff that would need to be torn down & relocated in a few years. The contact person at the Sonoma County Permit & Resource Mgmt. Dept. is Steve Dee at (707)565-8350.

Mike Healy

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
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September 15, 2004

SON-101-2.93
SON101892

Mr. Steve Padovan
County of Sonoma
Permit & Resource Management Dept.
2550 Ventura Avenue
Santa Rosa, CA 95403

Dear Mr. Padovan:

Dutra Materials Facility at Haystack Landing, File # PLP04-0046 – Use Permit Application

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed project. We have reviewed the use permit application dated May 18, 2004 and have the following comments to offer:

Traffic Analysis

1. Provide information on the proposed project's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed.

2. Sheet 3 of the site plans dated 2/14/04 indicates the existing driveway off of Petaluma Blvd. South will be widened, whereas Sheet 4 of the site plans dated 2/20/04 shows a new 30-foot driveway located north of the existing driveway. Please clarify the access locations for the proposed project and provide a schematic illustration of the traffic conditions at the proposed project driveway.

3. What size of trucks is expected at the facility? Are the existing US 101 ramps adequate to handle the proposed truck traffic?

4. The County has previously indicated concern regarding the geometrics of the northbound US 101 on-ramp. Have the ramp geometrics been reviewed? If not, we recommend a review of the US 101 ramp geometrics and mitigation, if necessary, to ensure that project truck traffic can safely be accommodated on the ramps.

5. The County has also indicated concern regarding the existing significant vehicle queues during the AM peak period on the southbound US 101 on-ramp. Therefore, the traffic

Please provide the Department with a response to each of our questions prior to completion of the environmental document. In addition, please send a copy of the environmental document and traffic analysis for our review when they become available.

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

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

bc: TSable/ MCottle/ File/ Chron File, Transit & Community Planning
Sean Charles, Design Redding
Ray Akkawi, Project Management North
Jonathan Lee, Design North Counties
Phillipe Van, Traffic

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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MAR 27 2006
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT COUNTY OF SONOMA

March 23, 2006

SON101892
SON-101-2.39
SCH # 2006022107

Mr. Steve Padovan/Mr. Steve Dee
Permit and Resource Management Department
Sonoma County
2550 Ventura Avenue
Santa Rosa, CA 95403

Post-it® Fax Note 7671	Date	# of pages ▶
To Geoff Reilly	From Steve Dee	
Co./Dept.	Co.	
Phone #	Phone # 565-8350	
Fax # 283-4041	Fax # 565-8358	

Dear Mr. Padovan/and Mr. Dee

Dutra Haystack Landing (PLP04-0046) – Notice of Preparation (NOP)

Thank you for continuing to include the California Department of Transportation (Department) in the review process for this project. We reviewed the NOP and have the following comments:

Marin-Sonoma Narrows Project

The Dutra Asphalt Facility project site map shows the project encompassing the three parcels between the Sonoma Marin Area Rail Transit (SMART) track and the existing State right of way (ROW) just to the east of the Petaluma Blvd South northbound off-ramp. The proposed site layout appears to be in conflict with the conceptual plans for the Marin-Sonoma Narrows (MSN) project for the Petaluma Blvd. South interchange and the associated frontage roads, for which additional ROW will be required from these three parcels:

- The proposed MSN ROW includes the area where the Fire Hall and the relocated entrance for the Dutra Haystack Landing project are envisioned. As proposed now, the Fire Hall would be located between the frontage road and the new Petaluma Blvd. South northbound off-ramp.
- The proposed entrance of the asphalt facility, as shown on the site plan, would be located extremely close (approximately 100 to 130 feet) to the new overcrossing intersection with Petaluma Blvd. South and, if constructed as proposed, would need to be relocated in the future. The vertical difference between the existing grade at the proposed location and the frontage road profile is approximately 8-10 feet.
- The northbound off-ramp and frontage road construction will remove the existing vegetation shown on the site plan as well as the proposed evergreen tree screen planting. New planting as part of Dutra project should be placed where it will not be disturbed during construction of the MSN Petaluma Blvd. South interchange.

Please contact Sean Charles, the design engineer for the MSN project at 530-225-3476 to discuss what modifications to the proposed project are necessary.

Traffic Analysis

In the traffic study to be prepared as part of the Environmental Impact Report (EIR), address and provide a written response to our letter dated September 15, 2004 (see attachment). Submit for our review and verification all analysis data and calculations (Level of Service reports, etc.) on which the result and conclusions are based. Furthermore, please address the following comments:

- The 2005 Traffic Operational Analysis Report identifies the southbound Petaluma Blvd. South on-ramp as creating a bottleneck in existing traffic operations. Traffic typically backs up to south of the Old Redwood Highway interchange. Traffic impacts from the Dutra Haystack Landing project as well as cumulative impacts should be addressed in the EIR. The Petaluma Blvd. South northbound ramp should be examined to determine if adequate sight and merge distances are provided. An increase in truck traffic could impact operations of both the north- and southbound on-ramps. Increases in delays on US 101 due to increased truck traffic should be studies as well.

As the project is currently proposed:

- What are the peak hour turning movement volumes at the driveway? If traffic accesses the site from the off-ramp, provide a deceleration lane at the project driveway.
- Provide an acceleration lane from the driveway on South Petaluma Boulevard.
- What is the sight distance from the driveway to the off-ramp?
- The driveway shall be improved to meet current design standards per Highway Design Manual Section Section 205.3 and Figure 205.1.
- What is the County's schedule for restriping of South Petaluma Boulevard for the two-way left turn lane? What is the schedule for the asphalt plant?
- Label the State and County ROW lines on the plans.
- Provide for our review a copy of the preliminary traffic analysis referred to in Comment 15.a on page 27 of the Environmental Checklist dated February 17, 2006.

Cultural Resources

It does not appear from the current project description that there will be earth disturbing construction activities with State ROW for this project. Should there be impacts within State ROW at a later date due to project changes, the Department's Cultural Resources Studies Office will need to review the cultural studies report and approve it in compliance with CEQA.

Landscaping

- The Department does not perform any roadside maintenance at the site since there is no irrigation system nor planting.
- For any landscaping work within State ROW as part of this project, the applicant must obtain an encroachment permit from the Department. As a condition of this permit, the Department will require that the applicant maintain in perpetuity all planting and related items (irrigation, grading, drainage, etc.) resulting from the proposal.
- A couple of years ago, the Sonoma County Redevelopment Agency had a landscape beautification proposal for this site. Sonoma County may want to coordinate with the Agency if this proposal is still valid.

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

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

Attachment: Our letter dated September 15, 2004.

c: State Clearinghouse

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
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July 5, 2006

SON101892
SON-101-2.39
SCH # 2006022107

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

Dear Mr. Dee:

Dutra Haystack Landing (PLP04-0046) – Frontage Improvements, Revised Plan

Thank you for continuing to include the California Department of Transportation (Department) in the review process for this project. We received the revised plan for the relocated Petaluma Blvd. South northbound off-ramp developed by CSW/ Stuber-Stroeh Engineering Group together with a cover letter dated May 31, 2006. The plan was prepared following a meeting with John Maitland with the County's Department of Transportation and Public Works and the Department's design engineer for the Marin-Sonoma Narrows (MSN) project, Sean Charles. We reviewed the plan and have the following comments:

1. The attached plan seems to reflect a significant improvement to the existing ramp configuration. It will off-set any difficulties caused when the proposed Petaluma Blvd. South Interchange will be built as part of the MSN project, such as the need for an additional stage of construction. The plan will require changes to State and County right-of-way, encroachment permits, design exceptions and, possibly, a maintenance agreement.

2. What are the sight distances for
   a. the left-turn traffic to the proposed Project driveway and
   b. traffic from the proposed project driveway?

3. Demonstrate that the acceleration lane from the driveway is adequate.

4. Who will pay for the improvements?

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

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

From: JOHN MAITLAND
To: Steve Dee
Date: 03/13/2006 10:38:49 AM
Subject: Dutra Haystack Landing NOP

Steve:

Transportation and Public Works is concerned with the location of the driveway and the truck traffic ingress and egress movements onto Petaluma Blvd South. Trucks entering the property will have to make left turns across Petaluma Blvd. South. Trucks exiting the property will need to merge with off-ramp traffic in order to turn into the northbound on-ramp for Hwy 101. Re-construction of Petulama Blvd. South and lane re-configuration will be necessary. Development (Royal Petroleum) planned to the north of the Dutra Haystack Landing project has conditions imposed on it for road re-construction and lane re-configuration. The Dutra Haystack Landing project will have to match the Royal Petroleum roadway work. Preliminary discussions with the engineer representing Dutra have already taken place. Coordination with Caltrans in regards to the existing northbound off-ramp and northbound on-ramp and the future Hwy 101 realignment needs to occur. The ultimate alignment could impact the Dutra frontage design. The transition of the Caltrans Hwy 101 northbound off-ramp right-of-way to the County's maintained portion of Petaluma Blvd. South occurs approximately midway along Dutra's frontage.

Dave Robertson has scheduled a meeting with the Royal Petroleum engineer to discuss the roadway layout on Wednesday, March 15, at 9:00, in our office. You are welcome to attend to see what is planned.

Will e-mail suffice for NOP comments?

Thanks,

John Maitland

COUNTY of SONOMA
DEPARTMENT OF HEALTH SERVICES

Rita Scardaci, MPH – Director
Sharon Aguilera – Assistant Director

Environmental Health Division
Walter L. Kruse - Director

March 15, 2006

Mr. Steve Dee, Senior Environmental Specialist
County of Sonoma Permit and Resource Management Department
2550 Ventura Avenue
Santa Rosa CA 95403

Re: Dutra Haystack Landing Asphalt and Recycling Facility: PLP04-0046

Dear Mr. Dee:

Thank you for the opportunity to review the Initial Study for the proposed Dutra Haystack Landing Asphalt and Recycling Facility. The Sonoma County Department of Health Services, Environmental Health Division is authorized by the California Integrated Waste Management Board (CIWMB) to act as the Local Enforcement Agency (LEA) responsible for the inspection, permitting and enforcement of solid waste laws and regulations in Sonoma County.

The Title 14 California Code of Regulations (CCR) Chapter 3, Article 5.9 Construction and Demolition and Inert (CDI) Debris Transfer/Processing Regulatory Requirements became effective in July, 2003. 14CCR17380(k) defines "Inert Debris" to mean "…solid waste and recyclable materials that are source separated or separated for reuse, do not contain hazardous waste (as defined in CCR, Title 22, section 66261.3 et seq.) or soluble pollutants at concentrations in excess of applicable water quality objectives and do not contain significant quantities of decomposable waste. Inert debris may not contain more than 1% putrescible wastes by volume calculated on a monthly basis and the putrescible wastes shall not constitute a nuisance, as determined by the EA. Gravel, rock, soil, sand and similar materials, whether processed or not, that have never been used in connection with any structure, development, or other human purpose are not inert debris and may be commingled with inert debris.

(1) "Type A Inert debris" includes but is not limited to concrete (including fiberglass or steel reinforcing bar embedded in the concrete), fully cured asphalt, glass, fiberglass asphalt or fiberglass roofing shingles, brick, slag, ceramics, plaster, clay and clay products. Type A inert debris is waste that does not contain soluble pollutants at concentrations in excess of water quality objectives and has not been treated in order to reduce pollutants. The board, upon consultation with the State Water Resources Control Board, will determine on a case by case basis whether materials not listed in this subdivision qualify as Type A inert debris.

Upon review of the Environmental Checklist Form and pursuant to 14CCR17381.1, it appears that this project would meet the Type A Inert Debris Recycling Center criteria and thus would be

475 Aviation Blvd., Suite 220, Santa Rosa, CA 95403 • *phone* (707) 565-6565 • *fax* (707) 565-6525 • www.sonoma-county.org

an activity that would not be subject to the Construction and Demolition/Inert Debris Regulatory Requirements.

Please be advised that the following criteria apply to Type A Inert Debris Recycling Centers:

1) An inert debris recycling center shall receive only Type A inert debris that is source separated or separated for reuse. The inert debris may be commingled in a single container.
2) The residual shall be less than 10% by weight of the amount of debris received at the site.
3) The amount of putsescible wastes shall be less than 1% by volume of the amount of debris received at the site.

Sites that do not meet the Type A Inert Debris Recycling Center exclusion criteria are subject to the CDI Transfer/Processing Regulatory Requirements. Nothing in 14CCR17381.1 precludes the LEA or the CIWMB from inspecting a site to verify that it is and has been operating in a manner that meets the Type A Inert Debris Recycling Center exclusion requirements.

The Environmental Checklist Form Section 7.a. indicates that the facility will store "… recycled tires in crumb form…" It is my understanding that the crumb rubber would be imported to the site (the transfer/processing of waste tires to produce the crumb rubber will not occur on-site) and thus this material would be considered to be a commodity or feedstock and therefore not regulated by the CIWMB.

If you should have any questions or wish to discuss the content of this letter further, please contact me at 565-6546.

Sincerely,

Robert A. Swift, R.E.H.S.
Senior Environmental Health Specialist

cc: Jeff Lewin, EA
Allison Spreadborough, CIWMB
John Loane, CIWMB
Steve Padovan, PRMD

RECEIVED

MAR 2 1 2006

COUNTY OF SONOMA
PRMD
Environmental Review Division

SONOMA COUNTY
AGRICULTURAL
PRESERVATION
& OPEN SPACE
DISTRICT

747 Mendocino Avenue
Suite 100
Santa Rosa, CA
95401-4850
(707) 565-7360
Fax: (707) 565-7359
www.sonomaopenspace.org

March 16, 2006

Steve Dee
Senior Environmental Specialist
Permit and Resource Management Department
2550 Ventura Avenue
Santa Rosa, CA 95403

RE: Dutra Haystack Landing Asphalt and Recycling Facility Project

Dear Mr. Dee:

Thank you for the opportunity to review the Notice of Preparation (NOP) for the proposed Asphalt and Recycling Facility project at Haystack Landing. The Sonoma County Agricultural Preservation and Open Space District (District) has reviewed the NOP for the proposed project and has the following comments.

This area south of the City of Petaluma along the Highway 101 corridor serves as a scenic gateway into Sonoma County for visitors and residents. Tourism significantly supports our local economy. The EIR should identify the potential adverse impacts of the project on the visual aesthetics of this well-traveled corridor and propose appropriate mitigation.

The construction and operation of new dock facilities on the Petaluma River including night lighting will not only adversely effect the scenic resources of the area but may significantly impact the biological resources of the river and its marshes and wetlands. The District's protected Alman Marsh and Petaluma River Marsh and Enhancement properties are adjacent to the City of Petaluma's Shollenberger Park, which is directly across the river from the project location. These properties provide an expanded area of valuable marsh and wetland habitat for birds, mammals, reptiles and amphibians.

The California clapper rail, a federally and state-listed endangered species, is now restricted almost entirely to the marshes of the San Francisco estuary, where the only known breeding populations occur. Among these breeding locations is the Petaluma Marsh. The nesting season for the clapper rail is from March through August and they are most active in early morning and late evening, when they forage in marsh vegetation. The elusive California black rail, a federal species of concern and a state-listed threatened species, depends on large tracts of marsh with adjacent wildlands. Remaining populations of black rail use the Petaluma River marsh for breeding habitat.

The EIR should address potential adverse impacts, including those associated with night lighting, that the project will have on these listed birds and other wildlife and propose appropriate mitigation.

The EIR should identify potential impacts to the Petaluma River and its surrounding tidal marshes and wetlands resulting from a spill of any hazardous materials, such as oil and fuel, which will be stored and used at the facility.

District staff requests that the EIR consider potential impacts to these important resources and propose appropriate mitigation measures. Please do not hesitate to contact me at 565-7360 should you have any questions.

Sincerely,

Marta L. Puente

Marta L. Puente
Open Space Planner

c: Andrea Mackenzie, General Manager
Maria J. Cipriani, Assistant General Manager
Kathleen Brennan Hunter, Conservation Program Manager

FILE COPY: PLP04-0046

YAHOO! MAIL

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RECEIVED

MAR 13 2006

COUNTY OF SONOMA
PRMD
Environmental Review Divisio

Date: Sat, 4 Mar 2006 23:44:59 -0800 (PST)

From: "mike gold" <mikegold290@yahoo.com>

Subject: COMMENTS - DUTRA HAYSTACK LANDING ASPHALT AND RECYCLING FACILITY

To: "STEVE PADOVAN" <spadovan@sonoma-county.org>

CC: ...@sonoma-county.org, "BRYAN WINTON" <bryan_winton@fws.gov>, "TIM SMITH" <tsmith@sonoma-county.org>

FROM: HARVEY GOLDBERG MARCH 5,2006
PETALUMA RIVER PROPERTY
#019-320-007-000

FILE# PLP04-0046 PLANNER:STEVE PADOVAN

THESE ARE MY COMMENTS REGARDING THE ASPHALT PLANT AT HAYSTACK LANDING.

MY PROPERTY IS MY HABITAT. I AM DOWNWIND OF THE PROPOSED SITE,AND WOULD LIKE TO KNOW HOW BREATHING THIS ASPHALT WILL AFFECT MY HEALTH. ALSO I HAVE BAR-B Q'S DURING THE SUMMER AND MY FRIENDS WILL HAVE TO BREATH THE P M (PARTICULATE MATTER) ASSOCIATED WITH THIS FACILITY. ALSO MY THREE GRANDCHILDREN AND OTHER CHILDREN THAT VISIT MY PROPERTY WOULD BE AT RISK .

WOULD THERE BE CONSTANT MONITORING OF FACILITY BY WHAT AGENCY. OR HOW OFTEN WOULD THIS BE CHECKED.

I AM CONCERNED ABOUT THE ACCESS ROAD AND THE RELOCATION OF IT.ALL OF THE PEOPLE THAT LIVE WORK OR VISIT , HAVE USED THIS ROAD OPEN AND NOTORIOUSLY FOR LONGER THAN 25 YEARS THAT I KNOW OF. IF THERE IS TO BE ANY CHANGE I FEEL THERE SHOULD BE NO LOCKED GATES.SO IT MAY BE NECESSARY TO HAVE A SEPARATE ROAD FOR NON COMMERCIAL VEHICLES. WITH OPEN ACCESS ALL THE TIME. THEY CAN GATE AND FENCE OFF THERE AREA,AND LEAVE AN OPEN ACCESS ROAD.

REGARDING YOUR ENVIRONMENTAL CHECKLIST FORM:

I REMEMBER GOING TO MEETINGS IN THE EARLY 1990'S ABOUT THIS AREA BEING THE GATEWAY TO SONOMA COUNTY. YOUR CHECKLIST SAY'S POTENTIALLY SIGNIFICANT IMPACT ON AESTHETICS-I AGREE WITH FINDINGS OF THIS REPORT. IMAGINE DRIVING INTO SONOMA COUNTY AND FIRST THING YOU SEE IS AN ASPHALT PLANT OR SMELL IT. THAT'S NOT GRAPES. THIS PROJECT DOES NOT SEEM RIGHT FOR THIS LOCATION.

AIR QUALITY-POTENTIALLY SIGNIFICANT IMPACT ON EVERY ITEM ON THE LIST. THAT IS A VERY VERY BAD GRADE.THIS PROJECT DOES NOT SEEM RIGHT FOR THIS LOCATION.

BIOLOGICAL RESOURCES-AGAIN THIS PROJECT SHOWS POTENTIALLY SIGNIFICANT IMPACT OR HAVE SUBSTANTIAL ADVERSE EFFECT ON THE RIVER AND AREA.

CULTURAL RESOURCES-MITIGATION IS NEEDED TO MITIGATE DAMAGE THIS PROJECT WOULD HAVE.

GEOLOGY AND SOILS-AGAIN THE REPORT SHOWS PROBLEMS FROM STRONG SEISMIC GROUND SHAKING TO POSSIBLE GROUND FAILURE. AND ITEM C IS VERY DISTURBING.

HAZARDS AND HAZARDOUS MATERIALS- BOTH A AND B POINT OUT MY MAIN CONCERN OF HAZARD TO THE PUBLIC OR ENVIRONMENT INVOLVING THE RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT.

HYDROLOGY AND WATER QUALITY-THIS ASPHALT MAKING FACILITY WOULD BE VERY NEAR THE PETALUMA RIVER. AN ACCIDENT COULD POLLUTE THE RIVER AND SAN FRANCISCO BAY.

LAND USE AND PLANNING- POTENTIAL SIGNIFICANT IMPACT.

NOISE- EVEN IF THERE ARE TREES ALONG SIDE THIS OPERATION. THE NOISE WOULD STILL BE HEARD ON HIGHWAY 101 .

ON PAGE 30 OF THE ENVIRONMENTAL CHECKLIST ITEM #17 A B C ALL SHOW POTENTIALLY SIGNIFICANT IMPACT THAT THE PROJECT WOULD DEGRADE THE QUALITY OF THE ENVIRONMENT, SUBSTANTIALLY REDUCE HABITAT OF FISH AND WILDLIFE SPECIES.

.THIS PROJECT WILL CAUSE SUBSTANTIAL ADVERSE EFFECTS ON HUMAN BEINGS,DIRECTLY OR INDIRECTLY.

AFTER CAREFULLY READING THE ENVIRONMENTAL CHECKLIST AND KNOWING THE AREA FOR MORE THAN 25 YEARS. I CANNOT SUPPORT THIS PROJECT. AN ALTERNATE LOCATION SHOULD BE LOOKED FOR . FURTHER AWAY FROM HIGHWAY 101.

WILL THE COUNTY AND STATE BE RESPONSIBLE FOR THE HEALTH OF ME AND MY FAMILY AND INVITED GUESTS.OR WILL THE INSURANCE COMPANY OF DUTRA BE RESPONSIBLE .

THANK YOU FOR ALLOWING ME TO COMMENT

HARVEY GOLDBERG

Harvey Goldberg

LIFE IS GOOD UNCLEMIKE

MIKE GOLD
7345 CASTILLE CT.
ROHNERT PK.CA.94928
707 792-9977 USA
060360508 THAILAND
0116660360508 FROM USA TO THAILAND

FILE COPY: PLP04-0046

YAHOO! MAIL

Print - Close Window

Date: Sat, 4 Mar 2006 08:22:12 -0800 (PST)

From: "mike gold" <mikegold290@yahoo.com>

Subject: Fwd: DUTRA PROJECT

To: "yahoo mikegold" <mikegold290@yahoo.com>, "mike300 GOLD300" <mikegold300@yahoo.com>

> TO:STEVE PADOVAN
> SONOMA COUNTY/PRMD SEPT.20,2004
> Hello Steve; I hope you and wonderful Sonoma county are doing well. I am out of the country and will return sonoma county about 27 sept. 2004. Could you e-mail me with any updates on the Dutra project. As you know my private property is near this location,and may be greatly affected by an asphalt plant. I would like to be present at any Board of Supervisor meetings concerning this project.
> thankyou
> HARVEY GOLDBERG

LIFE IS GOOD UNCLEMIKE

MIKE GOLD
7345 CASTILLE CT.
ROHNERT PK.CA.94928
707 792-9977 USA
060360508 THAILAND
0116660360508 FROM USA TO THAILAND

FILE COPY PLP04-0046

THE
DUTRA
GROUP

SEE
LETTER
OF
REPLY DATED JULY 27, 2004

July 23, 2004

Lawrence A. Baker
Buresh, Kaplan, Jang & Feller
2298 Durant Avenue
Berkeley, California 94704

Reference: Permission for Access - M. Harvey Goldberg

Dear Mr. Baker,

This will acknowledge receipt of your letter of July 1, 2004 with regard to access for your client, M. Harvey Goldberg, across property owned by The Dutra Group (hereinafter "Haystack").

For the record, it is by no means clear that your client has a right of access across the Haystack property. However, it is not an issue that is timely for resolution and until it is timely The Dutra Group hereby grants Mr. Goldberg permission to cross the Haystack property, on the same roadway, within the same limitations and pursuant to the same terms and conditions as granted in the Fontes easement.

We urge caution by your client in his use of the roadway, as The Dutra Group will hold Mr. Goldberg responsible for any loss, damage, injury, accident, fire or other casualty, liability, claim, cost or expense, including attorneys' fees, arising from Mr. Goldberg's, his agents', servants' or invitees' use or misuse of the Roadway or surrounding Dutra property.

This grant of permission shall continue in force until withdrawn in writing.

Sincerely,

James M. Hagood
Chief Financial Officer

cc. Bill T. Dutra, CEO
Brian Peer, Materials General Manager
K. W. Smith, General Counsel
P. Mar, Morrison & Foerster

LAW OFFICES
Buresh, Kaplan, Jang & Feller
2298 DURANT AVENUE
BERKELEY, CALIFORNIA 94704
TELEPHONE (510) 548-7474 -- FACSIMILE (510) 548-7488
WRITER'S DIRECT EMAIL: LBAKER@BKJF.COM

SCOTT BURESH
ANN S. KAPLAN
ALAN I. JANG
FRED M. FELLER
PEGGY CHANG
RAMON M. GONZALEZ

OF COUNSEL
LAWRENCE A. BAKER

VIA FACSIMILE & MAIL

July 27, 2004

James M. Hagood
Chief Financial Officer
The Dutra Group
1000 Point San Pedro Road
San Rafael, CA 94901-8312

Re: Access for M. Harvey Goldberg

Dear Mr. Hagood:

This is in response to your 7/23/04 letter.

Harvey Goldberg has used the road across the property now owned by your firm to gain access to his property since the 1970's. He has a prescriptive easement over this access road in that he has used this road openly and notoriously, continuously and uninterrupted, hostile to the true owner, exclusive and under a claim of right for more than five years. *Zumino v. Gabriel* (1960) 182 Cal.App.2d 613. Any attempt by your company to interfere with Mr. Goldberg's prescriptive right could result in legal action against your company.

Because Mr. Goldberg has a prescriptive easement, he rejects your belated attempt to grant him use of the access road over which he already has a prescriptive easement.

Very truly yours,

BURESH, KAPLAN, JANG & FELLER

LAWRENCE A. BAKER

LAB:jp

F:\HOME\SEC6\FONTES\L-Hagood.001

FILE PROJECT PLP04-0046

View Attachment [Back to Original Message - Printable View]

File name: L_DUTRA.001 | **File type:** application/x-wordperfect6.1

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SCOTT BURESH

ANN S. KAPLAN

ALAN J. JANG

FRED M. FELLER

PEGGY CHANG

RAMON M. GONZALEZ

OF COUNSEL

LAWRENCE A. BAKER

LAW OFFICES

Buresh, Kaplan, Jang & Feller

2298 DURANT AVENUE

BERKELEY, CALIFORNIA 94704

TELEPHONE (510) 548-7474 ~ FACSIMILE (510) 548-7488

WRITER*S DIRECT EMAIL: LBAKER@BKJF.COM

July 1, 2004

FILE PROJECT: PLP04-0046

JULY 1, 2004

SONOMACOUNTY
STOCKS
TOM FOSKARIS
TREASURES
ULTRALITE
VERIZON WIRELESS

James Haygood

Chief Financial Officer

Dutra Materials

1000 Point San Pedro Road

San Rafael, CA 94901

Re: Access for M. Harvey Goldberg

Dear Mr. Haygood:

As you may remember, I am one of the attorneys representing M. Harvey Goldberg in connection with his long-running dispute with his neighbors, the Fonteses, over his access to his undeveloped parcel in Sonoma County. As you may be aware from Mr. Goldberg, this litigation was finally settled in 3/04. Enclosed for your information please find a copy fo the Settlement Agreement which was filed with the Court.

This Agreement gives to Mr. Goldberg an easement over the Fontes* parcels for access to his land. (An easement deed will be recorded shortly.) This Agreement also allows Mr. Goldberg to bring a certain number of trucks over this access road for purposes of levy maintenance.

Recently, Mr. Goldberg has become concerned about the access to his property over property that is now apparently owned by your company. (As you will recall, Mr. Goldberg had problems about obtaining access through locked gates, etc.) Mr. Goldberg plans on building his retirement home on his land, and he needs unrestricted access to his private property. Any interference by your company of Mr. Goldberg*s access would be a violation of his rights as an easement holder for access.

Mr. Goldberg is certainly willing to work with your company towards a mutually-beneficial goals. If your company wants to modify Mr. Goldberg*s access to his property, I ask that you contact me; otherwise, Mr. Goldberg assumes that your company will not adversely affect this access route.

Please call me if you have any questions.

Very truly yours,

BURESH, KAPLAN, JANG & FELLER

FILE PROJECT: PLP04-0046

LAWRENCE A. BAKER

LAB:cnk

Enclosure

cc: Aimi Dutra (w/o encl.)

F:\HOME\SEC6\FONTES\L-DUTRA.001

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Mail Upgrades - Mail Options

FILE ...

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 527-1900 FAX (707) 527-1103
Field Operations / Code Enforcement / Permits / Environmental & Comprehensive Planning

March 21, 1997

Mr. Harvey Goldberg
PO Box 766
San Anselmo, CA 94979

Dear Mr. Goldberg:

As per your request, I am writing to you regarding your property south of the City of Petaluma, a vacant, 7.9 acre parcel, Assessor's Parcel Number 019-329-007. This parcel is zoned Land Extensive Agriculture (LEA) B6, BR, F2 160 acre density. According to zoning, this parcel is eligible for one primary dwelling unit. According to local rules, the owner would have to get water, septic and access to the property in order to be able to build a house. If the owner could do those things, the County would issue a building permit.

Please contact me if you have further questions or concerns regarding this matter. My phone number is (707) 527-1909.

Sincerely,

Richard Lehtinen

Richard Lehtinen
Planner III

FILE PROJECT: PLP04-0046

YAHOO! MAIL

Print - Close Window

Date: Sat, 4 Mar 2006 08:32:08 -0800 (PST)

From: "mike gold" <mikegold290@yahoo.com>

Subject: Dutra materials

To: "yahoo mikegold" <mikegold290@yahoo.com>

>>> mike gold 06/03/04 06:52AM
TO : BILL DUTRA, AMY DUTRA, JIM HAGOOD, AND DUTRA MATERIALS
DEAR MR DUTRA; SO AS TO BE IN A TIMELY MANNER,BECAUSE OF THE DOCTRINE OF LATCHES. I WANT TO GIVE YOU CONSTRUCTIVE NOTICE THAT I AM NOT HAPPY WITH THE GATES AND LOCKS YOU HAVE PUT ON THE EXISTING ROAD TO MY PRIVATE PROPERTY.
I HAVE CALLED REPEATEDLY BOTH YOU AND YOUR DAUGHTER AND HAVE NOT HEARD BACK FROM YOU. I HAVE TALKKED WITH MR HAGOOD BUT I DO NOT FEEL SECURE WITH WHAT I AM BEING TOLD.. HE HAS ASSURED ME I WILL HAVE UNRESTRICTED ACCESS TO MY PRIVATE PROPERTY. BUT I AM NOT SURE EXACTLY WHAT THAT MEANS OR WHERE. I WAS TOLD THE PRESENT SITUATION WOULD BE ONLY TEMPORARY UNTILL YOU CLEANED UP THE BARNS. THIS SITUATION HAS ALREADY BEEN VERY FRUSTRATING AND CAUSED MANY PROBLEMS FOR ME AND MY INVITED GUESTS.
WHEN I PURCHASED THIS PROPERTY IN 1978 I PLANNED ON BUILDING MY RETIRMENT HOME THERE. IN 1993 I HAD AN ARCHETECT DESIGN A HOUSE. I NEED TO MAKE SURE YOUR PLANS COINCIDE WITH THE HOME I BUILD TO RETIRE IN.
I MUST BE KEPT IN THE LOOP OF ANY AND ALL PLANS FOR THIS AREA. INCLUDING MITIGATION PROJECTS. .I WOULD APPRECIATE A MEETING WITH YOU AS SOON AS POSSIBLE TO SEE THE PLANS AND THE PROPOSED PROJECT. AND DESIGN FOR NEW ACCESS ROAD.
AS YOU KNOW I JUST FINISHED 4 YEARS IN COURT OVER THIS ACCESS ROAD AND PREVAILED. PLEASE LET'S MEET AND PUT THIS ALL ON THE TABLE , AND AVOID ME FILEING A CEASE AND DESIST AND COMPLAING TO THE COUNTY.
I ONLY WANT TO KNOW HOW WE WILL RESOLVE MY ACCESS ROAD AND IF YOUR PLAN'S WILL EFFECT MY FUTURE HOME PLANS.
SO PLEASE LET'S MEET

SINCERELY M. HARVEY GOLDBERG

LIFE IS GOOD UNCLEMIKE

MIKE GOLD
7345 CASTILLE CT.
ROHNERT PK.CA.94928
707 792-9977 USA
060360508 THAILAND
0116660360508 FROM USA TO THAILAND

FILE PLP04-0046 DRAFT GP 2020
PROJECT STEVE PADOVAN

COUNTY OF SONOMA

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 527-1900 FAX (707) 527-1103
Field Operations / Code Enforcement / Permits / Environmental & Comprehensive Planning

MAP PAGE PAR
#019-320-07-000

March 21, 1997

Mr. Harvey Goldberg
PO Box 766
San Anselmo, CA 94979

Dear Mr. Goldberg:

As per your request, I am writing to you regarding your property south of the City of Petaluma, a vacant, 7.9 acre parcel, Assessor's Parcel Number 019-329-007. This parcel is zoned Land Extensive Agriculture (LEA) B6, BR, F2 160 acre density. According to zoning, this parcel is eligible for one primary dwelling unit. According to local rules, the owner would have to get water, septic and access to the property in order to be able to build a house. If the owner could do those things, the County would issue a building permit.

Please contact me if you have further questions or concerns regarding this matter. My phone number is (707) 527-1909.

Sincerely,

Richard Lehtinen

Richard Lehtinen
Planner III

MARCH 1, 2006

THIS PRIVATE PROPERTY HAS SPECIAL TITLE. NO LAND USE CHANGE SHOULD BE MADE AT THIS TIME. THIS PROPERTY IS ELIGIBLE FOR ONE PRIMARY DWELLING UNIT.

Michael Harvey Goldberg

California Native Plant Society
Milo Baker Chapter

Via email
Date: March 23, 2006
To: Steve Dee
From: John Herrick
Subject: Dutra Haystack Landing Asphalt and Recycling Facility (PLP04-0046)

On behalf of the Milo Baker Chapter of the California Native Plant Society, thank you for the opportunity to express our views on the scope of environmental issues to be addressed in the EIR for the Dutra Haystack Landing Asphalt and Recycling Facility.

We request that the EIR identify measures that will protect native species and promote the integrity of native plant communities, and evaluate project alternatives that will avoid destruction of native species, habitats and natural communities.

In addition to the concerns identified on the 2/17/2006 Environmental Checklist, we believe that the project's potential for introducing invasive exotic plant species should be addressed. The introduction of invasive species is a concern given the sensitive nature of the wetland and marsh habitats. The off-loading, stockpiling and processing of foreign aggregate, sand and recycled materials presents the opportunity to introduce invasive exotic species. We recommend that the project area and adjacent area be surveyed prior to project approval and on a continuing basis following project completion to prevent introduction of pest plants.

Will the Corps of Engineers review the wetlands that would be impacted along the Petaluma River (page 14, 4.b)?

We are interested in reviewing the dEIR when it becomes available. Please contact me if you have questions regarding our comments.

John Herrick
Conservation Co-chair
Milo Baker Chapter, California Native Plant Society
887-8542

Post-it® Fax Note 7671	Date	# of pages ▸
To Geoff Reilly	From Steve Dee	
Co./Dept.	Co.	
Phone #	Phone # 565-8350	
Fax # 283-4041	Fax # 565-8358	

RECEI[VED]
MAR 2 1
PERMIT AND [RESOURCE] MANAGEMENT [DEPT] COUNTY OF [SONOMA]

March 18-06

County of Sonoma
Permit and Resource Management Dept
2550 Ventura Ave.
Santa Rosa, Ca 95403

ATTN: Mr S. PADOVAN

REF. Your File PLP04-0046
Dutra / Haystack Facility.

Dear Sir:

Thank you for given me the chance to express my Concern in above referenced matter, the Dutra project at the public scoping meeting, Feb 27-2006. The issues concerned me were verbally expressed. This writing is the follow-up.

1. Safety issue of Convey-belt system over the right-a-way must given prime consideration

2. 24 hr basis operation will created excessive noise and interfered with one's sleeping natural schedule at night.

3. The product material, such as sand will created dust and sandparticles and silica which have accumulative effect to one's lung. The carbon monoxide

generated by combustion engines will increase to high level. all these health issues must be taking into consideration

4. Dutra plant will gated the facility at the right away If so, Public health will be jeopardized, for emergency vechicle, fire & ambulance will not be readily accessed, one's life will be in danger.

5. There is Shamrock sand depot north to the Dutra property, now in operation. why not share the facility. If I am right. there must be some rules governing as to how many facility of same operation could located in the same vicinity, such as BAR, TAVERN, grocery store & restaurants

6. New huge size barge will created accidents for controlling is more difficult, especially docking to adjacent structure.

7. Recycle concret and asphalt solids will take huge pressure and power to break down, which will created sound level to extreme DB for human. On the top of this, the noise created by the said convey-belt system plus heavy vechicle for transport will added more noise.

8. Proposed SMART will be affected if over-head Conveyor-belt system.

At this point in time, I could only think of our issues immediated to my concern.
Please record the letter in your file as the formal concern, for I am immediately affected.

Sincerely
Leang Yee

LEANG YEE
P.O. Box 2006
PETALUMA, CA 94953

FARELLA BRAUN + MARTEL LLP
Attorneys At Law

Russ Building / 235 Montgomery Street
San Francisco / CA 94104

T 415.954.4400 / F 415.954.4480
www.fbm.com

NEIL SEKHRI
nsekhri@fbm.com
D 415.954.4478

March 21, 2006

Scott Briggs, Ph.D.
Permit and Resource Management Department
County of Sonoma
2550 Ventura Avenue
Santa Rosa, CA 95403

Re: Request for Modification of Land Use Designation for
<u>Assessor's Parcels No.("APN") 019-320-022 and 019-320-023</u>

Dear Dr. Briggs:

On behalf of The Dutra Group ("Dutra"), thank you for meeting with us on March 9 concerning the Haystack Landing project. As we discussed, in order to allow for the asphalt plant facilities contemplated by this project, it will be necessary for the County of Sonoma to redesignate two parcels comprising the Haystack Landing site as Limited Industrial. The third Haystack Landing parcel is already designated Limited Industrial.

Dutra operates an asphalt processing and recycling plant at the property located at 1600 Petaluma Boulevard South in Petaluma. In conjunction with the County, Dutra has initiated the environmental review and land use entitlement process for the proposed relocation of the asphalt plant to the property located at 3355 Petaluma Boulevard South (the "Haystack Landing Property"), approximately three-quarters of a mile south along Petaluma Boulevard South from the existing site.

The County and its consultant, Christoper A. Joseph & Associates, have completed a Project Description, Statement of Objectives and Alternatives Analysis for the Haystack Landing Property, a public Scoping Session has been conducted, and hearings on a draft EIR are expected in June or July with proceedings on a final EIR later this year. As you know, Dutra would like to do all that it can to expedite project approval to avoid interruption in the delivery of asphalt and aggregate materials for important public works and private construction projects in the community. Dutra is required by the second use developer to vacate the present site by the end of this year.

Dutra understands that the County's environmental review and other proceedings concerning the General Plan Update are on a path parallel to the County's environmental review and land use entitlement process for the Haystack Landing Property. We would like to accomplish the redesignation of the two Haystack Landing parcels in the most appropriate and expedient manner, to avoid interruption in the delivery of services. Therefore, Dutra requests that the County consider the redesignation as either (1) an amendment to the General Plan in the Haystack Landing entitlement process, or (2) part of the General Plan Update, whichever will best serve the interests of prompt and orderly review.

To this end, we will plan to submit comments on the General Plan Update, requesting that the County address the reasonably foreseeable Haystack Landing project. Environmental analysis of the redesignation as part of the General Plan Update could be prepared at a programmatic level and incorporated into the responses to comments and technical changes that are made part of the Final EIR. The County would then be able to rely on the General Plan Update EIR should it choose to redesignate the Haystack Landing parcels as part of the General Plan Update. Of course, full environmental review of the Haystack Landing project would be completed pursuant to the project-level EIR that is currently underway.

As noted above, the proposed relocation requires that the County redesignate two parcels within the Haystack Landing Property (APNs 019-320-022 and 019-320-023) as Limited Industrial, to allow for asphalt plant-related uses. APNs 019-320-022 and 019-320-023 are currently designated Limited Commercial use in the applicable Sonoma County General Plan and Petaluma Dairy Belt Specific Plan. The third parcel comprising the Haystack Landing Property is already designated Limited Industrial (APN 019-220-001).

The General Plan provides specific criteria to amend a land use designation to Limited Industrial. These are as follows:

- Lands shall be designated to recognize an existing permitted use or to serve the projected employment needs of the planning area.
- Lands outside urban service areas shall have adequate water and septic suitability.
- Lands shall have convenient access to an arterial or collector highway.
- Lands shall be located near population concentrations.
- Lands shall not be in environmentally sensitive or hazardous areas.
- Outside of the unincorporated communities on Figure LU-2 on page 33, lands shall not be located in a scenic corridor.
- Any applicable planning area policies.

Each of these criteria is addressed in order below.

1. Lands shall be designated to recognize an existing permitted use or to serve the projected employment needs of the planning area.

The permitted uses of properties adjacent to the Haystack Landing Property are industrial in nature. As noted above, a portion of the Haystack Landing Property is itself designated Limited Industrial under the General Plan. Other nearby properties already designated Limited Industrial include the Shamrock aggregate facility to the north of the Haystack Landing Property. Therefore, the redesignation of the remaining parcels of the Haystack Landing Property to Limited Industrial would not be incongruous with the existing permitted uses in area planning. Moreover, the redesignation would promote the use of the existing Limited Industrial parcel for industrial use.

The redesignation would preserve the jobs produced by the asphalt plant, which otherwise would be lost if the plant could not find a new location to operate within the Petaluma area. The asphalt plant would also continue to support employment in the construction industry by providing a local source of the asphalt and aggregate for public works and private construction projects in Southern Sonoma County and Marin County.

2. Lands outside urban service areas shall have adequate water and septic suitability.

Dutra proposes to construct a new septic system for the Haystack Landing Property in order to serve the plant's employees. Water is supplied by the North Marin Municipal Water Agency pipeline that runs along the westerly side of the Haystack Landing Property.

3. Lands shall have convenient access to an arterial or collector highway.

Dutra selected the site because, like the existing facility, the Haystack Landing Property has direct and proximate access to Highway 101 in both north and south-bound directions, and direct access to the Petaluma River by barge. The ability to import materials by barge will reduce truck traffic to the facility. Potential alternative sites to the Haystack Landing Property are not as suitable because access to Highway 101 and/or the Petaluma River is less direct, requiring more truck traffic on secondary streets.

4. Lands shall be located near population concentrations.

The Haystack Landing Property was also selected because its distance from downtown Petaluma and other areas of concentrated commercial and office uses will reduce the potential for land use incompatibilities, as well as truck traffic on secondary streets. However, the site is located sufficiently close to population concentrations and highways in Southern Sonoma County and Marin County to enable the plant to continue to meet the demand for construction materials for public works and private construction projects in these communities.

5. Lands shall not be in environmentally sensitive or hazardous areas.

The Haystack Landing Property has also been selected because sites located farther south on the Petaluma River are designated as critical habitat (primarily wetlands) in the Sonoma General Plan. Therefore, location of the proposed facility in these areas to the south would not be environmentally suitable.

Portions of the Haystack Landing Property contain jurisdictional wetlands. However, Dutra has designed the proposed project to avoid most of jurisdictional wetlands, and to preserve and enhance other wetland areas on the Property. Because the majority of these wetlands are located in the southern portion of Property, the asphalt, recycling and stockpile facilities will be located on the northern and central portions of the Haystack Landing Property.

6. Outside of the unincorporated communities on Figure LU-2 on page 33, lands shall not be located in a scenic corridor.

The Haystack Landing Property is located in an unincorporated area. Although it appears that APNs 012-320-022 and 019-320-023 are subject to the General Plan's scenic corridor setback requirements, none of the structures proposed for the asphalt plant, stockpile area and recycling facility are within the setback area. Therefore, the project complies with the requirements of the General Plan and Section 26-64-030 of the County zoning ordinances, and redesignation of these parcels as Limited Industrial will not affect the scenic corridor.

7. Any applicable planning area policies.

The portions of the Haystack Landing Property currently designated as Limited Commercial under the General Plan are also designated as Limited Commercial under the Petaluma Dairy Belt Specific Plan. However, the proposed development would comply with the open space policies by restoring the 16 acres of wetland that the Plan designates as a community separator.

Overall, therefore, the Haystack Landing Property represents the best location for the proposed project, and the proposed redesignation is consistent with the General Plan and County zoning ordinances. On behalf of The Dutra Group, we respectfully request that the County redesignate APNs 019-320-022 and 019-320-023 as Limited Industrial, to allow relocation of this important facility to the Haystack Landing site.

Thank you for your consideration. Please contact Al Cornwell, Chris Locke or me with any questions.

Very truly yours,

NS

Neil Sekhri

cc: Steve Dee, PRMD
Steve Padovan, PRMD
Jeff Brax, County Counsel
Geoffrey Reilly, CAJA ✓
Michele Ross, CAJA
Al Cornwell, CSWSt²
Robin Welter, CSWSt²
Aimi Dutra Krause, The Dutra Group
Jim Hagood, The Dutra Group
Brian Peer, The Dutra Group
Chris Locke, FB+M
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April 14, 2006

Via Federal Express

Scott Briggs, Ph.D.
Lisa Posternak
Permit and Resource Management Department
County of Sonoma
2550 Ventura Avenue
Santa Rosa, CA 95403

Re: Comments on Draft EIR for Sonoma County General Plan 2020("Draft EIR"): Haystack Landing (Assessor's Parcels No. 019-320-022 and 019-320-023)

Dear Dr. Briggs and Ms. Posternak:

On behalf of The Dutra Group ("Dutra"), this will provide comments on the Draft EIR for the proposed Sonoma County General Plan 2020 as it relates to the Haystack Landing site, located at 3355 Petaluma Boulevard South (the "Haystack Landing Property").

Dutra operates an asphalt processing and recycling plant at the property located at 1600 Petaluma Boulevard South in Petaluma. In conjunction with the County of Sonoma ("County"), Dutra has initiated the environmental review and land use entitlement process for the proposed relocation of the asphalt plant to Haystack Landing Property. It is not yet clear whether the Haystack project will be approved prior to or after adoption of the General Plan 2020. Hearings on a draft EIR are expected in June or July with proceedings on a final EIR later this year.

In order to allow for the asphalt plant facilities contemplated by this project, it will be necessary to amend the County's General Plan to redesignate two parcels comprising the Haystack Landing site as Limited Industrial (Assessor's Parcels No. 019-320-022 and 019-320-023). Dutra will also be requesting an amendment to Policy LU-17e as it relates to these two Haystack Landing parcels. A third Haystack Landing parcel is already designated Limited Industrial.

Pursuant to our March 21, 2006 letter sent to Dr. Briggs, a copy of which is attached and incorporated herein by this reference, we have requested that the County amend the General Plan to reflect the required redesignations. We are also submitting a letter, dated concurrently herewith, requesting a General Plan amendment to Land Use policy LU-17e. I have enclosed a copy of that letter also for your reference.

The current Draft EIR does not include a discussion of this reasonably foreseeable Haystack Project or the proposed redesignation. To this end, we respectfully request that the General Plan EIR include a discussion of this reasonably foreseeable project, and to the extent appropriate, include a discussion of this redesignation at a programmatic level in the responses to comments and technical changes that are made part of the Final EIR. Of course, full environmental review of the Haystack Landing project would be completed pursuant to the project-level EIR that is currently underway.

Thank you for your consideration. Please contact Al Cornwell, Chris Locke or me with any questions.

Very truly yours,

Neil Sekhri

Encls.

cc: Steve Dee, PRMD
Steve Padovan, PRMD
Jeff Brax, County Counsel
Geoffrey Reilly, CAJA
Michele Ross, CAJA
Al Cornwell, CSWSt²
Robin Welter, CSWSt²
Aimi Dutra Krause, The Dutra Group
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April 14, 2006

Via Federal Express

Scott Briggs, Ph.D.
Permit and Resource Management Department
County of Sonoma
2550 Ventura Avenue
Santa Rosa, CA 95403

Re: Request for General Plan Land Use Policy LU-17e:
Assessor's Parcels No.("APN") 019-320-022 and 019-320-023

Dear Dr. Briggs:

On March 21, 2006, we submitted a letter on behalf of The Dutra Group ("Dutra"), requesting that the County redesignate APNs 019-320-022 and 019-320-023 as Limited Industrial, to allow relocation of the Dutra's proposed asphalt processing and recycling plant to the Haystack Landing site located at 3355 Petaluma Boulevard South (the "Haystack Landing Property"), approximately three-quarters of a mile south along Petaluma Boulevard South from the existing site. The purpose of this letter is to also request a change to Land Use Policy LU-17e (Section 3.8 of the Sonoma County General Plan), that applies to Petaluma and Environs in general and would affect the Haystack Landing Property.

The Land Use objectives for Petaluma and Environs are related to the capacity of existing sewer and water facilities to serve projected growth, the extent of the urban service boundary, and whether commercial or industrial development should be located outside the urban service boundaries, particularly recreation and visitor serving commercial uses associated with area recreation. LU-17e is one of the land use policies intended to achieve these objectives. It provides:

> Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986.

As noted in our prior letter, the proposed relocation requires that the County redesignate two parcels within the Haystack Landing Property (APNs 019-320-022 and 019-320-023) as Limited Industrial, to allow for asphalt plant-related uses. APNs 019-320-022 and 019-320-023 are currently designated Limited Commercial use in the applicable Sonoma County General Plan and Petaluma Dairy Belt Specific Plan. The third parcel comprising the Haystack Landing Property is already designated Limited Industrial (APN 019-220-001).

The proposed redesignation of two of the Haystack Landing parcels is consistent with LU-17e in that the property has been used for an industrial use, settling ponds, since at least 1979, an industrial use. Further, the redesignation would meet all other criteria set forth in the General Plan to amend a land use designation to Limited Industrial, as described in our March 21, 2006 letter. The redesignation of these sites from Limited Commercial to Limited Industrial is also generally consistent with the Land Use Objectives for Petaluma and Environs set forth in Section 3.8 of the Land Use Element.

Nevertheless, should you desire further clarity, we would also request an amendment to the General Plan to address this important project. Our proposal would amend Land Use Policy LU-17e as follows (additions in bold/underline):

LU-17e: Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986, **except that areas designated "Limited Commercial" may be redesignated to "Limited Industrial" within the Haystack Landing Site along Petaluma Boulevard South (APNs 019-320-022 and 019-320-023) as necessary to accommodate the relocation of an asphalt and recycling plant.**

Thank you for your consideration. Please contact Al Cornwell, Chris Locke or me with any questions.

Very truly yours,

Neil Sekhri

cc: Steve Dee, PRMD
Steve Padovan, PRMD
Jeff Brax, County Counsel
Geoffrey Reilly, CAJA
Michele Ross, CAJA
Al Cornwell, CSWSt²
Robin Welter, CSWSt²
Aimi Dutra Krause, The Dutra Group
Jim Hagood, The Dutra Group
Brian Peer, The Dutra Group
Chris Locke, FB+M
Jim Abrams, FB+M

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February 27, 2006

TO: County of Sonoma Permit and Resource Management Department

PROJECT TITLE: Dutra Haystack Landing Asphalt and Recycling Facility

CONCERNS ABOUT SAFEGUARDING HERON/EGRET COLONY ON DUTRA SITE

BACKGROUND AND SUMMARY:

Volunteer Petaluma Wetlands Docents, appointed by the City of Petaluma, provide services to the public and support the wetlands, including Shollenberger Park and its adjoining properties. Since 2003 docents have been tracking activity at a Heron/Egret colony that is on the property now owned by Dutra Group, at its northwestern side. The colony is protected under the federal Migratory Bird Treaty Act.

Concerned that the proposed asphalt plant would interfere with the colony, Docent Gerald Moore and I spoke with Brian Peer, Material General Manager and Al Cornwell of Dutra in 2004, and were assured at the time that Dutra will do all it can to preserve the colony site. We want to be reassured that promise will endure.

The **Environmental Checklist Form** alludes to legal requirements in a general sense –

"4.d. Potentially Significant Impact....The EIR will address the potential of the proposed project to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites."

Since the colony is active from only March-August, it's possible the Senior Environmental Specialist is not aware of this specific colony. The purpose of this memo is to provide some background information on the colony, and to iterate the concerns of the docents that the colony not be disturbed in the future by any Dutra operations.

Copies of reports on the colony submitted to the Cypress Grove Research Center of Audubon Canyon Ranch and/or photographs of the colony are available upon request.

HERON/EGRET COLONY #121, SHOLLENBERGER 2003-2005

This Heron/Egret colony was first established in 2003. Docent Len Nelson and I have tracked activity there for Cypress Grove Research Center (CGRC) of Audubon Canyon Ranch. For 16 years CGRC has been collecting data from colonies in Napa, Marin and Sonoma Counties for a regional atlas of "heronies" in collaboration with the San Francisco Bay Bird Observatory. The health and well-being of these colonies is instructive as to the health and well-being of our environment.

During 2003-2005 Colony #121 has shown a growth of active nests and chicks produced. It is not actually in Shollenberger Park but across the river from the area of Marker #8, on property now owned by Dutra. The colony has been active from mid-March until August during this period. 100's of Petaluma school children have been taken on tours to the park to study the colony from Shollenberger Park using viewing scopes provided by park docents. Park regulars are also fascinated by colony activity as well as many birders who visit Petaluma and the park to watch colony activity.

SUMMARY OF COLONY #121 ACTIVITY 2003-2005

YEAR	GREAT BLUE HERON NESTS/CHICKS	GREAT EGRET NESTS/CHICKS	SNOWY EGRET NESTS/CHICKS
2003	**2 nests 4 chicks**	**15 nests 29 chicks**	**4 nests 10 chicks**
2004	**2 nests 2 chicks**	**22 nests 48 chicks**	**4 nests 8 chicks**
2005	**1 nest 2 chicks**	**25 nests 58 chicks**	**4 nests 8 chicks**
TOTALS	**5 nests 8 chicks**	**62 nests 135 chicks**	**12 nests 26 chicks**

Code: NESTS – only includes nests that produced viable chicks
CHICKS – only includes chicks that were active and standing on nest platforms

To summarize, there has been a grand total of 79 productive nests with 169 healthy chicks over the three year history of the colony.

HERON AND EGRET COLONY PROTECTION UNDER FEDERAL LAW

The Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*) and Snowy Egret (*Egretta thula*) are among the species of native birds protected under federal law, the Migratory Bird Treaty Act (MBTA), and are specifically named within Title 50 of the Code of Federal Regulations, Section 10.13.

MBTA implemented various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful. Eggs, nests and feathers are also protected. Disturbing nests to the point that the nests and their contents are abandoned during nesting season is also prohibited under MBTA. Additionally, nests, live young, and eggs are protected under the State of California's Fish and Game Code Section 3503.

Experts recommend maintaining a distinct human distance from colony sites. These buffer zones are needed to protect herons and egrets from human activity. R.M. Erwin, *Responses to human intruders by birds nesting in colonies,* Colonial Waterbirds, 1989 12(1): 104-108, recommends maintaining a 200 meter buffer distance, based upon 100 meter flush distance plus another 100 meters, to protect colony sites.

Colony #121, unlike several urban colonies in the county, has been isolated from surrounding human habitation, so its inhabitants may be less tolerant of human activity. It is likely that the scope of the project planned by Dutra will conflict with federal law unless extra care is taken during nesting season to maintain the current isolation of Colony #121.

At the minimum, if construction activities are ultimately approved and intended for late March through August, all suitable habitat on the Dutra property should be surveyed for the presence of nesting birds by a qualified biologist no earlier than mid-March (when herons and egrets are normally first present) before disturbance activities are allowed to commence. If nests are found, appropriate buffer areas must be established before activities are undertaken, to comply with the MBTA. Another option would be to *assume* this colony will be active from March-August and establish defined buffer zones for human activities during those months.

Norris R. Dyer
Senior Docent,
Petaluma Wetlands, City of Petaluma
1708 Granada Court
Petaluma, Ca 94954

PWA Response to the New Dutra Facility, 27 Feb 2006

First, let me say that I, like many other people in Petaluma, want Dutra to have a presence in our community for many years to come. Dutra is one of four companies in our town that ship their products in and out of town on the river. The yearly commercial tonnage of these 4 companies provides the justification for the US Government to pay for dredging our river. Without dredging, the Petaluma River would revert to a creek in about 15 years and be limited to kayaks and canoes. Our river heritage and river recreation would die.

That said, let me also stress that the Dutra Company has the responsibility to do everything possible to insure that their new facility is as nearly invisible to the public as possible. Dutra's down-wind neighbors include Shollenberger Park, the new Ellis Creek Water Recycling Facility & Wildlife Sanctuary, the Business Park, the Kaiser Medical Facility, and several new housing projects. Asphalt is made from petroleum products that are very unpleasant to smell and contain many carcinogens. If you have ever walked within two blocks of an older home getting a new asphalt and gravel roof you know what the issue is. About ten years ago the federal government published information stating that a man working on an asphalt & gravel roofing project for eight hours inhales a carcinogen load equivalent to smoking a carton of cigarettes. That's right – 200 cigarettes a day. The Petaluma Wetlands Alliance is concerned about four specific issues related to this project.

1) Toxic Air Pollution

Shollenberger Park (about 200 acres) is the most popular park in Petaluma and is used by 200-350 people per day. It is also used as a biology field trip site by hundreds of grade school children per year. In addition to being the cities dredge spoils site, Shollenberger is a wetland that also serves as a wildlife sanctuary for migrating birds and also hosts hundreds of nesting birds each year. To the immediate south of Shollenberger Park is the Ellis Creek Water Recycling Facility & Wildlife Sanctuary (about 250 acres) which will contain over three miles of public trails and be visited by hundreds of people per day, both locals and tourists. Ellis Creek will also be a wildlife sanctuary. These are not acceptable places for people or wildlife to be exposed to toxic chemicals blowing in from across the river. The same argument can be made for people working and doing business in the business park and the Kaiser Medical Facility which are located just east of the Petaluma public wetlands. Dutra must build asphalt processing facilities that are totally free of organic and inorganic emissions into the air.

2) Toxic Water Pollution

Dutra's new plant must be designed to insure that there can never be any spills of toxic materials which would either pollute the air, the ground, or any waterways running into the Petaluma River. Our river is a treasure which runs south into the Bay but also runs north on high tides. A chemical spill could contaminate this waterway from downtown

Petaluma to the Golden Gate, killing wildlife, including endangered species. Toxic spills could also endanger human health and downtown business trade in the Petaluma area.

3) Noise Pollution

What are the noise issues involved with processing asphalt? I don't know. But people want and expect to continue enjoying our public wetlands as quite nature sanctuaries that are reasonably free from the noise pollution of industrial operations. Currently the major sound pollution comes from the freeway, but that is minimal. Increased noise pollution would also have a negative impact on the wildlife which use the site, including nearly 180 species of birds. Increased noise could lead to less wildlife using the site, which would be a tragedy not only for the wildlife, but for our citizens who consider the wetlands as not only a place of recreation and enjoyment of great beauty, but also as a place of spiritual and emotional healing in the midst of our modern, chaotic life styles.

4) Aesthetic or Visual Pollution

One of the joys for both wildlife and people is walking or flying in our wetlands and seeing the Petaluma River in a reasonably natural state. The visual loss of habitat and the addition of a fume-belching asphalt plant across the river is unacceptable.

Proposed Environmental Design Solutions

1. I think people could tolerant reasonable loading and unloading of materials at the proposed dock. The upstream Shamrock facility has not been an issue. However the vast majority of the Dutra property facing toward the Petaluma River should be walled off from sight and sound with a quality sound wall. The visual impact of such a wall should blend into the natural wetland/riparian scene of the river by its design. Wall aesthetics should be addressed by either using wetlands plant landscaping in front of it, and/or by getting local school art classes to paint it with one giant wetlands mural.

2. Every step in the asphalt processing area should meet state-of-the-art pollution and safety parameters to the highest suburban EPA air pollution standards. The same high standards should be required for noise generation and potential chemical spill and runoff scenarios. Technology should be added to the plant to assure that said standards are met.

3. A Value Engineering Review approach to the plant design should be done to insure that the above conditions are met. During Value Engineering outside experts evaluate the project design and offer new, creative design solutions to insure optimal performance related to the above issues. Thank you.

Gerald Moore, Ph.D.
Chairman
Petaluma Wetlands Alliance

Robert Kertzner, M.D.
53 Augusta Circle
Petaluma, CA 94952
707-658-0382

RECEIVED
APR 25 2006
PERMIT AND MANAGEMENT COUNTY

April 23, 2006

Steve Dee
Senior Planner
Environmental Review Section
Permit Resource Management Department
2550 Ventura Ave.
Santa Rosa, CA 95403

Dear Mr. Dee,

I am writing to express my great alarm about the proposed Dutra asphalt plant between the Petaluma River and Highway 101, as described in today's Press Democrat. It's my first time writing to county government, but the proposed rezoning of the land in question from commercial to industrial in order to accommodate the proposed plant strikes me as a complete contradiction to good planning.

The plant would threaten a wonderful environmental resource across the river (Shollenberger Preserve) that is a significant economic (tourist) asset to the region, particularly now that the Point Reyes Bird Observatory is about to open at the Preserve. With significant new residential development planned for the former Dutra quarry site and Southern Petaluma, the potential environmental hazards of the plant could have significant public health consequences (e.g., degradation of air and water quality, odors, noise, exposure to hazardous materials). As a highly visible gateway to southern Sonoma County, the plant's large towers would be an eyesore and lead countless residents, commuters, and visitors to wrongly assume that we have no careful environmentally, economically, and aesthetically sensitive regional planning.

Thank you for taking the time to read this letter. I'd appreciate it if you could let me know if there will be other opportunities for citizens' voices to be heard during the review process.

In closing, it's hard to think of a more inappropriate site for an asphalt plant than the proposed location given its proximity to sensitive wetlands, a burgeoning city population, and the entryway to this beautiful county.

Sincerely,

1816 Falcon Ridge Drive
Petaluma, CA 94954
April 25, 2006

Mr. Steve Dee, Senior Planner
Sonoma County Environmental Review Section
Permit Resource Management Department
2550 Ventura Avenue
Santa Rosa, CA 95403

APR 26 2006

Subject: Proposed Petaluma Asphalt Refinery

Mr. Dee:

My wife and I read with alarm and serious concern the article in the April 23rd "Press Democrat" regarding the above. The article points out the project would require rezoning the site from commercial to industrial which we hope would never happen.

We point out that Shollenberger Park is directly across the river from the proposed asphalt site. This is a bird sanctuary and walking area for many residents of Petaluma. The parkland area is to be greatly expanded with the state of the art waste water reclamation facility now under construction (along Lakeville Highway). With prevailing west winds all of this area and other residential areas will be in the direct path of the noxious gases and fumes from any asphalt refinery operation.

In addition to the above, there is a nesting area naturally established in recent years by egrets in the tall trees across the Petaluma River from Shollenberger Park. Robert, a voluntary docent, and others have been monitoring the increasing number of nests which have begun to rival the number of nests at the Audubon Sanctuary along the Bolinas lagoon.

By copies of this letter to the Petaluma City Council and the Adobe Creek Homeowners' Association, I would like to urge a concerted effort be made to stop any rezoning that would permit an asphalt refinery be allowed near existing park and residential areas.

With a copy to the editor of "The Press Democrat" I would like to thank Jose L. Sanchez Jr. for the article bringing this possible rezoning to the attention of the community.

B. R. "Barney" Whitehill
789-0275

Cc: Petaluma City Council
Art Kerbel, President, Adobe Creek Homeowners Assn.
Editor, The Press Democrat

Sonoma Marin Area Rail Transit District (SMART)
4040 Civic Center Drive, Suite 200
San Rafael, California 94903
415.492.2859/FAX.492.2854
lmilla@sonomamarintrain.org

Fax Transmittal Sheet

To: Al Cornwall

From: Lucrecia Milla, Property Manager

Fax No.: 415-892-4502

Date: May 16, 2006

Number of Pages, including transmittal sheet: 4

Comments:

Hi Al-

Sorry this is via fax, but our scanner is broken. You should receive this today or tomorrow in the mail.

Thanks-

SONOMA-MARIN SMART AREA RAIL TRANSIT

4040 Civic Center Drive
Suite 200
San Rafael, CA 94903
415-492-2857
Fax-492-2854
Email www.sonomamarintrain.org

May 12, 2006

Mr. Al Cornwell, P.E.
Principle
CSW/Stuber-Stroeh Engineering Group, Inc.
790 Delong Avenue
Novato, CA 94945

Re: MP 36.5, Dutra Materials Asphalt and Recycling Project

Dear Al:

As you know, on May 3, 2006 the Sonoma-Marin Area Rail Transit District's Real Estate Committee ("the Committee") met in closed session to consider Dutra Materials request for a license to allow for a conveyer system over SMART's right-of-way. It is our understanding that the conveyer system is part of Dutra's proposed project to relocate its asphalt and recycling facility to property adjacent to SMART's right-of-way. Prior to the closed session, Dutra was provided an opportunity to present its proposal to the Committee.

The Committee has directed staff to obtain more information on this project and the scope of the license request before the Committee makes a recommendation to the full SMART Board. In general, the Committee is concerned that it lacks sufficient information to determine the potential impacts of this project on SMART's proposed rail operations; and, in particular, it lacks sufficient information on how the conveyer system will impact SMART's proposed rail operations. Set forth below is a summary of some concerns SMART has with the proposed conveyer system and additional information that SMART is requesting in order to fully analyze the license request.

<u>**Other Conveyer Systems**</u>

To begin with, the Committee needs more information on whether this type of conveyer system has been utilized elsewhere over an operating passenger railroad; and, if so, how those systems have operated. There was a brief discussion on this issue in Dutra's presentation; but, the discussion was very cursory. To our knowledge, no other passenger rail district allows for a conveyer system to cross its right-of-way, such as the one being proposed by Dutra.

Airborne Dust and Particles:

One of the most significant concerns with the proposed conveyer system and the material stockpiles is the potential for the creation of or an increase in airborne dust and particles. Though Dutra's presentation included a brief discussion on measures to reduce airborne dust and particles, the Committee is particularly concerned that any potential for airborne emissions must be eliminated before a license could be granted. Currently, SMART's proposed rail project anticipates utilizing a rail car which provides an air intake system. As a result, there is an increased concern that airborne dust and particles could infiltrate this system if a conveyer system is allowed to cross over SMART's right-of-way.

The Committee is also concerned with how the accumulation of dust and airborne particles may migrate onto the railroad and impair sight distance.

In short, Dutra needs to provide a more detailed proposal on how it would address the effect of airborne dust and particles on operations of passenger rail service.

Assuming the aforementioned concerns can be appropriately addresses, a number of issues must also be resolved. These include the following.

Drainage:

In reviewing Appendix C in the hydrology report of the Wetlands and Monitoring plan for the project, the report recommends the replacement of the old wood culvert at approximately E.S. 1831+00. The Committee would request as part of its recommendation to the full SMART Board that this structure be replaced before issuance of a license. The replacement needs to be a concrete structure designed and constructed to SMART standards and capable of accommodating a 100 year storm event.

In addition, there is a concern regarding accumulation of scour on the track bed. Dutra needs to provide a proposal on how that concern can be addressed.

Existing At-grade Private Crossing:

Dutra's proposal appears to assume that there is an existing at grade private crossing (at or near E.S. 1838+00) which Dutra may be able to utilize. That assumption is incorrect. The agreement for use of the existing at-grade private crossing is for the sole use of the licensee. It is not transferable without the prior written permission of SMART. Any change in the permanent use of this crossing will need SMART Board approval. SMART is requesting more information on whether and to what extent Dutra proposes to use this private crossing.

Overhead Crossing of New Conveyor Structure:

Though the proposed conveyor system appears, initially, to be acceptable for clearance purposes, any issuance of a license would be contingent upon SMART's review of the final plans and approval of the conveyer system.

Public Utilities Commission (PUC):

Lastly, this project may require some type of authorization from the PUC. Accordingly, any issuance of a license from SMART would be contingent upon any necessary approvals from the PUC or any other state or federal regulatory body.

As soon as we receive responses to the foregoing information, we hope to be able to set this matter again for the next Committee meeting. In the meantime, if you have any questions, please do not hesitate to contact me.

Sincerely,

Lillian Hames

Lillian Hames
General Manager

cc: Lucrecia Milla, SMART
Mike Strider, SMART
Sally McGough, esq.
Greg Dion, esq.

Greetings- 5/16/2006

I'm writing to express my opposition to a proposed asphalt plant just south of Petaluma. The visual (light 'pollution'), noise, and odor impacts of this project (upwind from sensitive areas) would negatively impact wildlife across a narrow stretch of river at the wetlands restoration and wildlife refuge areas at and adjacent to Shollenberger Park.

Further, Shollenberger Park is a cultural resource highly prized and highly used by Petalumans and others from around Marin & Sonoma Counties.

While some river commerce projects could be appropriate at this site, the impacts of this proposal seem greater than the benefits to The Public Good.

I respectfully suggest that a use permit be denied.

A. W. York
30 Augusta Circle
Petaluma, Ca 94952

April 19, 2006

Mr. Steve Dee
Sonoma County Permit and Resources Management Department
2550 Ventura Avenue
Santa Rosa, California 95403

SUBJECT: Dutra's Haystack Landing Asphalt Batch Plant and Asphalt/ Concrete Recycling Facility; State Clearinghouse No. 2006022107 (BCDC Inquiry File No. MC.MC.8702.1)

Dear Mr. Dee:

On February 23, 2006, the San Francisco Bay Conservation and Development Commission (Commission) staff received the Notice of Preparation for the Dutra's Haystack Landing Asphalt Batch Plant and Asphalt/Concrete Recycling Facility Draft Environmental Impact Report (DEIR). Thank you for accepting our comments after the 30-day comment period. We hope our early feedback will help in preparation of the DEIR.

The Dutra's Haystack Landing Asphalt Batch Plant and Asphalt/Concrete Recycling Facility (Dutra Facility Project) would be constructed along the Petaluma River, just south of Adobe Creek. The Dutra Facility Project would involve construction and operation of new dock facilities on the Petaluma River for the receipt of barged aggregate materials on a 24-hour basis, a conveyor and distribution system, stockpiled aggregates, sand and recycled materials, an asphalt mixing and loading facility, a portable asphalt recycling plant, and related office with truck scale. The Dutra Facility Project would also require a General Plan Amendment at the County level to change the land use designation from Limited Commercial to Limited Industrial.

The Commission staff has reviewed the NOP and is submitting its comments regarding the document. Although the Commission itself has not reviewed the NOP, the staff comments are based on the McAteer-Petris Act, the Commission's *San Francisco Bay Plan* (Bay Plan), the Commission's federally approved management plan for the San Francisco Bay, and the federal Coastal Zone Management Act (CZMA).

Commission Jurisdiction

The Commission's jurisdiction includes all tidal areas of the Bay up to the line of mean high tide or up to five feet above Mean Sea Level in marshlands, all areas formerly subject to tidal action that have been filled since September 17, 1965, and the "shoreline band," which extends 100 feet inland from and parallel to the Bay jurisdiction. The Commission also has jurisdiction over managed wetlands adjacent to the Bay, salt ponds, and certain waterways. At the proposed project site, the Commission has "certain waterway" jurisdiction up the Petaluma River to its confluence with Adobe Creek. At the proposed project site, the Commission does not have "100-foot shoreline band" jurisdiction.

State of California • SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION • *Gray Davis, Governor*
50 California Street, Suite 2600 • San Francisco, California 94111 • (415) 352-3600 • Fax: (415) 352-3606 • info@bcdc.ca.gov • www.bcdc.ca.gov

Commission permits are required for construction, dredging, fill placement, dredged material disposal, and substantial changes in use within its area of jurisdiction. Permits are issued if the Commission finds the activities to be consistent with the McAteer-Petris Act and the policies and findings of the Bay Plan. For the proposed Dutra Facility Project, only the facilities proposed in the Petaluma River would require a permit from the Commission.

Bay Plan Policies on Fill

The Commission may only authorize Bay fill for any use when that fill is consistent with the McAteer-Petris Act and the Bay Plan. The placement of fill in the Bay, or in this case, the Commission's certain waterway jurisdiction, may be authorized when it meets the fill requirements identified in Section 66605 of the McAteer-Petris Act, which states, in part, that: (1) the public benefits of fill must exceed the public detriment from the loss of water areas and should be limited to water-oriented uses (such as ports, water-related industry, etc.); (2) no alternative upland location is available; (3) the proposed fill is the minimum necessary to achieve the purpose of the fill; (4) the nature, location, and extent of any fill must minimize harmful effects to the Bay Area; (5) the fill would be constructed in accordance with sound safety standards; and (6) fill should establish a permanent shoreline. The Bay Plan states that, among other things, fill may be approved for port, water-related recreation, and public access. The DEIR should identify aspects of the proposed project that would involve fill in the Petaluma River and describe the amount, location, and possible environmental impacts of the fill, as well as the measures taken to minimize these potential impacts.

Bay Plan Policies on Fish and Wildlife

The San Francisco Bay Plan policies on fish and wildlife state, in part, that "[s]pecific habitats that are needed to prevent the extinction of any species, or to maintain or increase any species that would provide substantial public benefits, should be protected...." The DEIR should analyze any impacts the proposed project could have on fish and wildlife habitat, ✓ particularly on the nearby Petaluma Marsh.

Bay Plan Policies on Dredging

The Bay Plan on Dredging state, in part, that "[d]redging and dredged material disposal should be conducted in an environmentally and economically sound manner." In addition, the policies state that dredging should be authorized when the Commission can find that the dredging is needed to serve a water-oriented use, materials to be dredged meet the water quality requirements of the Regional Water Quality Control Board, important fisheries and other natural resources will be protected, the siting and design of the project will result in the minimum dredging volume necessary for the project, and the materials will be disposed, if feasible, outside of the Bay or certain waterways and reused for a beneficial purpose. The DEIR ✓ should describe any dredging that would be required with the project.

Bay Plan Policies on Public Access

The Bay Plan Policies on Public Access, in part, state: "[i]n addition to the public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline....Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed....Public access improvements provided as a condition of any approval should be consistent with the project and the physical environment, including protection of natural resources, and provide for the public's safety and convenience.... In some areas, a small amount of fill may be allowed if the fill is necessary--and is the minimum absolutely required--to develop the project in accordance with the Commission's public access requirements...."

The DEIR should discuss the type and amount of public access that would be associated with all components of this project.

Thank you for the opportunity to comment on the NOP for Dutra's Haystack Landing Asphalt Batch Plant and Asphalt/Concrete Recycling Facility. Should you have any further questions, please feel free to contact me at (415) 352-3618 or at andreag@bcdc.ca.gov.

Sincerely,

[signature] For

ANDREA M. GAUT
Coastal Program Analyst

Enc.

AMG/mm

cc: State Clearinghouse; Attn: Scott Morgan

ENVIRONMENTAL IMPACT REPORT SCOPING MEETING
Dutra Haystack Landing Asphalt and Recycling Facility

PLEASE PRINT CLEARLY

Monday, February 27, 2006 at 6:30 PM
Petaluma Community Center: 320 N. McDowell Blvd. Activity Room

#	NAME	ORGANIZATION/AFFILIATION (IF ANY)	ADDRESS
1	Leang S. Yee		3350 old Redwood Hy. So. Petaluma
2	Norris R. Dyer		1708 GRANADA CT. PETALUMA, CA 94954
3	Kathleen Garvey	Paddle Up Kayak Petaluma Wetlands Alliance	83 Maria Dr. Petaluma CA 94954
4	[illegible]		
5	Richard Nerviani	Nerviani Paving.	8 Crescent Circle Fairfax
6	DREW McINTYRE	NMWD	POB 146, NOVATO, CA
7	LEN NELSON		503 LARCH Petaluma
8	George White	City of Petaluma	11 English St.
9	Bill Dutra	DUTRA GROUP	
10	Lucrecia Milla	SMART	4040 Civic Center Dr., Suite 200 San Rafael, CA
11	ANASTASIA FONTES	COMMERCIAL FISHERMAN	3357 Petaluma CA
12	LUAN McGOWAN		533 EASTERBY St. Sausalito CA 94965
13	MARY FONTES		" " " " "
14	STAN GOLD	Petaluma Wetlands alliance	615 KING RD., PETALUMA 94952
15	Gene Petersen	Pedrazzi Ranch	2760 Redwood Hwy So

ENVIRONMENTAL IMPACT REPORT SCOPING MEETING
Dutra Haystack Landing Asphalt and Recycling Facility

PLEASE PRINT CLEARLY

Monday, February 27, 2006 at 6:30 PM
Petaluma Community Center: 320 N. McDowell Blvd. Activity Room

#	NAME	ORGANIZATION/AFFILIATION (IF ANY)	ADDRESS
1	MARY EDITH MOORE	PWA	1628 E. Madison 94954
2	ELAINE Pruett	PWA.	2 Twin Creeks Circle 94952
3	Gerald Moore	PWA	1628 East Madison ST 94954
4	Bruce Abelli-Amen	Baseline	101 H St., Ste C, Petaluma, CA 94952
5	Kevin Strain	SELF	4600 Kastania Rd Petaluma
6	MIKE STRIDER	SMART	4040 CIVIC CTR. DR. S. RAFAEL 94903
7	Jerry Corda	San Antonio VFD	5497 Redwood Hwy So. Pet 94952
8	Charles Nerviani	Nerviani Family	3150 Sir Francis Drake Fairfax 9493[illegible]
9			
10			
11			
12			
13			
14			
15			

ENVIRONMENTAL IMPACT REPORT
SCOPING MEETING
COMMENT/SPEAKER CARD

(Please note that this document will be part of the public record.)

Date: Monday, February 27, 2006 (6:30pm to 9:30pm)
Location: Community Center Activity Room at Luchessi Park,
320 North McDowell Boulevard, Petaluma, CA
Project: Dutra Haystack Landing Asphalt and Recycling Facility

Comments may be submitted at the Scoping Meeting, or may be sent to:

Sonoma County PMRD
Attn: Steve Dee, Senior Environmental Specialist
2550 Ventura Avenue
Santa Rosa, CA 95403-2829
Phone: (707) 565-8350 or FAX: (707)565-8358

Comments must be received no later than 5:00 p.m. on March 22, 2006.

Name (Please Print Clearly): NORRIS DYER

Mailing Address: 1708 GRANADA CT - PETALUMA, CA 94954

Resident, Business, Organization, etc.: PETALUMA WETLANDS DOCENT

Comment(s):

WISH TO SPEAK 5-7 MINUTES

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Name (Please Print Clearly): L. YEE

Mailing Address: P.O. Box 2006 Petaluma, CA. 94953

Resident, Business, Organization, etc.: Resident

Comment(s): 1) CONVEYOR. 2) 24 hr basis 3) Security 4) Facility at SHAMROCK 5) New BARGE 6) NOISE! 7) water

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Name (Please Print Clearly): Kevin + Kinston Strain
Mailing Address: 4600 Kastania Road, Petaluma 94952
Resident, Business, Organization, etc.: Rancher
Comment(s): Dutra serves the construction, ranching and farming business in South Sonoma and North Marin Counties. They have been in their present location for 25 years. Dutra provides a convenient and economical location for gravel, sand and asphalt. We need them to remain in South Petaluma. Call me if need for further input. Cel (415) 440-4044

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Comments must be received no later than 5:00 p.m. on March 22, 2006.

Name (Please Print Clearly): Gerald Moore

Mailing Address: 1628 East Madison ST, Petaluma CA 94954

Resident, Business, Organization, etc.: Petaluma Wetlands Alliance

Comment(s):

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Name (Please Print Clearly): MARY LU FONTES

Mailing Address: 533 EASTERBY ST, SAUSALITO

Resident, ~~Business, Organization, etc.~~:

Comment(s): Wrong address on papers mailed
dust + smell - water new dirt
What happens to my [illegible]

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Name (Please Print Clearly): Kathleen Garvey
Mailing Address: 83 Maria Dr. Petaluma CA 94954
Resident, Business, Organization, etc.: PWA - Petaluma Wetlands Alliance
Comment(s): Paddle Up Kayak - kayak tours & rentals

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Comments must be received no later than 5:00 p.m. on March 22, 2006.

Name (Please Print Clearly): Jerry Corda

Mailing Address:

Resident, Business, Organization, etc.: San Antonio VFD

Comment(s): - ~~[illegible]~~ -
I will send in written comment later.

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Name (Please Print Clearly): ANASTASIA FONTES
Mailing Address: 3357 PETALUMA BLVD. SO.
Resident, Business, Organization, etc.:
Comment(s): NEED TO KNOW

TIME & WORK HOUR'S
WHAT ABOUT BARGES, when they
COME IN LATE.
WILD LIFE
NOISE
SEATLING POND

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Phone: (707) 565-8350 or FAX: (707)565-8358

Comments must be received no later than 5:00 p.m. on March 22, 2006.

Name (Please Print Clearly): MARY EDITH MOORE

Mailing Address: 1628 E. Madison Pet 94954

Resident, Business, Organization, etc.:

Comment(s): conveyor tracks under the railroad track would eliminate an eyesore

Mary Edith Moore

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Phone: (707) 565-8350 or FAX: (707)565-8358

Comments must be received no later than 5:00 p.m. on March 22, 2006.

Name (Please Print Clearly): STAN GOLD
Mailing Address: 615 KING ROAD, Petaluma 94952
Resident, Business, Organization, etc.: Friends of the Petaluma River;
~~Comment(s)~~: Petaluma Wetlands alliance

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SUMMARY OF RESPONSES	Project Description	Aesthetics	Air Quality	Alternatives	Biological Resources	Construction Impacts	Cultural Resources	Geology & Soils	Hazards & Hazardous Materials	Hydrology and Water Quality	Land Use & Planning	Noise	Public Services	Recreation	Transportation/Traffic	Utilities & Service Systems	Other	NOTES
LETTERS RECEIVED IN RESPONSE TO THE NOTICE OF PREPARATION DATED FEBRUARY 17, 2006																		
Regional Agencies																		
Scott Morgan State of California Clearing House and Planning Unit 1400 Tenth Street Sacramento, CA 95812-3044																		Distributed Dutra Haystack Landing Asphalt & Recycling Facility NOP to appropriate agencies for review. Letter provided in EIR Appendix B.
Drew McIntyre North Marin Water District P.O. Box 146 Novato, CA 94948											•					•		Service to the project site is outside the NMWD territorial boundaries. NMWD policy provides an exception for lands within the South Petaluma Specific Plan area. No expansion of water service to project site will be allowed beyond the limited historical entitlement (sole discretion of District). See attached NMWD resolution 1230, regarding any proposed new water service connections in the Novato-Petaluma separator corridor. Letter provided in EIR Appendix B.

SUMMARY OF RESPONSES	Project Description	Aesthetics	Air Quality	Alternatives	Biological Resources	Construction Impacts	Cultural Resources	Geology & Soils	Hazards & Hazardous Materials	Hydrology and Water Quality	Land Use & Planning	Noise	Public Services	Recreation	Transportation/Traffic	Utilities & Service Systems	Other	NOTES
Robert W. Floerke Department of Fish and Game P.O. Box 47 Yountville, CA 94599					•													This project may result in changes to fish and wildlife resources. A de minimis determination in not appropriate, and an environmental filing fee is required and should be paid before filing NOD. Requests a complete assessment of the habitats, flora and fauna within and adjacent to the project area. Address rare, endangered, and threatened species—meet CEQA definition. CESA permit is required if project has the potential to result in take of listed plant or animal species. CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. Any activity that diverts or obstructs natural flow, or changes the bed, channel, or bank of a river or stream, or uses material from a streambed requires a Streambed Alteration Agreement. Letter provided in EIR Appendix B.
Dean Eckerson City of Petaluma Water Resources & Conservation 202 North McDowell Blvd. Petaluma, CA 94954									•	•								Project has potential to provide polluted runoff. Project is in close proximity to River, drainage swales along perimeter of property may not be adequate to filter and contain contaminants before they enter drainage ditches or wetlands. EIR should include analysis of type and volume of surface water contaminants and identify mitigation measures to ensure proper handling of polluted runoff. EIR should address design, construction, operation, and maintenance concerns of each proposed measure. Letter provided in EIR Appendix B.
Dwight E. Sanders, Chief California State Lands Commission 100 Howe Avenue, Suite 100-South Sacramento, CA 95825-8202																	•	The Petaluma River is a navigable waterway under the jurisdiction of the California State Lands Commission, and a lease for the new docking facilities is required. Letter provided in EIR Appendix B.

SUMMARY OF RESPONSES	Project Description	Aesthetics	Air Quality	Alternatives	Biological Resources	Construction Impacts	Cultural Resources	Geology & Soils	Hazards & Hazardous Materials	Hydrology and Water Quality	Land Use & Planning	Noise	Public Services	Recreation	Transportation/Traffic	Utilities & Service Systems	Other	NOTES
	•		•			•		•		•		•	•		•	•	•	Project description is brief and incomplete, more information and data is needed to allow a complete and thorough evaluation of any proposal being considered for permitting purposes. The recycling operation (reclaimed asphalt products and the use of crumb rubber) must meet certain criteria, or will fall under the Board's regulatory jurisdiction. Board has questions around permit regulatory parameters. A Streambed Alteration Notification will need to be submitted to CDFG to evaluate impacts to the Petaluma River associated with construction of the proposed off-loading facility. Draft EIR should analyze potential issues involving traffic, noise, air quality, and public health & safety resulting from construction and operational activities, moving and processing of materials, and sending of finished products to market (Board has many questions and concerns). Site is in a seismically active area and will accommodate tons of aggregate, potential to experience liquefaction and settlement. Board requests a description of on-site hygienic facilities, first aid equipment accessibility, employee safety and fire prevention training, security of the site and surrounding property, and a facility site map including access roads. What will be the provisions for the permanent potable and/or non-potable water supply? Important that the draft EIR identify potentially significant cumulative impacts. Letter provided in EIR Appendix B.
Michael Healy, Council Member City of Petaluma 11 English Street Petaluma, CA 94952															•			Concerned about adding buildings and facilities on project site that would conflict with the new proposed interchange (Petaluma Blvd. South). Email response provided in EIR Appendix B.

SUMMARY OF RESPONSES	Project Description	Aesthetics	Air Quality	Alternatives	Biological Resources	Construction Impacts	Cultural Resources	Geology & Soils	Hazards & Hazardous Materials	Hydrology and Water Quality	Land Use & Planning	Noise	Public Services	Recreation	Transportation/Traffic	Utilities & Service Systems	Other	**NOTES**
Timothy C. Sable Department of Transportation 111 Grand Avenue Oakland, CA 94623-0660							•								•	•		The proposed site layout appears to be in conflict with the conceptual plans for the Marin-Sonoma Narrows project for the Petaluma Blvd. South interchange and the associated frontage roads. Regarding traffic analysis, the Department's requests a response to their letter dated (9-15-2004) (letter attached in Appendix B). For Department review and verification, provide all analysis data and calculations on which the result and conclusions are based. Regarding the Petaluma Blvd. South northbound ramp, refer to the *2005 Traffic Operation Analysis Report*. Should there be impacts within State ROW at a later date due to project changes, the Department's Cultural Resources Studies Office will need to review the cultural studies report. For any landscaping work within State ROW for this project, the applicant must obtain an encroachment permit form the Department. Sonoma County Redevelopment Agency had a landscape beautification proposal for this site; County may want to check if proposal is still valid. Letter provided in EIR Appendix B.

SUMMARY OF RESPONSES	Project Description	Aesthetics	Air Quality	Alternatives	Biological Resources	Construction Impacts	Cultural Resources	Geology & Soils	Hazards & Hazardous Materials	Hydrology and Water Quality	Land Use & Planning	Noise	Public Services	Recreation	Transportation/Traffic	Utilities & Service Systems	Other	NOTES
Andrea M. Gaut State of California San Francisco Bay Conservation and Development Commission 50 California Street, Suite 2600 San Francisco, CA 94111					•	•				•				•			•	For the proposed project, only the facilities proposed in the Petaluma River would require a permit from BCDC. If applicable, the proposed project must meet the fill requirements identified in Section 66605 of the McAteer-Petris Act. The DEIR should analyze any impacts the proposed project could have on fish and wildlife habitat, particularly on the nearly Petaluma Marsh; the San Francisco Bay Plan Policy Requirements on Fish and Wildlife must be met. The DEIR should describe any dredging that would be required with the project; the San Francisco Bay Plan Policy Requirements on Dredging must be met. The DEIR should discuss the type and amount of public access that would be associated with all components of this project; the San Francisco Bay Plan Policy Requirements on Public Access must be met. Letter provided in EIR Appendix B

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Lillian Harnes, General Manager Sonoma-Marin Area Rail Transit 4040 Civic Center Drive, Suite 200 San Rafael, CA 94903			•			•				•					•		•	SMART needs more info regarding overhead conveyor system and structure. Has this type of conveyor system been utilized elsewhere over an operating passenger railroad? Issuance of a license for the conveyor system would be contingent upon SMART's review and approval. Concerned about potential airborne dust and particles in relation to rail car with air intake system and to migration and accumulation of dust and particles onto the railroad. Concerned about old wood drainage culvert; SMART would request structure to be replaced with a concrete structure capable of accommodating a 100 year storm event before issuance of a license. Regarding the existing at-grade private crossing, the sole use is for the licensee and is not transferable without the prior written permission of SMART. SMART needs more info on whether and to what extent the proposed project would use this private crossing. Any issuance of a license from SMART would be contingent upon any necessary approvals from the PUC or any other state or federal regulatory body. Letter provided in EIR Appendix B

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County Agencies																		
John Maitland Sonoma County Department of Transportation & Public Works 2300 County Center Drive, Suite B 100 Santa Rosa, CA 95403															•			Concerned with location of project driveway and project truck traffic ingress and egress movements onto Petaluma Blvd South. Re-construction of Petaluma Blvd South and lane re-configuration will be necessary (similar development conditions have been imposed on site north of project). Coordination with Caltrans, regarding future Hwy 101 realignment, is necessary. Email response provided in EIR Appendix B.
Robert A. Swift Sonoma County Department of Health Services 475 Aviation Blvd., Suite 220 Santa Rosa, CA 95403																•		It appears this project would meet the Type A Inert Debris Recycling Center (IDRC) criteria and thus would be an activity that would not be subject to the Construction and Demolition/Inert Debris Regulatory Requirements. Advises and lists 3 criteria that do apply to Type A IDRCs. Sites that do not meet the Type A IDRC exclusion criteria are subject to regulatory requirements and may be inspected. Understands the transfer/processing of waste tires to produce crumb rubber will not occur on-site and thus would be considered to be a commodity and therefore not regulated. Letter provided in EIR Appendix B.

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Marta L. Puente Sonoma County Agricultural Preservation & Open Space 747 Mendocino Ave., Suite 100 Santa Rosa, CA 95401-4850		•			•	•			•									Highway 101 scenic corridor—EIR should identify potential adverse impacts of the project on the visual aesthetics and propose appropriate mitigation. Construction and operation of new dock facilities on the River, including night lighting, will adversely effect scenic resources of the area and may significantly impact the biological resources. California clapper rail and California black rail use the Petaluma River marsh. EIR should address potential adverse impacts the project will have on these listed birds and other wildlife, and propose appropriate mitigation. EIR should identify potential impacts to the River and its surrounding tidal marshes and wetlands resulting from a spill or any hazardous materials stored and used at the proposed facility. Letter provided in EIR Appendix B.
Private Individuals and Organizations																		
Michael Harvey Goldberg 7345 Castille Ct. Rohnert Park, CA 94928		•	•	•					•	•		•			•			Property owner downwind. Concerned about air quality in regards to health. Concerned about access road and locked gates. Suggests a separate access road for non-commercial vehicles. Aesthetics—this area considered to be a gateway to Sonoma County. Concerned about the potential for hazardous spills into the Petaluma River and SF Bay. Trees along freeway not sufficient to diminish noise. Suggests an alternative location for the project, away from Hwy. 101. Email response provided in EIR Appendix B. Also attached in Appendix B are previously dated letters regarding zoning and permission for access.

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John Herrick California Native Plant Society Milo Baker Chapter P.O. Box 892 Santa Rosa, CA 95402				•	•													Requests EIR to identify measures that will protect native species and promote integrity of native plant communities. Evaluate alternatives that will avoid destruction of native species, habitats and natural communities. Concerned about the introduction of invasive species into the sensitive wetland and marsh habitats. Recommends that the project and adjacent areas be surveyed prior to approval and on a continuing basis following project completion. Will the Corp of Engineers review the wetlands that would be impacted along the River? Interested in reviewing the DEIR when available. Letter provided in EIR Appendix B.
Leang Yee P.O. Box 2006 Petaluma, CA 94913																	•	SMART will be affected with overhead conveyor system. Written response reiterates oral response. See oral response below. Letter provided in EIR Appendix B.
Neil Sekhri Farella Braun+ Martel LLP Attorneys at Law 235 Montgomery Street San Francisco, CA 94104											•							Requests for Dutra that the County consider the re-designation of two Haystack Landing parcels as either (1) an amendment to the General Plan in the entitlement process or (2) part of the General Plan Update. Addresses General Plan criteria to amend a land use designation to Limited Industrial. Letter provided in EIR Appendix B.
Barney Whitehill 1816 Falcon Ridge Drive Petaluma, CA 94954			•		•						•			•				Has objections to rezoning the project site to accommodate asphalt plant—should not be allowed near recreational, bird sanctuary or residential areas. Prevailing west winds in this area would carry the asphalt plant's noxious gases and fumes to nearby area and residents. In tall trees across the river from Schollenberger Park are nesting sites for egrets, which have been increasing in number. Letter provided in EIR Appendix B.

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Robert Kertzner,M.D. 53 Augusta Circle Petaluma, CA 94952		•	•		•				•	•	•	•		•				Thinks rezoning of site is bad planning. Concerned about potential environmental hazards and health risks (e.g. degradation of air and water quality and exposure to odors, noise and hazardous materials). Concerned about proximity to sensitive wetlands and Schollenberger Preserve. Site location is in a highly visible gateway to southern Sonoma County. Letter provided in EIR Appendix B.
A.W. York 30 Augusta Circle Petaluma, CA 94952		•	•		•							•		•				Opposes asphalt plant because the light pollution, noise, and odors from the proposed project would negatively impact sensitive areas (wildlife at wetlands restoration and refuge areas at and adjacent to Schollengerger Park). Schollenberger Park is a prized and highly-used resource. A river commerce project could be appropriate at this site, however the proposed project seems to have more impacts than benefits for the public good Letter provided in EIR Appendix B.

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LETTERS RECEIVED AT THE EIR SCOPING MEETING DATED FEBRUARY 27, 2006																		
Norris R. Dyer, Senior Docent Petaluma Wetlands Alliance 1708 Granada Court Petaluma, CA 94954					•									•			•	See summary of speaker's letter below, and letter is provided in EIR, Appendix B.
Gerald Moore, Ph.D., Chairman Petaluma Wetlands Alliance 1628 East Madison St. Petaluma, CA 94954		•	•	•	•				•	•		•		•			•	See summary of speaker's letter below, and letter is provided in EIR, Appendix B.
ORAL RESPONSES RECEIVED AT THE EIR SCOPING MEETING DATED FEBRUARY 27, 2006																		
Jerry Corda, Chief San Antonio Volunteer Fire Dept. 5497 Redwood Hwy. South Petaluma, CA 94952																	•	Project allows VFD to keep fire equipment in one area and gives them a place to train volunteers (23 at this time). Currently, the VFD is in a temporary facility, equipment is scattered.
Norris Dyer, Senior Docent Petaluma Wetlands Alliance 1708 Granada Ct. Petaluma, CA 94954					•									•			•	Concerned that proposed project would interfere with heron/egret colony (viable breeding sites established 2003) on northwestern portion of the site. Colony is protected under the federal Migratory Bird Treaty Act (Title 50, Section 10.13), and the State of California's Fish & Game (Code Section 3503) offers some protection. Recommends surveys and establishment of buffer zones to protect birds from human disturbance activities, especially from March to August when the colony is active. Colony offers environmental education and bird watching. Wants to know location of fire house in relation to colony. See letter, Appendix B.

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Mary Lu Fontes 533 Easterby St. Sausalito, CA 94965			•									•			•	•		Owner of property adjacent to site. 3357 Petaluma Blvd. South is Mary's address, make correction. Railroad ROW (25 feet on either side of track), will they take more and is the project treated the same? Water supply—share meter, may need another line and meter? Air quality—health impacts. Noise—early hours of operation. Gated access/private access/ROW—indicate on record.
Anastasia Fontes 3357 Petaluma Blvd. South Petaluma, CA 94952			•									•	•		•			Resident adjacent to site. Noise of barges and engines, especially at night. Air quality—airborne matter. Barge interaction with river equipment and boats. Safety concerns regarding accessibility and theft, and traveling under conveyor belt and liability of accidents. ROW—do residents need to move their access?
Kathleen Garvey Petaluma Wetlands Alliance 83 Maria Dr. Petaluma, CA 94954		•			•		•							•				Runs kayak business that uses Petaluma River. Aesthetics of river is important. Wildlife impacts; breeding bird sites are more sensitive than roosting sites. Site has historical and cultural significance, potential to lose archeological knowledge.
Stan Gold 615 King Road Petaluma, CA 94952			•		•					•		•						Air, noise, and water quality as mentioned in meeting. Proposed site and nature sanctuary are located in a flyway. Economic impact to birding activities which bring revenue to community.
Mary Edith Moore Petaluma Wetlands Alliance 1628 East Madison St. Petaluma, CA 94954				•														Conveyor belt height—can it go under the railroad instead of over?

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Gerald Moore, Chairman Petaluma Wetlands Alliance 1628 East Madison St. Petaluma, CA 94954		•	•	•	•				•	•		•		•			•	Dredging has benefits for commerce and wildlife habitat. Consider odors and carcinogens in asphalt process in relation to health. Air quality of concern for surrounding area (including business park and Kaiser Medical). Potential for toxic spills. Water quality of concern for human health, wildlife (including endangered species), and downtown business. Noise pollution would have a negative impact on wildlife and visitors. Aesthetic or visual pollution is of concern. Minimize visibility of facility. Build sound and sight wall that blends with nature. Use state-of-the-art technology to insure regulatory compliance. Evaluate project design to ensure high standards are met. See letter, Appendix B.
Kevin Strain 4600 Kastania Road Petaluma, CA 94952		•	•	•						•					•		•	Without project, materials become less accessible resulting in more traffic and more air pollution. Companies like Dutra require dredging, improving river access and reducing flooding. Ultra-light aircraft facility south of site. Tugboat may be illegal. Not opposed to visual impact, good for project to be visible in community. In favor of project.

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Leang S. Yee 3350 Old Redwood Hwy. South Petaluma, CA 94952	•		•	•					•			•	•		•	•	•	Resident near project site. What will the width of his access be? The height and width of the conveyor system? Hours of operation? Mr. Yee knows barge traffic is governed by tide; how much disturbance is he to expect at night during loading and unloading, and will he need to adjust his schedule around the project's? Will there be protection from incidental falling of rocks? Air quality and health—effects of sand, silica, other airborne matter, and carbon monoxide generation from combustion engines. Will gate be locked? Concerns about security and emergency access and response times. Adjacent land use—can project share operations with Shamrock, they do the same thing? Size of barge—what safety features for backing up, steering, and stopping will be in place? There is limited frontage and concern for river access and feasibility. Will only one pilot be operating the barge—what if the sole pilot has a heart attack? It would be good to have a pilot and co-pilot. River traffic and operational noise, distance to sensitive receptors, duration of noise, and nighttime noise. Concerns about water use and efficiency, and fire potential and water needs. What fire safety features will there be?

APPENDIX C

PROJECT REFERRALS FROM RESPONSIBLE AGENCIES

SONOMA COUNTY
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-8343

GENERAL PLAN CONSISTENCY ANALYSIS

(References are to the Sonoma County General Plan as amended to date unless stated otherwise. General Plan policies relevant to this project are stated on the pages following this analysis.)

Date: October 20, 2004
Project Applicant: Gilbert Labrie for Dutra Group
Project File Number: PLP 04-0046
Project Location / APN: ~~3357~~ 3355 Petaluma Boulevard South / 019-320-021, 022 & 023

Project Description:
1. General Plan Amendment to change the Land Use Plan Map designation from Limited Commercial to Limited Industrial on AP 019-320-022 & 023.
2. Zone change from LC (Limited Commercial) to LI (Limited Industrial).
3. Use permit for an asphalt plant, recycling facility and barge unloading facility.

Consistency: The proposed project appears to be inconsistent with General Plan goals, objectives and policies as follows:

A. The proposed Limited Industrial designation may not meet the following designation criteria in the Land Use Element:
   #1 The project site is proposed to accomodate a relocated existing use from another site, but industrial uses have not been established on most of the project site.
   #6. The frontage of the site is located in a Scenic Corridor.
B. Policy LU-17c requires annexation to the City of Petaluma for new urban uses within the Petaluma urban service area.
C. Policy LU-17e allows the "Limited Industrial" designation to be applied only to industrial uses existing in 1986.
D. The project's traffic and visual impacts may not meet the approval criteria in policy LU-17f.
E. The intent of the Scenic Corridor designation for Highway 101 may not be met by compliance with design review criteria.

A text amendment of the Petaluma Dairy Belt Area Plan regarding the use of the site would be required to accommodate the project. It appears that such an amendment may not conflict with any other Area Plan policies.

General Plan Analysis: On the General Plan Land Use Plan Map, the project site is currently split by land use categories and by the boundary of the Petaluma Urban Service Area. The current designations for the three subject parcels are as follows:

APN	Current Land Use Designation	Proposed Land Use Designation	In Urban Service Area Boundary?
019-320-021 (001?)	General Industrial	No change	M-2 Yes ✓
019-320-022	Limited Commercial	Limited Industrial	No ✓
019-320-023	Limited Commercial	Limited Industrial	Yes ✓ complete parcel not inside

The General Industrial designation allows the proposed uses but can be applied only inside designated Urban Service Boundaries. The Limited Industrial designation and zoning is requested for two parcels because the current Limited Commercial designation and zoning does not allow the proposed uses.

The minimum designation criteria for the Limited Industrial land use designation are:

1. Lands shall be designated to recognize an existing permitted use or to serve the projected employment needs of the planning area.
   The applicant states that the proposed asphalt plant is a replacement of an existing plant located on another site in a quarry which is no longer operating. Some industrial use has reportedly taken place on APN 019-320-023 but not on the other two subject parcels. The application states that there will be five full-time employees. The project may help meet area needs for materials and services.
2. Lands outside urban service areas shall have adequate water and septic suitability.
   The site has a well and septic system. The application also states that the site has access to public water from the North Marin Water District.
3. Lands shall have convenient access to an arterial or collector highway.
   Petaluma Boulevard South is a collector with nearby access to Highway 101.
4. Lands shall be located near population concentrations.
   The site is at the edge of the Petaluma urban area.
5. Lands shall not be in environmentally sensitive or hazardous areas.
   Most of the site is within the 100-year floodplain and F-2 combining zoning. Highway 101, across Petaluma Boulevard South from the site, is designated as a Scenic Corridor and the front edge of the site is within the SR combining zoning. There is also a historic residence with HD combining zoning on APN 019-320-023. was
6. Outside of the unincorporated communities on Figure LU-2 on page 33, lands shall not be located in a scenic corridor.
   The frontage of the site is in a designated Scenic Corridor.
7. Any applicable planning area policies.
   See the analysis of planning area policies below.

The following planning area polices in the Land use Element apply to this project:

LU-17a: Include industrial lands located along Petaluma Boulevard south of Petaluma within the city's sphere of influence.
APN 019-320-021 & 023 are within the City of Petaluma's Sphere of Influence, but APN 019-320-022 is outside the Sphere.

LU-17c: Use zoning to avoid new urban uses within the Petaluma urban service area prior to annexation by Petaluma.
Since the existing LC zoning on the site allows new urban uses, this policy is not pertinent to project consistency.

LU-17d: Refer to the City of Petaluma for review and comment any application for discretionary projects within one mile of the urban service boundary.
A project referral was sent to the City of Petaluma planning department.

LU-17e: Apply the "General Commercial" and "General Industrial" categories only to appropriate uses existing as of 1986 inside the urban service boundary. Apply the "Limited Commercial" and "Limited Industrial" categories only to appropriate uses existing as of 1986.
The Assessor describes the existing uses within the urban service boundary as mixed industrial processing on APN 019-320-023 and pasture with residence on APN 019-320-021. APN 019-320-022 is vacant.

LU-17f: Use the following criteria for approval of discretionary projects in the "Limited Commercial" and "Limited Industrial" category:

Rural?

1) the use specifically serves the service, employment, or agricultural processing needs of local area residents or the local agricultural community.
2) the use is compatible with adjacent residential or agricultural uses. ?
3) the use won't adversely affect the level of service on public roadways and will not interfere with the movement of farm vehicles.
4) if the use is located within a designated scenic corridor, mitigate visual impacts by appropriate

setbacks, landscaping, and/or screening.
The project does not conflict with the first two criteria, but compliance with the third and fourth criteria is uncertain and not possible to determine from the information provided.

Since APN 019-320-021 & 023 are within the County General Plan Urban Service Area Boundary for the City of Petaluma and within the City's Sphere of Influence, annexation to the City and/or connecting to City utilities would be consistent with the General Plan and are encouraged.

The Open Space Plan Map designates Highway 101 to the west as a Scenic Corridor. The following related policies are applicable to the project under consideration:

OS-3d: Establish a building setback of 20 feet along the Highway 101 Scenic Corridor in urban service areas to be reserved for landscaping. Where a sound barrier must be located along a scenic corridor, ensure that the landscaped area is visible from the highway. Cooperate with state agencies to achieve compatible goals with regard to visual quality along scenic corridors.
OS-3e: Incorporate design criteria for scenic corridors in urban areas.

Area Plan Analysis: Use of the project site is also addressed by the Petaluma Dairy Belt Area Plan. The Plan's land use map designates the entire site as commercial. The Plan text states that the intended uses for the project site are as follows:

Current APN	Former APN	Intended Land Use
019-320-021	019-320-008 (north part)	Uses allowed by C-1, C-2 or C-3 zoning
019-320-022	019-320-009 (north part)	Uses allowed by C-2 or C-3 zoning
019-320-023	019-320-009 (south part)	Uses allowed by C-3 zoning

Since the uses allowed by these provisions do not include the proposed manufacture of asphalt, amendment of this section of the Area Plan to change the "Intended Land Use" of the project site to "Uses allowed by M-1 zoning" would be required to accommodate the project. Approval of this change would require findings of consistency with both the General Plan policies reviewed above, as well as the Area Plan's policies on land use and open space. Attached are the Area Plan policies that appear most pertinent to the project. In addition, the Area Plan's Open Space map designates the natural marsh on APN 019-320-021 as a unique feature and designates Highway 101 as a Scenic Corridor.

By: Robert Gaiser

ROBERT GAISER,
Planner III

GREG CARR,
Comprehensive Planning Manager

bg/02gpcr

Date: September 24, 2004

To: Steve Padovan, PRMD
From: John Kottage, TPW

Re: PLP 04-0046
Dutra Group – Brian Peer
3357 & 3355 Petaluma Blvd. South, Petaluma
APN 019-320-022 & 023
Asphalt and Recycling Facility

TRANSPORTATION AND PUBLIC WORKS:

1. The Developer shall offer right-of-way to the County of Sonoma, free of encumbrances, and of sufficient width to contain the public improvements required by this approval. This Right-of-Way requirement shall be void if the existing right-of-way meets or exceeds the minimum requirements described above. Right-of-Way, if required shall be dedicated using a Grant Deed. The Developer shall have prepared a Grant Deed, together with the required descriptions and shall submit them to the County Surveyor for review and approval. A copy of the recorded Grant Deed shall be submitted to the Land Development Section of the Permit and Resource Management Department prior to clearance of these conditions.

2. The Developer shall construct or install improvements described as follows:

   Widen and/or reconstruct as necessary on Petaluma Blvd South, along the Developer's property frontage, with the improvements described below. The improvements shall follow the concept described in the plan titled "Conceptual Plan for Reconfiguring Petaluma Boulevard South" dated August 19, 2004 and on file in the Sonoma County Department of Transportation and Public Works, Engineering and Design Section. Said improvements shall include:
   a) Two, 12-foot wide paved travel lanes to a point 400 south of the entrance to the site.
   b) One, 16-foot wide continuous left turn lane to a point 400 south of the entrance to the site.
   c) Two, 8-foot wide paved shoulders to a point 400 south of the entrance to the site.
   d) One standard concrete curb and gutter on the east side of the road to a point 400 south of the entrance to the site. The 2-foot wide gutter pan may be used as part of the shoulder, but not the travel lane.
   e) Elimination of the grade difference between the northbound and southbound lanes to a point 400 south of the entrance to the site.
   f) Portions of the above described Improvements necessary for safe operation shall be extended to and include modification of the northbound Highway 101 on-ramp if said improvements are not completed by others prior to commencement of operations of this proposal.
   g) Trees / landscaping in accord with the City of Petaluma landscaping plan for this area for the full length of the property's frontage.

h) Overlay with a minimum of 2.4 inches of asphalt concrete, the full width of the road, to a point 400 south of the entrance to the site on Petaluma Boulevard South to offset the additional wear associated with heavy truck traffic associated with the proposed use and to allow for necessary restriping of the roadway.

i) The final road shall have sufficient section to provide for a Traffic Index of 11.0.

The improvements may vary depending upon the location and condition of the existing improvements. Depending on the existing conditions, the improvements may consist of widening, reconstruction, overlay, etc, all as necessary to create the required widths and structural section(s).

3. The structural section of all road improvements shall be designed using a soils investigation, which provides the basement soil's R-value and Expansion Pressure test results. A copy of the soils report shall also be submitted with the first set of improvement plan check prints.

4. To allow for the smooth and safe movement of single unit trucks entering and exiting the public road that provides access to the property, the Developer shall construct an at-grade driveway, including curb and gutter. Entrance curve returns shall have a radius of 55 feet and a throat width of at least 24 feet. The driveway shall be perpendicular to the public road. The minimum sight distance for vehicles entering and exiting this driveway shall be in accordance with AASHTO requirements for the actual speed traveled on the public road servicing the property. The Developer shall surface the entry with asphalt concrete pavement between the edge of the existing pavement and the right-of-way line or a minimum of 20 feet, whichever is greater. This condition shall be void if the existing entry already meets these standards. The driveway improvements shall be in place prior to occupancy or commencement of the new activity.

5. Any gate installed across this driveway shall be located a minimum distance of 30 feet from the edge of the travel way, in accordance with Sonoma County Mandatory Fire Safe Standards, Section 13-38.

6. The Developer shall install traffic control devices as required by the Department of Transportation and Public Works, including items such as traffic signs, roadway striping, pavement markers, transition barricades, etc.

7. All improvements shall be constructed in accordance with the Department of Transportation and Public Works Road Policy.

8. Developer shall employ a Registered Civil Engineer, licensed in the State of California, to develop plans for the required improvements. The scale of these improvement plans shall be a minimum 1-inch equal 40 feet, and shall be submitted on 24 inch by 36 inch sheets for review. The Plans shall include roadway cross-sections, at a maximum interval between cross-sections of 50 feet.

9. Plan checking fees and Inspection fees, including those involving off-site frontage improvements, shall be paid to the Permit and Resource Management Department, prior to signature of the Improvement Plans by the Director of the Department of Transportation and Public Works.

10. Prior to issuance of any building permit, which results from approval of this application, a development fee (Traffic Mitigation Fee) shall be paid to the County of Sonoma, as required by Section 26, Article 98 of the Sonoma County Code.

11. The Developer shall submit improvement plans for all required improvements to the Permit and Resource Management Department for review and approval. Prior to the issuance of any Grading, Building or Encroachment permits, the Developer shall be required to obtain signed Improvement Plans from the Director of the Department of Transportation and Public Works.

12. Prior to construction of any improvements that are to be made within County Road Right-of-way, the Developer must obtain an Encroachment Permit from the Permit and Resource Management Department.

13. The Developer shall complete construction of all the required public improvements prior to occupancy. Further, the developer shall enter into an Improvement Maintenance Agreement and post security with the County of Sonoma, to guarantee the improvements for a period of one (1 year) after acceptance of the improvements as being complete by the County.

14. Advisory Note: The Sonoma County Department of Transportation and Public Works may modify these conditions if the Applicant can demonstrate that the conditions are infeasible due to unforeseen field constraints or lack of property rights, and that the goals of these conditions can be safely achieved in some other manner. However, the threshold for any modification is high, and therefore modification of conditions is not common.

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

June 1, 2004

Steve Padovan
County of Sonoma
Permit and Resource Management
Department
2550 Ventura Avenue
Santa Rosa, CA 95403
Via fax (707) 565-1103

Labrie Use Permit and Design Review
PLP04-0046, Petaluma
Sonoma County

The Department of Fish and Game (DFG) has reviewed the document for the subject project. Please be advised this project may result in changes to fish and wildlife resources as described in the California Code of Regulations, Title 14, Section 753.5(d)(1)(A)-(G)[1]. Therefore, if you are preparing an Environmental Impact Report or an Initial Study and Negative Declaration for this project, a de minimis determination is not appropriate, and an environmental filing fee as required under Fish and Game Code Section 711.4(d) should be paid to the Sonoma County Clerk on or before filing of the Notice of Determination for this project.

For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of SAAs is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the local jurisdiction's (lead agency) Negative Declaration or Environmental Impact Report for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation,

[1] http://ccr.oal.ca.gov/. **Find California Code of Regulations, Title 14 Natural Resources, Division 1, Section 753**

monitoring and reporting commitments for completion of the agreement. To obtain information about the SAA notification process, please access our website at www.dfg.ca.gov/1600; or to request a notification package, contact the Streambed Alteration Program at (707) 944-5520.

If you have any questions, please contact Liam Davis, Environmental Scientist, at (707) 944-5529; or Scott Wilson, Habitat Conservation Supervisor, at (707) 944-5584.

Sincerely,

Robert W. Floerke
Regional Manager
Central Coast Region

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

Flex your power!
Be energy efficient!

September 15, 2004

SON-101-2.93
SON101892

Mr. Steve Padovan
County of Sonoma
Permit & Resource Management Dept.
2550 Ventura Avenue
Santa Rosa, CA 95403

Dear Mr. Padovan:

Dutra Materials Facility at Haystack Landing, File # PLP04-0046 – Use Permit Application

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed project. We have reviewed the use permit application dated May 18, 2004 and have the following comments to offer:

Traffic Analysis

1. Provide information on the proposed project's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed.

2. Sheet 3 of the site plans dated 2/14/04 indicates the existing driveway off of Petaluma Blvd. South will be widened, whereas Sheet 4 of the site plans dated 2/20/04 shows a new 30-foot driveway located north of the existing driveway. Please clarify the access locations for the proposed project and provide a schematic illustration of the traffic conditions at the proposed project driveway.

3. What size of trucks is expected at the facility? Are the existing US 101 ramps adequate to handle the proposed truck traffic?

4. The County has previously indicated concern regarding the geometrics of the northbound US 101 on-ramp. Have the ramp geometrics been reviewed? If not, we recommend a review of the US 101 ramp geometrics and mitigation, if necessary, to ensure that project truck traffic can safely be accommodated on the ramps.

5. The County has also indicated concern regarding the existing significant vehicle queues during the AM peak period on the southbound US 101 on-ramp. Therefore, the traffic

impact study should include an analysis of the on-ramp operations for existing and cumulative conditions. The analysis should consider AM peak period conditions on the mainline freeway, and evaluate how all on-ramp demand traffic can be accommodated without creating significant vehicle queues on the ramp approach. Mitigation measures, such as the collection of fair share fees, should be proposed to reduce vehicle queuing on the on-ramp. In addition, please clarify what the level of service would be for the US 101 southbound ramps/ Petaluma Blvd. South intersection if it were signalized and how much queuing would be expected.

Driveway Modification
The existing and/or proposed driveway connections shall be upgraded according to the Department's standards for Public Road Intersections as described in Index 405.7 and Figure 405.7 of the Highway Design Manual (HDM). The HDM manual can be accessed at the following web site: http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm.

Consultation with the Department
At a meeting with the developers of the Dutra-Haystack Landing project the following comments were provided by the Department, after reviewing the preliminary roadway improvements for Petaluma Blvd. South. We were told that the improvements to Petaluma Blvd. South would be constructed as part of the Dutra project.

1. The Petaluma Blvd. South southbound through lane should not have an angle point at the US 101 northbound ramp intersection. The angle point at the intersection could create a conflict with on-coming northbound left turning vehicles. The through lane should proceed tangent through the intersection. This could be accomplished by using the existing Petaluma Blvd. South lane configuration. This would eliminate the proposed 12-foot Petaluma Blvd. South northbound through lane; however, there is sufficient room at the Dutra-Haystack Landing road connection to construct an acceleration lane.
2. Is there adequate vehicle storage capacity at the Petaluma Blvd. South left turn lane between the 101 southbound on-ramp intersection and the new Dutra-Haystack Landing road connection?
3. Does the existing Petaluma Blvd. South/ US 101 northbound on-ramp have adequate merge and sight distance? Do the trees to the south of the ramp create a sight distance problem for ramp and 101 mainline traffic?
4. Any additional pavement remaining not required for the Petaluma Blvd. South roadway improvements should be removed. This includes additional pavement on the east side of the US 101 northbound off-ramp.
5. Traffic volume and operations at the Petaluma Blvd. South/ US 101 southbound (under-crossing) ramp intersection should be studied.

Marin-Sonoma Narrows Project
Sheet 3 of the site plans dated 2/14/04 shows the proposed site layout, which appears to be in conflict with the Department's planned Marin-Sonoma Narrows project. Contact Sean Charles, design engineer for the Marin-Sonoma Narrows project at (530) 225-3476 to discuss what modifications to the proposed project site layout are necessary.

Please provide the Department with a response to each of our questions prior to completion of the environmental document. In addition, please send a copy of the environmental document and traffic analysis for our review when they become available.

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

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

October 29, 2004

Comments From the September 30, 2004
Sonoma County Development Coordinating Committee

Project Review Health - Jon Tracy (707) 565-1683

- A sound study by a qualified noise consultant addressing noise and vibration impacts to nearby residences to the east.
- A connection to public water is required.
- Need a permit to abandon any existing septic systems on the property.
- Provide a floor plan of the office space showing the location of restrooms and the number of offices.
- If noise complaints are received, PRMD will require a long-term noise monitoring program. In addition, a noise study will be required one year from the date the use is established to verify compliance with the General Plan.

Sanitation - Dave Caldwell (707) 565-3638

- Site is within Petaluma Urban Service Area with North Marin Water District potentially providing public water to the site. However, the water district has stated that they will provide no new water connections to their system in this area. Confirm ability to connect to public water.

Drainage Review - Lola Coretti (707) 565-3605

- Civil Engineer will be required to design the drainage facilities.
- Zero net fill is County Policy with regard to grading of land in the flood plain. This applies to the area that is within the flood plain; ie: the flood carrying capacity of the land in the flood plain cannot be diminished.
- Applicant will need to obtain permits from Army Corps, BCDC and California Fish and Game for filling of wetlands and for any work in the Petaluma River.
- A grading permit will be required for the stockpiling of the aggregates.
- Concerned about any berms or improvements on water agency easement.
- Erosion control plan will be required along with NPDES permits

Building/Plan Check - Kevin Berger (707) 565-3631

to

- Show all property lines on the site plan. Is there a plan the merge parcels?
- Grading permit will be required for any fill. Grading permits would be required for each parcel if they remain separate.
- Need clarification on whether the piling for the new pier needs a building permit from the County or is it entirely within Army Corps jurisdiction.
- All fixed foundation for equipment and any walls over four feet between the materials' cells requires a building permit.

Surveyor - Gary O'Conner (707) 565-3711

- Provide information on all easements and lot lines within or affecting the project area and show on site plan

Transportation and Public Works - John Kottage (707) 565-2760 and Dave Robertson (707) 565-2231

- Road improvements will be required along the frontage of offramp...up to 400 feet south of the new driveway. Improvements to consist of curb, gutter and landscaping. Will also require regrade of southbound lanes of Petaluma Blvd. South to new driveway to correct difference in elevation between north and southbound lanes.
- See additional comments on attached memo

Department of Emergency Services - Jerry Faddis (707) 565-2410

Not present at meeting - awaiting conditions

Project Review - Steve Padovan (707) 565-1352

- Need wetland delineation and mitigation plan for environmental analysis.
- Applicant needs to provide noise and visual analysis.
- Clarify access and utility easement through property and determine if it can be relocated.
- Consider berming and significant landscaping along the 101 frontage to reduce visual impact along this scenic corridor.
- Provide visual screening of conveyor system and aggregate piles from the residences on the river and from Shollerberger Park in on the east bank of the Petaluma River.
- Consider designs to reduce the overall height of the asphalt batch plant.
- Mitigation for the removal of existing landscaping on property hill

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

DRAFT HEALTH USE PERMIT CONDITIONS

DATE: August 13, 2004
TO: Permit and Resource Management Department, Project Review Section, Planning

ATTN: Steve Padovan

FROM: **Jon Tracy, R.E.H.S., Project Review Section, Health**

PROJECT TYPE: Planning Project

SUBJECT:

File Number:	**PLP04-0046**
Applicant Name:	**Gilbert Labrie**
Owner Name:	**Dutra Group - Brian Peer**
Site Address:	**3357 Petaluma Blvd. S. & 3355 Hwy 101 S, Petaluma**
A.P.N.	**019-320-022, -023**

Request for a Use Permit and Design Review for an asphalt plant, recycling facility and barge unloading facility with a Zone Change from commercial designations to industrial designations.

The application has been reviewed by this Division (see x1 through x4).

X2) Prior to a Negative Declaration, further information as indicated below is needed before we can respond to the project.

D) A sound study by a qualified noise consultant addressing: Noise and vibration inpactsto the nearby residences to the east.

Assuming that the applicant will provide an acceptable sound study, draft health conditions (with space reserved for sound conditions) have been attached as follows:

X1) If the application is approved, it is recommended that it be subject to the following conditions:

PRIOR TO BUILDING PERMIT :

Water:

1. Connection shall continue to be made to public water.

Septic:

9. Prior to building permit issuance, a permit for the sewage disposal system shall be obtained. The system may require design by a Registered Civil Engineer or Registered Environmental Health Specialist and both soils analysis and percolation testing may be required. Groundwater testing may also be required. The sewage system shall meet peak flow discharge of the wastewater from all sources. The Project Review Health Specialist shall receive a final clearance from the District Specialist that all required septic system testing and design elements have been met.

10. Application for wastewater discharge requirements shall be filed by the applicant with the North Coast Regional Water Quality Control Board. Documentation of acceptance of a complete application with no initial objections by the Regional Water Quality Control Board shall be submitted to Project Review Health prior to building, grading for ponds or septic permit issuance. A copy of the waste discharge permit shall be submitted to Project Review Health prior to issuance of a certificate of occupancy or project operation. ***An application may be printed from the State Water Resources Control Board website at: www.swrcb.ca.gov/sbforms/***

13. Toilet facilities shall be provided for patrons and employees. A copy of the floor plan showing the location of the restrooms shall be submitted to Project Review Health prior to issuance of building permits.

Noise:

SPACE RESERVED FOR SOUND CONDITIONS

Solid Waste:

20. Prior to building permit issuance, the applicant shall submit a design for trash enclosures and recycling areas for review and approval to the Division of Environmental Health. (Fees may apply.) The Project Review Health Specialist shall receive a copy of an approval letter from the Solid Waste Section of the Division of Environmental Health.

Vector Control:

21. A mosquito and vector control plan acceptable to the Marin-Sonoma Mosquito and Vector Control District (telephone 707-285-2200) shall be submitted prior to the construction of any ponds. The Project Review Health Specialist shall receive a copy of the vector control plan and an acceptance letter from the Marin-Sonoma Mosquito and Vector Control District.

PRIOR TO OCCUPANCY:

Noise:

SPACE RESERVED FOR SOUND CONDITIONS

OPERATIONAL REQUIREMENTS:

35. A safe, potable water supply shall be provided and maintained.

36. Groundwater elevations and quantities of groundwater extracted for this site shall be monitored and reported to PRMD pursuant to section RC-3b of the Sonoma County General Plan and County policies. Note that projects exceeding 5.0 acre-feet per year of groundwater use will be required to install a monitoring well.

Septic:

37. Maintain the annual operating permit for any alternative (mound or pressure distribution) or experimental septic system installed, and all applicable Waste Discharge Requirements set by the Regional Water Quality Control Board.

Hazardous Materials Program:

38. Comply with applicable hazardous waste generator, underground storage tank, above ground storage tank and AB2185 (hazardous materials handling) requirements and maintain any applicable permits for these programs.

Noise:

42. Noise shall be controlled in accordance with the following as measured at the exterior property line of any affected residential or sensitive land use:

Maximum Exterior Noise Level Standards, dBA

Cumulative Duration of Noise Event in any one-hour Period	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
30-60 Minutes	50	45
15-30 Minutes	55	50
5-15 Minutes	60	55
1-5 Minutes	65	60
0-1 Minutes	70	65

Limit exceptions to the following:

A. If the ambient noise level exceeds the standard, adjust the standard to equal the ambient level.

B. Reduce the applicable standards by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

C. Reduce the applicable standards by 5 decibels if they exceed the ambient level by 10 or more decibels.

SPACE RESERVED FOR SOUND CONDITIONS

Comments:

1. This is a Zone 1 Water Availability Area.

2. The draft conditions assume that all domestic water will be supplied by North Marin Water District and that the well will only be used for materials washing and/or landscaping. The quantities of water used for materials washing and related settling ponds and wastewater disposal is not clear. Groundwater monitoring, mosquito control and wastewater disposal draft conditions assume a large use of groundwater.

Please feel free to contact Jon Tracy, Project Review Health Specialist at (707) 565-1683, 7:30 AM to 9:00 AM, Monday Tuesday, Thursday or Friday, should you have any questions on the above information.

Cc: District Specialist
Applicant — Gilbert Labrie
Owner — Dutra Group - Brian Peer
Other

Revised 05/04

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

1-10-05AF

DRAFT HEALTH USE PERMIT CONDITIONS

DATE: January 7, 2005

TO: Permit and Resource Management Department, Project Review Section, Planning

ATTN: Steve Padovan

FROM: **Jon Tracy, R.E.H.S., Project Review Section, Health**

PROJECT TYPE: Planning Project

SUBJECT:

File Number:	**PLP04-0046**
Applicant Name:	**Gilbert Labrie**
Owner Name:	**Dutra Group - Brian Peer**
Site Address:	**3357 Petaluma Blvd. S. & 3355 Hwy 101 S, Petaluma**
A.P.N.	**019-320-022, -023**

Request for a Use Permit and Design Review for an asphalt plant, recycling facility and barge unloading facility with a Zone Change from commercial designations to industrial designations.

Thank you for the sound study dated September 15, 2004. This report projects noise impacts to nearby residences and proposes mitigations with noise reduction goals, but does not specify the calculated reduction in noise specifically achieved by the mitigations. The sound study must make specific recommendations to mitigate identified noise impacts and calculate the specific noise reduction that will be achieved. If clear compliance with the Noise Element of the Sonoma County General Plan is not demonstrated, than an Environmental Impact Report will be required.

Also be advised that the County does not accept mitigations that require on going monitoring beyond the County's resources or abilities (i.e. mobile sound barriers to be placed upon each barge prior to unloading, turning off tug boat engines when they are not normally shut off, or filling hoppers prior to night time operations or any other activity that would require the frequent, if not constant, presence of County personnel to properly enforce).

Please feel free to contact Jon Tracy, Project Review Health Specialist at (707) 565-1683, 7:30 AM to 9:00 AM, Monday Tuesday, Thursday or Friday, should you have any questions on the above information.

Cc: District Specialist
Applicant Gilbert Labrie
Owner Dutra Group - Brian Peer
Other

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLARA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
1303 Maurice Avenue
Rohnert Park, California 94928-3609
Tel: 707.664.0880 • Fax: 707.664.0890
E-mail: nwic@sonoma.edu

13 September 2004 File No.: 04-S0-25

Steve Padovan, Project Planner
County of Sonoma
Permit & Resource Management Dept., Planning Division
2550 Ventura Avenue
Santa Rosa, CA 95403

re: PLP04-0046 / 3357 Petaluma Blvd. South & 3355 Hwy 101 South, Petaluma / Gilbert Labrie, AIA

Dear Mr. Padovan;

Records at this office were reviewed to determine if this project could adversely affect historical resources. The review for possible historic structures, however, was limited to references currently in our office. **Please note that use of the term historical resources includes both archaeological sites and historic structures.**

XX Unsurveyed portions of the proposed project area have the possibility of containing unrecorded archaeological site(s). In addition, historic-period archaeological resources located near the Haystack Land residence and barns were not formally recorded (Hayes & Alvarez 1985). A study to record those resources, to identify any resources on the unsurveyed portion of the project area, and to provide a project-specific treatment plan for all archaeological resources is recommended prior to commencement of project activities.

XX Study #S-7244 (Hayes & Alvarez 1985), covering approximately 20% of the proposed project area, identified one or more historical resources (CA-SON-1465H, Haystack Landing residence and two barns). In addition, the Sonoma County Landmarks Commission has designated the Haystack Ranch as Landmark #29. It is recommended that a qualified architectural historian familiar with the history of Sonoma County evaluated these buildings, and that the Sonoma County Landmarks Commission review the evaluation, assess possible project impacts, and determine if mitigation is warranted.

XX Review for possible historic structures was limited to the Northwest Information Centers documents and should not be considered comprehensive. Since the Office of Historic Preservation has determined that any building or structure 45 years or older maybe of historic value, if the project area contains such properties it is recommended that they be assess by the Sonoma County Landmarks Commission to determine if a formal CEQA evaluation is warranted.

XX The guidelines for implementation of the California Register of Historical Resources (Cal Register) criteria for evaluation of historical properties have been developed by the State Office of Historical Preservation. For the purposes of CEQA, all identified sites should be evaluated using the Cal Register criteria.

XX We recommend you contact the local Native American tribe(s) regarding traditional, cultural, and religious values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/653-4082.

If archaeological resources are encountered during the project, work in the immediate vicinity of the finds should be halted until a qualified archaeologist has evaluated the situation. If you have any questions please give us a call (707) 664-0880.

Sincerely,

Leigh Jordan
Coordinator

cc: Gilbert Labrie, AIA, P.O. Box 183, Walnut Grove, CA 95690

NORTH MARIN WATER DISTRICT
999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133 • FAX (415) 892-8043

October 30, 2006

Aimi Dutra
Dutra Materials
1000 Point San Pedro Rd.
San Rafael, CA 94901

RE: Dutra Haystack Landing
APN 019-220-01, 22, 23

Dear Ms. Dutra:

This is in response to your letter, dated October 5, 2006, discussing the irregular water service to 3355 Petaluma Blvd. South.

As previously explained to Mr. Peer and Mr. Cornwell, your parcel is outside the North Marin Water District's (NMWD) territorial boundary and it is the District's policy to restrict expansion of water service to customers outside its service territory. Therefore, no expansion of water service will be allowed, beyond the entitlement to 3355 Petaluma Blvd So. NMWD Regulation 1, Section c, paragraph 2, states the District shall determine the Facilities Reserve Charge (water entitlement) for customers served prior to May 1, 1973 based on historical average day, peak month usage for the first ten years of service. As the water service for 3355 Petaluma Blvd So. was established in August 1966, historical data has been used to establish the Facilities Reserve Charge. Accordingly, the total water allotment for 3355 Petaluma Blvd So. is 6 EDUs, or 4,452 gallons per day.

In regards to providing a new fire protection service for said property, the water facilities currently serving your parcel are inadequate to provide fire protection. One option is to extend a water main from Landing Way. NMWD is willing to further investigate this option upon receipt of an application and an engineering deposit.

Should you have any questions in the meantime please do not hesitate to contact me at your convenience at 707-897-4133, extension 8510.

Sincerely,

Drew McIntyre
Chief Engineer

Encl'd: NMWD Regulation 1, pages 1-2

cc: Mr. Yee
P.O. Box 2006
Petaluma, CA 94953

DM: LJ
R:\CHIEF ENG\MCINTYRE\Dutra Haystack ltr 10-30-06.doc

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

May 10, 2007

Drew McIntyre
North Marin Water District
P.O. Box 146
Novato, CA 94948

Re: Legality of Existing Dwellings along the Petaluma River - 3355, 3357 and 3367 Petaluma Boulevard South, Petaluma; APN's 019-320-010 and 019-320-021

Mr. McIntyre,

The purpose of this letter is to establish the legality of the dwelling units that are located along the Petaluma River adjacent to the proposed Dutra/Haystack Landing Asphalt Plant Project at 3355 Petaluma Boulevard, South (APN 019-320-022). The properties in question are identified as 3367 Petaluma Boulevard, South (APN 019-320-010) and 3357 Petaluma Boulevard, South (APN 019-320-021). Based on a review of our assessor's records and permit files, the County has determined that there are two legal non-conforming units located on these properties. A non-conforming unit is a legal dwelling that no longer conforms to the densities or land use designations in the Zoning Ordinance. In general, the structure was either constructed prior to 1962 (prior to building permits being required) or was constructed on property that originally was zoned for residential uses and has since been changed to a commercial or industrial designation.

The most northerly property, 3367 Petaluma Boulevard South (APN 019-320-010), is owned by Leang Yee. The Assessor's records indicate that there are structures being assessed on the site and the owner is claiming a homeowner's exemption. The dwelling unit on this property is a mobile/manufactured home on a fixed foundation and was placed on the lot prior to 1962. As stated above, the County did not require building permits for residential structures created before 1962, therefore the dwelling is deemed legal non-conforming. There are no Building Permit records on the property and no records from our Code Enforcement Division indicating that the existing structure is illegal.

The other property in question is 3357 Petaluma Boulevard, South (APN 019-320-021) owned by Mary Fontes. The Assessor records show that there is one unit on the property and it was constructed in 1935, making it a legal non-conforming dwelling. No other units are assessed on the property and there are no Building Permit records for any new construction or alterations.

In conclusion, there are two existing legal non-conforming dwelling units along the Petaluma River and their potable water is being supplied through a connection granted to the property at 3355 Petaluma Boulevard, South.

If you have any further questions, please contact me at (707) 565-1352.

Sincerely,

Steve Padovan
Project Planner

c: Jeff Brax
Steve Dee
Geoff Reilly, CAJA
Al Cornwell, CSW/Stuber Stroeh Engineers
Aimi Dutra, The Dutra Group

APPENDIX D
AIR QUALITY DATA

APPLICATION TO THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street
San Francisco, CA 94109

Barge Off-Loading Facility and Hot Mix Asphalt Plant (Drum Plant)

Prepared for:

Dutra Materials
1000 Pt. San Pedro Road
San Rafael, CA 94901

Justice *& Associates*
4155 Outer Traffic Circle
Long Beach, CA 90804-2111

(562) 961-3494 Fax: (562) 961-3493

CONTACT: Scott Taylor

Reference: 8706

Justice & Associates

.155 Outer Traffic Circle
ong Beach, CA 90804-2111
52.961.3494 Fax 562.961.3493

www.justiceassociates.com

1401 S. Arville St., Suite J
Las Vegas, NV 89102-0537
702.822.2111 Fax 702.822.2113

September 24, 2004

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Attention: Permit Services

Subject: Dutra Materials
Applications for a Barge Off-Loading Facility and a Hot Mix Asphalt Plant

Attached you will find an application package for a new Barge Off-Loading Facility and a Drum Hot Mix Asphalt Plant to be located at Haystack Landing. Attached is a check in the amount of $12,315.40 covering the filing fee, initial fee and Permit to Operate fees.

Please send us a draft copy of the permit so we may comment prior to the issuance. We trust this information is adequate to process this application. If you have any questions, please call me at (562) 961-3494.

Sincerely,

Scott Taylor

Scott Taylor
Justice & Associates

cc: Josh Kirtley, Dutra Materials

J:\DutraConstruction\letters\8706lett.doc

Justice & Associates

155 Outer Traffic Circle
ong Beach, CA 90804-2111
62.961.3494 Fax 562.961.3493

www.justiceassociates.com

1401 S. Arville St., Suite J
Las Vegas, NV 89102-0537
702.822.2111 Fax 702.822.2113

September 24, 2004

Dutra Materials
1000 Pt. San Pedro Road
San Rafael, CA 94901

Attention: Josh Kirtley

Subject: HMA Permit Application (Haystack Landing)

Dear Josh:

Enclosed are your copy and the original of the permit application for the Haystack Landing HMA Plant. Please sign the originals and attach a check in the amount of $12,315.40. Send the original copy of the permit and check to the Bay Area Air Quality Management District in the envelope provided.

If you have any questions, please feel free to call me at (562) 961-3494.

Very truly yours,

Scott Taylor

Scott Taylor
Justice & Associates

J:\DutraConstruction\letters\8706-letter.doc

Justice & Associates
4155 Outer Traffic Circle
Long Beach, CA 90804-2111
(562) 961-3494 Fax (562) 961-3493

FEE SCHEDULE WORK SHEET

(For permit processing in accordance with Regulation 3-302)

Permits to be issued to: Dutra Materials

Address: 1000 Pt. San Pedro Road

City, State, Zip: San Rafael, CA 94901

Source	Equipment/Process	Fee Schedule	Filing Fee	Initial Fee	Permit to Operate Fee	Total
S-7, S-8, S-9, S-10, S-11,						
S-12, S-13, S-14	Storage Pile-Aggregate	F	$259	$182	$130	$571
S-1, S-2, S-3, S-4, S-5, S-6	Conveyors-Aggregate	F	$259	$182	$130	$571
S-23	Screen-Aggregate	F	$259	$182	$130	$571
S-25	Drum Dryer	B	$259	$4,611.60	$2,305.80	$7,176.40
S-15, S-16, S-17, S-18, S-19, S-20,						
S-21,S-22,S-24	Conveyors Aggregate (Cold Feed)	F	$259	$182	$130	$571
S-35	Asphalt Oil Tank	C	$259	$182	$130	$571
S-36	Asphalt Oil Tank	F	$259	$182	$130	$571
S-29	Asphalt Truck Loading	F	$259	$182	$130	$571
S-38	Storage Pile-RAP	F	$259	$182	$130	$571
S-30, -S31, S-32, S-33, S-34	Conveyors-RAP	F	$259	$182	$130	$571

Total Fees Due: $12,315.40

Note: If the District determines the facility exceeds the toxic trigger levels it will bill Dutra Materials for a Toxics surcharge fee.

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

939 Ellis Street ... San Francisco, CA 94109
(415) 749-4990 ... FAX (415) 749-5030
www.baaqmd.gov

FORM P-101 B

AUTHORITY TO CONSTRUCT/
PERMIT TO OPERATE

Application Information

Plant No.	NAICS (leave blank if unknown)
Business Name: Dutra Materials	
Equipment Description: Hot Mix Asphalt Including an Aggregate Receiving / Storage System	

If you qualify for the District's **Accelerated Permitting Program,** (see reverse for criteria), check here ☐
If you are applying to permit **portable equipment,** in accordance with Regulation 2-1-220, check here ☐

New Plant Information

If you have not previously been assigned a Plant Number by the District or if you want to update any Plant data that you have previously supplied to the District, please complete the New Plant Information box below.

Plant Address (equipment location): 3355 Petaluma Blvd.		
City: South Petaluma	State: CA	Zip: 94952
Mailing Address: 1000 Pt. San Pedro Road		
City: San Rafael	State: CA	Zip: 94901
Plant Contact: Josh Kirtley		
Title: Manager		
Telephone: (415) 459-7740	Fax	
E-mail Address		

Application Contact Information *(if different from plant contact)*

All correspondence regarding this application will be sent to the plant contact person unless you wish to designate a different contact for this application. If you are changing the plant contact person, complete the "New Plant Information" Section.

Application Contact: Scott Taylor		
Title/Company: Justice & Associates		
Mailing Address: 4155 Outer Traffic Circle		
City: Long Beach	State: CA	Zip: 90804-2111
Telephone: (562) 961-3494	Fax: (562) 961-3493	
E-mail Address: staylor@justiceassociates.com		

Small Business Certification

You are entitled to a reduced permit fee if you qualify as a small business as defined by BAAQMD Regulation 3. In order to qualify, you must certify that your business meets all of the following criteria:

☐ The business does not employ more than 10 persons and its gross annual income does not exceed $500,000.

☐ The business is not an affiliate of a non-small business. (Note: a non-small business employs more than 10 persons and/or its gross income exceeds $500,000.)

Signature: ____________________ Date: ____________

Job & Form # 8706

Accelerated Permitting Program

The Accelerated Permitting Program entities you to install and operate qualifying sources of air pollution and abatement equipment **without waiting for the District to issue a Permit to Operate.** In order to participate in this program you must certify that your project will meet <u>all</u> of the following criteria. Please acknowledge each item by checking each box and signing below.

- ☐ Uncontrolled emissions of any single pollutant are each less than 10 lb/highest day, or the equipment has been precertified by the BAAQMD.
- ☐ Emissions of toxic compounds do not exceed the trigger levels identified in Table 2-1-316 (see Regulation 2, Rule 1).
- ☐ The project is not subject to public notice requirements (source is either more than 1000 ft. from the nearest school, <u>or</u> source does not emit any toxic compound in table 2-1-316).
- ☐ For replacement of abatement equipment, the new equipment must have an equal or greater overall abatement efficiency for all pollutants than the equipment being replaced.
- ☐ For alterations of existing sources, for all pollutants the alteration does not result in an increase in emissions.
- ☐ Payment of applicable fees (the minimum permit fee to install and operate each source). See Regulation 3 or contact the Permit Services Division for help in determining your fees..

Signature: Date:

All Applications

All applications should contain the following additional information:

- ☒ Completed data form(s) for each piece of equipment (data forms listed below)
- ☒ A facility map, drawn roughly to scale, that locates the equipment and its emission points
- ☒ Project/equipment description, manufacturer's data
- ☒ Pollutant flow diagram
- ☒ Discussion/calculations relating to emissions from the equipment
- ☐ if a new Plant, a local street map showing the location of your business

I hereby certify that the sources in this permit application: *(check one)*

☐ Are ☒ Are <u>not</u> within 1,000 feet of the outer boundary of the nearest school

Has an Environmental Impact Report (EIR) or other California Environmental Quality Act (CEQA) document been prepared for this project? ☒ no ☐ yes If yes, by whom? ______________________

IMPORTANT: Under the California Public Records Act, all information in your permit application will be considered a matter of public record and may be disclosed to a third party. If you wish to keep certain items separate as specified in Regulation 2, Rule 1, Section 202.7, please complete the following steps:

(a) Make a copy of your permit application with the confidential information blanked out. Label this copy "Public Copy"

(b) Label the original copy "Confidential." Circle all confidential items on each page. Label each page with confidential information "Confidential".

(c) Prepare a written justification for the confidentiality of each confidential item. Append this to the confidential copy,

Signature: ______________________ Date: ______________

Mail the completed application to: **Bay Area Air Quality Management District**
939 Ellis Street
San Francisco, CA 94109
Attention: Engineering Division

The appropriate data form(s) should be completed for all equipment requiring a Permit to Operate. The data forms are listed below. If you are uncertain which data form to use, need additional data forms, or require assistance completing a form, please call the **Engineering Services Division** at (415) 749-4990. Forms are also available on the District's website at <u>www.baaqmd.gov/permit/forms.htm</u>

Form A	Abatement Device	Form C	Combustion Equipment
Form D	Dry cleaner	Form F	Semiconductor Fabrication
Form G	Other Miscellaneous	Form SC	Solvent Cleaning Operation
Form S	Surface Coating	Form SS	Form S supplement for printers
Form T	Organic Liquid Loading/Storage	Form P	Emission Point
Form Diesel	Loss of Exemption Diesel Engines		

Form RSA

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street ... San Francisco, CA 94109 ... (415) 749-4990 ... FAX (415) 749-5030
Website: WWW.BAAQMD.GOV

REQUEST FOR INFORMATION
Risk Screening Analysis

NOTE: You must fill out this form for each source in the permit application that requires a risk screening, unless all sources exhaust through a single stack. These may be discrete sources such as stacks or area sources such as surface area fugitive emissions.

Plant Name Dutra Materials (Haystack Facility)

Source Description Baghouse Stack

Source No. S-23 (if known) Emission Point P-1 (if known)

SECTION A

1. Is the source a clearly defined emission point; i.e., a stack or ventilation duct? ☒ yes ☐ no
   (if NO, go on to Section B)
2. Does the stack stand alone or is it located on the roof of a building? ☒ alone ☐ on roof
3. What is the stack height? 30'-3" meters or feet?
   (Note: stack height only, whether freestanding or on rooftop)
4. What is the combined stack height and building height (if applicable)?_______ meters or feet
5. What is the stack diameter? 61" meters or feet
6. What is the stack gas flowrate? _______ cfm or m^3/sec
7. What is the stack gas exit temperature? 275 degrees (Fahrenheit or centigrade)
8. If the stack is located on a rooftop, what are the dimensions of the building?
   height = _______ meters or feet
   width = _______ meters or feet
   length = _______ meters or feet
9. Are there any buildings, walls or other structures located near this source? ☒ yes ☐ no
   If YES, what are their dimensions?
   height = 28'-9" meters or feet
   width = 11' meters or feet
   length = 22' meters or feet
   distance from source 12'-6" meters or feet

(Go on to Section C)

Job & Form # 8706

SECTION B

1. Is the source located within a building? ☐ yes ☐ no

   (if **NO**, please provide a description of the source. For example, fugitive emissions that must be evaluated as an area source. If an area source, provide the dimensions of the area in question. Then go on to Section C. If **YES**, proceed to #2, below)

2. Does the building have a ventilation system that is vented to the outside? ☐ yes ☐ no

   a. If NO, are the building's doors and windows kept open during hours of operation? ☐ yes ☐ no

3. Please provide the building dimensions:

   height = _______ meters or feet

   width = _______ meters or feet

   length = _______ meters or feet

4. Are there any buildings, walls, or other structures located near this source? ☐ yes ☐ no

   If YES, what are their dimensions?

   height = _______ meters or feet

   width = _______ meters or feet

   length = _______ meters or feet

   distance from source _______meters or feet

(Go on to Section C)

SECTION C

1. Indicate the area where the source is located (check one):

   ☒ zoned for commercial use, pending light industrial

   ☐ zoned for residential use

   ☐ zoned for mixed commercial and residential use

2. Distance from source (stack or building to property line = __100__ meters or feet

3. Distance from source to nearest receptor** = __750__ meters or feet

IMPORTANT: You must provide a plot plan or a map, drawn to scale, which clearly demonstrates the location of your site, the property lines and any surrounding residences and/or businesses. The plot plan or map should also show the location of the source(s) at the site and their relationship to the property line.

**Receptors are defined as individual dwellings where persons are assumed to be in continuous residence. *Please note that this does not refer to places of business.*

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street ... San Francisco, CA 94109 ... (415) 749-4990
Website: www.baaqmd.gov

Data Form C
FUEL COMBUSTION SOURCE

(for District use only)

New ☒ Modified ☐ Retro ☐

Form C is for all operations which burn fuel. If the operation also involves evaporation of any organic solvent, complete Form S and attach to this form. If the operation involves a process which generates any other air pollutants, complete Form G and attach to this form.

☐ Check box if this source has a secondary function as an abatement device for some other source(s); complete lines 1, 2, and 7-13 on Form A (using the source number below for the Abatement Device No.) and attach to this form.

(If unknown, leave blank)

1. Company Name: Dutra Materials Plant No: Source No.
2. Equipment Name & Number, or Description: Hot Mix Asphalt Dryer
3. Make, Model: Astec, Phoenix,125-GLP Maximum firing rate: 125 Btu/hr
4. Date of modification or initial operation: ______ *(if unknown, leave blank)*
5. Primary use (check one): ☐ electrical generation ☐ abatement device ☒ process heat; material heated aggregate ☐ space heat ☐ cogeneration ☐ waste disposal ☐ resource recovery ☐ testing ☐ other
6. SIC Number 2951 (If unknown leave blank)
7. Equipment type (check one)

Internal combustion ☐ diesel engine ☐ Otto cycle engine ☐ gas turbine ☐ other ______ Displacement ______ cubic inches ______ hp

Incinerator ☐ salvage operation ☐ liquid waste ☐ pathological waste ☐ other ______ Temperature ______ ºF Residence time ______ Sec

Others ☐ boiler ☐ afterburner ☐ flare ☐ open burning ☐ other ______ ☒ dryer ☐ oven ☐ furnace ☐ kiln Material dried, baked, or heated: Aggregate

8. Over fire air? ☐ yes ☐ no If yes, what percent ______ %
9. Flue gas recirculation? ☐ yes ☐ no If yes, what percent ______ %
10. Air preheat? ☐ yes ☐ no Temperature ______ ºF
11. Low NOx burners? ☒ yes ☐ no Make, Model Astec, Phoenix,125-GLP
12. Combustion products: Wet gas flow rate ____ acfm at ______ ºF
13. Typical Use 10 hours/day 5 days/week 52 weeks/year
14. Typical % of annual total: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %

15. With regard to air pollutant flow, what source(s) or abatement device(s) are immediately UPSTREAM?

S ______ S ______ S ______ S ______ S ______ S ______ A ______ A ______ A ______

With regard to air pollutant flow, what source(s) or abatement device(s), and/or emission points are immediately DOWNSTREAM?

S ______ S ______ A 1 A 2 P ______ P ______

Person completing this form: Scott Taylor Date:

P:www/formC (revised 6/01)

Job & Form # 8706

FUELS

INSTRUCTIONS: Complete one line in Section A for each fuel. Section B is OPTIONAL. Please use the units at the bottom of each table. N/A means "Not Applicable."

SECTION A: FUEL DATA

	Fuel Name	Fuel Code**	Total Annual Usage***	Maximum Possible Fuel Use Rate	Typical Heat Content	Sulfur Content	Nitrogen Content (optional)	Ash Content (optional)
1.	Natural Gas	189	2,200,000	135,000,000				
2.								
3.								
4.								
5.								

Use the appropriate units for each fuel							
	Natural Gas	therm *	Btu/hr	N/A	N/A	N/A	N/A
	Other Gas	MSCF*	MSCF/hr	Btu/MSCF	PPM	N/A	N/A
	Liquid	m gal*	m gal/hr	Btu/m gal	Wt%	Wt%	Wt%
	Solid	ton	ton/hr	Btu/ton	Wt%	Wt%	Wt%

SECTION B: EMISSION FACTORS (optional)

	Fuel Name	*Fuel Code***	Particulates		NOx		CO	
			Emission Factor	***Basis Code*	*Emission Factor*	***Basis Code*	*Emission Factor*	***Basis Code*
1.	Natural Gas	189	7.5	7	45.94	7	320.85	7
2.								
3.								
4.								

*Use the appropriate units for each fuel. Natural Gas = lb / therm**
*Other Gas = lb / MSCF**
*Liquid = lb / m gal**
Solid = lb / ton

Note: * MSCF thousand standard cubic feet
* m gal = thousand gallons
* therm 100,000 BTU
** See tables below for fuel and basis codes
*** Total annual usage is: - Projected usage over next 12 months if equipment is new or modified.
- Actual usage for last 12 months if equipment is existing and unchanged.

Fuel Codes				**Basis Codes**	
Code	*Fuel*	*Code*	*Fuel*	*Code*	*Method*
25	Anthracite coal	189	Natural Gas	0	Not applicable for this pollutant
33	Bagasse	234	Process gas - blast furnace	1	Source testing or other measurement by plant (attach copy)
35	Bark	235	Process gas - CO	2	Source testing or other measurement by BAAQMD (give date)
43	Bituminous coal	236	Process gas - coke oven gas	3	Specifications from vendor (attach copy)
47	Brown coal	238	Process gas - RMG	4	Material balance by plant using engineering expertise and knowledge of process
242	Bunker C fuel oil	237	Process gas - other		
80	Coke	242	Residual oil	5	Material balance by BAAQMD
89	Crude oil	495	RDF	6	Taken from AP-42 (compilation of Air Pollutant Emission Factors, EPA)
98	Diesel oil	493	Sludge gas		
493	Digester gas	511	Landfill gas	7	Taken from literature, other than AP-42 (attach copy)
100	Distillate oil	256	Solid propellant	8	Guess
128	Gasoline	257	Solid waste		
158	Jet fuel	304	Wood - hogged		
160	LPG	305	Wood - other		
165	Lignite	198	Other - gaseous fuels		
167	Liquid waste	200	Other - liquid fuels		
494	Municipal solid waste	203	Other - solid fuels		

Data Form A
ABATEMENT DEVICE

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street ... San Francisco, CA 94109... (415) 749-4990 ... FAX (415) 749-5030

for office use only

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)

2. Name or Description Rotary Drum Dryer Abatement Device No: A- 1, A-2

3. Make, Model, and Rated Capacity Astec,Double Barrel, 400TPH

4. Abatement Device Code (See table*) 9 Date of Initial Operation ______

5. With regard to air pollutant flow into this abatement device, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- ______ S- ______ S- ______ S- ______ S- ______
S- ______ A- 1 A- 2 A- ______ A- ______ A - ______

6. Typical gas stream temperature at inlet: 275 °F

If this form is being submitted as part of an application for an **Authority to Construct,** completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of the table is requested but not required.

	Pollutant	Weight Percent Reduction (at typical operation)	Basis Codes *(See Table**)*
7.	Particulate	0.035	6
8.	Organics	0.015	6
9.	Nitrogen Oxides (as NO_2)	0.011370	
10.	Sulfur Dioxide	0.0046	6
11.	Carbon Monoxide	0.50	6
12.	Other:		
13.	Other:		

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S- ______ A- ______ A- ______ A- ______ P- 1 P- ______

Person completing this form: Scott Taylor Date:

(revised: 7/99)

Job & Form # 8706-1

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Screen Source No.: S- 23
4. Make, Model, and Rated Capacity of Equipment: 5 x 14, Single Deck
5. Process Code[1] 4064 Material Code[2] Aggregates Usage Unit[2] Tons
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: 400 usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: Wet gas flowrate ______ cfm at ______ °F
    (at maximum operation) Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate................................	0.00074	6
12. Organics...............................		
13. Nitrogen Oxides (as NO²).........		
14. Sulfur Dioxide........................		
15. Carbon Monoxide..................		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-24

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form: Scott Taylor	Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/4

Data Form G

Conveyors

Equipment ID	Maximum Operating Rate (tons)
S-21	400
S-22	400
S-24	400

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials   Plant No: ____ (if unknown, leave blank)
2. SIC No.: 2951   Date of Initial Operation ____
3. Name or Description: Conveyors   Source No.: S- 21, S-22, S-24
4. Make, Model, and Rated Capacity of Equipment: See Attached List
5. Process Code[1] 4030   Material Code[2] Aggregates   Usage Unit[2] Tons
6. Total throughput, last 12 mos. ____ usage units[2]   Maximum operating rate: 400 usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 %   Mar-May 25 %   Jun-Aug 25 %   Sep-Nov 25 %
8. Typical operating times: 10 hrs/day   5 days/week   52 weeks/year
9. For batch or cyclic processes: ____ minutes/cycle   ____ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)*   Wet gas flowrate ____ cfm at ____ °F
    Approximate water vapor content ____ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct**, completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate................................	0.000046	6
12. Organics................................		
13. Nitrogen Oxides (as NO^2).........		
14. Sulfur Dioxide.........................		
15. Carbon Monoxide..................		
16. Other:____		
17. Other:____		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-25

[1]**See Tables G-1 through G-7 for code**
[3]**See Basis Code Table below**
[2]**See Table G5 or the Material Codes Table (available upon request)**

Person completing this form: Scott Taylor   Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/3

Data Form G

Hoppers

Equipment ID	Maximum Capacity (tons)
S-15	22.5
S-16	22.5
S-17	22.5
S-18	22.5
S-19	22.5
S-20	22.5

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Hopper with Feed Conveyor Source No.: S- 15, S-16, S-17, S-18, S-19, S-20
4. Make, Model, and Rated Capacity of Equipment: 22.5
5. Process Code[1] 4076 Material Code[2] Aggregate Usage Unit[2] Tons
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
    Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate................................	0.000046	6
12. Organics................................		
13. Nitrogen Oxides (as NO^2).........		
14. Sulfur Dioxide........................		
15. Carbon Monoxide..................		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-21

[1]**See Tables G-1 through G-7 for code**
[3]**See Basis Code Table below**
[2]**See Table G5 or the Material Codes Table (available upon request)**

Person completing this form: Scott Taylor Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/2

Data Form G

Belt Conveyors

Equipment ID	Maximum Operating Rate (tons/hr)
S-1	400
S-2	400
S-3	400
S-4	400
S-5	400
S-6	400

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 1440 Date of Initial Operation ______
3. Name or Description: Belt Conveyors Source No.: S- 1, S-2, S-3, S-4, S-5, S-6
4. Make, Model, and Rated Capacity of Equipment: See Attached List
5. Process Code[1] 4030 Material Code[2] Aggregate Usage Unit[2] Tons
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
    Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate	0.000045	6
12. Organics		
13. Nitrogen Oxides (as NO_2)		
14. Sulfur Dioxide		
15. Carbon Monoxide		
16. Other:		
17. Other:		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-7 S-8 S-9 S-10 S-11 S-12
S-13 S-14

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form: Scott Taylor Date:

DATA FORM T
Organic Liquid Evaporation
(tankage, loading and handling)

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street San Francisco, CA 94109. (415) 749-4990 FAX (415)-749-5030

1. Business Name: Dutra Materials Plant No: ______ (if unknown. leave blank)
2. SIC No: 2951 Date of Initial Operation ______ Source No S- 35, S-36
3. Name or Description Asphalt Oil Storage Tanks
4. Code materials* in order of highest throughputs: 1) 30 2) ____ 3) ____ 4) ____
5. Total throughput (all materials), last 12 months: ______ thousand gal **or** ______ thousand bbl
6. Typical % of total annual throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
   ☐ Check box if loading/handling facility; complete lines 7-11 and omit the remainder of this form. (Also complete one Form T for each storage tank)
7. • Usage type: ☐ Bulk plant (truck/rail car) ☐ Bulk plant (marine) ☐ Vehicle service station
   ☐ Aircraft/marine servicing Other: ______
8. • How many nozzles/loading arms? ______ How many pumps? ______
9. • Make and model of nozzles/loading arms: ______
10. • Nozzle/arm loads tank by: ☐ splash fill ☐ submerged fill ☐ part splash, part submerged
11. • Upon loading, vapor space in tank(s) is: ☐ Vented directly to atmosphere
    ☐ Collected by nozzle/arm and sent to Abatement Device(s): A ______ A ______
12. Annual Average: Storage vapor pressure ______ psia **or** tank temperature 350 °F and RVP 0.0006 psia
13. Highest v.p. of all materials stored: ______ psia **or** high tank temperature 450 °F and high RVP 0.0009 psia
14. Highest ºAPI of all material stored: ______ ° Lowest initial B.P. of all materials stored: ______ °F
15. Tank Type: ☐ underground ☒ fixed roof ☐ internal floating roof ☐ floating roof
    ☐ pressure ☐ other: ______
16. Tank volume: 30 thousand gallons **or** ______ thousand barrels
17 Tank Diameter: 12 ft height or length: 36 ft Check if applicable: ☒ heated ☒ insulated

Fixed Roof Tanks Only

18. Maximum fill rate: 18,000 gal/hr **or** ______ bbl/hr
19. Average height of vapor space: 1 ft Highest head space reactivity ______ %
    ☒ Check box if emissions from this tank are controlled; complete lines 20 and 21.
20. • Emissions vent to what source(s) and/or abatement device(s)? S ______ S ______ A 3 A 4
21. • Do all gauging/sampling devices have gas-tight covers? ☐ yes ☒ no
22. Paint color: ☐ Aluminum ☒ White ☐ Light grey ☐ Medium grey ☐ Other ______
23. Paint Condition: ☒ good ☐ poor

Floating Roof Tanks Only

24. Shell Type: ☐ gunited ☐ riveted ☐ welded ☐ other: ______
25. Seal Type: ☐ single ☐ double ☐ other: ______ Condition: ☐ tight ☐ loose
26. Maximum withdrawn rate: ______ gal/hr **or** ______ bbl/hr
27. Do all gauging/sampling devices enter below liquid level and have gas-tight covers? ☐ yes ☐ no
28. Roof type: ☐ pan ☐ pontoon ☐ other: ______ Is emergency roof drain at least 90% covered? ☐ yes ☐ no

Person completing this form	Scott Taylor	Date

***See Material Code Reference List.**

Job & Form No. 8706

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ____ (if unknown, leave blank)
2. SIC No.: 1440 Date of Initial Operation ____
3. Name or Description: Conveying Source No.: S- 26, S-27, S-28
4. Make, Model, and Rated Capacity of Equipment: See Attached List
5. Process Code[1] 4043 Material Code[2] Asphalt Concrete Usage Unit[2] Tons
6. Total throughput, last 12 mos. ____ usage units[2] Maximum operating rate: 400 usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ____ minutes/cycle ____ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ____ cfm at ____ °F
Approximate water vapor content ____ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate................................	0	Enclosed
12. Organics...............................		
13. Nitrogen Oxides (as NO2).........		
14. Sulfur Dioxide........................		
15. Carbon Monoxide..................		
16. Other: ____		
17. Other: ____		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-29

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form: Scott Taylor Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/5

Data Form G

Belt Conveyors

Equipment ID	Maximum Operating Rate (tons/hr)
S-26	400
S-27	400
S-28	400

Data Form G

Belt Conveyors

Equipment ID	Maximum Operating Rate (tons/hr)
S-32	100
S-34	100

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Asphalt Truck Loadout Source No.: S- 29
4. Make, Model, and Rated Capacity of Equipment: ______
5. Process Code[1] 4080 Material Code[2] Asphalt Usage Unit[2] Tons
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☒ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	*Basis Code* [3]
11. Particulate................................	2.93 E-5	6*
12. Organics...............................	4.1589 E-3	6
13. Nitrogen Oxides (as NO²).........		
14. Sulfur Dioxide........................		
15. Carbon Monoxide..................	1.3492 E-3	6
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

A-5 A-6

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form: Scott Taylor Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/5

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Hoppers (Recycle) with feed conveyors Source No.: S- 30, S-31
4. Make, Model, and Rated Capacity of Equipment: ______
5. Process Code[1] 4076 Material Code[2] Recycled Asphalt Usage Unit[2] Tons
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate................................	0.000046	6
12. Organics...............................		
13. Nitrogen Oxides (as NO2).........		
14. Sulfur Dioxide........................		
15. Carbon Monoxide..................		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-32 S-33

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form: Scott Taylor Date:

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Conveyors Source No.: S- 32, S-34
4. Make, Model, and Rated Capacity of Equipment: See Attached List
5. Process Code[1] 4030 Material Code[2] Recycled Asphalt Usage Unit[2] Tons
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
    Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate................................	0.000046	6
12. Organics...............................		
13. Nitrogen Oxides (as NO_2).........		
14. Sulfur Dioxide........................		
15. Carbon Monoxide..................		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S-25

[1]**See Tables G-1 through G-7 for code**
[3]**See Basis Code Table below**
[2]**See Table G5 or the Material Codes Table (available upon request)**

Person completing this form:	Scott Taylor	Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/7

DATA FORM P
Emission Point

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street.. San Francisco, CA ... 94109... (415) 749-4990 ... Fax (415) 749-5030

Form P is for well-defined emission points such as stacks or chimneys only; do not use for windows, room vents, etc.

Business Name: Dutra Materials Plant No: 705

Emission Point No: P- 1

With regard to air pollutant flow into this emission point, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- ____ S- ____ S- ____ S- ____ S- ____

S- ____ A- 1 A- ____ A- ____ A- ____ A- ____

Exit cross-section area: 11.35 sq. ft. Height above grade: 30 ft.

Effluent Flow from Stack

	Typical Operating Condition	*Maximum Operating Condition*
Actual Wet Gas Flowrate	cfm	cfm
Percent Water Vapor	Vol %	Vol %
Temperature	°F	250 °F

If this stack is equipped to measure (monitor) the emission of any air pollutants,

Is monitoring continuous? ☐ yes ☒ no

What pollutants are monitored? ____

Person completing this form Scott Taylor Date ____

P:www/Permit/forms/FormP-4/99

Job & Form # 8706-1

Data Form A
ABATEMENT DEVICE

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street ... San Francisco, CA 94109... (415) 749-4990 ... FAX (415) 749-5030

for office use only

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: Dutra Materials Plant No: ____ (if unknown, leave blank)

2. Name or Description Blue Smoke Control System Abatement Device No: A- 4

3. Make, Model, and Rated Capacity Astec, BSC-16-FBF,16,000 cfm

4. Abatement Device Code (See table*) 20 Date of Initial Operation ____

5. With regard to air pollutant flow into this abatement device, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- 29 S- ____ S- ____ S- ____ S- ____

S- ____ A- ____ A- ____ A- ____ A- ____ A - ____

6. Typical gas stream temperature at inlet: Ambient to 120 °F

If this form is being submitted as part of an application for an **Authority to Construct,** completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of the table is requested but not required.

	Pollutant	Weight Percent Reduction (at typical operation)	Basis Codes *(See Table**)*
7.	Particulate		
8.	Organics		
9.	Nitrogen Oxides (as NO_2)		
10.	Sulfur Dioxide		
11.	Carbon Monoxide		
12.	Other:		
13.	Other:		

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S- ____ A- ____ A- ____ A- ____ P- 2 P- ____

Person completing this form: Scott Taylor Date:

(revised: 7/99)

Job & Form # 8706-2

Data Form A
ABATEMENT DEVICE

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street ... San Francisco, CA 94109... (415) 749-4990 ... FAX (415) 749-5030

for office use only

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)

2. Name or Description Cyclone Abatement Device No: A- 1

3. Make, Model, and Rated Capacity Astec

4. Abatement Device Code (See table*) 20 Date of Initial Operation ______

5. With regard to air pollutant flow into this abatement device, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- 23 S- ____ S- ____ S- ____ S- ____
S- ____ A- ____ A- ____ A- ____ A- ____ A - ____

6. Typical gas stream temperature at inlet: 250 °F

If this form is being submitted as part of an application for an **Authority to Construct,** completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of the table is requested but not required.

	Pollutant	Weight Percent Reduction (at typical operation)	Basis Codes *(See Table**)*
7.	Particulate		
8.	Organics		
9.	Nitrogen Oxides (as NO_2)		
10.	Sulfur Dioxide		
11.	Carbon Monoxide		
12.	Other:		
13.	Other:		

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S- ____ A- 2 A- ____ A- ____ P- 1 P- ____

Person completing this form: Scott Taylor Date:

(revised: 7/99)

Job & Form # 8706-3

Data Form A
ABATEMENT DEVICE

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street ... San Francisco, CA 94109... (415) 749-4990 ... FAX (415) 749-5030

for office use only

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: Dutra Materials Plant No: 705
(if unknown, leave blank)

2. Name or Description Baghouse Abatement Device No: A- 1

3. Make, Model, and Rated Capacity Astec, RBH-76, 76,718cfm

4. Abatement Device Code (See table*) 8 or 9 Date of Initial Operation ______

5. With regard to air pollutant flow into this abatement device, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- 25 S- ______ S- ______ S- ______ S- ______
S- ______ A- ______ A- ______ A- ______ A- ______ A - ______

6. Typical gas stream temperature at inlet: 250 °F

If this form is being submitted as part of an application for an **Authority to Construct,** completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of the table is requested but not required.

	Pollutant	Weight Percent Reduction (at typical operation)	Basis Codes *(See Table**)*
7.	Particulate	99.9	3
8.	Organics		
9.	Nitrogen Oxides (as NO_2)		
10.	Sulfur Dioxide		
11.	Carbon Monoxide		
12.	Other:		
13.	Other:		

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S- ______ A- ______ A- ______ A- ______ P- 1 P- ______

Person completing this form: Scott Taylor Date:

(revised: 7/99)

Job & Form # 8706-4

DATA FORM P
Emission Point

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street.. San Francisco, CA ... 94109... (415) 749-4990 ... Fax (415) 749-5030

Form P is for well-defined emission points such as stacks or chimneys only; do not use for windows, room vents, etc.

Business Name: Dutra Materials Plant No: 705

Emission Point No: P- 1

With regard to air pollutant flow into this emission point, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- ______ S- ______ S- ______ S- ______ S- ______

S- ______ A- 1 A- ______ A- ______ A- ______ A- ______

Exit cross-section area: 11.35 sq. ft. Height above grade: 30 ft.

Effluent Flow from Stack

	Typical Operating Condition	*Maximum Operating Condition*
Actual Wet Gas Flowrate	cfm	cfm
Percent Water Vapor	Vol %	Vol %
Temperature	°F	250 °F

If this stack is equipped to measure (monitor) the emission of any air pollutants,

Is monitoring continuous? ☐ yes ☒ no

What pollutants are monitored? ______

Person completing this form Scott Taylor Date ______

Job & Form # 8706-1

Data Form A
ABATEMENT DEVICE

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street ... San Francisco, CA 94109... (415) 749-4990 ... FAX (415) 749-5030

for office use only

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)

2. Name or Description Blue Smoke Control System Abatement Device No: A- 4

3. Make, Model, and Rated Capacity Astec, BSC-16-FBF,16,000 cfm

4. Abatement Device Code (See table*) 20 Date of Initial Operation ______

5. With regard to air pollutant flow into this abatement device, what sources(s) and/or abatement device(s) are **immediately** upstream?

S- 29 S- ____ S- ____ S- ____ S- ____

S- ____ A- ____ A- ____ A- ____ A- ____ A- ____

6. Typical gas stream temperature at inlet: Ambient to 120 °F

If this form is being submitted as part of an application for an **Authority to Construct,** completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of the table is requested but not required.

	Pollutant	Weight Percent Reduction (at typical operation)	Basis Codes *(See Table**)*
7.	Particulate		
8.	Organics		
9.	Nitrogen Oxides (as NO_2)		
10.	Sulfur Dioxide		
11.	Carbon Monoxide		
12.	Other:		
13.	Other:		

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

S- ____ A- ____ A- ____ A- ____ P- 2 P- ____

Person completing this form: Scott Taylor Date:

(revised: 7/99)

Job & Form # 8706-2

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials   Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951   Date of Initial Operation ______
3. Name or Description: Storage Piles   Source No.: S-7, S-8, S-9, S-10, S-11
4. Make, Model, and Rated Capacity of Equipment: 0.50 acres each
5. Process Code[1] 4076   Material Code[2] Aggregate   Usage Unit[2] Acres-day
6. Total throughput, last 12 mos. ______ usage units[2]   Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 %   Mar-May 25 %   Jun-Aug 25 %   Sep-Nov 25 %
8. Typical operating times: 10 hrs/day   5 days/week   52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle   ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)*   Wet gas flowrate ______ cfm   at ______ °F
    Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct,** completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate	4.05 lb/acre	6
12. Organics		
13. Nitrogen Oxides (as NO2)		
14. Sulfur Dioxide		
15. Carbon Monoxide		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

______ ______ ______ ______ ______ ______

______ ______ ______ ______ ______

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form: Scott Taylor   Date: ______

P:www\forms\FormG.doc-9/99

Job & Form # 8706/8

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Storage Piles Source No.: S- 12, S-13, S-14
4. Make, Model, and Rated Capacity of Equipment: 0.25 acres (S-12), 0.150 acres (S-13, S-14)
5. Process Code[1] 4076 Material Code[2] Aggregate Usage Unit[2] Acres-day
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
    Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct**, completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate..............................	4.05 lb/acre	6
12. Organics..............................		
13. Nitrogen Oxides (as NO2).........		
14. Sulfur Dioxide.......................		
15. Carbon Monoxide.................		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

______ ______ ______ ______ ______ ______

______ ______ ______ ______ ______

[1]See Tables G-1 through G-7 for code
[3]See Basis Code Table below
[2]See Table G5 or the Material Codes Table (available upon request)

Person completing this form:	Scott Taylor	Date:

Justice & *Associates*

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SUMMARY

Dutra Materials is requesting an Authority to Construct and Permit to Operate for a barge off-loading facility and a stationary Hot Mix Asphalt Plant (HMA) at their Haystack Landing property. Applications are attached to cover this equipment.

This facility will be operated on grid power.

The new equipment will be equipped with the Best Available Control Technology (BACT) in compliance with the District's New Source Review Regulation.

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TABLE OF CONTENTS

Attachment	-	**Description**
8706-1FLOW	-	Material Flow Diagram for Off-Loading Facility
8706-2FLOW	-	Material Flow Diagram for Hot Mix Asphalt Plant
"A"		Table 3-D, SCAQMD Rule 2012, Emissions Factors and Heat Value for Various Fuels
"B"	-	AP-42 Emissions Factors – Table 11.19.2-2
"C"	-	NO_x Mass Emission Equation
"D"	-	Dry F Factor for Natural Gas
"E"	-	SCAQMD Emissions Factors for External Combustion Equipment
"F"	-	Plot Plan
"G"	-	Asphalt Oil MSDS
"H"	-	Tanks 4.08 Printout

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PART I - PROJECT DESCRIPTION

A. Business Background

1. Name

   Dutra Materials

2. Owner

   Dutra Materials
   1000 Pt. San Pedro Road
   San Rafael, CA 94901

3. Contact

   Josh Kirtley
   (415) 459-7740

4. Entitlement

   Equipment to be owned and operated by Dutra Materials

5. Business Description

   Manufacturer of Asphaltic Concrete

B. Type of Application

New Construction

C. Description of Facility

1. Location

   3355 Petaluma Blvd.
   South Petaluma, CA 94952

2. General Purpose of Facility

   To produce asphalt concrete mix for wholesale delivery to the construction industry.

D. Description of Process

1. General Description

a. Barge Off-Loading Facility

Preprocessed aggregate will be shipped to the site via a barge. Material from the barge will be fed into a hopper and conveyed to storage piles on-site. The material can be loaded into one of eight piles depending on the size of the material.

b. Asphaltic Concrete Production

The facility will produce State of California Standard Specification Asphalt Concrete mixes which consist of 3/4", 1/2" and 3/8" asphalt concrete mix.

Coarse material (3/4" and 1/2" mixes) will comprise approximately 70% of total plant production with the 3/8" mix comprising approximately 20% and fine mix making up the remainder. The maximum plant output for this particular application will be approximately 400 tons per hour.

Raw aggregate is fed into a rotary dryer from an on-site cold feed system. The material is heated to specification temperature to remove moisture, then mixed with liquid asphalt. The asphaltic concrete is discharged into a bucket elevator. The asphaltic concrete is then weighed and fed into a hot asphalt silo. These silos will store the asphaltic concrete which will then batch into waiting trucks.

c. Asphalt Recycled System

Asphalt rubble will be loaded into the feed hopper where it will be delivered by belt conveyor to the dryer. Note, that at times RAP is added the virgin aggregate is reduced by like amount. The maximum RAP that will be fed to the drum will be 30% of the virgin aggregate thruput. Therefore the maximum amount of RAP that could be processed is 100 tph.

2. Flow Diagram

Refer to Justice & Associates Flow Diagram, 8706-1FLOW and 8706-2FLOW which shows the interaction between equipment and process lines, transfer of materials and basic control equipment.

3. Operation Schedule

The operations are proposed to run 10 hours per day, 5 days per week and 52 weeks per year.

4. Maximum Production Data

Materials	Thruput (ton/hr)	(ton/day)	(ton/year)
Rock and Sand	376	3,760	827,200
Liquid Asphalt	24	240	52,800
Total Asphaltic Concrete	400	4,000	880,000

5. Belts for Haystack Landing Barge Off-Load

Belt #	Belt Length	Belt Width	Description	HP
1	50	36	Drawbridge Conveyor (Sets Onto Barge)	15
3	325	36	Belt Conveyor (From Water Over RR Tracks)	60
4	430	36	Belt Conveyor (Overland Belt To Piles)	40
6	470	36	Belt Conveyor (Over Pile Conveyor With Traveling Tripper)	50
9	185	36	Belt From End Of Bunkers To Stacker	15
10	120	36	120' or 125' Radial Stacker	40

6. Equipment List and Horsepower Schedule
(Refer to flow diagram 8706-1FLOW and 8706-2FLOW)

Belt #	Belt Length	Belt Width	Description	HP
D1-D6	10'	14'	Aggregate Bins	
D7-D12	30"	7.5"	Feeder Belt Conveyors	7.5
D13	30"	74'	Belt Conveyor	15
D14	30"	45'	Belt Conveyor	15
D15			5 × 14 Scalping Screen	25
D16	30"	70'	Belt Conveyor	
D17			Drum Dryer with an Equi NO_x-135 Burner	
D18			81' Drag Slat Conveyor	75
D19			16' Horizontal Drag Slat Conveyor	25
D20			16' Horizontal Drag Slat Conveyor	25
D21			200 ton Asphalt Storage Silo	
D22			200 ton Asphalt Storage Silo	
D23			200 ton Asphalt Storage Silo	
D24			10' × 15" Recycle Hopper	
D25	36"	10' 6"	Feeder Belt Conveyor	15
D26			Feeder Belt Conveyor	15
D27			Belt Conveyor	
D28			Pugmill	40
D29	24"	70"	Belt Conveyor	
D30			Baghouse, 89,217 CFM	
D31			14" Screw Conveyor	
D32			14" Screw Conveyor	
D33			Cyclone	
D34			Condenser	
D35			30,000 Asphalt Oil Tanks	
D36			Condenser	
D37			30,000 Asphalt Oil Tanks	
D38			Asphalt Oil Heater	
D39			1,000 gallon Calibration Tank	
D40			Dry Desiccant Filter	
D41			Dry Desiccant Filter	

E. Control Equipment

The District New Source Review regulation specifies that new equipment will be in compliance with the BACT guidelines.

1. Particulate Matter Control

Hot Baghouse Venting Dryer:

The baghouse specifications are outlined below:

Manufactured by:	Gencor
Model:	CFS-182
CFM:	89,217
Fabric Area:	18,134 sq. ft. – 1,050 bags

2. Blue Smoke Control

a. Truck Loading – Dry Desiccant Filter

The asphalt loadout will be vented through two Dry Desiccant filters to control the blue smoke emissions from the truck loading tunnel.

The blue smoke control system that will be installed at this facility is a state-of-art system that uses dry desiccant with polyester filter media bags to capture blue smoke. Each filter system will be rated at 12,000 cfm using a 30 hp fan. A filter system will be located at the front and back of the loadout in order to ensure that the blue smoke from the drop zone is collected.

F. Fuel Burning Equipment and Fuel

1. The Dryer process requires a 135 mmBTU/hr burner manufactured by Gencor and fueled by natural gas. The control of the burner is automatic with modulation being controlled by mix temperature. This burner is anticipated to meet the low NO_x emission requirements of 36 ppm at 3% O_2. And therefore, will also meet the District's BACT level of 400 ppmv at 3% O_2.

2. The hot oil heater has a rated heat input of 2.00 mmBTU/hr, therefore it is exempt per Rule 2-1-114.

3. Fuel used is natural gas with a heating value of 1,050 mmBTU/mmcf in accordance with Attachment "A".

G. Asphalt Storage Tanks

The plant will be equipped with two (2) asphalt oil tanks. Each new tank has a capacity of 30,000 gallons.

VOC and particulate emissions are not expected to be a problem due to the low vapor pressure (0.0006 psia). As a result of the low vapor pressure, VOC emissions for both working and standing losses will be minimal. The EPA tanks 4.08 program has been used to determine the emissions from the tanks.

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PART II - REGULATORY ANALYSIS

A. Analysis of Emissions Restrictions

District's prohibitory rules limit the emissions of various pollutants from all sources in the district. The specific rules that apply to this project are discussed below. The limitations in these rules are met through the application of Best Available Control Technology (BACT), as required by Rule 2-2-206. Rule 6-310 limits the emissions which can be emitted as a function on material processed on a daily basis.

1. Visible Emissions

   Rule 6-310 limits the opacity of visible emissions from an exhaust stack to not be greater than No. 1 on the United States Bureau of Mines Ringelmann chart, or to the equivalent opacity. Ringelmann No. 1 corresponds to 20% opacity. Because Regulation XIII (New Source Review) requires that the asphalt plant be exhausted by a baghouse type dust collector, compliance with the opacity limitation is not expected to be a problem.

2. Fugitive Dust

   Rule 6-305 prohibits the emissions of fugitive dust from transport, handling or storage activity in quantities such that the dust remains visible in the air beyond the sources property line. The new source review regulation will require control of potential sources of fugitive dust through the application of dust suppressants and other emission controls. Therefore, compliance with fugitive dust regulation should not be a concern.

3. Particulate Emissions

   Rule 6-310 and 6-311 limit the concentration and weight of particulate matter which can be emitted as a function of the quantity of material processed on an hourly basis. In compliance with the BACT requirements, dust collection and suppression systems will be employed to assure particulate emissions are below the rule limitations.

4. Air Toxics Analysis

BAAQMD rules require new facilities which emit Toxic Air Contaminants (TAC) which are listed in the rule to perform a risk assessment to determine the accumulated cancer health risks. On District Form RSA the necessary information is listed for the District to perform a screening analysis.

B. Analysis of New Source Review Requirements / BACT

In accordance with the requirements of Rule 2-2-206, the District staff has published a guideline of BACT for commonly processed permit units and industrial processes. The guideline is used by District's engineering staff in determining the acceptable degree of control for new or modified equipment , and therefore the control devices or techniques specified in the guideline must be incorporated to demonstrate compliance with Rule 2-2-206. The BACT determinations which will apply to the proposed facility is discussed in detail in the following sections.

1. Aggregate Processing

The applicant is proposing to use baghouse type dust collector on the dryer operations. The cold feed system and the RAP system will be sprayed with sufficient moisture to minimize particulate emissions.

2. Burner

A low NO_x burner will be used for the drying process.

3. Blue Smoke

The blue smoke emissions from the truck loadout tunnel will be vented to two (2) Dry Desiccant Filters. Blue Smoke from the inclined screw conveyor and the drag slat conveyor will be vented back into the drum mixer. This will be accomplished through the use of a Blue Smoke fan.

a. In accordance with Rule 2-1-114; Boilers, Heaters, Steam Generators, Duct Burners and Similar Combustion Equipment with less than 10 million BTU per hour rated heat input if fired exclusively with natural gas (including compressed natural gas), liquefied petroleum gas (e.g. propane, butane, isobutene, propylene, butylenes and their mixtures), or any combination thereof are exempt from requirements of obtaining an Authority to Construct/Permit to Operate.

The hot oil heater is rated at 2 mmBTU/hr and is fired exclusively on natural gas, therefore it is exempt from obtaining a permit.

C. Exempt Equipment

In accordance with Rule 2-1-114; Boilers, Heaters, Steam Generators, Duct Burners and Similar Combustion Equipment with less than 10 million BTU per hour rated heat input if fired exclusively with natural gas (including compressed natural gas), liquefied petroleum gas (e.g. propane, butane, isobutene, propylene, butylenes and their mixtures), or any combination thereof are exempt from requirements of obtaining an Authority to Construct/Permit to Operate.

The hot oil heater is rated at 2 mmBTU/hr and is fired exclusively on natural gas, therefore it is exempt from obtaining a permit.

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PART III - ESTIMATED EMISSIONS

A. Emissions Estimates for Barge Off-Loading Facility

The emissions estimates for the off-loading facility were calculated below. The emissions factors were taken from EPA AP-42 Table 11.19.2-2 (Refer to Attachment "B").

Description	Thruput	×	AP-42 Emission Factor (lb/ton)	=	PM_{10} Emissions (lb/hr)
Receiving Hopper with Conveyor S-1 to Conveyor S-2	400		0.000046		0.0184
Conveyor S-2 to Conveyor S-3	400		0.000046		0.0184
Conveyor S-3 to Shuttle Conveyor S-4	400		0.000046		0.0184
Shuttle Conveyor S-4 to Conveyor S-5	400		0.000046		0.0184
Conveyor S-5 to Conveyor S-6	400		0.000046		0.0184
Conveyor S-6 to Stockpile	400		0.000046		0.0184
			Total		0.1104
			Thruput	÷	400
			PM_{10} Emission Factor (lb/ton)		0.000276

Aggregate Thruput	×	Process Emission Factor (lb/ton)	=	PM_{10} Emissions
400 TPH		0.000276		0.1104 lb/hr
4,000 TPD		0.000276		1.104 lb/day
880,000 TPY		0.000276		242.88 lb/yr

B. Emissions Estimates for Aggregate Side of Hot Mix Asphalt Plant

The emissions estimates for the cold feed system were calculated below. The emissions factors were taken from EPA AP-42 Table 11.19.2-2 (Refer to Attachment "B").

Description	Thruput	×	AP-42 Emission Factor (lb/ton)	=	PM_{10} Emissions (lb/hr)
Hoppers with Feeders S-15, S-20 to Collecting Conveyor S-21	376		0.000046		0.0172
Collecting Conveyor S-21 to Transfer Conveyor S-22	376		0.000046		0.0172
Transfer Conveyor S-22 to Screen S-23	376		0.000046		0.0172
Screen S-23	376		0.00074		0.2782
Screen S-23 to Conveyor S-24	376		0.000046		0.0172
Conveyor S-24 to Drum Mixer S-25	376		0.000046		0.0172
Receiving Hopper with Feeders S-30, S-31 to Conveyor S-32	100		--		--
*Belt Conveyor S-32 to Pugmill S-33	100		--		--
*Pugmill S-33 to Belt Conveyor S-34	100		--		--
*Belt Conveyor S-34 to Drum Mixer S-25	100		--		--
			Total		0.3642
			Thruput	÷	376
			PM_{10} Emission Factor (lb/ton)		0.0009

Aggregate Thruput	×	Process Emission Factor (lb/ton)	=	PM_{10} Emissions
376 TPH		0.000969		0.364 lb/hr
3,760 TPD		0.000969		3.64 lb/day
827,200 TPY		0.000969		801.56 lb/yr

* An increase or decrease in the amount of RAP material through these devices will correspond to an increase or decrease in a like amount of virgin aggregate through the cold feed system. Therefore, no emissions are calculated through these devices.

C. Emission Calculation – Storage Pile

The storage pile emissions are calculated below.

These emissions are based on Emission Inventory Guidance from Mojave AQMD (Refer to Attachment "B").

Source S-7, S-8, S-9, S-10, S-11

Annual PM_{10} = 3.15 acres * 4.05 lb/acre = 12.76 lbs/yr
Daily PM_{10} = 12.76 lbs/yr ÷ 365 days/yr = 0.035 lb/day
Hourly PM_{10} = 0.035 lb/day ÷ 24 hr/day = 0.00145 lbs/hr

Source S-12, S13, S-14

Annual PM_{10} = 0.639 acres * 4.05 lb/acre = 2.59 lbs/yr
Daily PM_{10} = 2.59 lbs/yr ÷ 365 day/yr = 0.0071 lbs/day
Hourly PM_{10} = 0.0071 lbs/day ÷ 24 hr/day = 0.000296 lb/hr

Source S-38

Annual PM_{10} = 2.00 acres * 4.05 lb/acre = 8.10 lbs/yr
Daily PM_{10} = 8.10 lb/yr ÷ 365 day/yr = 0.0222 lb/day
Hourly PM_{10} = 0.0222 lb/day ÷ 24 hr/day = 0.000925 lb/hr

D. Emissions Estimates for the Asphalt Oil Tank

1. Annual Tank Emissions

   The EPA Tanks 4.08 program was used to determine the uncontrolled emissions from all tanks. The following calculations are used to estimate the daily emissions (Refer to a complete print out as Attachment "H".)

2. Daily Summary of Emissions – Asphalt Storage Tank

	Description	Uncontrolled Emissions VOC's (lb/yr)
S-35, S-36	(2) 30,000 gallon/tanks	15.69
	Total	15.69

VOC's (lb/day) = 1.3075 lb/month ÷ 30 days/month = 0.0436 lb/day

VOC's (lb/hr) = 0.0436 lb/day ÷ 24 hr/day = 0.002 lb/yr

E. Emission Estimates for the Asphalt Dryer

1. NO_x Emissions for the Asphalt Dryer

The NO_x mass emissions can be calculated using the following equation found in SCAQMD Rule 2012 (Refer to Attachment "C").

$$E_k = PPMV_c \times [20.9/(20.9 - b)] \times 1.195 \times 10^7 \times \sum_{J=1}^{r} (F_{dj} \times {}_{dj} \times V_j)$$

Where:

E_k	=	lb. Pollutant
dj	=	Fuel usage Natural Gas mmcf
b	=	3% O_2 SCAQMD Default Value
$PPMV_c$	=	Concentration of Dryer, 36 NO_x PPMV
Fdj	=	8710, Dry F Factor for Natural Gas, dscf/mmBTU/mmcf (Attachment "D")
Vj	=	1050, High heat value of Natural Gas mmBTU/mmcf (Attachment "A")
Ek/dj	=	45.94 lb/mmcf

2. CO Emissions for the Asphalt Dryer

The CO mass emissions can be calculated using the following equation found in SCAQMD Rule 2012 with an adjustment in the correction for CO (Refer to Attachment "C").

$$E_k = PPMV_c \times [20.9/(20.9 - b)] \times 7.267 \times 10^{-8} \times \sum_{J=1}^{r} (F_{dj} \times {}_{dj} \times V_j)$$

Where:

E_k	=	lb. Pollutant
dj	=	Fuel usage Natural Gas mmcf
b	=	3% O_2 SCAQMD Default Value
$PPMV_c$	=	Concentration of Dryer, 400 PPMV
Fdj	=	8710, Dry F Factor for Natural Gas, dscf/mmBTU/mmcf (Attachment "D")
Vj	=	1050, High heat value of Natural Gas mmBTU/mmcf (Attachment "A")
Ek/dj	=	320.85 lb/mmcf

3. Overall Emissions Estimate for Dryer (S-33)

The equipment emissions for the asphalt plant dryer for VOC, SO_x and PM_{10} are based on SCAQMD emissions factors for combustion of natural gas (Attachment "E").

The emissions for NO_x and CO are based on the mass emission equation as detailed in the previous section.

The dryer in this facility is expected to consume 2.6 therms/ton of Hot Mix Asphalt produced (10 therms = 1 mmBTU heat value) 2.6 therms/ton × 1,000,000 BTU/10 therms = 0.26 mmBTU/ton.

Pollutant	Hot Mix Heat Requirement (mmBTU/ton)	÷	Natural Gas (1) Heating Value (mmBTU/mmcf)	×	SCAQMD (2) Emission Factor (lb/mmcf)	=	Emission Factor (lb/ton)
VOC	0.26		1050		7		0.001733
SO_x	0.26		1050		0.83		0.000206
PM_{10}	0.26		1050		7.5		0.001857
NO_x	0.26		1050		45.94		0.011376
CO	0.26		1050		320.85		0.0794

Pollutant	Asphalt Production (ton/hr)	×	Emission Factor (lb/ton)	=	Maximum Emissions (lb/hr)
VOC	400		0.001733		0.6932
SO_x	400		0.000206		0.0824
PM_{10}	400		0.001857		0.7428
NO_x	400		0.0011376		4.55
CO	400		0.0794		31.76

Pollutant	Asphalt Production (ton/day)	×	Emission Factor (lb/ton)	=	Maximum Emissions (lb/day)
VOC	4,000		0.001733		6.932
SO_x	4,000		0.000206		0.824
PM_{10}	4,000		0.001857		7.428
NO_x	4,000		0.011376		45.504
CO	4,000		0.0794		317.60

Pollutant	Asphalt Production (ton/yr)	×	Emission Factor (lb/ton)	=	Maximum Emissions (lb/yr)	=	Maximum Emissions (tons/yr)
VOC	880,000		0.001733		1,525.04		0.7625
SO_x	880,000		0.000206		181.28		0.091
PM_{10}	880,000		0.001857		1,634.16		0.81
NO_x	880,000		0.011376		10,010.88		5.01
CO	880,000		0.0794		69,872		34.936

1. Refer to Attachment "A"
2. Refer to Attachment "E"
3. Refer to Previous Section

F. Emissions Estimate for the Asphalt Oil Heater

The hot oil tanks will use a 2.0 mmBTU/hr burner to maintain heat in the oil. Since this equipment will be fired on natural gas and the input rating of the burner is below 10 mmBTU/hr, this equipment is exempt pursuant to Rule 2-1-114.1.2. As a result, no emission calculations have been included for this equipment.

G. Emissions Estimate from the Truck Loadout

The truck loadout emissions are calculated below. These emissions are based on AP-42 Table 11.1-14.

Pollutant	Asphalt Production (ton/hr)	×	Emission Factor (lb/ton)	=	Emission Factor (lb/hr)
TOC	400		4.1589E-3		1.66
PM	400		2.619E-5		0.011
CO	400		1.3492E-2		5.40

Pollutant	Asphalt Production (ton/hr)	×	Emission Factor (lb/ton)	=	Emission Factor (lb/day)
TOC	4,000		4.1589E-3		16.64
PM	4,000		2.619E-5		0.10
CO	4,000		1.3492E-2		53.97

Pollutant	Asphalt Production (ton/yr)	×	Emission Factor (lb/ton)	=	Maximum Emissions (lb/yr)	=	Maximum Emissions (tons/yr)
TOC	880,000		4.1589E-3		3,659.83		1.83
PM	880,000		2.619E-5		23.04		0.01
CO	880,000		1.3492E-2		11,872.96		5.94

H. Drum Plant Emissions

Pollutant	Barge Off-Loading Facility (lb/hr)	Hot Mix Asphalt Aggregate Emissions (lb/hr)	+	All Storage Piles (lb/hr)	+	Asphalt Oil Storage Tank (lb/hr)	+	Dryer Emissions (lb/hr)	+	Truck Loadout Emissions (lb/hr)	=	Overall Emissions (lb/hr)
VOC						0.002		0.6932		1.66		2.36
SO_x								0.0824				0.0824
PM_{10}	0.114	0.364		0.002671				0.7428		0.011		1.233
NO_x								4.55				4.55
CO								31.76		5.40		37.16

Pollutant	Barge Off-Loading Facility (lb/day)	Aggregate Emissions (lb/day)	+	All Storage Piles (lb/day)	+	Asphalt Oil Storage Tank (lb/day)	+	Dryer Emissions (lb/day)	+	Truck Loadout Emissions (lb/day)	=	Overall Emissions (lb/day)
VOC						0.0436		6.932		16.64		23.57
SO_x								0.824				0.824
PM_{10}	1.104	3.64		0.0643				7.428		0.10		12.34
NO_x								45.504				45.504
CO								317.60		53.97		371.57

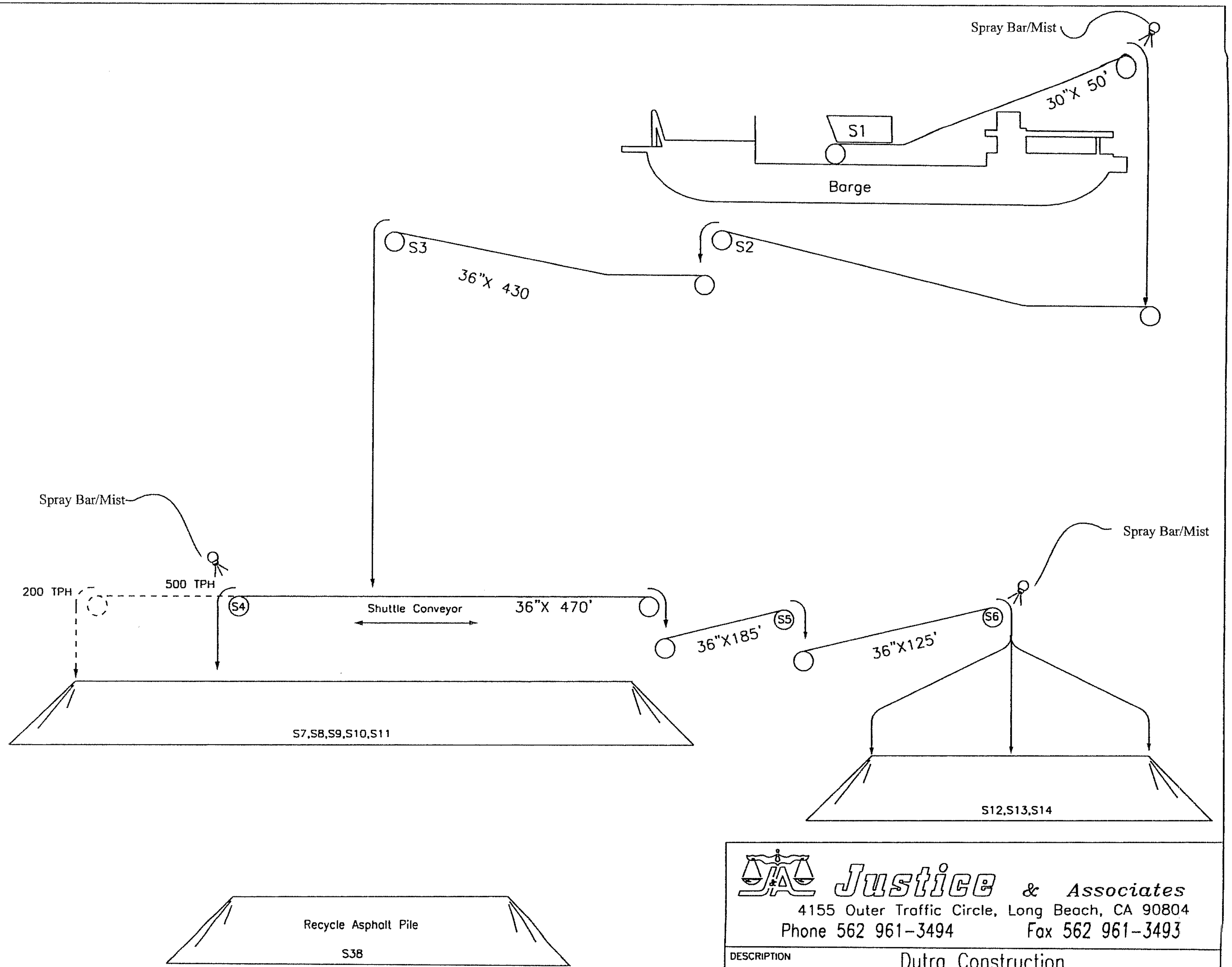
Pollutant	Barge Off-Loading Facility (lb/yr)	Aggregate Emissions (lb/yr)	+	All Storage Piles (lb/yr)	+	Asphalt Oil Storage Tank (lb/yr)	+	Dryer Emissions (lb/yr)	+	Truck Loadout Emissions (lb/yr)	=	Overall Emissions (lb/yr)	=	Overall Emissions (ton/yr)
VOC						15.69		1,525.04		3,659.83		5,200.56		2.6
SO_x								181.28				181.28		0.091
PM_{10}	242.88	801.56		23.45				1,634.16		23.04		2,725.09		1.36
NO_x								10,010.88				10,010.88		5.00
CO								69,872		11,872.96		81,745.96		40.873

PART IV – ANALYSIS OF PERMIT RESTRICTIONS

Anticipated production and fuel limits are listed below:

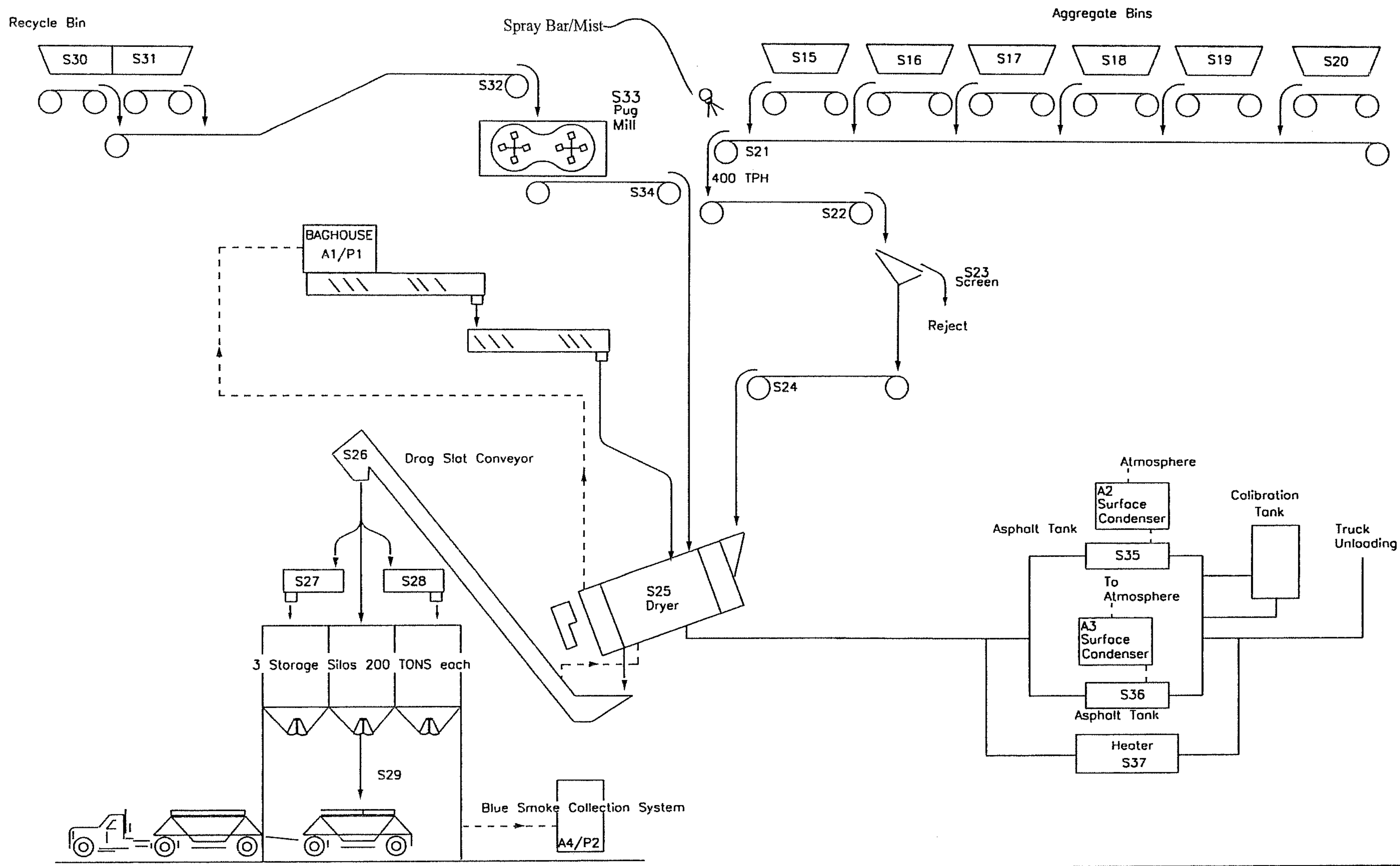
Asphalt production through the new Drum HMA plant should be limited to 880,000 tons per year.

Since asphalt production has been limited, it is not necessary to limit fuel consumption.



Justice & Associates
4155 Outer Traffic Circle, Long Beach, CA 90804
Phone 562 961-3494 Fax 562 961-3493

DESCRIPTION				
Dutra Construction Haystack Barge Off-loading System				
JOB NO.	CADCODE	DRAWN BY:	DATE	DWG. NO.
C8706	C8706	ST	11/30/04	C8706-1



Justice & Associates
4155 Outer Traffic Circle, Long Beach, CA 90804
Phone 562 961-3494 Fax 562 961-3493

DESCRIPTION	Dutra Construction Haystack HMA Plant			
JOB NO. C8706	CADCODE C8706-1	DRAWN BY: ST	DATE 01/24/04	DWG. NO. C8706-2

Table 3-D

EMISSION FEE BILLING NOx FACTORS

BASIC EQUIPMENT	TYPE OF FUEL	EMISSION FACTOR	HIGHER HEATING VALUE OF FUEL
Boilers, Ovens, Heaters, Furnaces, Kilns, Calciners, Dryers	Natural Gas	130 lb/mmscf	1050 mmBtu/mmscf
	Refinery Gas	161 lb/mmscf	1150 mmBtu/mmscf
	LPG, Propane, Butane	12.8 lb/mgal	94 mmBtu/mgal
	Diesel Light Dist. (0.05% S)	19 lb/mgal	137 mmBtu/mgal
	Fuel Oil (0.1% S)	20 lb/mgal	150 mmBtu/mgal
	Fuel Oil (0.25% S)	60 lb/mgal	150 mmBtu/mgal
	Fuel Oil (0.5% S)	55 lb/mgal	150 mmBtu/mgal
Internal Combustion Engines	Natural Gas	3400 lb/mmscf	1050 mmBtu/mmscf
	LPG, Propane, Butane	139 lb/mgal	94 mmBtu/mgal
	Gasoline	102 lb/mgal	130 mmBtu/mgal
	Diesel Oil	469 lb/mgal	137 mmBtu/mgal
Gas Turbines	Natural Gas	413 lb/mmscf	1050 mmBtu/mmscf
	Diesel Oil	67.8 lb/mgal	137 mmBtu/mgal

Table 11.19.2-2 (English Units). EMISSION FACTORS FOR CRUSHED STONE PROCESSING OPERATIONS (lb/Ton)[a]

Source [b]	Total Particulate Matter [r,s]	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Primary Crushing (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Primary Crushing (controlled) (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Secondary Crushing (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Secondary Crushing (controlled) (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Tertiary Crushing (SCC 3-050030-03)	0.0054[d]	E	0.0024[o]	C	ND[n]	
Tertiary Crushing (controlled) (SCC 3-05-020-03)	0.0012[d]	E	0.00054[p]	C	0.00010[q]	E
Fines Crushing (SCC 3-05-020-05)	0.0390[e]	E	0.0150[e]	E	ND	
Fines Crushing (controlled) (SCC 3-05-020-05)	0.0030[f]	E	0.0012[f]	E	0.000070[q]	E
Screening (SCC 3-05-020-02, 03)	0.025[c]	E	0.0087[l]	C	ND	
Screening (controlled) (SCC 3-05-020-02, 03)	0.0022[d]	E	0.00074[m]	C	0.000050[q]	E
Fines Screening (SCC 3-05-020-21)	0.30[g]	E	0.072[g]	E	ND	
Fines Screening (controlled) (SCC 3-05-020-21)	0.0036[g]	E	0.0022[g]	E	ND	
Conveyor Transfer Point (SCC 3-05-020-06)	0.0030[h]	E	0.00110[h]	D	ND	
Conveyor Transfer Point (controlled) (SCC 3-05-020-06)	0.00014[i]	E	4.6×10^{-5}[i]	D	1.3×10^{-5}[q]	E
Wet Drilling - Unfragmented Stone (SCC 3-05-020-10)	ND		8.0×10^{-5}[j]	E	ND	
Truck Unloading -Fragmented Stone (SCC 3-05-020-31)	ND		1.6×10^{-5}[j]	E	ND	
Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32)	ND		0.00010[k]	E	ND	

a. Emission factors represent uncontrolled emissions unless noted. Emission factors in lb/Ton of material of throughput. SCC = Source Classification Code. ND = No data.

b. Controlled sources (with wet suppression) are those that are part of the processing plant that employs current wet suppression technology similar to the study group. The moisture content of the study group without wet suppression systems operating (uncontrolled) ranged from 0.21 to 1.3 percent, and the same facilities operating wet suppression systems (controlled) ranged from 0.55 to 2.88 percent. Due to carry over of the small amount of moisture required, it has been shown that each source, with the exception of crushers, does not need to employ direct water sprays. Although the moisture content was the only variable measured, other process features may have as much influence on emissions from a given source. Visual observations from each source under normal operating conditions are probably the best indicator of which emission factor is most appropriate. Plants that employ substandard control measures as indicated by visual observations should use the uncontrolled factor with an appropriate control efficiency that best reflects the effectiveness of the controls employed.

c. References 1, 3, 7, and 8

d. References 3, 7, and 8

e. Reference 4

f. References 4 and 15

g. Reference 4

h. References 5 and 6

i. References 5, 6, and 15

j. Reference 11

k. Reference 12

l. References 1, 3, 7, and 8

m. References 1, 3, 7, 8, and 15

n. No data available, but emission factors for PM-10 for tertiary crushers can be used as an upper limit for primary or secondary crushing

o. References 2, 3, 7, 8

p. References 2, 3, 7, 8, and 15

q. Reference 15

r. PM emission factors are presented based on PM-100 data in the Background Support Document for Section 11.19.2

s. Emission factors for PM-30 and PM-50 are available in Figures 11.19.2-3 through 11.19.2-6.

d_j = The monthly metered fuel usage for each type of fuel recorded as mmscf/ month or mgal/month.

j = Each type of fuel used, or material processed or produced by a large NOx source

r = The total number of fuel types used, or materials processed or produced by a large NOx source

Example calculation: Boiler burning natural gas, rated 40 mmBtu/hr, in compliance with Rule 1146. Applicable starting year emission factor =49.18 lb/mmscf
Monthly fuel usage = 20 mmscf per month

$$E_{ip} = (49.18) \times (20) = 983.6 \text{ lb/month}$$

2. Monthly Mass Emissions for Normal Operating Hours

a. When the Facility Permit holder elects to use the concentration limit, the monthly mass emission shall be calculated and recorded according to the following equation:

$$E_k = PPMV_c \times [20.9/(20.9 - b)] \times 1.195 \times 10^{-7} \times \sum_{j=1}^{r} (F_{dj} \times d_j \times V_j) \quad \text{(Eq.17)}$$

where:

E_k = The monthly mass emission of nitrogen oxides (lb/month).

$PPMV_c$ = The equipment-specific compliance concentration limit measured over any continuous 60 minutes and requested by the Facility Permit holder, or calculated by Eq. 14 in Chapter 3, Subdivision C. (ppmv).

b = The standard concentrations of oxygen as requested by the Facility Permit holder, or as found in Table 3-F. (%).

r = The number of different types of fuel.

j = Each type of fuel.

F_{dj} = The dry F factor for each type of fuel, the ratio of the dry gas volume of the products of combustion to the heat content of the fuel (dscf/mmBtu) specified in 40 CFR Part 60, Appendix A, Method 19.

d_j = The monthly fuel usage for each type of fuel recorded by the fuel totalizer (mmscf per month or mgal per month).

V_j = The higher heating value of the fuel for each type of fuel found in Table 3-D (mmBtu/mmscf or mmBtu/mgal)

The product (d_j x V_j) shall have units of mmBtu per month (mmBtu/month).

Equation 16 shall not be used in cases where enriched oxygen is used, non-fuel sources of carbon dioxide are present (e.g., lime kilns and calciners), and the oxygen content of the stack gas is 19 percent or greater.

b. When the Facility Permit holder elects to use the emission rate, the monthly emission shall be calculated and recorded according to:

$$E_k = \sum_{j=1}^{r} d_j \times V_j \times ER_j \qquad \text{(Eq.18)}$$

where:

E_k = The monthly mass emission of nitrogen oxides (lb/month).

d_j = The monthly fuel usage for each type of fuel recorded by the fuel totalizer (mmscf/month or mgal/month) or the monthly amount of materials produced or processed, depending to the units of the equipment specific emission rate.

ER_j = The equipment-specific emission rate proposed by the Facility Permit holder and determined according to Chapter 5, Subdivision E (lb/mmBtu).

V_j = The higher heating value of each type of fuel (mmBtu/mmscf or mmBtu/mgal). This equals 1 if ERj is not dependent on fuel combustion.

Eq. 19-9

2.7 Direct-Fired Reheat Fuel Burning. The effect of direct-fired reheat fuel burning (for the purpose of raising the temperature of the exhaust effluent from wet scrubbers to above the moisture dew-point) on emission rates will be less than ±1.0 percent and, therefore, may be ignored.

2.8 Combined Cycle-Gas Turbine Systems. For gas turbine-steam generator combined cycle systems, determine the emissions from the steam generating unit or the percent reduction in potential SO_2 emissions as follows:

2.8.1 Compute the emission rate from the steam generating unit using the following equation:

$$E_{bo}=E_{co}+(H_g/H_b)(E_{co}-E_g)$$

Eq. 19-10

where:

E_{bo}=pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).

E_{co}=pollutant emission rate in combined effluent, ng/J (lb/million Btu).

E_g=pollutant rate from gas turbine, ng/J (lb/million Btu).

H_b=heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).

H_g=heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).

2.8.1.1 Use the test methods and procedures section of Subpart GG to obtain E_{co} and E_g. Do not use F_w factors for determining E_g or E_{co}. If an SO_2 control device is used, measure E_{co} after the control device.

2.8.1.2 Suitable methods shall be used to determine the heat input rates to the steam generating units (H_b) and the gas turbine (H_g).

2.8.2 If a control device is used, compute the percent of potential SO_2 emissions (% P_s) using the following equations:

$$E_{bi}=E_{ci}-(H_g/H_b)(E_{ci}-E_g)$$

Eq. 19-11

$$\% P_s=100\ (1-E_{bo}/E_{bi})$$

Eq. 19-12

where:

E_{bi}=pollutant rate from the steam generating unit, ng/J (lb/million Btu)

E_{ci}=pollutant rate in combined effluent, ng/J (lb/million Btu).

Use the test methods and procedures section of Subpart GG to obtain E_{ci} and E_g. Do not use F_w factors for determining E_g or E_{ci}.

3. *F Factors*

Use an average F factor according to Section 3.1 or determine an applicable F factor according to Section 3.2. If combined fuels are fired, prorate the applicable F factors using the procedure in Section 3.3.

3.1 Average F Factors. Average F factors (F_d, F_w, or F_c) from Table 19-1 may be used.

TABLE 19–1—F FACTORS FOR VARIOUS FUELS [1]

Fuel type	F_d		F_w		F_c	
	dscm/J	dscf/10⁶ Btu	wscm/J	wscf/10⁶ Btu	scm/J	scf/10⁶ Btu
Coal:						
Anthracite [2]	2.71×10^{-7}	10,100	2.83×10^{-7}	10,540	0.530×10^{-7}	1,970
Bituminous [2]	2.63×10^{-7}	9,780	2.86×10^{-7}	10,640	0.484×10^{-7}	1,800
Lignite	2.65×10^{-7}	9,860	3.21×10^{-7}	11,950	0.513×10^{-7}	1,910
Oil [3]	2.47×10^{-7}	9,190	2.77×10^{-7}	10,320	0.383×10^{-7}	1,420
Gas:						
Natural	2.43×10^{-7}	8,710	2.85×10^{-7}	10,610	0.287×10^{-7}	1,040
Propane	2.34×10^{-7}	8,710	2.74×10^{-7}	10,200	0.321×10^{-7}	1,190
Butane	2.34×10^{-7}	8,710	2.79×10^{-7}	10,390	0.337×10^{-7}	1,250
Wood	2.48×10^{-7}	9,240	....	....	0.492×10^{-7}	1,830
Wood Bark	2.58×10^{-7}	9,600	....	....	0.516×10^{-7}	1,920
Municipal	2.57×10^{-7}	9,570	....	....	0.488×10^{-7}	1,820
Solid Waste	....					

[1] Determined at standard conditions: 20 °C (68 °F) and 760 mm Hg (29.92 in. Hg).
[2] As classified according to ASTM D388–77.
[3] Crude, residual, or distillate.

3.2 Determined F Factors. If the fuel burned is not listed in Table 19-1 or if the owner or operator chooses to determine an F factor rather than use the values in Table 19-1, use the procedure below:

3.2.1 Equations. Use the equations below, as appropriate, to compute the F factors:

$$F_d = K[(K_{hd}\%H) + (K_c\%C) + (K_s\%S) + (K_n\%N) - (K_o\%0)]/GCV_w$$

Eq. 19-13

$$F_w = K[(K_{hw}\%H) + (K_c\%C) + (K_s\%S) + (K_n\%N) - (K_o\%0) + (K_w\%H_2O)]/GCV_w$$

Eq. 19-14

$$F_c=K(K_{cc}\%C)/GCV$$

APPENDIX A - DEFAULT EMISSION FACTORS FOR COMBUSTION EQUIPMENT

Table 1
Default Emission Factors for External Combustion Equipment for Forms B1 and B1U

Fuel Type (fuel unit)	Organic Gases (lb/unit)	Methane (lb/unit)	Nitrogen Oxides (lb/unit)	Sulfur Oxides (lb/unit)	Carbon Monoxide (lb/unit)	Particulate Matter (lb/unit)
Natural Gas (mmcf) / Boilers Only	5.50	2.30	100.00	0.60	84.00	7.60
Natural Gas (mmcf) / Other Equipment	7.00	2.30	130.00	0.83	35.00	7.50
LPG, Propane, Butane (1000 gal.)	0.26	0.28	12.80	4.60	3.20	0.28
Distillate Oil 0.05%S (1000 gal.)	0.20	0.05	20.00	7.10	5.00	2.00

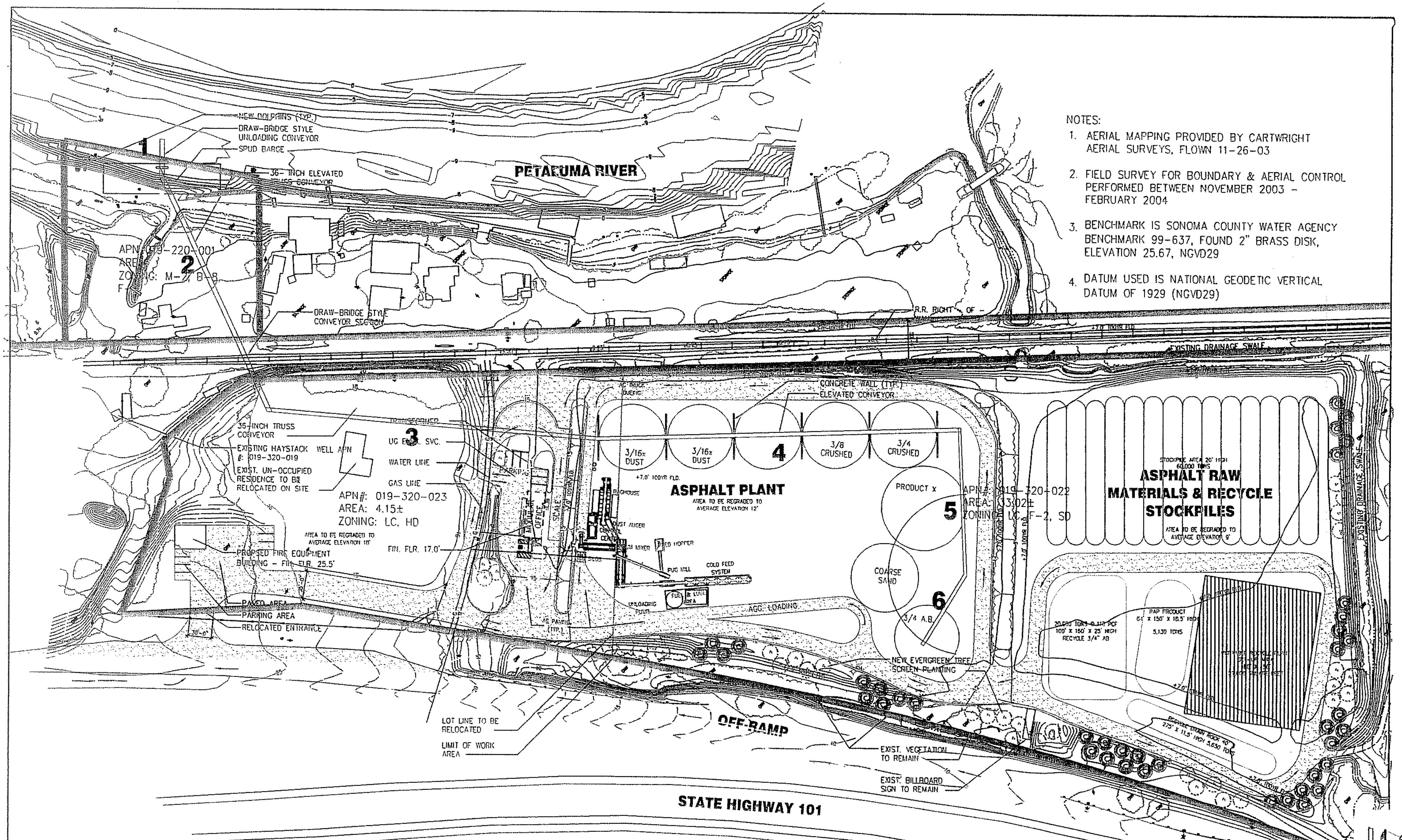
Table 2
Default Emission Factors for Internal Combustion Engines for Forms B2 and B2U

Fuel Type (fuel unit)	Organic Gases (lb/unit)	Methane (lb/unit)	Nitrogen Oxides (lb/unit)	Sulfur Oxides (lb/unit)	Carbon Monoxide (lb/unit)	Particulate Matter (lb/unit)
Natural gas (mmcf)	280.00	1,120.00	3,400.00	0.60	430.00	----
LPG, Propane, Butane (1000 gal.)	83.00	----	139.00	0.35	129.00	5.00
Diesel Oil (1000 gal.)	37.50	----	469.00	7.10	102.00	33.50
Gasoline (1000 gal.)	206.00	----	102.00	5.30	3,940.00	6.50

Table 3
Rule-Based Emission Factors for Combustion Equipment for Forms B1 and B2

Fuel Type (fuel unit)	Nitrogen Oxides (lb/unit)
A) E.F. based on Rule 1146 for Form B1	
Natural Gas (mmcf)	49.80
LPG, Propane, Butane (1000 gal.)	4.50
B) E.F. based on Rule 1146.1 for Form B1	
Natural Gas (mmcf)	37.40
LPG, Propane, Butane (1000 gal.)	3.40
C) E.F. based on Rule 1110.2 for Form B2	
Natural gas (mmcf)	238.70
LPG, Propane, Butane (1000 gallons)	15.30
Gasoline (1000 gallons)	21.50
Diesel Oil (1000 gallons)	33.40

Attachment "F"



NOTES:
1. AERIAL MAPPING PROVIDED BY CARTWRIGHT AERIAL SURVEYS, FLOWN 11-26-03
2. FIELD SURVEY FOR BOUNDARY & AERIAL CONTROL PERFORMED BETWEEN NOVEMBER 2003 - FEBRUARY 2004
3. BENCHMARK IS SONOMA COUNTY WATER AGENCY BENCHMARK 99-637, FOUND 2" BRASS DISK, ELEVATION 25.67, NGVD29
4. DATUM USED IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)

Justice & Associates
4155 Outer Traffic Circle, Long Beach, CA. 90804
Phone 562 961-3494 Fax 562 961-3494

DESCRIPTION	Dutra Materials Site Plan			
JOB NO.	CADCODE	DRAWN BY:	DATE	DWG. NO.
C8706	C8706-2	ST	9/8/04	Plot Plan

Attachment "G"

MATERIAL SAFETY DATA SHEET

MSDS Number: 53230E - 14
CHEMTEL (877) 276-7283
24 Hour Emergency Assistance:
General Assistance Number: (877) 276-7285

SECTION 1 PRODUCT IDENTIFICATION

MATERIAL IDENTITY: Shell AR 4000 Paving Asphalt Cement

PRODUCT CODES: 50246
COMPANY ADDRESS: Equilon Enterprises LLC, P. O. Box 4453, Houston, TX. 77210-4453

SECTION 2 PRODUCT/INGREDIENTS

INGREDIENTS	CAS#	CONCENTRATION	
Asphalt Mixture		100	%volume
Vacuum Tower Bottoms	64741-56-6	40 - 96	%volume
Heavy Naphthenic Petroleum Distillates	64741-53-3	4 - 60	%volume
Hydrogen Sulfide	7783-06-4	< 0.1	%weight

NOTE: H2S is a naturally occuring constituent in the petroleum stream and is not added separately to the product.

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW Appearance & Odor: Black viscous semi-solid. Asphalt or rotten egg odor. **Health Hazards:** Hydrogen sulfide (H2S), an extremely flammable and toxic gas, may be present. Contact with hot material will cause thermal burns. **NFPA Rating (Health, Fire, Reactivity):** 1, 1, 0 Hazard Rating:Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

Inhalation:
In applications where vapors (caused by high temperature) or mists (caused by mixing or spraying) are created, breathing may cause a mild burning sensation in the nose, throat and lungs. Hydrogen Sulfide (H2S) and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Hydrogen Sulfide is an extremely flammable, toxic gas. Inhalation of vapors, mist or fumes (generated at high temperatures) may cause irritation to the nose, throat and respiratory tract.

Eye Irritation:
Contact with hot material can cause thermal burns which may result in permanent damage or blindness. Based on essentially similar product testing, cool product is presumed to be minimally irritating to the eyes.

Skin Contact:
Contact with hot material can cause thermal burns which may result in permanent damage. Other adverse effects not expected from brief skin contact. Based on essentially similar product testing, cool product is presumed to be minimally irritating to the skin.

Ingestion:
May be harmful if swallowed. Based on essentially similar product testing, cool product is presumed to be no more than slightly toxic if ingested. Generally considered to have a low order of acute oral toxicity.
Other Health Effects:
Carcinogenic in animal tests.
Material may release hydrogen sulfide (H2S), a highly toxic and extremely flammable gas, when heated to 180 Degrees F or higher. H2S can cause irritation of the eyes and respiratory tract, headache, dizziness, nausea, vomitting, diarrhea, and pulmonary edema. The odor ("rotten egg") threshold is 0.02 ppm. Do not depend on sense of smell for warning; H2S rapidly deadens the sense of smell.

This material and/or components may cause the following effects:
Genotoxicity

Primary Target Organs:
The following organs and/or organ systems may be damaged by overexposure to this material and/or its components.
Lungs
Signs and Symptoms:
Lung damage (scarring, bronchitis, emphysema) may be indicated by shortness of breath, especially on exertion and may be accompanied by chronic cough.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:
Vaporization of H2S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from victim to rescuer. Mechanical ventilation should be used to resuscitate the victim. DO NOT attempt to rescue victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin:
If contact with hot material, cool the burn area by flushing with large amounts of water. DO NOT attempt to remove anything from the burn area or apply burn creams or ointments. Cover the burn area loosely with a sterile dressing, if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye:
Flush eyes with plenty of water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision or swelling occur, transport to nearest medical facility for additional treatment.

Ingestion:
DO NOT induce vomiting. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: 555 °F/290.56 °C [Closed Cup]

Extinguishing Media:

DATA FORM G
General Air Pollution Source

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109 (415) 749-4990 FAX (415) 749-5030

Form G is for general air pollution sources. Use specific forms when applicable. If this source burns fuel, then also complete Form C.

1. Business Name: Dutra Materials Plant No: ______ (if unknown, leave blank)
2. SIC No.: 2951 Date of Initial Operation ______
3. Name or Description: Storage Piles Source No.: S- 38
4. Make, Model, and Rated Capacity of Equipment: 2 acres
5. Process Code[1] 4076 Material Code[2] RAP Usage Unit[2] Acres-day
6. Total throughput, last 12 mos. ______ usage units[2] Maximum operating rate: ______ usage units[2]/hr
7. Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
8. Typical operating times: 10 hrs/day 5 days/week 52 weeks/year
9. For batch or cyclic processes: ______ minutes/cycle ______ minutes between cycles
10. Exhaust gases from source: *(at maximum operation)* Wet gas flowrate ______ cfm at ______ °F
    Approximate water vapor content ______ volume%

EMISSION FACTORS (*at maximum operating rate*)

If this form is being submitted as part of an application for an **authority to construct**, completion of the following table is mandatory. If not, and the Source is *already* in operation, completion of the table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

☐ Check box if factors apply to emissions ***after*** Abatement Device(s).

	Emission Factors lb/Usage Unit [2]	***Basis Code*** [3]
11. Particulate	4.05 lb/acre	6
12. Organics		
13. Nitrogen Oxides (as NO_2)		
14. Sulfur Dioxide		
15. Carbon Monoxide		
16. Other: ______		
17. Other: ______		

18. With regard to air pollutant flow from this source, what sources(s), abatement device(s) and/or emission point(s) are **immediately** downstream?

______ ______ ______ ______ ______ ______
______ ______ ______ ______ ______

[1]**See Tables G-1 through G-7 for code**
[3]**See Basis Code Table below**
[2]**See Table G5 or the Material Codes Table (available upon request)**

Person completing this form: Scott Taylor Date:

P:www\forms\FormG.doc-9/99

Job & Form # 8706/10

Material will float and can be re-ignited on surface of water. Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water.

Fire Fighting Instructions:
Material will not burn unless preheated. Clear fire area of all non-emergency personnel. Only enter confined fire space with full gear, including a positive pressure, NIOSH-approved, self-contained breathing apparatus. Cool surrounding equipment, fire-exposed containers and structures with water. Container areas exposed to direct flame contact should be cooled with large quantities of water (500 gallons water per minute flame impingement exposure) to prevent weakening of container structure.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:
May burn although not readily ignitable.

Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

Spill Management:
May burn although not readily ignitable. Use cautious judgement when cleaning up large molten spills.
LARGE MOLTEN SPILL: Wear respirator and protective clothing as appropriate. Shut off source of leak if safe to do so. Dike and contain. Allow product to cool and remove as a solid.
SMALL MOLTEN SPILL: Allow product to cool and remove as a solid. Shut off source of leak if safe to do so.

Reporting:
U.S. regulations require reporting releases of this material to the environment which exceed the reportable quantity to the National Response Center at (800)424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:
Do not breathe material. Keep container closed. Use only with adequate ventilation. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Material may release hydrogen sulfide (H_2S), a highly toxic and extremely flammable gas, when heated to 180 Degrees F or higher. H_2S may collect in the headspace of the container.

Handling:
Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet. Launder contaminated clothing before reuse. Properly dispose of contaminated leather articles such as shoes or belts that cannot be decontaminated. When asphaltic products are heated, they may give off small amounts of hydrogen sulfide, an extremely flammable, highly toxic gas. Breathing hydrogen sulfide must be avoided. Use ventilation, when possible, or work upwind of source of vapors, fumes and mists. Do not allow molten products to contact water or liquids as this can cause violent eruptions, splatter hot material or ignite flammable materials.

Container Warnings:
Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical	Limit	TWA	STEL	Ceiling	Notation
Asphalt fumes	ACGIH TLV	0.5 mg/m3			A4 *,**

NOTE: * Asphalt (Petroleum; Bitumen) Fumes. As benzene-extractable inhalable particulate (or equivalent Method).

** Not Classifiable as a Human Carcinogen-Asphalt Fume (coal tar-free).

Decomposition Product	Limit	TWA	STEL	Ceiling	Notation
Carbon dioxide	ACGIH - TLV	5000 ppmm		30000 ppmm	
Carbon dioxide	OSHA - PEL		30000 ppmm		
Carbon dioxide	OSHA - PEL_IS	10000 ppmm			
Carbon monoxide	OSHA - PEL	35 ppmv		200 ppmv	
Hydrogen sulfide	ACGIH - TLV	10 ppmm		15 ppmm	
Hydrogen sulfide	OSHA - PEL_IS	10 ppmm		15 ppmm	

Decomposition Product	Method	Condition
Carbon dioxide	Combustion	Combustion
Carbon monoxide	Combustion	Combustion
Hydrogen sulfide	Combustion	Closed container/ Overheating

Exposure Controls

Adequate ventilation to control airborne concentrations.

Personal Protection
Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles and Face Shield, or Safety Glasses

Skin Protection:
Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:

Clothing and gloves to protect against hot material.

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:
Full-Face Air-Purifying Respirator for Acid Gases. Air-Purifying Respirator for Organic Vapors.

Self-contained breathing apparatus.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Black viscous semi-solid. Asphalt or rotten egg odor.
Substance Chemical Family: Petroleum Hydrocarbon

Flash Point	555 °F [Closed Cup]	**Specific Gravity**	1.016 @ 77 °F
Stability	Stable	**Viscosity**	2440 poise @ 140 °F

SECTION 10 REACTIVITY AND STABILITY

Stability:
Material is stable under normal conditions.

Materials to Avoid:
Do not allow molten material to contact water or liquids as this can cause violent eruptions, splatter hot material, or ignite flammable material. Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:
Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Carbon Monoxide, Carbon Dioxide, Hydrogen Sulfide, Miscellaneous Organic Material, Simple Hydrocarbons and other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Carcinogenicity Classification

Chemical Name	NTP	IARC	ACGIH	OSHA
Asphalt	No	Not Classifiable (3)	No	No
Heavy Naphthenic Petroleum Distillates	No	Carcinogen (1)	No	No

Carcinogenicity Certain asphalt fume condensates have been shown to cause tumors when repeatedly painted on the skin of laboratory mice. The relevance of these data to humans exposd to the fume itself is unknown. The International Agency for Research on Cancer has classified untreated mineral oils as Carcinogenic to Humans (Group 1). The component used in this product (Heavy Naphthenic Petroleum Distillate) meets the criteria for such an oil. A similar petroleum fraction also induced skin tumors in male mice in a long-term skin painting study.

Epidemiology There is no evidence that human exposure to bitumen or its fumes in manufacturing processes or in road use results in any cancer risk. While there is some evidence of an increased risk of lung cancer among roofers, building insulators and mastic asphalt workers, concurrent or previous exposure to coal tar products has also taken place and may therefore have been responsible.

Genotoxicity Two samples of vaccum residuum were found to be non-genotoxic (no genetic damage) in a live rat study and weakly genotoxic when metabolically activated in an in vitro (test tube) assay.

Lungs Mice exposed to laboratory-generated asphalt fume for up to 21 months developed bronchitis along with inflammation and other signs of lung injury.

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification

Proper Shipping Name: Elevated temperature liquid, N.O.S. (Petroleum Asphalt)
Identification Number: UN3257
Hazard Class/Division: 9 (Miscellaneous)
Packing Group: III

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.
Emergency Response Guide # 128

SECTION 15 REGULATORY INFORMATION

Federal Regulatory Status

OSHA Classification:
Product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Ozone Depleting Substances (40 CFR 82 Clean Air Act):
This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:

SARA Extremely Hazardous Substances (302/304):
Residues, Petroleum, Vacuum RQ 100 lbs Reportable Spill => 109.707447 lbs or 13.29 gal

SARA Hazard Categories (311/312):

Immediate Health	Delayed Health	Fire	Pressure	Reactivity
YES	YES	NO	NO	NO

SARA Toxic Release Inventory (TRI) (313):
There are no components in this product on the SARA 313 list.

Toxic Substances Control Act (TSCA) Status:
This material is listed on the EPA/TSCA Inventory of Chemical Substances.

Other Chemical Inventories:
Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Japan ENCS, Korean Inventory, Philippines PICCS

State Regulation

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65).

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

SECTION 16 OTHER INFORMATION

Revision#: 14 **Revision Date:** 04/03/2002 **Revisions since last change (discussion):** This Material Safety Data Sheet has changed because Equiva Services LLC has implemented new software to generate the sheet. There will be slight differences in the hazard and precautionary language as we incorporate the guidance contained in the ANSI MSDS standard (ANSI Z400.1-1998). The composition and health and safety summaries have been updated. We encourage you to take the opportunity to reread the sheet and review the information contained.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODES: 50246

Shell AR 4000 Paving Asphalt Cement

CAUTION!

CONTACT WITH HOT PRODUCT CAN CAUSE THERMAL BURNS.

MATERIAL AND/OR COMPONENTS THAT HAVE BEEN SHOWN TO CAUSE CANCER INCLUDE: Heavy Naphthenic Petroleum Distillates

MAY CAUSE DAMAGE TO: Lungs

This material and/or components may cause the following effects:
Genotoxicity

Precautionary Measures: Hydrogen Sulfide and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Hydrogen Sulfide is an extremely flammable, toxic gas. Respiratory protection should be worn when venting tanks. Avoid contact with hot material. Avoid contact with water or liquids. Avoid breathing of vapors, fumes, or mist. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Keep container closed when not in use. Wash thoroughly after handling.

FIRST AID

Inhalation: Move victim to fresh air and provide oxygen if breathing is difficult. Get medical attention. Vaporization of H_2S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from victim to rescuer. Mechanical ventilation should be used to resuscitate the victim. DO NOT attempt to rescue victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
Skin Contact: If contact with hot material, cool the burn area by flushing with large amounts of water. DO NOT attempt to remove anything from the burn area or apply burn creams or ointments. Cover the burn area loosely with a sterile dressing, if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact: Flush eyes with plenty of water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision or swelling occur, transport to nearest medical facility for additional treatment.
Ingestion: DO NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

FIRE

In case of fire, Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO_2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

SPILL OR LEAK

May burn although not readily ignitable. Use cautious judgement when cleaning up large molten spills.
LARGE MOLTEN SPILL: Wear respirator and protective clothing as appropriate. Shut off source of leak if safe to do so. Dike and contain. Allow product to cool and remove as a solid.
SMALL MOLTEN SPILL: Allow product to cool and remove as a solid.

CONTAINS: Vacuum Tower Bottoms, 64741-56-6; Heavy Naphthenic Petroleum Distillates, 64741-53-3; Hydrogen Sulfide, 7783-06-4

NFPA Rating (Health, Fire, Reactivity): 1, 1, 0

TRANSPORTATION

US Department of Transportation Classification

Proper Shipping Name:	Elevated temperature liquid, N.O.S. (Petroleum Asphalt)
Identification Number:	UN3257
Hazard Class/Division:	9 (Miscellaneous)
Packing Group:	III

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.
Emergency Response Guide # 128

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flames or heat. Keep container closed and drum bungs in place.

Name and Address
Equilon Enterprises LLC
P. O. Box 4453
Houston, TX 77210-4453

TRANSPORTATION EMERGENCY CHEMTEL (877) 276-7283

HEALTH EMERGENCY CHEMTEL (877) 276-7283

ADMINISTRATIVE INFORMATION
COMPANY ADDRESS: Equilon Enterprises LLC, P. O. Box 4453, Houston, TX. 77210-4453
Company Product Stewardship & Regulatory Compliance Contact: Barbara Schroeder
MSDS FAX-BACK Phone Number: (877) 276-7285

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TANKS 4.0
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Dutra S39,S40
City:	San Rafael
State:	California
Company:	Dutra Materials
Type of Tank:	Vertical Fixed Roof Tank
Description:	Dutra Materials (Haystack Plant)

Tank Dimensions

Shell Height (ft):	36.00
Diameter (ft):	12.00
Liquid Height (ft):	34.00
Avg. Liquid Height (ft):	24.00
Volume (gallons):	30,000.00
Turnovers:	412.66
Net Throughput (gal/yr):	12,379,836.00
Is Tank Heated (y/n):	Y

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft):	0.10
Radius (ft) (Dome Roof):	12.00

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig):	0.00

Meteorological Data used in Emissions Calculations: San Francisco C.O., California (Avg Atmospheric Pressure = 14.75 psia)

Attachment "H"

TANKS 4.0
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Asphalt Oils	All	265.00	80.00	450.00	450.00	0.0008	0.0006	0.0009	190.0000			1.00	

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)

Annual Emission Calculations	
Standing Losses (lb):	4.9620
Vapor Space Volume (cu ft):	1,362.8234
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.5106
Vented Vapor Saturation Factor:	0.9995
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	1,362.8234
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	12.0500
Tank Shell Height (ft):	36.0000
Average Liquid Height (ft):	24.0000
Roof Outage (ft):	0.0500
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.0500
Dome Radius (ft):	12.0000
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
Daily Avg. Liquid Surface Temp. (deg. R):	724.6700
Daily Average Ambient Temp. (deg. F):	56.9542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	909.6700
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,493.6278
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.5106
Daily Vapor Temperature Range (deg. R):	370.0000
Daily Vapor Pressure Range (psia):	0.0003
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0006
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0009
Daily Avg. Liquid Surface Temp. (deg R):	724.6700
Daily Min. Liquid Surface Temp. (deg R):	539.6700
Daily Max. Liquid Surface Temp. (deg R):	909.6700
Daily Ambient Temp. Range (deg. R):	11.5417
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9995
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
Vapor Space Outage (ft):	12.0500
Working Losses (lb):	10.7243

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)- (Continued)

Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
Annual Net Throughput (gal/yr.):	12,379,836.00 00
Annual Turnovers:	412.6612
Turnover Factor:	0.2394
Maximum Liquid Volume (gal):	30,000.0000
Maximum Liquid Height (ft):	34.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	15.6863

TANKS 4.0
Emissions Report - Detail Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Asphalt Oils	10.72	4.96	15.69

Justice & Associates

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Long Beach, CA 90804-2111
562.961.3494 Fax 562.961.3493

www.justiceassociates.com

1401 S. Arville St., Suite J
Las Vegas, NV 89102-0537
702.822.2111 Fax 702.822.2113

February 16, 2007

Dutra Materials
1000 Point San Pedro Road
San Rafael, CA 94901-8312

Attention: Josh Kirtley

Subject: Tugboat Trips for Haystack Landing
Barge Off-Loading and Hot Mix Asphalt Plant

Josh:

We have evaluated the comments provided by PRMD staff in their December 15, 2006 letter and compared it to our Air Quality Analysis and the decision by Dutra Materials to reduce production to 225,000 tons per year. The letter refers to the number of barge trips contributing to the project having a significant air quality impact. As discussed in Justice & Associates' April 7, 2006 letter, reducing asphalt production to 225,000 tons per year will cut the projects emissions in half. Based on the reduced production, the Reactive Organic Gases (ROG) will be below the significance level. Although NO_x emissions will be reduced, they will still be considered significant. NO_x Emissions from the operation of the barge and other equipment may be further reduced by applying additional mitigation measures.

The reduced production will decrease the number of trips necessary to supply aggregate to the site. Based on our phone conversations last week, it is estimated that 125 barge trips per year will be needed to supply the aggregate to the site for the asphalt plant and aggregate sales. The PRMD letter stated that the project would need to reduce barge trips to 100 per year in order to stay below the significance threshold. An evaluation of the most appropriate mitigation measures to bring emissions below significance will be performed once the draft EIR is made available to us.

If you have any questions, please give me a call at (562) 961-3494.

Sincerely,

Scott Taylor
Justice & Associates

cc: Al Cornwell, CSWSt2

EXHIBIT 7

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April 7, 2006

Dutra Materials
1000 Pt. San Pedro Road
San Rafael, CA 94901

Attention: Josh Kirtley

Subject: CEQA Air Quality Analysis for Haystack Landing Barge Off Loading and Hot Mix Asphalt Plant

Josh:

Per your request we have performed an Air Quality Analysis to evaluate your facility against the CEQA significance thresholds for the Haystack Landing Project. The evaluation used a potential production rate of 440,000 tons per year to calculate emissions. The analysis showed the facility as significant for NO_X and ROG on a daily basis and NO_X on an annual basis.

Reducing production to 225,000 TPY will almost cut the emissions in half. Based on the reduced production, the ROG will be below the significance level. Although NO_X emissions will be reduced, they will still be considered significant.

The Bay Area Air Quality Management District (BAAQMD) permit had a limit of 300 tons per hour of production on the Petaluma HMA plant. However, the permit did not have annual asphalt production limits. This is not unusual for facilities that had older grandfathered permits. The new BAAQMD permit for the Haystack Landing Facility will include an annual emission limit for the facility and require that the Best Available Control Technology be implemented. As a result, the new facility will have fewer NO_X emissions then the previously permitted facility, resulting in a net air quality benefit to the area.

In order to address the CEQA significance thresholds, production should be reduced to 225,000 TPY.

If you have any questions, please give me a call at (562) 961-3494.

Sincerely,

Scott Taylor

Scott Taylor
Justice & Associates

J:\DutraConstruction\letters\8706 Letter.doc

Justice & Associates

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COPY

CSW/STUBER-STROEH
APR 25 2007
RECEIVED

April 23, 2007

Dutra Materials
1000 Point San Pedro Road
San Rafael, CA 94901-8312

Attention: Josh Kirtley

Subject: EIR Analysis for Tugboat Trips at Haystack Landings

Josh:

Justice & Associates evaluated the emissions analysis for the aggregate barge performed by Jim McCarthy at Baseline Environmental for the haystack landing Environmental Impact Report (EIR). The baseline environmental analysis evaluated emissions from 125 barge trips (25 existing barge trips and 100 additional barge trips).

The study entitled, *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data*, prepared by the EPA was the basis of the evaluation. The study provides a methodology to calculate emission rates for a variety of marine vessels based on a number of equipment specific variables. After review, Justice & Associates recommends some adjustments to the assumption in the evaluation so that it closer reflects the actual operation of the tug that is used by Dutra Materials. Under Attachment "A" are the original emissions analysis and the analysis with our changes incorporated. The following are our comments:

1.) The tug that is used for this operation has two 800-hoursepower engines for a total of 1,600 horsepower. This translates to 1,193.12 kilowatts for the tug (1,600 HP × 0.7457 KW//HP(mech) = 1,193.12 KW). The barge trip takes a total of eight hours. Five hours of that time is used to transport the barge. A total of one hour is used to maneuver the barge for loading and unloading. Two hours of the trip the tug is idling while it is unloaded, which remains unchanged from the original evaluation. The assumptions in the spreadsheet have been adjusted to reflect the actual hours and horsepower of the tug.

2.) The route the barge takes up the Petaluma River does not allow full load operation of the tug. For most of the trip, the tug slowly cruises up the river at about 40% load. The tug's travel speed typically ranges between six to eight knots. As a result, the evaluation was adjusted such that the tug operates five hours at 40% load under the slow cruise operating scenarios.

3.) The State mandates that low-sulfur diesel be used in all equipment including water vessels. Low-sulfur diesel is 15 Parts Per Million (PPM) or 0.0015%. The SO_x emissions have been adjusted to reflect the actual fuel used.

After the adjustments, the NO_x emissions from the project continue to be the highest pollutant. The adjusted evaluation concluded that total NO_x emissions for the barge are 3.3 tons per year. Since the revised evaluation remains under the 15 tons per year significance threshold, the project is less than significant.

This conclusion supports the determination that the new facility can operate the necessary 100 additional barge trips and maintain emissions below significance.

If you have any questions, please give me a call at (562) 961-3494.

Sincerely,

Scott Taylor

Scott Taylor
Justice & Associates

cc: Al Cornwell, CSWSt2

Table D-1: Estimated PM_{10} Emissions From Barge Off-Loading Facility

Existing Asphalt Plant

Dutra Haystack Landing Asphalt & Recycling Facility

Draft Environmental Impact Report

Description	**Maximum Daily Process Rate (tons/day)**	**AP-42 [1] PM_{10} Emission Factor (pounds/ton)**	**PM_{10} Emissions (pounds/day)**
Receiving Hopper with Conveyor	2,000	0.000046	0.09
Conveyor to Conveyor	2,000	0.000046	0.09
Conveyor to Truck	2,000	0.000046	0.09
		Maximum Emission Rate (pounds per day)	0.28
		Maximum Daily Process Rate (tons/day)	2,000
		Cumulative Off-Loading PM_{10} Emission Factor (pounds/ton)	0.00014
		Average Annual Import (tons)	104,731
		Average Annual PM_{10} Emissions (tons)	0.0072

Notes:

PM_{10} = particulate matter less than 10 microns in size

[1] Environmental Protection Agency AP-42 Emission Factor for Crushed Stone Processing Operations, Table 11.19.2-2

Table D-2: Estimated PM_{10} Emission From Cold Feed System

Existing Asphalt Plant

Dutra Haystack Landing Asphalt & Recycling Facility

Draft Environmental Impact Report

Description	Process Rate (tons/day)	AP-42 [1] PM_{10} Emission Factor (pounds/ton)	PM_{10} Emissions (pounds/day)
Hoppers with Feeders to Collecting Conveyor	1,880	0.000046	0.09
Collecting Conveyors to Transfer Conveyors	1,880	0.000046	0.09
Transfer Conveyor to Screen	1,880	0.000046	0.09
Screen	1,880	0.00074	1.4
Screen to Conveyor	1,880	0.000046	0.09
Conveyor to Drum Mixer	1,880	0.000046	0.09
		Maximum Emission Rate (pounds per day)	*1.8*
		Process Rate (tons/day)	3,760
		Cold Feed System PM_{10} Emission Factor (pounds/ton)	0.00049
		Average Annual Production (tons)	104,731
		Average Annual PM_{10} Emissions (tons)	*0.025*

Notes:

PM_{10} = particulate matter less than 10 microns in size

[1] Environmental Protection Agency AP-42 Emission Factor for Crushed Stone Processing Operations, Table 11.19.2-2

Table D-3: Estimated PM_{10} Emission From Fugitive Dust/Yard Emissions
Existing Asphalt Plant
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Aggregate Stockpiles		
Aggregate handling PM_{10} emission factor [1]	$= 0.35 \times 0.0032 \times (U/5)^{1.3} \times (M/2)^{-1.4}$	
U = mean wind speed [2]	6.0	miles per hour
M = material moisture content [3]	5	%
Aggregate handling PM_{10} emission factor	0.00039	pounds per ton
Aggregate handling PM_{10} emissions	= (emission factor) x (aggregate usage)	
Aggregate usage [4]	1,880	tons per day
PM_{10} Emissions	0.74	pounds per year
Aggregate usage [5]	104,731	tons per year
PM_{10} Emissions	0.02	tons per year
On-Road Trucks (On-Site)		
Paved road PM_{10} emission factor [1]	$= 0.016 \times (sL/2)^{0.65} \times (W/3)^{1.5}$	
sL = road surface silt loading [6]	0.015	grams per square meter
W = average weight of the vehicles traveling the road [7]	25	tons
Emission Factor	0.0160	pounds PM_{10} per vehicle mile traveled
Paved road PM_{10} emissions	= (emission factor) x (average vehicle mile traveled)	
Average vehicle miles traveled [8]	87	miles per day
Paved road PM_{10} emissions	1.39	pounds per day
Average vehicle miles traveled [9]	16,518	miles per year
Paved road PM_{10} emissions	0.132	tons per year
Off-Road Mobile Equipment (Loaders, etc.)		
Unpaved Road PM_{10} emission factor [1]	$= 2.6(s/12)^{0.8}(W/3)^{0.4}\ (M_{dry}/0.2)^{-0.3}(365-p)/365$	
s = surface material silt content [3]	4.8	%
W = average weight of the vehicles traveling the road	4	tons
M_{dry} = surface material moisture content under dry uncontrolled conditions [3]	0.2	%
p = number of days with at least 0.01 inch of precipitation per year [10]	194	days
Unpaved Road PM_{10} emission factor	0.6566	pounds PM_{10} per vehicle mile traveled
Unpaved road PM_{10} emissions	= (emission factor) x (average vehicle mile traveled)	
Average vehicle miles traveled per day	5	miles per day
Paved road PM_{10} emissions	3.3	pounds PM_{10} per day
Paved road PM_{10} emissions [11]	0.4	tons PM_{10} per year
Total Fugitive Dust / Yard Emissions		
Total Fugitive Dust / Yard PM_{10} Emissions	= (aggregate handling) + (paved road) + (unpaved road)	
	5.4	pounds PM_{10} per day
	0.58	tons PM_{10} per year

Notes:
PM_{10} = particulate matter less than 10 microns in size

[1] BAAQMD Hot Asphalt Mixing Facilities Engineering Evaluation Template
[2] Petaluma Municipal Airport, Fire Station #2
[3] BAAQMD recommended value
[4] Maximum plant production capacity
[5] Based on estimated import per year
[6] BAAQMD recommended value for limited access roadways
[7] Average for empty and loaded various classes of trucks
[8] Round trip through facility is approximately 0.5 miles, 2,000 tons asphalt/23 tons per truck = 87 trips
[9] Based on assumption of 33,035 truck trips per year, see Traffic Section
[10] NOAA Daily Station Petaluma Fire Station #2 1971-2000
[11] Assumes 250 working days per year

Table D-4: Estimated VOC, CO, NOx, SOx, and PM_{10} Emission From Asphalt Oil Tank, Batch Mixer, and Batch Dryer

Existing Asphalt Plant

Dutra Haystack Landing Asphalt & Recycling Facility

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Asphalt Tank	Emission Rate [1] (pounds per year)	Maximum Daily VOC Emissions (pounds)	Total Annual VOC Emissions (tons)	Maximum Daily CO Emissions (pounds)	Total Annual CO Emissions (tons)
30,000 Asphalt Tank	8.32	0.023	0.008	0.0022	0.0008
30,000 Asphalt Tank	8.32	0.023	0.012	0.0022	0.0012
Total	17	0.046	0.021	0.0044	0.0020

Batch Mixer	Hot Mix Heat Requirement (mmBTU/ton)	Natural Gas Heating Value [2] (mmBTU/mmcf)	Emission Rate [2] (pounds/mmcf)	Emission Rate (pounds/ton)	Maximum Daily Asphalt Production (tons)	Maximum Daily Emissions (pounds)	Annual Emissions (tons)
VOCs	0.26	1,020	5.5	0.0014	2,000	2.8	0.07
SOx	0.26	1,020	0.60	0.00015	2,000	0.31	0.008
NOx	0.26	1,020	190	0.048	2,000	97	2.5
CO	0.26	1,020	84	0.021	2,000	43	1.1

Batch Dryer	Natural Gas Emission Factor [2] (pounds per ton)	Maximum Daily Asphalt Production (ton)	Maximum Daily Emissions (pounds)	Annual Emissions (ton)
PM_{10}	0.027	2,000	54	1.4
VOCs [3]	0.0082	2,000	14	0.36

Notes:

Based on an annual production capacity of 104,731 tons

CO = carbon monoxide

NOx = nitrogen oxides

VOC = volatile organic compound

PM_{10} = particulate matter less than one micron in size

SOx = sulfide oxides

mmBTU = million British thermal units

mmcf = million cubic feet

VOCs are synonymous with reactive organic gases (ROG)

[1] Tank emissions estimated using EPA software Tank 4.0.9d

[2] BAAQMD Hot Asphalt Mixing Facilities Engineering Evaluation Template

[3] VOC emission = VOC dryer - VOC mixer

Table D-5: Estimated PM and VOC Emission From Truck Loadout and Silo Filling
Existing Asphalt Plant
Dutra Haystack Landing Asphalt & Recycling Facility
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Truck Loadout - PM		
Load-out Emission Factor [1]	= 0.000181 + 0.00214 x (-V) x exp[0.0251x (T + 460) - 20.43]	
V = Asphalt volatility	-0.5	
T = Asphalt temperature	325	degrees Fahrenheit
Load-out Emission Factor	0.00070	pounds PM per ton asphalt produced
Maximum Daily Production	2,000	tons
Maximum Daily PM Emissions	1.4	pounds
Annual Production	104,731	tons
Annual PM Emissions	0.037	tons
Silo Filling - PM		
Silo Filling Emission Factor [1]	= 0.000332 + 0.00105 x (-V) x exp[0.0251x (T + 460) - 20.43]	
V = Asphalt volatility [2]	-0.5	
T = Asphalt temperature [2]	325	degrees Fahrenheit
Emission Factor	0.00059	pounds PM per ton asphalt produced
Maximum Daily Production	2,000	tons
Maximum Daily PM Emissions	1.2	pounds
Annual Production	104,731	tons
Annual PM Emissions	0.031	tons
Truck Loadout - VOCs		
Batch Mix Load-out VOC Emission Factor	= 0.0172 x (-V) x exp[0.0251x(T+460) - 20.43]	
V = Asphalt volatility [2]	-0.5	
T = Asphalt temperature [2]	325	
Load-out VOC Emission Factor [2]	0.0042	pounds VOC per ton asphalt produced
Maximum Daily Production	2,000	tons
Maximum Daily VOCs Emissions	8.3	pounds
Annual Production	104,731	tons
Annual VOCs Emissions	0.22	tons
Silo Filling - VOCs		
Silo Filling VOC Emission Factor	= 0.0504 x (-V) x exp[0.0251x(T+460) - 20.43]	
V = Asphalt volatility [2]	-0.5	
T = Asphalt temperature [2]	325	
Silo Filling VOC Emission Factor [2]	0.012	pounds VOC per ton asphalt produced
Maximum Daily Production	2,000	tons
Maximum Daily VOCs Emissions	24	pounds
Annual Production	104,731	tons
Annual VOCs Emissions	0.64	tons
Totals PM (tons per year)	**0.07**	
Total VOCs (tons per year)	**0.86**	

Notes
PM = particulate matter
VOCs = volatile organic compound
VOCs are synonymous with reactive organic gases (ROG)

[1] BAAQMD Hot Asphalt Mixing Facilities Engineering Evaluation Template
[2] BAAQMD recommended value

Table D-6: Total Estimated Batch Asphalt Plant Emissions
Existing Asphalt Plant
Dutra Haystack Landing Asphalt & Recycling Facility
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Pounds per Day Based on Maximum Production of 2,000 tons of Asphalt per Day					
Activity	**PM_{10}**	**VOCs**	**SOx**	**NOx**	**CO**
Barge Off-Loading Emissions	0.3	NA	NA	NA	NA
Cold Feed System Emissions	1.8	NA	NA	NA	NA
Total Fugitive Dust / Yard Emissions	5.4	NA	NA	NA	NA
Asphalt Oil Storage Tank Emissions	NA	0.046	NA	NA	0.0044
Mixer Emissions	NA	2.8	0.31	97	43
Dryer Emissions	54	14	NA	NA	NA
Truck Loadout Emissions [1]	1.4	8	NA	NA	NA
Silo Filling Emissions [1]	1.2	24	NA	NA	NA
Maximum Daily Emissions	64	49	0.31	97	43
Tons per Year Based on Maximum Production of 131,498 tons of Asphalt per Year					
Activity	**PM_{10}**	**VOCs**	**SOx**	**NOx**	**CO**
Barge Off-Loading Emissions	0.007	NA	NA	NA	NA
Cold Feed System Emissions	0.03	NA	NA	NA	NA
Total Fugitive Dust / Yard Emissions	0.58	NA	NA	NA	NA
Asphalt Oil Storage Tank Emissions	NA	0.021	NA	NA	0.0020
Mixer Emissions	NA	0.07	0.008	2.5	1.1
Dryer Emissions	1.4	0.36	NA	NA	NA
Truck Loadout Emissions [1]	0.037	0.22	NA	NA	NA
Silo Filling Emissions [1]	0.031	0.6	NA	NA	NA
Total Annual Emissions	2.1	1.3	0.008	2.5	1.1

Notes:
NA = not applicable
PM_{10} = particulate matter less than 10 microns in size
VOCs = volatile organic compounds
SOx = sulfur oxides
NOx = nitrogen oxides
CO = carbon monoxide
VOCs are synonymous with reactive organic gases (ROG)

[1] Conservatively assumes all particulate matter from truck loading and silo filling is PM_{10}.

Table D-7: Estimated PM_{10} Emissions From Barge Off-Loading Facility
Proposed Asphalt & Recycling Plant
Dutra Haystack Landing Asphalt & Recycling Facility
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Description	Maximum Daily Process Rate (tons/day)	AP-42 [1] PM_{10} Emission Factor (pounds/ton)	PM_{10} Emissions (pounds/day)
Receiving Hopper with Conveyor	4,000	0.000046	0.18
Conveyor to Conveyor	4,000	0.000046	0.18
Conveyor to Shuttle conveyor	4,000	0.000046	0.18
Shuttle Conveyor to Conveyor	4,000	0.000046	0.18
Conveyor to Conveyor	4,000	0.000046	0.18
Conveyor to Stockpile	4,000	0.000046	0.18
		Maximum Emission Rate (pounds per day)	*1.1*
		Maximum Daily Process Rate (tons/day)	4,000
		Cumulative Off-Loading PM_{10} Emission Factor (pounds/ton)	0.00028
		Maximum Annual Aggregate Import (tons)	425,000
		Maximum Annual PM_{10} Emissions (tons)	*0.059*

Notes:
PM_{10} = particulate matter less than 10 microns in size

[1] Environmental Protection Agency AP-42 Emission Factor for Crushed Stone Processing Operations, Table 11.19.2-2

Table D-8: Estimated PM_{10} Emission From Cold Feed System

Proposed Asphalt & Recycling Plant

Dutra Haystack Landing Asphalt & Recycling Facility

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Description	Process Rate (tons/day)	AP-42 [1] PM10 Emission Factor (pounds/ton)	PM10 Emissions (pounds/day)
Hoppers with Feeders to Collecting Conveyor	3,760	0.000046	0.17
Collecting Conveyor to Transfer Conveyor	3,760	0.000046	0.17
Transfer Conveyor to Screen	3,760	0.000046	0.17
Screen	3,760	0.00074	2.8
Screen to Conveyor	3,760	0.000046	0.17
Conveyor to Drum Mixer	3,760	0.000046	0.17
Receiving Hopper with Feeders and to Conveyor	1,000	NC	--
Belt Conveyor to Pugmill	1,000	NC	--
Pugmill to Belt Conveyor	1,000	NC	--
Belt Conveyor to Drum Mixer	1,000	NC	--
		Maximum Emission Rate (pounds per day)	*3.6*
		Process Rate (tons/day)	3,760
		Cold Feed System PM_{10} Emission Factor (pounds/ton)	0.00097
		Maximum Annual Production (tons)	225,000
		Maximum Annual PM_{10} Emissions (tons)	*0.11*

Notes:

NC = not calculated - An increase in the amount of recycled asphalt material through these devices will correspond to a decrease in the amount of virgin aggregate processed through the cold feed system; therefore, PM_{10} emissions are not calculated for these devices.

PM_{10} = particulate matter less than 10 microns in size

[1] Environmental Protection Agency AP-42 Emission Factor for Crushed Stone Processing Operations, Table 11.19.2-2

Table D-9: Estimated PM_{10} Emission From Fugitive Dust/Yard Emissions
Proposed Asphalt & Recycling Plant
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Aggregate Stockpiles		
Aggregate handling PM_{10} emission factor [1]	$= 0.35 \times 0.0032 \times (U/5)^{1.3} \times (M/2)^{-1.4}$	
U = mean wind speed [2]	6.0	miles per hour
M = material moisture content [3]	5	%
Aggregate handling PM_{10} emission factor	0.00039	pounds per ton
Aggregate handling PM_{10} emissions	= (emission factor) x (aggregate usage)	
Aggregate usage [4]	3,760	tons per day
PM_{10} Emissions	1.48	pounds per year
Aggregate usage [5]	425,000	tons per year
PM_{10} Emissions	0.08	tons per year
On-Road Trucks		
Paved road PM_{10} emission factor [1]	$= 0.016 \times (sL/2)^{0.65} \times (W/3)^{1.5}$	
sL = road surface silt loading [6]	0.015	grams per square meter
W = average weight of the vehicles traveling the road [7]	25	tons
Emission Factor	0.0160	pounds PM_{10} per vehicle mile traveled
Paved road PM_{10} emissions	= (emission factor) x (average vehicle mile traveled)	
Average vehicle miles traveled [8]	100	miles per day
Paved road PM_{10} emissions	1.60	pounds per day
Average vehicle miles traveled [9]	62,541	miles per year
Paved road PM_{10} emissions	0.500	tons per year
Off-Road Mobile Equipment (Loaders, etc.)		
Unpaved Road PM_{10} emission factor [1]	$= 2.6(s/12)^{0.8}(W/3)^{0.4}(M_{dry}/0.2)^{-0.3}(365-p)/365$	
s = surface material silt content [3]	4.8	%
W = average weight of the vehicles traveling the road	4	tons
M_{dry} = surface material moisture content under dry uncontrolled conditions	0.2	%
p = number of days with at least 0.01 inch of precipitation per year [10]	194	days
Unpaved Road PM_{10} emission factor	0.6566	pounds PM_{10} per vehicle mile traveled
Unpaved road PM_{10} emissions	= (emission factor) x (average vehicle mile traveled)	
Average vehicle miles traveled per day	5	miles per day
Paved road PM_{10} emissions	3.3	pounds PM_{10} per day
Paved road PM_{10} emissions [11]	0.4	tons PM_{10} per year
Total Fugitive Dust / Yard Emissions		
Total Fugitive Dust / Yard PM_{10} Emissions	= (aggregate handling) + (paved road) + (unpaved road)	
	6.4	pounds PM_{10} per day
	1.0	tons PM_{10} per year

Notes:
PM_{10} = particulate matter less than 10 microns in size

[1] BAAQMD Hot Asphalt Mixing Facilities Engineering Evaluation Template
[2] Petaluma Municipal Airport, Fire Station #2
[3] BAAQMD recommended value
[4] Maximum plant production capacity

[5] Based on estimated import per year
[6] BAAQMD recommended value for limited access roadways
[7] Average for empty and loaded various classes of trucks
[8] Round trip through facility is approximately 0.5 miles, 4,000 tons asphalt/23 tons per truck = 174 trips, plus 26 trucks
[9] Based on assumption of 125,082 truck trips per year, see Traffic Section
[10] NOAA Daily Station Petaluma Fire Station #2 1971-2000
[11] Assumes 250 working days per year

Table D-10: Estimated VOC, CO, NOx, SOx, and PM_{10} Emission Asphalt Oil Tank, Batch Mixer, and Batch Dryer

Proposed Asphalt & Recycling Plant

Dutra Haystack Landing Asphalt & Recycling Facility

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Asphalt Tank	Emission Rate [1] (pounds per year)	Maximum Daily VOC Emissions (pounds)	Total Annual VOC Emissions (tons)	Maximum Daily CO Emissions (pounds)	Total Annual CO Emissions (tons)		
30,000 Asphalt Tank	9.18	0.025	0.009	0.0024	0.0009		
30,000 Asphalt Tank	9.18	0.025	0.014	0.0024	0.0013		
Total	18	0.050	0.023	0.0049	0.0022		
Batch Mixer	**Hot Mix Heat Requirement (mmBTU/ton)**	**Natural Gas Heating Value [2] (mmBTU/mmcf)**	**Emission Rate [2] (pounds/mmcf)**	**Emission Rate (pounds/ton)**	**Maximum Daily Asphalt Production (tons)**	**Maximum Daily Emissions (pounds)**	**Annual Emissions (tons)**
VOCs	0.26	1,020	5.5	0.0014	4,000	5.6	0.16
SOx	0.26	1,020	0.60	0.00015	4,000	0.61	0.017
NOx	0.26	1,020	190	0.048	4,000	194	5.4
CO	0.26	1,020	84	0.021	4,000	86	2.4
Batch Dryer	**Natural Gas Emission Factor [2] (pounds per ton)**	**Maximum Daily Asphalt Production (ton)**	**Maximum Daily Emissions (pounds)**	**Annual Emissions (ton)**			
PM_{10}	0.027	4,000	108	3.0			
VOCs [3]	0.0082	4,000	27	0.76			

Notes:

Based on an annual production capacity of 225,000 tons

CO = carbon monoxide

NOx = nitrogen oxides

VOCs = volatile organic compounds

PM_{10} = particulate matter less than one micron in size

SOx = sulfide oxides

mmBTU = million British thermal units

mmcf = million cubic feet

VOCs are synonymous with reactive organic gases (ROG)

[1] Tank emissions estimated using EPA software Tank 4.0.9d

[2] BAAQMD Hot Asphalt Mixing Facilities Engineering Evaluation Template

[3] VOC emission = VOC dryer - VOC mixer

Table D-11: Estimated PM and VOC Emission From Truck Loadout and Silo Filling
Proposed Asphalt & Recycling Plant
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Truck Loadout - PM		
Load-out Emission Factor [1]	= 0.000181 + 0.00214 x (-V) x exp[0.0251x (T + 460) - 20.43]	
V = Asphalt volatility	-0.5	
T = Asphalt temperature	325	degrees Fahrenheit
Load-out Emission Factor	0.00070	pounds PM per ton asphalt produced
Maximum Daily Production	4,000	tons
Maximum Daily PM Emissions	2.8	pounds
Annual Production	225,000	tons
Annual PM Emissions	0.079	tons
Silo Filling - PM		
Silo Filling Emission Factor [1]	= 0.000332 + 0.00105 x (-V) x exp[0.0251x (T + 460) - 20.43]	
V = Asphalt volatility [2]	-0.5	
T = Asphalt temperature [2]	325	degrees Fahrenheit
Emission Factor	0.00059	pounds PM per ton asphalt produced
Maximum Daily Production	4,000	tons
Maximum Daily PM Emissions	2.3	pounds
Annual Production	225,000	tons
Annual PM Emissions	0.066	tons
Truck Loadout - VOCs		
Batch Mix Load-out VOC Emission Factor	= 0.0172 x (-V) x exp[0.0251x(T+460) - 20.43]	
V = Asphalt volatility [2]	-0.5	
T = Asphalt temperature [2]	325	
Load-out VOC Emission Factor [2]	0.0042	pounds VOC per ton asphalt produced
Maximum Daily Production	4,000	tons
Maximum Daily VOCs Emissions	17	pounds
Annual Production	225,000	tons
Annual VOCs Emissions	0.47	tons
Silo Filling - VOCs		
Silo Filling VOC Emission Factor	= 0.0504 x (-V) x exp[0.0251x(T+460) - 20.43]	
V = Asphalt volatility [2]	-0.5	
T = Asphalt temperature [2]	325	
Silo Filling VOC Emission Factor [2]	0.012	pounds VOC per ton asphalt produced
Maximum Daily Production	4,000	tons
Maximum Daily VOCs Emissions	49	pounds
Annual Production	225,000	tons
Annual VOCs Emissions	1.4	tons

Notes:
PM = particulate matter
VOCs = volatile organic compound
VOCs are synonymous with reactive organic gases (ROG)

[1] BAAQMD Hot Asphalt Mixing Facilities Engineering Evaluation Template
[2] BAAQMD recommended value

Table D-12: Estimated PM_{10} Emission Estimates for Asphalt Crusher

Proposed Asphalt & Recycling Plant

Dutra Haystack Landing Asphalt & Recycling Facility

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Description	Process Rate (tons/day)	AP-42 [1] PM_{10} Emission Factor (pounds/ton)	PM10 Emissions (pounds/day)
Crusher Feed Opening	1,000	0.000046	0.046
Crusher	1,000	0.00054	0.540
Feed Hopper	1,000	0.000046	0.046
Vibrating Grizzly Feeder	1,000	0.00074	0.74
Discharge System	1,000	0.000046	0.046
Stacking Conveyor	1,000	0.000046	0.046
		Maximum Emission Rate (pounds per day)	*1.5*
		Process Rate (tons/day)	1,000
		PM_{10} Emission Factor (pounds/ton)	0.00146
		Maximum Annual Production (tons)	150,000
		Maximum Annual PM_{10} Emissions (tons)	*0.11*

Notes:
Based on:
UltraMax 1000-15CV Plant Specs:
Manufacturer: Eagle Crusher Company, Inc.
On-Plant Power Supply: 275 HP diesel and 75 Kw generator; plant-mounted electrical panel
PM_{10} = particulate matter less than 10 microns in size

1 Environmental Protection Agency AP-42 Emission Factor for Crushed Stone Processing Operations, Table 11.19.2-2

Table D-13: Total Estimated Batch Asphalt Plant Emissions
Proposed Asphalt & Recycling Plant
Dutra Haystack Landing Asphalt & Recycling Facility
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Pounds per Day Based on Maximum Production of		4,000	tons of Asphalt per Day		
Activity	**PM_{10}**	**VOCs**	**SOx**	**NOx**	**CO**
Barge Off-Loading Emissions	1.1	NA	NA	NA	NA
Cold Feed System Emissions	3.6	NA	NA	NA	NA
Total Fugitive Dust / Yard Emissions	6.4	NA	NA	NA	NA
Asphalt Oil Storage Tank Emissions	NA	0.050	NA	NA	0.0049
Mixer Emissions	NA	5.6	0.61	194	86
Dryer Emissions	108	27	NA	NA	NA
Truck Loadout Emissions [1]	2.8	17	NA	NA	NA
Silo Filling Emissions [1]	2.3	49	NA	NA	NA
Asphalt Crusher	1.5	NA	NA	NA	NA
Maximum Daily Emissions	124	98	0.61	194	86
Tons per Year Based on Maximum Production of		**225,000**	**tons of Asphalt per Year**		
Activity	**PM_{10}**	**VOCs**	**SOx**	**NOx**	**CO**
Barge Off-Loading Emissions	0.059	NA	NA	NA	NA
Cold Feed System Emissions	0.11	NA	NA	NA	NA
Total Fugitive Dust / Yard Emissions	1.0	NA	NA	NA	NA
Asphalt Oil Storage Tank Emissions	NA	0.023	NA	NA	0.0022
Mixer Emissions	NA	0.16	0.017	5.4	2.4
Dryer Emissions	3.0	0.76	NA	NA	NA
Truck Loadout Emissions [1]	0.079	0.47	NA	NA	NA
Silo Filling Emissions [1]	0.066	1.4	NA	NA	NA
Asphalt Crusher	0.11	NA	NA	NA	NA
Total Annual Emissions	4.3	2.8	0.017	5.4	2.4

Notes:
NA = not applicable
PM10 = particulate mater less than 10 microns in size
VOCs = volatile organic compounds
SOx = sulfur oxides
NOx = nitrogen oxides
CO = carbon monoxide

[1] Conservatively assumes all particulate matter from truck loading and silo filling is PM_{10}.
VOCs are synonymous with reactive organic gases (ROG)

Table D-14: Estimate of Net Increase in On-site Emissions of Criteria Pollutants From Plant Operation
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Criteria Air Pollutants	PM_{10} [1]	ROG [2]	SOx	NOx	CO
Existing Asphalt Facility					
Maximum Daily Emissions (pounds) [3]	64	49	0.31	97	43
Total Annual Emissions (tons) [5]	2.1	1.3	0.0080	2.5	1.1
Proposed Asphalt and Recycling Facility					
Maximum Daily Emissions (pounds) [5]	124	98	0.61	194	86
Total Annual Emissions (tons) [6]	4.3	2.8	0.017	5.4	2.4
Increase in Criteria Air Pollutant Emissions					
Maximum Daily Increase (pounds)	60	49	0.31	97	43
Total Annual Increase (tons)	2.3	1.5	0.0092	2.9	1.3

Notes:
NA = not applicable
PM_{10} = particulate mater less than 10 microns in size
ROG = reactive organic gases
SOx = oxides of sulfur
NOx = nitrogen oxides
CO = carbon monoxide

[1] Conservatively assumes all particulate matter from truck loading and silo filling is PM_{10}.
[2] Assumes volatile organic gases are synonymous with ROG
[3] Assumes 2,000 tons per day production
[4] Assumes 131,498 tons per year production
[5] Assumes 4,000 tons per day production
[6] Assumes 225,000 tons per year production

Table D-15: Estimated Off-road and On-road Vehicle Emission
Existing Asphalt Plant
Dutra Haystack Landing Asphalt & Recycling Facility
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Mobile Offroad Equipment	Horsepower	Fuel Type	Gallons per Hour	Hours Per Month	Gallons Consumed Per Day	Gallons Consumed Per Year	Load Factor	Emission Factors (gm/bhp-hr)					Daily (pounds)				
								PM_{10}	ROG	SOx	NOx	CO	PM_{10}	ROG	SOx	NOx	CO
Caterpillar 988 Front-End Loader	350	Bio-Diesel	12	300	120	30,000	0.55	1.00	8.50	0.0015%	6.90	0.40	5.09E-02	4.33E-01	7.64E-07	3.51E-01	2.04E-02
Kubota Tractor	200	Bio-Diesel	0.5	45	0.75	188	0.55	1.00	8.50	0.0015%	6.90	0.40	4.37E-03	3.71E-02	6.55E-08	3.01E-02	1.75E-03
Caterpillar 345 Excavator	350	Bio-Diesel	9	80	24	6,000	0.55	1.00	8.50	0.0015%	6.90	0.40	1.36E-02	1.15E-01	2.04E-07	9.37E-02	5.43E-03
10 Wheel Dump Truck	150	Bio-Diesel	1.7	15	0.85	213	0.55	0.68	2.70	0.0015%	6.90	0.38	7.42E-04	2.95E-03	1.64E-08	7.53E-03	4.15E-04
10 Wheel Water Truck	150	Bio-Diesel	1.7	126	7.1	1,785	0.55	0.68	2.70	0.0015%	6.90	0.38	6.23E-03	2.48E-02	1.38E-07	6.33E-02	3.48E-03
Service/Utility Truck [1]	--	Gasoline	--	--	0.83	208	--	--	--	0.0015%	--	--	1.47E-03	2.46E-02	1.80E-04	2.89E-02	2.88E-01
Pickup Truck [1]	--	Gasoline	--	--	0.83	208	--	--	--	0.0015%	--	--	1.47E-03	2.46E-02	1.80E-04	2.89E-02	2.88E-01
Daily Emission (pounds)													7.88E-02	6.62E-01	3.60E-04	6.04E-01	6.08E-01
Annual Emissions (tons) [2]													9.85E-03	8.28E-02	4.50E-05	7.55E-02	7.60E-02

Onroad Truck Activity	Type	Annual Volume (trips)	Estimated Round Trip Distance (miles)	ROG Emissions (pound)	CO Emissions (pounds)	NOx Emissions (pounds)	PM_{10} Emissions (pounds)	SOx Emissions (pounds)
HHDT-DSL Emission Factors (pounds per VMT) [3]				0.00300	0.012294	0.044029	0.001824	0.000029
MHDT-DSL Emission Factors (pounds per VMT) [3]				0.00049	0.004564	0.023362	0.000687	0.000037
LDA Emission Factors (pounds per VMT) [3]				0.00108	0.010847	0.001007	0.000074	0.000009
Raw Aggregate Import [4]	HHDT-DSL	9,107	5.0	137	560	2,005	83	1.3
Fine Sand Import	HHDT-DSL	1,607	50	241	988	3,538	147	2.4
Crumb Rubber Import	HHDT-DSL	34	90	9.2	38	135	5.6	0.09
Water Tanker	HHDT-DSL	380	5.0	5.7	23	84	3.5	0.056
Asphalt Oil	MHDT-DSL	371	50	9.1	85	433	13	0.7
Asphalt Export	MHDT-DSL	21,916	25	269	2,501	12,800	376	20.2
Worker	LDA	1,500	30	49	488	45	3.3	0.41
Total Annual Emissions (tons)				0.34	2.1	9.5	0.31	0.0123
Maximum Daily Emissions		**Maximum Truck Volume (trips) [5]**	**Estimated Round Trip Distance (miles)**	**ROG Emissions (pound)**	**CO Emissions (pounds)**	**NOx Emissions (pounds)**	**PM_{10} Emissions (pounds)**	**SOx Emissions (pounds)**
Total Maximum Daily Emissions (pounds)		87	25	6.5	27	96	4.0	0.064

Total Emissions	ROG	CO	NOx	PM_{10}	SOx
Total Maximum Daily Emissions (pounds)	6.6	27	96	4.6	0.67
Total Annual Emissions (tons)	0.35	2.2	9.50	0.39	0.088

Notes:
Assumes Tier I emission rates year 2000 from OFFROAD (ARB 2006) for offroad mobile equipment.
VMT = vehicle miles traveled
HHDT-DSL = Heavy Heavy Duty Diesel Trucks (33,001 to 60,000 pounds)
MHDT-DSL = Medium Heavy Duty Diesel Trucks (14,001 to 33,000 pounds)
LDA = light duty auto
ROG = reactive organic gases
CO = carbon monoxide
NOx = nitrogen oxides
PM_{10} = particulate matter less than one micron in size
SOx = oxides of sulfur
gm/bhp-hr = grams per brake horsepower hour

[1] Emissionare based on fuel usage and EMFAC2007 emissions per vehicle mile traveled.
[2] Assumes 250 working days
[3] Source: California Air Resources Board's EMFAC2007 for Southern Sonoma County, Year 2007.
Emissions factors include start, running and idling exhaust. In addition, ROG emission factors account for diurnal, hot soak, running and resting emissions, and the PM10 emission factors account for tire and brake wear.
[4] Aggregate is brought to landing by barge and then trucked to existing plant.
[5] Based on maximum production capacity of 2,000 tons per day.

Table D-16: Estimated Off-road and On-road Vehicle Emissions
Proposed Asphalt & Recycling Plant
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Mobile Offroad Equipment	Horsepower	Fuel Type	Gallons per Hour	Hours Per Month	Gallons Consumed Per Day	Gallons Consumed Per Year	Load Factor	Emission Factors (gm/bhp-hr) PM_{10}	ROG	SOx	NOx	CO	Daily (pounds) PM_{10}	ROG	SOx	NOx	CO
Caterpillar 988 Front-End Loader	350	Bio-Diesel	12	300	120	30,000	0.55	1.00	8.50	0.0015%	6.90	0.40	5.09E-02	4.33E-01	7.64E-07	3.51E-01	2.04E-02
Kubota Tractor	200	Bio-Diesel	0.5	45	0.75	188	0.55	1.00	8.50	0.0015%	6.90	0.40	4.37E-03	3.71E-02	6.55E-08	3.01E-02	1.75E-03
Caterpillar 345 Excavator	350	Bio-Diesel	9	80	24	6,000	0.55	1.00	8.50	0.0015%	6.90	0.40	1.36E-02	1.15E-01	2.04E-07	9.37E-02	5.43E-03
10 Wheel Dump Truck	150	Bio-Diesel	1.7	15	0.85	213	0.55	0.68	2.70	0.0015%	6.90	0.38	7.42E-04	2.95E-03	1.64E-08	7.53E-03	4.15E-04
10 Wheel Water Truck	150	Bio-Diesel	1.7	126	7.1	1,785	0.55	0.68	2.70	0.0015%	6.90	0.38	6.23E-03	2.48E-02	1.38E-07	6.33E-02	3.48E-03
Service/Utility Truck [1]	--	Gasoline	--	--	0.83	208	--	--	--	0.0015%	--	--	1.47E-03	2.46E-02	1.80E-04	2.89E-02	2.88E-01
Pickup Truck [1]	--	Gasoline	--	--	0.83	208	--	--	--	0.0015%	--	--	1.47E-03	2.46E-02	1.80E-04	2.89E-02	2.88E-01
Daily Emission (pounds)													7.88E-02	6.62E-01	3.60E-04	6.04E-01	6.08E-01
Annual Emissions (tons) [2]													9.85E-03	8.28E-02	4.50E-05	7.55E-02	7.60E-02

Truck Activity	Type	Annual Volume (trips)	Estimated Round Trip Distance (miles)	ROG Emissions (pound)	CO Emissions (pounds)	NOx Emissions (pounds)	PM_{10} Emissions (pounds)	SOx Emissions (pounds)
HHDT-DSL Emission Factors (pounds per VMT) [3]				0.002812	0.011507	0.041101	0.001652	0.000029
MHDT-DSL Emission Factors (pounds per VMT) [3]				0.000485	0.004485	0.021927	0.000655	0.000036
LDA Emission Factors (pounds per VMT) 3				0.001009	0.010048	0.000924	0.000075	0.0000090
Crumb Rubber Import	HHDT-DSL	59	90	15	61	218	8.8	0.15
Recycled Ashalt Import	HHDT-DSL	13,043	20	733	3,002	10,722	431.0	7.6
Water Tanker	HHDT-DSL	650	5.0	9	37	134	5.4	0.094
Asphalt Oil	HHDT-DSL	634	50	89	365	1,303	52.4	0.92
Raw Aggregate Export	MHDT-DSL	40,967	25	497	4,593	22,457	670.4	37
Fine Sand Export	MHDT-DSL	7,229	25	88	811	3,963	118.3	6.6
Recycled Ashalt Export	MHDT-DSL	25,000	25	303	2,803	13,705	409.1	22.7
Asphalt Export	MHDT-DSL	37,500	25	946	9,420	867	70.1	8
Worker	LDA	1,500	30	45	452	42	3.4	0.41
Total Annual Emissions (tons)				1.3	10.5	27	0.88	0.042
Maximum Daily Emissions		**Maximum Truck Volume (trips) [4]**	**Estimated Round Trip Distance (miles)**	**ROG Emissions (pound)**	**CO Emissions (pounds)**	**NOx Emissions (pounds)**	**PM_{10} Emissions (pounds)**	**SOx Emissions (pounds)**
Maximum Daily Emissions (pounds)		174	25	12	50	179	7.2	0.13

Total Emissions	ROG	CO	NOx	PM_{10}	SOx
Total Maximum Daily Emissions (pounds)	12	51	179	7.8	0.73
Total Annual Emissions (tons)	1.3	11	27	1.0	0.12

Notes:
Assumes Tier I emission rates year 2000 from OFFROAD (ARB 2006) for offroad mobile equipment.
VMT = vehicle miles traveled
HHDT-DSL = Heavy Heavy Duty Diesel Trucks (33,001 to 60,000 pounds)
MHDT-DSL = Medium Heavy Duty Diesel Trucks (14,001 to 33,000 pounds)
LDA = light duty auto
ROG = reactive organic gases
CO = carbon monoxide
NOx = nitrogen oxides
PM_{10} = particulate matter less than one micron in size
SOx = oxides of sulfur
gm/bhp-hr = grams per brake horsepower hour

[1] Emissionare based on fuel usage and EMFAC2007 emissions per vehicle mile traveled.
[2] Assumes 250 working days
[3] Source: California Air Resources Board's EMFAC2007 for Southern Sonoma County, Year 2008.
Emissions factors include start, running and idling exhaust. In addition, ROG emission factors account for diurnal, hot soak, running and resting emissions, and the PM10 emission factors account for tire and brake wear.
[4] Based on maximum production capacity of 4,000 tons per day.

Table D-17: Estimate of Net Increase in On-road and Off-road Vehicle Emissions of Criteria Pollutants
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Criteria Air Pollutants	PM_{10} [1]	ROG	SOx	NOx	CO
Existing Asphalt Facility					
Maximum Daily Emissions (pounds)	4.6	6.6	0.67	96	27
Total Annual Emissions (tons) [3]	0.39	0.35	0.088	9.5	2.2
Proposed Asphalt and Recycling Facility					
Maximum Daily Emissions (pounds)	7.8	12	0.73	179	51
Total Annual Emissions (tons) [5]	1.0	1.3	0.12	27	11
Increase in Criteria Air Pollutant Emissions					
Maximum Daily Emissions (pounds)	3.2	5.7	0.062	83	23.3
Total Annual Increase (tons)	0.6	1.0	0.030	17	8.4

NA = not applicable
PM_{10} = particulate mater less than 10 microns in size
VOCs = volatile organic compounds
SOx = oxides of sulfur
NOx = nitrogen oxides
CO = carbon monoxide

Table D-18: Estimated Barge Emission
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Marine Vessel Emission Factor (Rate) Calculation [1]							
				Emission Rate (g/kW-hr)			
Pollutant	Exponent (x)	Intercept (b)	Coefficient (a)	Cruise Mode	Slow Cruise Mode	Maneuvering	Auxiliary Engine
PM_{10}	1.5	0.2551	0.0059	0.00	0.28	0.32	0.26
NOx	1.5	10	0.13	0	10.95	11.85	11
SO_2	---	---	2.4	0	0.01	16.40	13
CO	1.0	---	0.84	0.0	2.09	4.19	0.84
ROG	1.5	---	0.067	0.000	0.26	0.75	0.070

Estimated Tugboat Emissions								
	Emissions Rates (lb/trip)				Emissions per Trip	Existing Plant Emissions	Proposed Plant Emissions	Increase in Emissions
Pollutant	Cruise Mode	Slow Cruise Mode	Maneuvering	Auxiliary Engine	(lb)	(tpy)	(tpy)	(tpy)
PM_{10}	0.0	1.5	0.17	0.069	1.7	0.021	0.11	0.085
NOx	0	58	6.2	2.8	67	0.83	4.2	3.3
SO_2	0	0	8.6	3.4	12	0.15	0.76	0.61
CO	0	11.0	2.2	0.22	13	0.17	0.84	0.67
ROG	0.0	1.4	0.4	0.019	1.8	0.022	0.11	0.090

Notes:
- g = grams
- kW = kilowatt
- hr = hour
- lb = pounds
- tpy = tons per year
- hp = horsepower

Equations:

For PM, NOx, CO and HC, Emission Rate (g/kW-hr) = a (Fractional Load)-x + b
For SOx, Emission Rate (g/kW-hr) = a (Fuel Sulfur Flow in g/kW-hr) + b
Fuel Consumption (g/kW-hr) = 14.12/(Fractional Load) + 205.717

Sulfur Fuel Flow (g/kW-hr) = 0.025 * Fuel Consumption (g/kW-hr)
For all pollutants,
Emissions = Emission Rate (g/kW-hr) * Mode Specific (kW) * Time (hours)]*pounds/453.5924 grams

[1] US. EPA, 2000, Analysis of Commercial Marine Vessel Emissions and Fuel Consumption.

Assumptions:

Main Engine	
DWT (hp) =	1,600
DWT (kW) =	1,193
Trip in BAAQMD (hours) =	8
Cruise Fractional Load =	0.8
Cruise Load (kW) =	0
Cruise (hr/trip) =	0
Slow Cruise Fractional Load =	0.4
Slow Cruise Load (kW) =	477
Slow Cruise (hr/trip) =	5
Slow Cruise Sulfur Fuel Flow	0.0036
Maneuvering Fractional Load =	0.2
Maneuvering Load (kW) =	239
Maneuvering (hr/trip) =	1
Maneuvering Sulfur Fuel Flow	6.9
Baseline (trips/year) =	25
Future (trips/year) =	125
Increase (trips/year) =	100
Sulfur in Fuel (%) =	0.0015
Auxiliary Engine	
Auxiliary Engine (kW) =	60
Standby Fractional Load =	1
Standby Mode (hr/trip) =	2

Table D-19: Estimate in Net Increase of Criteria Air Pollutants from On-Site and Off-Site Emissions
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Criteria Air Pollutants	Maxiumum Emissions [3]	PM_{10} [1]	ROG [2]	SOx	NOx	CO
Existing Plant Estimated Criteria Air Pollutant Emissions	(pounds per day)	70	58	13	194	84
	(tons per year)	2.5	1.7	0.25	13	3.5
Proposed Plant Estimated Annual Criteria Air Pollutant Emissions	(pounds per day)	134	112	13	439	150
	(tons per year)	5.4	4.2	0.89	36	14
Net Increase in Criteria Air Pollutant Emissions	(pounds per day)	63	55	0.37	245	66
	(tons per year)	2.9	2.6	0.64	23	10

PM_{10} = particulate matter less than 10 microns in size
VOCs = volatile organic compounds
SOx = sulfur oxides
NOx = nitrogen oxides
CO = carbon monoxide
ROG = reactive organic gases

1 Conservatively assumes all particulate matter from truck loading and silo filling is PM_{10}.
[2] Assumes volatile organic gases are synonymous with ROG
[3] Assumes one barge trip and maximum production rate for daily maximum.
Assumes maximum annual production for maximum annual emissions.

Table D-20: Estimated GHG Emission - Existing Asphalt Plant
Existing Asphalt Plant
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

On-Site Mobile Equipment	Fuel Type	Gallons Consumed Per Year	CO_2 Emission Factor (kg/gallon)	CO_2 Emissions (tons)	N_2O Emission Factor (kg/gallon)	N_2O Emissions (tons)	CH_4 Emission Factor (kg/gallon)	CH_4 Emissions (tons)
Caterpillar 988 Front-End Loader	Diesel	43,200	9.96	474	0.0001	5.23E-05	0.003	1.73E-10
Kubota Tractor	Diesel	270	9.96	3.0	0.0001	3.27E-07	0.003	1.08E-12
Caterpillar 345 Excavator	Diesel	8,640	9.96	95	0.0001	1.05E-05	0.003	3.46E-11
10 Wheel Dump Truck	Diesel	306	9.96	3.4	0.0001	3.70E-07	0.003	1.22E-12
10 Wheel Water Truck	Diesel	2,570	9.96	28	0.0001	3.11E-06	0.003	1.03E-11
Service/Utility Truck	Gasoline	300	8.78	2.9	0.0001	3.20E-07	0.0013	4.59E-13
Pickup Truck	Gasoline	300	8.78	2.9	0.0001	3.20E-07	0.0013	4.59E-13
Welder	Gasoline	60	8.78	0.58	0.0001	6.40E-08	0.0013	9.17E-14
Total GHG Emissions (ton)				610		6.73E-05		2.21E-10
TOTAL CO_2eq (tons)	**610**							

Fixed Sources		Therms Per Ton	Tons Per Month	Therms/Month	MBTUs/Year	CO_2 Emission Factor (kg/MBTU)	CO_2 Emissions (ton)	N_2O Emission Factor (kg/MBTU)	N_2O Emissions (ton)	CH_4 Emission Factor (kg/MBTU)	CH_4 Emissions (ton)
AC Plant Oil Heater	Natural Gas	--	--	75	90	53.05	5.3	0.00010	0.000010	0.0059	0.00059
AC Plant Dryer Drum Burner	Natural Gas	2.6	10,958	28,492	34,190	53.05	1,999	0.00010	0.0012	0.0059	0.22
Total GHG Emissions (ton)							2,005		0.0012		0.22
TOTAL CO_2eq (tons)	**2,010**										

Indirect Sources (electrical)	
Asphalt Plant Production Limit	131,500 tons
Asphalt Equipment Capacity	200 tons per hour
Asphalt Equipment Runtime	658 hours
Asphalt Equipment Capacity	100 tons per hour

Electrical Motors	Horse Power	MegaWatt	MegaWatt-hour	CO_2 Emission Factor (pounds per MWh)	N_2O Emission Factor (pounds per MWh)	CH_4 Emission Factor (pounds per MWh)
			Emission Factor	**804.54**	**0.0067**	**0.0037**
Belt From End Of Bunkers To Stacker	15	0.011	7.4	5,917	0.049	0.027
120' or 125' Radial Stacker	40	0.030	20	15,779	0.13	0.07
Feeder Belt Conveyors	7.5	0.006	3.7	2,958	0.025	0.014
Belt Conveyor	15	0.011	7.4	5,917	0.049	0.027
Belt Conveyor	15	0.011	7.4	5,917	0.049	0.027
5 x 14 Scalping Screen	25	0.019	12	9,862	0.082	0.045
81' Drag Slat Conveyor	75	0.056	37	29,585	0.25	0.14
16' Horizontal Drag Slat Conveyor	25	0.019	12	9,862	0.082	0.045
16' Horizontal Drag Slat Conveyor	25	0.019	12	9,862	0.082	0.045
Feeder Belt Conveyor	15	0.011	7.4	5,917	0.049	0.027
Feeder Belt Conveyor	15	0.011	7.4	5,917	0.049	0.027
Pugmill	40	0.030	20	15,779	0.13	0.07
Baghouse Fan	250	0.186	123	98,616	0.82	0.45
Total GHG Emissions (ton)				111	0.00092	0.00051
TOTAL CO_2eq (tons)	**111**					

Off-Site Mobile Equipment	Type	Annual Volume (trips)	Estimated Round Trip Distance (miles)	Fuel	Fuel Usage per Trip [1] (gallons)	CO_2 Emission Factor (kg/gallon)	CO_2 Emissions (tons)	N_2O Emission Factor (grams/mile)	N_2O Emissions (tons)	CH_4 Emission Factor (grams/mile)	CH_4 Emissions (tons)
Raw Aggregate Import	HHDT-DSL	9,107	5	Diesel	0.9	9.96	87	0.0001	5.02E-06	0.003	1.51E-04
Fine Sand Import	HHDT-DSL	1,607	50	Diesel	8.7	9.96	153	0.0001	8.86E-06	0.003	2.66E-04
Crumb Rubber Import	HHDT-DSL	34	80	Diesel	13.9	9.96	5	0.05	1.50E-04	0.06	1.80E-04
Asphalt Oil	MHDT-DSL	371	50	Diesel	7.5	9.96	30	0.05	1.02E-03	0.06	1.23E-03
Asphalt Export	MHDT-DSL	21,916	25	Diesel	3.7	9.96	898	0.05	3.02E-02	0.06	3.62E-02
Worker	LDA	1,500	30	Gasoline	1.0	8.55	14	0.05	2.48E-03	0.05	2.48E-03
Total (tons)							1,189		0.034		0.041
TOTAL CO_2eq (tons)	**1,200**										

TOTAL (ton)	**3,931**

[1] Fuel usage factors were compiled by running the California Air Resources Board's EMFAC2007 (version 2.3) for Sonoma County, year 2008.

LDA mileage rate = 29.29 gallons per mile
MHDT-DSL mileage rate = 6.698 gallons per mile
HHDT-DSL mileage rate = 5.749 gallons per mile

[2] BAAQMD, 2006, Source Inventory of Bay Area Greenhouse Gas Emissions, November.

GHG = greenhouse gases
CO_2 = carbon dioxide
N_2O = nitrous oxide
CH_4 = methane
CO_2e = CO_2 equivalent
Converted NOx and CH_4 to CO_2e using GWP factors (California Climate Action Registry, 2007):
N_2O GWP = 310
CH_4 GWP = 21
GWP = global warming potential

Table D-21: Estimated GHG Emission
Proposed Asphalt & Recycling Plant
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

On-Site Mobile Equipment	Fuel Type	Gallons Consumed Per Year	CO_2 Emission Factor (kg/gallon)	CO_2 Emissions (tons)	N_2O Emission Factor (kg/gallon)	N_2O Emissions (tons)	CH_4 Emission Factor (kg/gallon)	CH_4 Emissions (tons)
Caterpillar 988 Front-End Loader	Diesel	43,200	9.96	474	0.0001	5.23E-05	0.003	1.73E-10
Kubota Tractor	Diesel	270	9.96	3.0	0.0001	3.27E-07	0.003	1.08E-12
Caterpillar 345 Excavator	Diesel	8,640	9.96	95	0.0001	1.05E-05	0.003	3.46E-11
10 Wheel Dump Truck	Diesel	306	9.96	3.4	0.0001	3.70E-07	0.003	1.22E-12
10 Wheel Water Truck	Diesel	2,570	9.96	28	0.0001	3.11E-06	0.003	1.03E-11
Service/Utility Truck	Gasoline	300	8.78	2.9	0.0001	3.20E-07	0.0013	4.59E-13
Pickup Truck	Gasoline	300	8.78	2.9	0.0001	3.20E-07	0.0013	4.59E-13
Welder	Gasoline	60	8.78	0.58	0.0001	6.40E-08	0.0013	9.17E-14
Total GHG Emissions (ton)				610		6.73E-05		2.21E-10
TOTAL CO_2eq (tons)	**610**							

Fixed Sources		Therms Per Ton	Tons Per Month	Therms/Month	MBTUs/Year	CO_2 Emission Factor (kg/MBTU)	CO_2 Emissions (ton)	N_2O Emission Factor (kg/MBTU)	N_2O Emissions (ton)	CH_4 Emission Factor (kg/MBTU)	CH_4 Emissions (ton)
AC Plant Oil Heater	Natural Gas	--	--	75	90	53.05	5.3	0.00010	0.000010	0.0059	0.00059
AC Plant Dryer Drum Burner	Natural Gas	2.6	18,750	48,750	58,500	53.05	3,421	0.00010	0.0021	0.0059	0.38
Total GHG Emissions (ton)							3,426		0.0021		0.38
TOTAL CO_2eq (tons)	**3,435**										

Indirect Sources (electrical)		
Barge Import	500,675	tons
Barge Unloading Equipment Capacity	400	tons per hour
Barge Unloading Equipment Runtime	1,252	hours
Asphalt Plant Production Limit	225,000	tons
Asphalt Equipment Capacity	400	tons per hour
Asphalt Equipment Runtime	563	hours
Asphalt Crusher Annual Production	150,000	tons
Asphalt Equipment Capacity	100	tons per hour
Asphalt Equipment Runtime	1,500	hours

Description	HP	MW	MWh	CO_2 Emission Factor (pounds per MWh)	N_2O Emission Factor (pounds per MWh)	CH_4 Emission Factor (pounds per MWh)
				804.54	**0.0067**	**0.0037**
Drawbridge Conveyor (Sets Onto Barge)	15	0.011	14	11,264	0.094	0.052
Belt Conveyor (From Water Over RR Tracks)	60	0.045	56	45,057	0.38	0.21
Belt Conveyor (Overland Belt To Piles)	40	0.030	37	30,038	0.25	0.14
Belt Conveyor (Over Pile Conveyor With Traveling Trippe	50	0.037	47	37,547	0.31	0.17
Belt From End Of Bunkers To Stacker	15	0.011	6.3	5,062	0.042	0.023
120' or 125' Radial Stacker	40	0.030	17	13,499	0.11	0.06
Feeder Belt Conveyors	7.5	0.006	3.1	2,531	0.021	0.012
Belt Conveyor	15	0.011	6.3	5,062	0.042	0.023
Belt Conveyor	15	0.011	6.3	5,062	0.042	0.023
5 x 14 Scalping Screen	25	0.019	10	8,437	0.070	0.039
81' Drag Slat Conveyor	75	0.056	31	25,310	0.21	0.12
16' Horizontal Drag Slat Conveyor	25	0.019	10	8,437	0.070	0.039
16' Horizontal Drag Slat Conveyor	25	0.019	10	8,437	0.070	0.039
Feeder Belt Conveyor	15	0.011	6.3	5,062	0.042	0.023
Feeder Belt Conveyor	15	0.011	6.3	5,062	0.042	0.023
Pugmill	40	0.030	17	13,499	0.11	0.06
Baghouse Fan	250	0.186	105	84,367	0.70	0.39
Asphalt Crusher	250	0.186	280	224,980	1.9	1.0
Total GHG Emissions (ton)				269	0.0022	0.0012
TOTAL CO_2eq (tons)	**270**					

Off-Site Mobile Equipment	Type	Annual Volume (trips)	Estimated Round Trip Distance (miles)	Fuel	Fuel Usage per Trip (gallons) [1]	CO_2 Emission Factor (kg/gallon)	CO_2 Emissions (tons)	N_2O Emission Factor (grams/mile)	N_2O Emissions (tons)	CH_4 Emission Factor (grams/mile)	CH_4 Emissions (tons)
Raw Aggregate Import	Barge	213	50	Diesel	630	9.96	1,473	0.0001	1.17E-06	0.003	3.52E-05
Fine Sand Import	Barge	38	50	Diesel	630	9.96	263	0.0001	2.09E-07	0.003	6.28E-06
Crumb Rubber Import	HHDT-DSL	59	80	Diesel	13.9	9.96	9	0.05	2.60E-04	0.06	3.12E-04
Recycled Asphalt Import	HHDT-DSL	13,043	50	Diesel	8.7	9.96	1,245	0.05	3.59E-02	0.06	4.31E-02
Water Tanker	HHDT-DSL	650	5	Diesel	0.9	9.96	6	0.05	1.79E-04	0.06	2.15E-04
Asphalt Oil	HHDT-DSL	634	50	Diesel	8.7	9.96	61	0.05	1.75E-03	0.06	2.10E-03
Raw Aggregate Export	MHDT-DSL	40,967	25	Diesel	3.7	9.96	1,679	0.05	5.64E-02	0.06	6.77E-02
Fine Sand Export	MHDT-DSL	7,229	25	Diesel	3.7	9.96	296	0.05	9.96E-03	0.06	1.20E-02
Recycled Asphalt Export	MHDT-DSL	25,000	25	Diesel	3.7	9.96	1,024	0.05	3.44E-02	0.06	4.13E-02
Asphalt Export	MHDT-DSL	37,500	25	Diesel	3.7	9.96	1,537	0.05	5.17E-02	0.06	6.20E-02
Worker	LDA	1,500	30	Gasoline	1.0	8.55	14	0.05	2.48E-03	0.05	2.48E-03
Total (tons)							7,608		0.19		0.23
TOTAL CO_2eq (tons)	**7,673**										

TOTAL (ton)	**11,988**

[1] Fuel usage factors were compiled by running the California Air Resources Board's EMFAC2007 (version 2.3) for Sonoma County, year 2008.

LDA mileage rate =	29.29	gallons per mile
MHDT-DSL mileage rate =	6.698	gallons per mile
HHDT-DSL mileage rate =	5.749	gallons per mile

[2] California Climate Action Registry, 2007.

[3] BAAQMD, 2006, Source Inventory of Bay Area Greenhouse Gas Emissions, November.

GHG = greenhouse gases
CO_2 = carbon dioxide
N_2O = nitrous oxide
CH_4 = methane
CO_2e = CO_2 equivalent
Converted NOx and CH_4 to CO_2e using GWP factors (California Climate Action Registry, 2007):
N_2O GWP = 310
CH_4 GWP = 21
GWP = global warming potential

Table D-22: Estimate of Net Increase in GHG Emissions
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

Greenhouse Gases	**CO_2** (tons per year)	**N_2O** (tons per year)	**CH_4** (tons per year)	**CO_2eq** (tons per year)
Existing Asphalt Plant				
On-Site Mobile Equipment	6.10E+02	6.73E-05	2.21E-10	6.10E+02
Off-Site Mobile Equipment	1.19E+03	3.39E-02	4.05E-02	1.20E+03
Fixed Sources	2.00E+03	1.22E-03	2.23E-01	2.01E+03
Indirect Sources (electrical)	1.11E+02	9.24E-04	5.10E-04	1.11E+02
Proposed Asphalt and Recycling Plant				
On-Site Mobile Equipment	6.10E+02	6.73E-05	2.21E-10	6.10E+02
Off-Site Mobile Equipment	7.61E+03	1.93E-01	2.31E-01	7.67E+03
Fixed Sources	3.43E+03	2.08E-03	3.81E-01	3.43E+03
Indirect Sources (electrical)	2.69E+02	2.24E-03	1.24E-03	2.70E+02
Net Increase in Greenhouse Gases	**8.00E+03**	**1.61E-01**	**3.50E-01**	**8.06E+03**

TOTAL (Million tons)	0.008
Sonoma County 2002 Emissions (Million tons) [1]	3.7
Percent	0.22%

[1] BAAQMD, 2006, Source Inventory of Bay Area Greenhouse Gas Emissions, November.

GHG = greenhouse gases
CO_2 = carbon dioxide
N_2O = nitrous oxide
CH_4 = methane
CO_2e = CO_2 equivalent
Converted NOx and CH_4 to CO_2e using GWP factors (California Climate Action Registry, 2007):
N_2O GWP = 310
CH_4 GWP = 21
GWP = global warming potential

Table D-23: Estimated Mitigated GHG Emission - Biodiesel in On-site Equipment
Dutra Haystack Landing Asphalt & Recycling Facility
Draft Environmental Impact Report

On-Site Mobile Equipment	Fuel Type	Gallons Consumed Per Year	CO_2 Emission Factor (kg/gallon)	CO_2 Emissions (tons)	N_2O Emission Factor (kg/gallon)	N_2O Emissions (tons)	CH_4 Emission Factor (kg/gallon)	CH_4 Emissions (tons)
Caterpillar 988 Front-End Loader	Biodiesel	43,200	9.52	453	0.0001	5.00E-05	0.003	1.65E-10
Kubota Tractor	Biodiesel	270	9.52	2.8	0.0001	3.12E-07	0.003	1.03E-12
Caterpillar 345 Excavator	Biodiesel	8,640	9.52	91	0.0001	9.99E-06	0.003	3.31E-11
10 Wheel Dump Truck	Biodiesel	306	9.52	3.2	0.0001	3.54E-07	0.003	1.17E-12
10 Wheel Water Truck	Biodiesel	2,570	9.52	27	0.0001	2.97E-06	0.003	9.83E-12
Service/Utility Truck	Gasoline	300	8.78	2.9	0.0001	3.20E-07	0.0013	4.59E-13
Pickup Truck	Gasoline	300	8.78	2.9	0.0001	3.20E-07	0.0013	4.59E-13
Welder	Gasoline	60	8.78	0.58	0.0001	6.40E-08	0.0013	9.17E-14
Total GHG Emissions (ton)				583		6.43E-05		2.11E-10
TOTAL CO_2eq (tons)	583							
Bio-diesel GHG Reduction (tons)	27							
Bio-diesel GHG Reduction (percent)	4%							

Notes:
biodiesel = 20 percent biodiesel blend

GHG = greenhouse gases
CO_2 = carbon dioxide
N_2O = nitrous oxide
CH_4 = methane
CO_2e = CO_2 equivalent
Converted NOx and CH_4 to CO_2e using GWP factors (California Climate Action Registry, 2007):
N_2O GWP = 310
CH_4 GWP = 21
GWP = global warming potential

APPENDIX E

BIOLOGICAL RESOURCES DATA

Sherby Sanborn, Consulting Arborist
ISA Certified Arborist Number WE-0258A
Member American Society of Consulting Arborists
Post Office Box 447, Glen Ellen, CA 95442 Phone/Fax 707.935.0892 Email:ssanborn@sonic.net

Dutra Materials
Attn: Josh Kirtley
1000 Point San Pedro Road
San Rafael, CA 94901-8312

April 12, 2004

Dear Josh:

Please find enclosed the tree report you requested for Haystack Landing, 3355 Petaluma Blvd. South, Petaluma. I believe the report addresses all the issues we discussed when we met at the site on March 24, however, if I left something out please let me know. As I mentioned to you in an email, and based on web based Sonoma County maps delineating Valley Oak Habitat (VOH), the Haystack Landing site is outside any designated VOH. This means there are no tree replacement requirements when removing valley oaks. In addition, if the property is in a VOH, because only one of three valley oaks is being removed I believe you would not have to provide replacements. There may, however, be other permit requirements that affect the trees.

Its been a pleasure working with you and if I can be of further assistance please contact me. I look forward to working with you again in the future.

Sincerely,

Sherby Sanborn

Sherburn R. Sanborn

SRS:ss

Enclosures: Three copies of tree report
Invoice

Sherby Sanborn, Consulting Arborist
ISA Certified Arborist Number WE-0258A
Member American Society of Consulting Arborists
Post Office Box 447, Glen Ellen, CA 95442 Phone/Fax 707.935.0892 Email:ssanborn@sonic.net

Haystack Landing Tree Protection Report
3355 Petaluma Blvd. South
Petaluma, California

April 11, 2004

Summary

The proposed project at Haystack Landing will require the removal of 20 trees including: a valley oak, a Monterey pine, a black walnut, a black locust, a coast live oak, eight European elm, and seven madrone. An opportunity to replace these trees exists along the west side of the property. Trees could be planted as a view screen adjacent to hwy 101.

Introduction

On March 24, 2004 I met Josh Kirtley, Quarry Engineer for Dutra Materials, to discuss development plans for the property at 3355 Petaluma Blvd. South, Petaluma, California. Specifically Mr. Kirtley requested that I prepare a tree report describing the condition of trees that will be affected by future development. Mr. Kirtley told me that current plans will involve moving the old house and grading the area from the house southward to an area that will be preserved and restored as a marsh. As a result all trees would be removed.

Scope of Work

This document describes 20 trees at this site including their condition, signs and symptoms of diseases, and defects. The following evaluations are based upon on site observations and VTA, Visual Tree Assessment. Trees often exhibit external signs of internal defects or disease. Using VTA and his/her knowledge of tree biology and growth an arborist can evaluate external bulges, bends, leans, or cracks. These apparently superfluous repair structures develop as a result of internal defects or disease (Mattheck 1998). Not all internal diseases or defects cause trees to develop externally observable repair structures. No root crown (the area at the base of the tree where the trunk and roots merge) excavations were performed to examine roots and root crowns for defects or diseases such as armillaria. Finally, only trees greater than or equal to 4 inches DBH (diameter breast height, measured on the trunk at 4.5 feet above median soil grade) were examined.

Limitation of Observations

One aspect of any tree evaluation involves identifying trees that are a "HAZARD." To be a hazard, a tree must have a "DEFECT" that could cause all or part of it to fail and a "TARGET." Targets include people, houses, cars and facilities that attract people (like a picnic table) or any object of value. Due to their condition, many of the trees described below, particularly the elms, the oak, and the black walnut have defects that could result in partial or total tree failure.

Construction impacts such as soil compaction, root cutting, mechanical damage and improper pruning, to name just a few human activities, can affect tree health and safety. As an arborist I make recommendations based upon observations made during site visits, from site maps, and from the information provided by the client. As a result, pertinent information that is withheld may compromise the accuracy of this report. Additionally, my evaluations are based on the condition of these twenty trees on March 24, 2004.

Observations

There is a large, old two story house and mobile home on a hill at the north end of the property. There are two large valley oaks on the north side of the house, as well as, some declining black walnut trees, at least one European elm, and a large patch of elm suckers (probably the result of a removal). A the northern property boundary, there is a stand of mature eucalyptus. The majority of trees to be removed are on the south side of the house and trailer (see map page 9). A third valley oak is growing down slope from the south side of the trailer, along the eastern property boundary and it will be removed. Other trees on the site include eight European elm, seven madrone, one Monterey pine, one black walnut, one black locust, and one coast live oak. In general these trees have been poorly maintained for many years. Because the oaks and madrone are well adapted to California's inland climate, they have generally done well at this site.

Disease Problems: At the time I visited the site in late March, the trees were just beginning to leaf out. As a result, no obvious pest or disease problems were noted. From 1979 to 1990 I was the Sonoma County coordinator for the California Department of Forestry and Fire Protections (CDF) Dutch Elm Disease Project (DED). I visited this site several time during that period because several elms became infected with DED. The elms on the property were already struggling during the 1980's due primarily to insufficient water and poor maintenance.

Individual Tree Evaluations

Tree diameter is measured at 4.5 feet above median soil grade also known as DBH (diameter breast height). Trees that have more than one trunk or stems joined at or just above ground level are defined as multi-trunk. Each of the trunks of multitrunk trees were measured at DBH. Trees with branches arising at or below 4.5 feet were measured at the narrowest point between the lowest branch and the ground.

Crown Radius is the maximum crown radius (the distance from the trunk center to the outer edge of the longest branch). Tree crowns are usually not symmetrical. In addition the crown may not be centered over the tree's root crown (the area at the base of the tree where the trunk and roots merge).

Tree Number 1

Black Acacia, *Robinia pseudoacacia* Trunk Diameter (DBH): 25 in.
Crown Radius: 15 ft. Number of Trunks: 1

Condition: This tree is declining with sparse foliage, many broken branches and trunk cavities.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. This tree is in poor condition and does not warrant protection.

Tree Number 2

Monterey Pine, *Pinus radiata* Trunk Diameter (DBH): 16 in.
Crown Radius: 12 ft. Number of Trunks: 1

Condition: This is a young tree and it is growing well with no signs of the usual pests associated with this species.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Monterey pine is a coastal tree and is, therefore, poorly adapted to the hot dry summers typical of our inland valleys. Monterey pines do well when young but as they mature they are attacked and eventually killed by bark beetles.

Tree Number 3

European Elm, *Ulmus procera* Trunk Diameter (DBH): 15 in.
Crown Radius: 16 ft. Number of Trunks: 1

Condition: This tree is in fair condition with some dead broken branches and sucker that have developed from roots. Suckering is a common characteristic of this species.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but its condition does not warrant preservation.

Tree Number 4

European Elm, *Ulmus procera* Trunk Diameter (DBH): 11.5 in.
Crown Radius: 13 ft. Number of Trunks: 1

Condition: This tree is in fair condition with deadwood and suckers.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but its condition does not warrant preservation.

Tree Number 5

Black Walnut, *Juglans nigra* Trunk Diameter (DBH): 28.5 in.
Crown Radius: 16 ft. Number of Trunks: 1

Condition: This tree is in fair condition with some large dead and broken branches. The large broken branches have left stubs that are open with pockets of decay which may extend into the trunk.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. This tree has become structurally undesirable due to lack of care and proper pruning.

Tree Number 6

Valley Oak, *Quercus lobata* Trunk Diameter (DBH): 48 in.
Crown Radius: 27 ft. Number of Trunks: 1

Condition: Generally speaking this tree is in good health. It does have numerous dead branches, as well as, broken branches with decayed stubs. Several of the large stubs have large pockets of decay that may extend into the trunk potentially compromising the structural soundness of the tree. Additionally, the trunk has some unusual bulges at the root crown (the area at the base of the tree where the trunk and roots merge) which may also indicate structural weakness.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. This tree's questionable condition does not warrant preservation.

Tree Number 7

European Elm, *Ulmus procera* Trunk Diameter (DBH): 33.5 in.
Crown Radius: 19 ft. Number of Trunks: 1

Condition: This tree appears to be in fair condition. Like the other elms on the property, it has dead and broken branches in its crown. There is a large vertical crack the length of the main trunk that extends to the root crown. This crack is a sign of potential structural weakness.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but the tree's condition does not warrant preservation.

Tree Number 8

European Elm, *Ulmus procera* Trunk Diameter (DBH): 33.1 in.
Crown Radius: 13 ft. Number of Trunks: 1

Condition: This tree is in poor condition with many dead and broken branches, as well as, significant suckering which is an indication of tree decline.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but this tree's condition does not warrant preservation.

Tree Number 9

European Elm, *Ulmus procera* Trunk Diameter (DBH): 34.5 in.
Crown Radius: 18 ft. Number of Trunks: 1

Condition: This tree is in poor condition with many large broken branches and significant dieback in the crown. These are symptoms of significant decline

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but its condition does not warrant preservation.

Tree Number 10

European Elm, *Ulmus procera* Trunk Diameter (DBH): 10.5 & 13.5 in.
Crown Radius: 20 ft. Number of Trunks: 2

Condition: This tree is in fair condition with significant deadwood in the crown, and many broken branches. This tree, like others, is suckering profusely, an additional sign that this tree is in severe decline.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but its condition does not warrant preservation.

Tree Number 11

European Elm, *Ulmus procera* Trunk Diameter (DBH): 13.5 in.
Crown Radius: 17 ft. Number of Trunks: 1

Condition: This tree is in fair condition with significant deadwood in the crown, and many broken branches. This tree, like others, is suckering profusely, an additional sign that it's in severe decline.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but its condition does not warrant preservation.

Tree Number 12

European Elm, *Ulmus procera* Trunk Diameter (DBH): 13.2 in.
Crown Radius: 14 ft. Number of Trunks: 1

Condition: This tree is in fair condition with significant deadwood in the crown, and many broken branches. This tree, like others, is suckering profusely, an additional sign that it's in severe decline.

Development Impacts: Significant. This section of the hill will be excavated.

Recommendations: Remove. Not only is this species susceptible to DED but its condition does not warrant preservation.

Tree Number 13

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 11, 7, & 4 in.
Crown Radius: 11 ft. Number of Trunks: 3

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Tree Number 14

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 6.5,7,11,4.8, & 5 in.
Crown Radius: 13 ft. Number of Trunks: 5

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Tree Number 15

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 6.8 & 9.5 in.
Crown Radius: 12 ft. Number of Trunks: 2

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Tree Number 16

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 7 & 11.5 in.
Crown Radius: 12.5 ft. Number of Trunks: 2

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Tree Number 17

Coast Live Oak, *Quercus agrifolia* Trunk Diameter (DBH): 4.5 in.
Crown Radius: 8 ft. Number of Trunks: 1

Condition: This small tree is growing vigorously. The trees upper crown is somewhat bent toward the south possibly due to prevailing wind flow patterns.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. Unlike madrone, coast live oak have a good success rate when transplanted. This is particularly true if the tree is removed carefully with a majority of the roots intact. The tree is small enough that a large tree spade could accomplish the task.

Tree Number 18

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 6 in.
Crown Radius: 12 ft. Number of Trunks: 1

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Tree Number 19

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 8.5 & 11 in.
Crown Radius: 12.5 ft. Number of Trunks: 2

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Tree Number 20

Madrone, *Arbutus menziesii* Trunk Diameter (DBH): 4.5,4.5,5,3 & 3 in.
Crown Radius: 6 ft. Number of Trunks: 5

Condition: This tree is in excellent condition and growing well. I saw no evidence of madrone canker which is unusual for this species.

Development Impacts: Significant because the area will be graded and compacted.

Recommendations: Remove the tree or attempt relocation. The efficacy of transplanting madrone is questionable because they generally do poorly when disturbed. Well established trees in particular don't respond well to relocation.

Adjacent Trees

There are no trees on properties adjacent to this one that will be affected by development activities.

Discussion and Conclusions

The trees in the vicinity of the old house and mobile home are in general declining and have been for years. Because the use of this property requires extensive grading and compaction, the trees cannot remain. Moving them is not economical because of their condition and value as landscape trees. The old house has already been lifted and is sitting on beams (this was done over ten years ago). Moving it should not impact the two remaining valley oaks. A few of the trees could be moved to another location at the site prior to grading, however, only the coast live oak is likely to survive the stress.

Based upon maps available on the Sonoma County website, the property is not within a Valley Oak Habitat (VOH) area. If this is correct there are no replacement tree requirements. There may, however, be other permitting processes related to trees that I was unable to find.

Recommendations

The twenty trees designated on the accompanying map (page 9) should be removed. Only one tree, # 17, a coast live oak is suitable for transplanting. The cost of transplanting might exceed the cost of installing a new tree of similar size. There is an opportunity to plant trees on the west side of the property as a view screen along hwy 101. Utilizing native plants such as oaks would be viable option that should be considered.

References:

Mattheck, Claus, 1998. *Design in Nature, Learning from Trees*. Springer. 276 pages.


Haystack Landing
3355 Petaluma Blvd. South
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Lucy Macmillan
Wetlands Specialist

Conceptual Wetlands Mitigation Plan
Haystack Landing Project Site
Petaluma, Sonoma County, California
U.S. Army Corps of Engineers File No. 28104N

The proposed Haystack Landing Asphalt Facility project would result in the filling of approximately 1.76 acres of seasonal wetland habitat on the central portion of the Haystack Landing project site located in Petaluma, Sonoma County, California. A total of 9.93 acres of existing jurisdictional wetlands on the remainder of the project site would not be filled as a result of the project. The proposed mitigation plan would involve reintroducing tidal flows to approximately 16 acres on the southern portion of the site thereby restoring degraded wetlands in this area and creating new brackish marsh habitat.

Historic Land Use of the Site

Historically, most of the 38-acre Haystack Landing site was used as a dairy farm until 1968 when the site was purchased by a quarry located on the west side of Highway 101 just north of the project site. The northern 27 acres of the site were leased back to the dairy rancher at that time and the remaining 10 acres located in the southern portion of the site were used for the disposal of sediments from the aggregate processing facility. Since 1968, various dikes and siltation ponds were constructed on the site; eventually five siltation ponds were constructed. In 1976, the northernmost siltation pond was filled with earthen material excavated from an adjacent hill. The quarry actively used the remaining ponds, including the one originally constructed in 1968 at the southernmost portion of the site, until the mid-1970s'. Two of the ponds located on the southwestern portion of the site were in continuous use until at least 1990. According to the current property owners, none of the siltation ponds have been actively used for quarry or other operations since 1990.

Proposed Wetlands Mitigation Concept

The proposed wetlands mitigation plan for the Haystack Landing site is to restore the lower third of the project site (which covers approximately 16 acres) to brackish marsh. Of the 16-acre area, approximately 9.6 acres consists of seasonal wetland that developed over time in the abandoned siltation ponds referenced above.

Review of a 1963 black and white aerial photograph illustrating site conditions prior to disturbance from quarry use, shows evidence of a brackish marsh on most of the lower two-thirds of the project site west of the existing railroad tracks. Various sloughs can be observed on the aerial photograph, suggesting tidal influence from the Petaluma River occurred on this part of the site. A significant goal of the proposed wetlands mitigation plan is to therefore restore historic hydrologic conditions by reintroducing tidal circulation to the 16-acre mitigation area.

Lucy Macmillan
Wetlands Specialist

The proposed mitigation project could result in restoring approximately 9.6 acres of existing seasonal wetland to brackish marsh and creating up to 4 acres of wetland habitat. This habitat could provide wildlife habitat for rare, coastal marsh dependent species, including the federal and state endangered California clapper rail, the state threatened Black rail, possibly the federal and state endangered salt marsh harvest mouse, as well as the northern harrier, salt marsh common yellow throat, and other species.

The proposed mitigation plan will be submitted to the U.S. Army Corps of Engineers and San Francisco Bay Regional Water Quality Control Board for their review and approval as part of the Clean Water Act Sections 404 and 401 permitting processes.

WETLANDS MITIGATION AND MONITORING PLAN
HAYSTACK LANDING WETLAND MITIGATION PROJECT
PETALUMA, SONOMA COUNTY, CALIFORNIA
(U.S. Army Corps of Engineers File No. 28104N)

Prepared for:

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APRIL 2006

1.0 INTRODUCTION

The Dutra Group is proposing to establish an asphalt plant, recycling operation and associated stockpiles of rock and sand used to produce finished products at the approximately 37-acre Haystack Landing project site located at 3355 Petaluma Boulevard South in Petaluma, Sonoma County, California. In support of the asphalt plant, a new barge off-loading facility will be constructed on a small parcel located on the Petaluma River that will be used to import material from outside Sonoma County. The locations of the proposed asphalt plant and the off-loading facility are illustrated on Figure 1.

Construction of the proposed operating and off-loading facility project would result in the filling of approximately 1.76 acres of seasonal wetland and approximately 0.01 acre of riverbed subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act. This report details the proposed mitigation program designed to mitigate for the loss of these jurisdictional areas. An additional 0.57 acre of degraded seasonal wetland habitat would be filled during the implementation of the proposed mitigation project.

The proposed wetland mitigation project would occur on approximately 19 acres on the southern portion of the 37-acre site. Of these 19 acres, approximately 9.39 acres are existing jurisdictional seasonal wetlands (Plate 1). The reason this portion of the site was selected as the optimal location for the mitigation preserve was two-fold: 1) to locate the operating facilities on primarily upland habitats north of this area thereby avoiding over 80 percent of the wetland habitats on the 37-acre site, and 2) to create new wetland and marsh habitat and enhance degraded wetland habitat as a bay-fringe mosaic in an area adjacent to tidal sloughs and wetlands associated with the Petaluma River corridor (Plate 2).

The proposed mitigation project would include the following:

- creation of 0.67 acre of tidal marsh
- creation of 2.04 acres seasonally inundated wetland
- enhancement of 0.51 acre seasonal wetland to tidal marsh
- enhancement of 5.47 acres seasonally inundated wetland
- enhancement of 2.50 acres of seasonal wetland to emergent marsh

In total, the proposed mitigation would compensate for wetlands-related impacts resulting from construction of the operating plant and off-loading facility at approximately a 3:1 replacement ratio[1] with the goal of creating improved wetlands functions and values on the project site.

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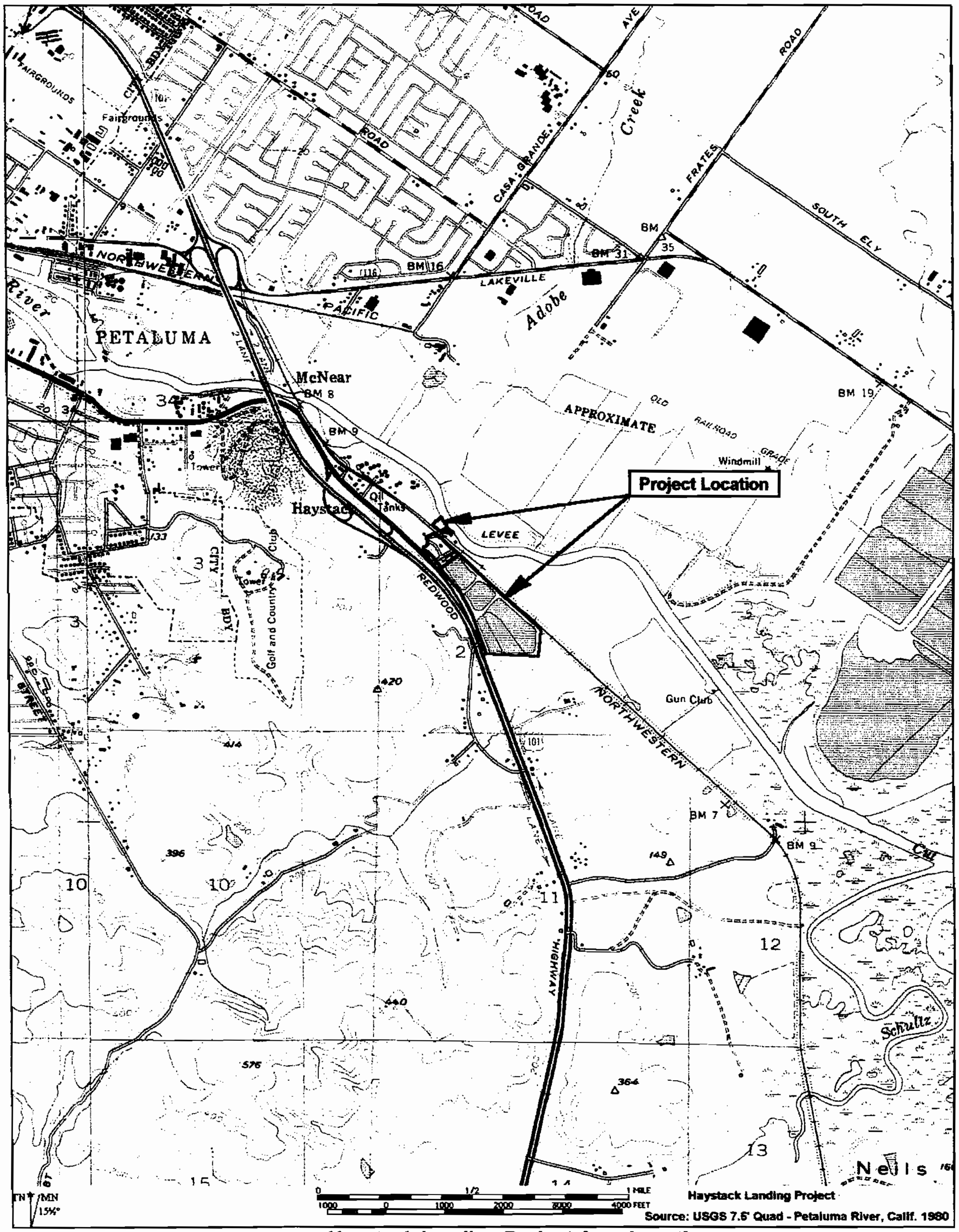
[1] The replacement ratio was calculated assuming full credit for the creation of 2.71 acres of new wetland habitat and 50% credit for the enhancement of 8.48 acres of existing wetland habitat.



Haystack Landing Project Area Location

Figure 1

2.0 RESPONSIBLE PARTIES

2.1 Applicant/Permittee

Pagliaio Ventures, L.L.C., P.O. Box 751222, Petaluma, California 94975 is the applicant for the proposed project.

2.2 Applicant's Designated Agent

Mr. Brian Peer of the Dutra Group, 1000 Point San Pedro Road, San Rafael, California 94901-8312 is the designated agent for the proposed project.

2.3 Preparers of Mitigation Plan

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3.0 PROJECT REQUIRING MITIGATION

3.1 Environmental Setting

The Haystack Landing project site consists of three assessor parcels on the Petaluma River USGS quadrangle in the middle portion of Section 2 in Sonoma County, California. Two of these parcels (APN 019-320-023 and APN 019-320-022) form an approximately 37-acre trapezoidal parcel bound to the east by the Northwestern Pacific Railroad tracks and to the west by Highway 101 (hereafter jointly referred to as Parcel A). The third parcel (APN 019-220-001) occurs east of the railroad tracks and fronts the Petaluma River (hereafter referred to as Parcel B). These parcels are described in greater detail in Section 3.3.

3.2 Description of Asphalt Plant, Recycling Plant, and Off-loading Facility

The proposed project will consist of a new asphalt plant, an asphalt recycling plant, and associated stockpiles of rock and sand used to produce finished products. These products include recycled asphalt products, an integral component for manufacturing new asphaltic concrete (AC).

The new asphalt plant, which will be located on the northern portion of Parcel A, will consist of a 6-product cold feed bin assembly, a 400 ton per hour counter flow drum mix assembly, twin oil storage tanks, two 200 ton storage silo assemblies, a heating oil plant, and a truck scale installation. An operator's compartment and electrical motor center will also be incorporated into the plant. This facility will be designed and constructed to address all seismic movements, as well as blue smoke and related emission requirements.

In support of the asphalt plant, a new barge off-loading facility will be constructed on Parcel B that will be used to import material from outside Sonoma County. This facility is required because all mining products will be imported from other locations. Conveyor belts will be erected to transport materials from the water's edge to stockpile locations within the property.

The barge offloading equipment will include a conveyor with hopper, which will be lowered down onto a loaded barge. A front-end loader located on the barge will place material into the hopper for transport onto land. The conveyor with the hopper will be relatively short (about 40') and will drop material onto a longer conveyor (about 200') located perpendicular to the railroad tracks. This longer conveyor will rise from the river's edge up to a height of 24' going over the railroad tracks. This height is necessary to allow standard trains to pass underneath the conveyor. After crossing the railroad, another conveyor will take the material 700' in a southeast direction roughly parallel to the railroad. This conveyor will remain at a height of approximately 20' until it crosses over the current access road, which will remain in place. At the end of this conveyor, a telescoping radial stacking conveyor or similar conveyor system will stockpile the material. This will allow the most efficient storage of material on the site.

A small office complex, consisting of a reception and weighmaster area, an operations office, and a conference room area will also support the facility.

3.3 Site Characteristics

3.3.1 Background

The project site is divided into two parcels: Parcel A covers approximately 37 acres east of Petaluma Boulevard South and Parcel B covers approximately 0.8 acres east of Parcel A and fronts the Petaluma River.

Historically, Parcel A was used as a dairy farm until 1968 when the site was purchased by American Rock and later the Dutra Group. The northern 27 acres of the site were leased back to the dairy rancher at that time and the remaining 10 acres located in the southern portion of the site were used for the disposal of quarry wash water transferred from a quarry located on the west side of Highway 101 just north of the project site. Since 1968, various dikes and siltation ponds were constructed on the Haystack site; eventually five siltation ponds were constructed for settling quarry wash water (Figure 2). In 1976, the northernmost siltation pond was filled with earthen material excavated from an adjacent hill. The remaining ponds, including the one originally constructed in 1968 at the southernmost portion of the site, were actively used by the quarry for the disposal of quarry wash water until the mid-1970s. Two of the ponds located on the southwestern portion of the site were in continuous use until at least 1990[2]. According to the current property owners, none of the siltation ponds have been actively used for quarry or other operations since 1990. An historic farmhouse occurred on the northern 4 acres of the project site until it burned down in 2004. Several barns and outbuildings used to store miscellaneous materials located south of the house were demolished in 2004 as permitted by a County demolition permit as well.

Parcel B fronts the Petaluma River and covers approximately 0.8 acre of relatively flat land. Historically this site had a small residence on it and was primarily vegetated with non-native grasses and various shrubs including coyote bush.

A description of current conditions at the project site is provided below.

Parcel A

The northern portion of Parcel A covers approximately 4 acres directly adjacent to Petaluma Boulevard South. Two small dirt roads provide access to this area which is vacant and primarily dominated by ruderal grasses and herbs and mature trees, including eucalyptus. The southern portion of Parcel A covers approximately 33 acres east of Highway 101 and is comprised of the abandoned siltation ponds referenced above.

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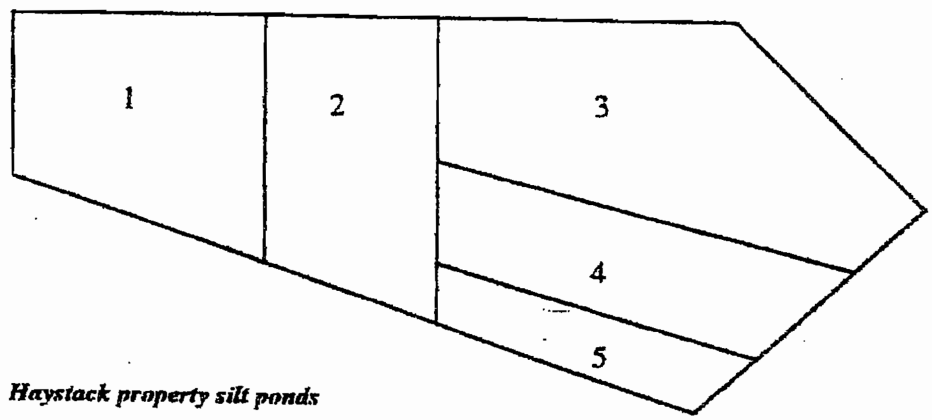
[2] LSA Associates, Inc. 1995. *Determination of Corps Jurisdictional Area, Haystack Landing, Petaluma.*



Siltation Ponds
Haystack Landing Project Site
Petaluma, California

Figure 2
(Source: LSA Associates, Inc. 1995)

Portions of the ponds that are higher in elevation have developed upland characteristics while lower elevations have developed primarily seasonal wetland characteristics. Various drainage ditches, at least one of which is tidally influenced, traverse portions of the site.

In September 2005 approximately 10 acres of the northern portion of Parcel A were grubbed and cleared of vegetation. Since that time, this portion of the site was hydroseeded as part of an erosion control program and has revegetated with herbaceous vegetation.

Parcel B

Parcel B fronts the Petaluma River and covers approximately 0.80 acre. A small band of coastal brackish marsh associated with the Petaluma River forms the eastern property boundary of this parcel. A remnant slough bisects a portion this parcel for a distance of approximately 110 linear feet, averaging approximately 7 feet wide, and is connected to the Petaluma River.

In early 2005 the house on this parcel was demolished as authorized by a County of Sonoma demolition permit. In September 2005, the parcel was cleared of vegetation and a layer of drain rock applied to the majority of the site (excluding the small tidal slough). The purpose of installing the drain rock was to provide a foundation for storing equipment associated with the future asphalt plant.

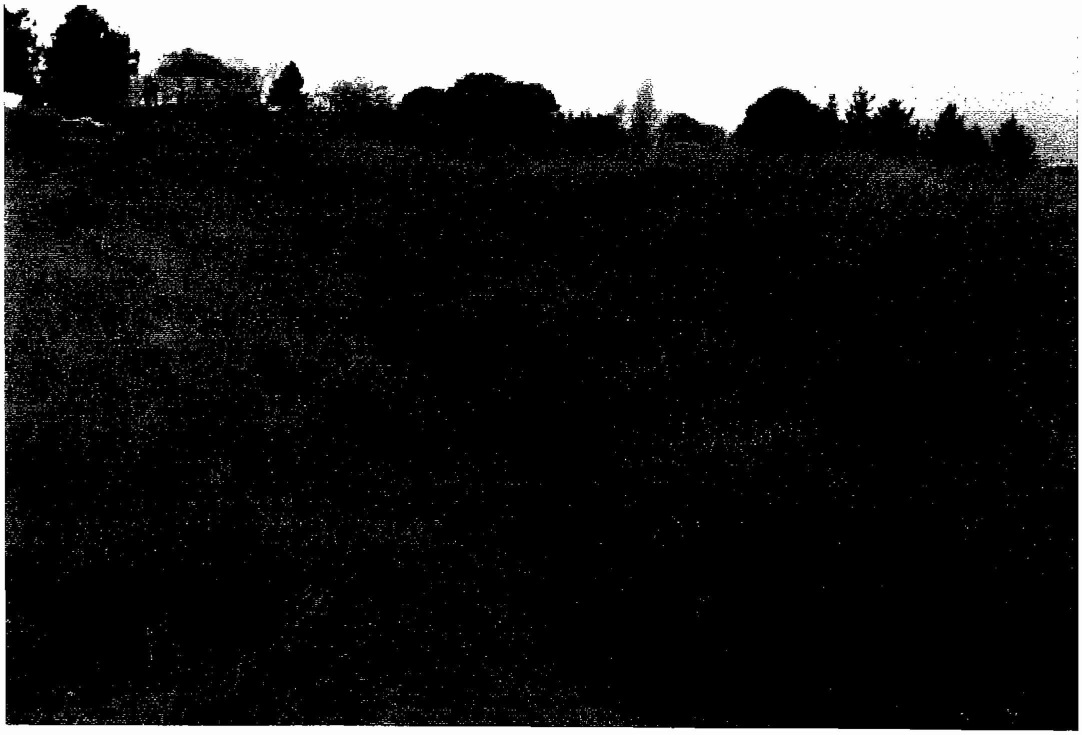
3.3.2 Existing Wetland Habitats

3.3.2.1 Parcel A

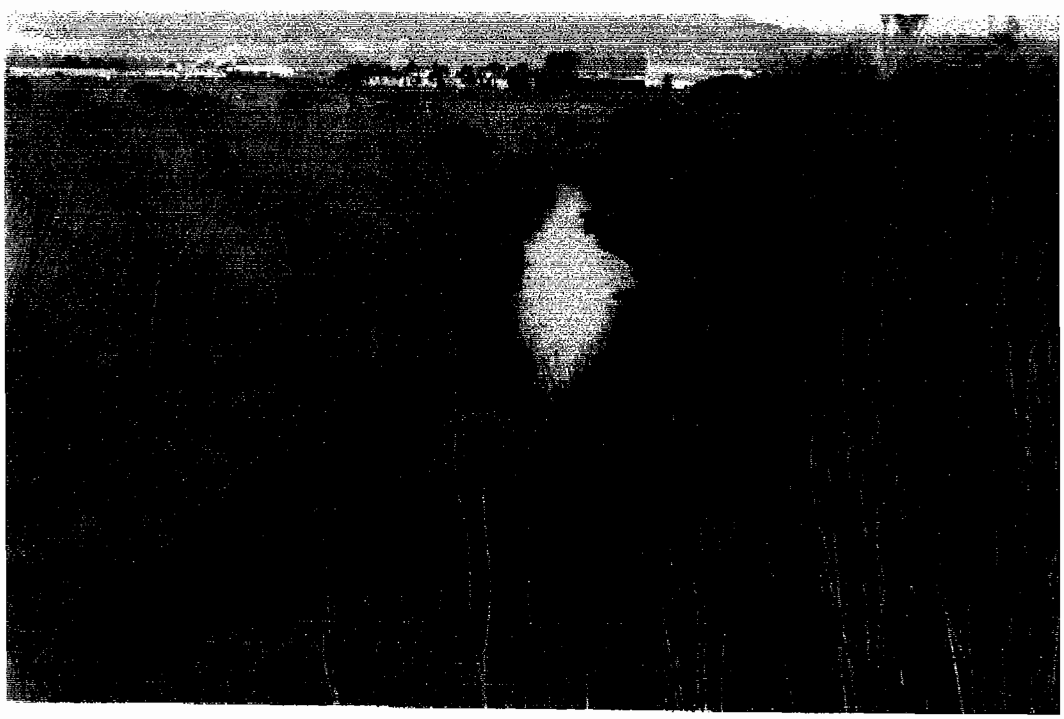
On November 7, 2003 the San Francisco District of the U.S. Army Corps of Engineers conducted a jurisdictional determination on Parcel A. Approximately 11.69 acres of jurisdictional wetlands and waters of the U.S. were identified. These areas are described below.

Drainage Ditches

Several drainage ditches occur on the project site. Most of these ditches support shallow pools of standing water and two of the drainage ditches appear to be tidally influenced. Illustrated on Plate 1 as drainage ditch DD1 and drainage ditch DD2 in the central portion of the property, these areas drain into a larger drainage ditch along the railroad tracks that parallels the eastern property boundary. The drainage ditch within the railroad easement is outside the project area and therefore is not mapped on the project site. Aerial photograph review indicates that the railroad ditch drains to the Petaluma River via a tidally-influenced slough.



Drainage ditch DD 1 looking north



Drainage Ditch DD 2 looking east towards Petaluma River

A smaller drainage ditch, delineated as drainage ditch DD3, parallels the southern property line for approximately 500 feet and is approximately 3 feet wide as shown on Plate 1. Saturated soils were observed in March 2003 in the eastern portion of the ditch where it connects to a pond located east of the property. This area also appears to be marginally tidally influenced.

The remaining ditches (drainage ditches DD4 and DD5) are probably brackish given the composition of cattail and pickleweed. However, it appears that the most northern of the ditches (drainage DD6) may convey and contain freshwater as there is no evidence of a direct hydrologic connection to any of the other tidally influenced ditches on the project site and the vegetation growing in drainage ditch DD6 consists of cattails

In total, the ditches on Parcel A cover approximately 1.53 acres subject to Corps jurisdiction.

Seasonal Wetlands

A total of nine wetland areas were identified on Parcel A ranging in size from 0.07-acre to 4.0 acres as illustrated on Plate 1. All of these areas occur within the former siltation ponds.

Wetland A is located in the middle of the site and covers approximately 1.09 acres. This wetland area appears to occasionally support standing water for a significant period of time during the growing season, as evidenced by the presence of algal matting in the western and northern edges of the wetland. Soils in this area are moist clay loam, with some gleying observed at approximately 16 inches. Hydrophytes (wetland plants) including alkali heath (*Frankenia salina*), rye grass (*Lolium multiflorum*), bird's-foot trefoil (*Lotus corniculatus*), and bristly ox tongue (*Picris echioides*) were the dominant plant species observed growing in this area. As a result of the grubbing activity that occurred on the northern portion of parcel A in 2005, approximately 0.53 acre of Wetland A was grubbed and cleared of vegetation.

Other wetlands on the site include a small seasonal wetland (Wetland I) covering 0.03-acre and wetlands B, C, and D which occur on the southern portion of the site. Wetland B is the largest of these areas (measuring 4.0 acres) and during the rainy season supports standing water in the eastern portion where it connects to a small ditch that drains to the ditch adjacent to the railroad tracks east of the project site. Obligate wetland plants including cattail (*Typha domenigensis*) and pickleweed (*Salicornia virginica*) grow in this area. Significant algal matting in the lower portions of this area and evidence of debris at the outlet of the drainage ditch connecting to Wetland B were observed in March 2003 which indicates that this area ponds water during the wetter months.

Soil texture, color, and structure are greatly varied throughout the soil profile within the Wetland B area. This is mostly attributed to the fact that the soils in this area are an accumulation of sediments from quarry wash water deposited in these ponds in the

1970's and 1980's. Gleying and mottling observed throughout the soil profile suggests that soils in this area are saturated for extended periods of time.

View of Wetland B looking southeast

Wetlands C and D (covering 0.08 and 0.39-acre respectively) are located north of Wetland B and are dominated primarily by facultative plant species including bristly ox-tongue and bird's-foot trefoil, and facultative-wet species, most notably peppergrass (*Lepidium latifolium*). Occasional bulrush (*Schoenoplectus maritimus*), formerly known as *Scirpus maritimus*) and cattail also grow in this wetland, though these species are sparse. Soils in these areas are less varied in composition than those observed in Wetland B and exhibit significant mottling, especially in the surface soils. Algal matting is also present. The upland areas adjacent to these wetland areas are primarily dominated by Italian thistle (*Carduus pycnocephalus*), vulpia (*Vulpia bromoides*), and geranium (*Geranium dissectum*).

Wetlands E through H occur on the southern portion of the site just east of Highway 101. These areas range in size from 0.07 to 3.51 acres as shown on Plate 1. Soil texture, structure, and color vary significantly because this portion of the site was also used for quarry siltation ponds. Mottling, oxidized rhizospheres, and algal matting provide hydrology indicators that suggest prolonged inundation in these wetland areas. Vegetation in these areas was comprised mostly of obligate- and facultative-wet plant species, including pickleweed, toad rush (*Juncus bufonius*), salt grass (*Distichlis spicata*), and sand spurrey (*Spergularia marina*). Patches of bare ground were also observed within these wetland areas, perhaps because the salt content of the soils is too high for some species to tolerate or that prolonged inundation has resulted in vegetation suppression.

View of Wetland H looking southwest towards Highway 101

A small pond that supports several feet of standing water is located at the northwestern edge of Wetland H and is connected to drainage ditch DD2 (which is tidally influenced) via a small culvert that passes under a levee road. Wetland I supported standing water (up to 2 inches) in March 2003 and saturated soils in several lower depressions in the northern portion of the wetland. Plant species composition is similar to that of Wetlands E-H; however, more obligate species including cattail and bulrush occur, particularly in the areas with standing water. Wetlands A through I cover a total area of 10.16 acres subject to Corps jurisdiction.

In total, 11.69 acres of jurisdictional wetland areas were identified on Parcel A (Plate 1).

3.3.2.2 Parcel B

A jurisdictional wetland delineation was conducted on Parcel B on January 21, 2004 after this parcel was included as part of the proposed project. One remnant slough occurs on this parcel and measures approximately 120 feet in length and approximately 6-8 feet in width, covering a total area of approximately 0.02 acre potentially subject to Corps jurisdiction. In addition, approximately 200 linear feet of coastal brackish marsh averaging about 20 feet wide occur on the eastern boundary of this parcel. In January 2004 it was determined that the coastal brackish marsh habitat covered about 0.10 acre potentially subject to Corps jurisdiction.

As a result of the grubbing activities and the installation of drain rock across the majority of this parcel in 2005, it was determined that approximately 0.01 acre of the coastal marsh habitat on this parcel was filled.

3.3.3 Aquatic Functions of Wetland Habitats on Site

The seasonal wetland areas on the project site provide flood retention and sediment storage, serving to filter sediments that otherwise may flow directly to the drainages on and adjacent to the project site and provide groundwater recharge functions.

3.3.4 Wildlife Habitat Functions of Wetland Habitats on Site

The seasonal wetlands provide habitat for birds, especially waterfowl, during the winter and spring months when wetland areas pond water for extended periods of time. The seasonal wetlands also provide habitat and forage opportunities for small mammals. A variety of terrestrial wildlife use the seasonal wetlands and adjacent uplands onsite as well. Wildlife species commonly associated with open grasslands and seasonal wetland habitats such as those found on the project site include western meadowlark (*Sturnella neglecta*), savannah sparrow (*Passerculus sandwichensis*), northern harrier (*Circus cyaneus*), killdeer (*Charadrius vociferus*), western terrestrial garter snake (*Thamnophis elegans*), pacific chorus frog (*Pseudacris regilla*), red-tailed hawk (*Buteo jamaicensis*), white-tailed kite (*Elanus leucurus*), and black-tailed jackrabbit (*Lepus californicus*). Species associated with coastal marsh and estuarine habitats include great egret (*Ardea alba*), green heron (*Butorides virescens*), great blue heron (*Ardea herodias*), sora (rail) (*Porzana carolina*), and American coot (*Fulica americana*).

Animal species observed on the project site during field surveys conducted in January, September, and October 2004 include mute swan (*Cygnus olor*), mallard (*Anas platyrhynchos*), black-necked stilt (*Himantopus mexicanus*), song sparrow (*Melospiza melodia*), acorn woodpecker (*Melanerpes formicivorus*), mourning dove (*Zenaida macroura*), killdeer, black-tailed hare, opossum (*Didelphis virginiana*) tracks, cinnamon teal (*Anas cyanoptera*), blue-winged teal (*Anas discors*), northern harrier, Canada goose (*Branta canadensis*), western harvest mouse (*Reithrodontomys megalotis*), California meadow vole (*Microtus californicus*), and the non-native house mouse (*Mus musculus*).

3.3.5 Climate

The project site has climate characteristics similar to other locations on the lowlands surrounding the northwest corner of San Pablo Bay. In general, the site is located in the Mediterranean climate zone typical of central coastal California. This climate zone is characterized by cool, wet winters and hot, dry summers tempered, in this case, by proximity to San Pablo Bay and by the occurrence of occasional coastal fog, especially in late spring and summer. The windiest months are May and June, when turbidities in the Bay and Petaluma River can frequently persist at levels of 200 to 500 nephelometric turbidity units (NTUs).

Situated in the 'rain shadow' of coastal mountains, the project site receives a mean annual precipitation of approximately 22 inches (Rantz, 1971). The average rainfall value is the statistical mean of rainfall totals that show a wide range of values strongly influenced by global weather patterns, such as the El Nino Southern Oscillation and prolonged periods of drought. The location of the site north and east of Bolinas and Big Rock Ridges, Mount Burdell and Chileno Valley hills, and west of the Sonoma Mountains strongly influences event totals.

Reference evapotranspiration at Petaluma averages 44 inches per year.[3] Reference evapotranspiration is the evapotranspiration of a well-watered 4- to 6-inch tall cool-season grass; evapotranspiration from small seasonally inundated or emergent wetland vegetation can be 10 to 15 percent higher.

3.3.6 Hydrography

The project site is situated in the upper reaches of the tidally-influenced portion of the Petaluma River, in a zone of transition between freshwater runoff and saline water of the San Pablo Bay. It is on the western flank of the valley, on lowlands adjacent to shallow 400- to 500-foot hills having roughly 30-percent slopes, in an area characteristic for tidal-fringe habitats. A mile upstream, the Town of Petaluma is a classic 'bridge point' town, founded at the head of tidewater, at another transition from fresher headwater habitats to downstream salt-marsh habitats. Hence, the site affords an opportunity to restore much of the same types of landward-edge-of-tidewater wetlands upon which much of downtown Petaluma has been established, and which has disproportionately been filled or affected – both in the Petaluma River system, and throughout the San Francisco Bay region.

In the vicinity of the project site, river salinity seasonally fluctuates down to about 7 parts per thousand (ppt) during wet-season runoff and increases to about 25 ppt during dry-season baseflow (see hydrologic report in Appendix C). Tidal water circulates onto the project site through a 20-foot wide slough east of the Northwestern Pacific Railroad (NWPRR) tracks, and beneath the tracks through a 2-foot by 2-foot old wooden box culvert. Flow through the culvert is constrained by sediment, aquatic growth and floating debris. West of the tracks, tidal waters flow in the ditch along the tracks and onto the project site via drainage ditches DD1, DD2 and DD3. Tidal action reaches an off-site diked pond of about 8 to 10 acre-feet in size located to the southeast of Parcel A.

On Parcel A, tidal circulation is limited to the drainage ditches, and only during the highest, primarily winter tides does water spill from drainage ditch DD2 to Wetland H. The ditches on-site drain poorly relative to the off-site railroad-track ditch and slough

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[3] California Irrigation Management Information System (CIMIS) station 144; http://wwwcimis.water.ca.gov/cimis/frontStationDetailInfo.do?stationId=144&src=info; Station averages: Jan 0.98, Feb 1.65, Mar 2.81, Apr 4.25, May 5.61, Jun, 6.26, Jul 6.47, Aug 5.86, Sep 4.49, Oct 3.05, Nov 1.54, Dec 0.98, Annual 43.95 inches.

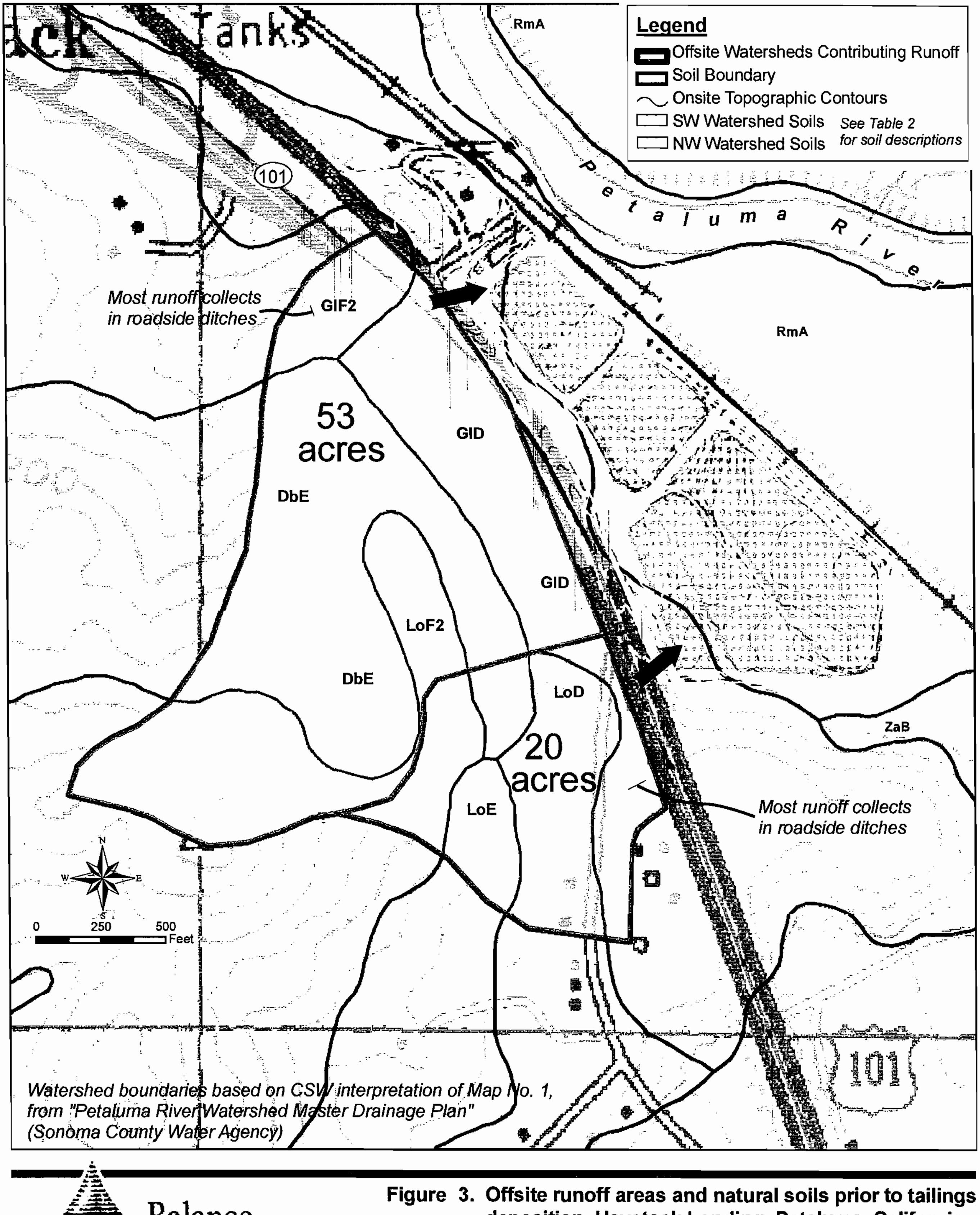
downstream, and always have water below 2.6-foot elevation, owing to the nearly level channel slope, accumulated sediment and wetland vegetation above the confluences. Mean High Water (MHW) is 3.0-foot elevation, and Mean Higher High Water (MHHW) is 3.4 foot elevation. These elevations are optimal for pickleweed colonization (see Appendix C).

On-site runoff during the wet season collects in the seasonally inundated wetland areas and/or sheet flows to the drainage ditches. Wetlands A and H overflow to drainage ditch DD2, and Wetland B drains to the railroad track ditch. Other wetlands, such as Wetland E, do not generate runoff except during the most extreme events. During the dry season, all of the wetlands desiccate. Only drainage ditches DD1 and DD2 receive tidal water. Tidal waters extend in these ditches as far upstream as the onsite access road and not beyond. Off-site runoff from the upland slopes to the west enters the site from two locations (Figure 3): 1) at the southwest corner of Parcel A from a watershed area of 53 acres; and 2) at the northwest corner of Parcel A from an area of 20 acres. Regional runoff averages about 6 inches per year (Rantz, 1974).

The highest values of specific conductance (a surrogate for salinity) are commonly found in the tidally influenced waters, in drainage ditches DD1 and DD2, particularly in the dry-season when freshwater inflows in the Petaluma River recede and saline bay water extends further upstream. Regardless of the tidal waters, specific conductance of surface waters and near-surface ground waters on site vary greatly, and are influenced largely by high soil salinities at the south portion of the parcel resulting from a combination of effects including evapo-concentration, poor drainage locally, and possibly wicking up of displaced porewaters of underlying compacted bay mud (see Appendix D for details). Wetlands B and H largely receive runoff from this southern portion of the parcel, and both have moderately high specific conductance when ponded but lower specific conductance than tidal waters. Lowest conductivities (salinities) were measured in smaller seasonally inundated wetlands such as Wetlands C, D, E and I that collect rainfall.

3.3.7 Soils/Substrate

The Haystack Landing site is located within the Coast Range Geomorphic Province of California, where slopes developed on older bedrock meet the geologically-recent deposits of San Pablo Bay. The regional bedrock geology in the vicinity of the project site primarily consists of complexly folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock of the Juarrasic- and Cretaceous-age Franciscan Complex. Tolay Volcanics of Miocene age outcrop in the region – most notably Burdell Mountain – and are found just northwest of the site in the area of the Dutra quarry Petaluma from which the source rock was extracted for aggregate processing (mapped by Blake and others, 1974). South of this Tolay Volcanics outcrop, Franciscan bedrock form the shallow hills immediately west of the site. Quaternary alluvium (Bay Mud marsh deposits) largely overlies bedrock within the Petaluma River valley lowlands, and



Balance Hydrologics, Inc.

Figure 3. Offsite runoff areas and natural soils prior to tailings deposition, Haystack Landing, Petaluma, California

Source: Air photo courtesy of the USGS, captured June 10, 1993.
U.S. Department of Agriculture, Natural Resources Conservation Service, 2003, Soil Survey Geographic (SSURGO) database for Sonoma County, California (Based on U.S. Department of Agriculture, Soil Conservation Service, 1972, Soil Survey of Sonoma County, California).

W:\Projects\204012\204012_soils_map2.mxd at the site, the artificial fill and wash deposits (deposited from quarry operations) overlie Bay Mud.

Natural soils developed in place before quarry fines were deposited and consisted of Reyes silty clay underlying much of the site, and Goulding cobbly clay loam along the western boundary of the site, rising from the lowlands to Highway 101 and beyond (Sonoma County Soil Survey, USDA, by Miller, 1972). Reyes silty clay developed on Bay Mud and low-gradient stream alluvium. Poorly drained, it is common in saline and brackish marshes surrounding the Bay. In contrast, Goulding soils are well drained and are found on hilly volcanic (andesite or basalt) bedrock west and south of the site. Goulding soils also extend from the site about a mile to the northwest, to the quarry from which the source rock was extracted for aggregate processing. Other soils further west of the site, on the low hills draining to the site from west of Highway 101 are also well drained. They consist of Diablo clay and Los Osos clay loam, which both commonly form on weathered Franciscan sandstone and shale. Table 1 lists the recharge and water-holding properties of the on-site and off-site soils.

The quarry fines on site consist of silts and clays washed from the material processed at the quarry, primarily composed of Tolay Volcanics with some outcrops of typical Franciscan bedrock. A geotechnical investigation of the tailings on the southern portion of the site designated for the proposed wetlands mitigation project was conducted by Miller Pacific Engineering Group (2004). A copy of this report is attached as Appendix B. Subsurface exploration was performed on May 21, 2004 and consisted of drilling 6 soil borings utilizing truck-mounted drilling equipment with 6-inch hollow-stem continuous flight augers.

The subsurface conditions encountered were consistent with the mapped geology and soils. Miller Pacific staff found 6.5 to 11.0 feet of variable artificial fill/wash sediments. The fill materials encountered consisted of soft to very stiff, high to low plasticity sandy and silty clays and dense clayey sands. Soft, highly compressible Bay Mud varying in thickness from 8.0 to 13.5-feet underlies the fill. Older alluvial deposits underlie the Bay Mud. These deposits consist of very dense sandy clays and stiff, medium to highly plastic, sandy silts and clays. Bay Mud thickness contours (appearing in Figure 2 of Appendix B) are consistent with the soils survey, which shows Bay Mud 'pinching out' along the western portion of the site.

The lowest ground-water levels (during late summer and fall) are expected to be near the Bay Mud surface or slightly higher (Miller Pacific Engineering Group, 2004). Ground-water conditions in winter can be variable, depending on amount of and the elapsed time since significant rainfall. To minimize these effects, we measured conditions three weeks into a typical mid-winter drought. Wet-season ground-water levels, as well as subsurface specific conductance (salinity) and temperature levels, were evaluated on February 4, 2005 by Balance Hydrologics, following this 3-week mid-winter dry spell after a 2-week period of heavy rainfall during early January (see Appendix D for details). Within the tailings basins on the southern portion of the site, depth to water was 2 to 3 feet below

Table 1. Recharge and water-holding properties of surficial soils
Haystack Landing, Sonoma County, California

Map Symbol	Soil Series [1]	Parent Material	Taxonomy (order, subgroup, family)	Hydrologic Soil Group [2]	Project Area Coverage (% estimated)	Off-Site Watershed Coverage from SW	Off-Site Watershed Coverage from NW	Depth Zone (inches)	USCS[3]	Atterberg Limits Liquid	Atterberg Limits Plastic	Permeability (inches/hour)	Available Water Capacity[4] Per inch (in./in. of soil)	Available Water Capacity[4] Profile (total, in)	Reaction (pH)	Remarks
Qaf	Artificial fill (aggregate processing wash tailing)	Sonoma Volcanics and some Franciscan bedrock.	-- -- --	C	100%	0%	0%	0 to 100	SM, SC, SW, CL, ML	43-56	7-28	0.06 to 0.2	0.1	10.0	6	Onsite area for wetlands restoration; mostly overlying RmA; depths and Attenberg Limits after MPEG 2004, other properties estimated
													Total	*10.0*		
RmA	Reyes silty clay, < 2% slopes	Bay Mud and river alluvium	Inceptisols Fluventic Haplaquepts Fine, mixed, sulfurous, acid, thermic	D	0%	0%	0%	0 to 63	MH, OH	60-70	10-30	0.06 to 0.2	0.14 to 0.16	9.5	4.0-4.5	Poorly-drained silty clay marshland soils underlying on-site artificial fill; soils compacted altering properties since survey.
													Total	*9.5*		
GID	Goulding cobbly clay loam, 5% to 15% slopes	Metamorphosed basic igneous and weathered andesitic basalt of old volcanic formation.	Inceptisols Lithic Xerochrepts Loamy-skeletal, mixed, mesic	D	0%	19%	23%	0 to 15	CL	30-40	15-30	0.63 to 2.0	0.15 to 0.17	2.4	5.6-6.5	Underlying the northern-most portion of the site and the southwest corner, along the west boundary, and west off-site; runoff is medium and the erosion hazard is moderate.
								11 to 30	GC	30-40	15-30	0.63 to 2.0	0.09 to 0.11	1.5	6.1-6.5	
													Total	*3.9*		
GIF2	Goulding cobbly clay loam, 30% to 50% slopes	Metamorphosed basic igneous and weathered andesitic basalt of old volcanic formation.	Inceptisols Lithic Xerochrepts Loamy-skeletal, mixed, mesic	D	0%	0%	7%	0 to 11	CL	30-40	15-30	0.63 to 2.0	0.15 to 0.17	1.8	5.6-6.5	On steeper slopes off-site to the northwest; runoff is rapid and the erosion hazard is high.
								11 to 22	GC	30-40	15-30	0.63 to 2.0	0.09 to 0.11	1.1	6.1-6.5	
													Total	*2.9*		

Map Symbol	Soil Series [1]	Parent Material	Taxonomy (order, subgroup, family)	Hydrologic Soil Group [2]	Project Area Coverage (% estimated)	Off-Site Watershed Coverage from SW	Off-Site Watershed Coverage from NW	Depth Zone (inches)	USCS [3]	Atterberg Limits Liquid	Atterberg Limits Plastic	Permeability (inches/hour)	Available Water Capacity [4] Per Inch (in./in. of soil)	Available Water Capacity [4] Profile (total, in)	Reaction (pH)	Remarks
LoD, LoE	Los Osos clay loam, 2% to 30% slopes	Weathered, fractured sandstone and shale	Mollisols	C	0%	55%	0%	0 to 16	CL or ML	35-45	10-20	0.2 to 0.63	0.19 to 0.21	3.0	5.6 to 6.0	Runoff contributing areas off-site to the west; runoff is medium to rapid and the erosion hazard is medium to high.
			Typic Argixerolls					16 to 34	CL or ML	35-50	10-25	0.06 to 0.2	0.14 to 0.16	2.5	6.6 to 7.3	
			Fine, montmorillonic, thermic										*Total*	*5.6*		
LoF2	Los Osos clay loam, 30% to 50% slopes, eroded	Weathered, fractured sandstone and shale	Mollisols	C	0%	18%	26%	0 to 12	CL or ML	35-45	10-20	0.2 to 0.63	0.19 to 0.21	2.3	5.6 to 6.0	Runoff contributing areas off-site to the west; runoff is medium to rapid and the erosion hazard is medium to high.
			Typic Argixerolls					12 to 28	CL or ML	35-50	10-25	0.06 to 0.2	0.14 to 0.16	2.2	6.6 to 7.3	
			Fine, montmorillonic, thermic										*Total*	*4.5*		
DbE	Diablo clay, 15% to 30% percent slopes	Interbedded calcareous fine-grained sandstone, clayey shale, weathered	Vertisols	D	0%	8%	44%	0 to 45	CH or MH	50-65	20-35	0.06 to 0.2	0.14 to 0.16	6.0	6.1 to 8.4	Runoff contributing areas off-site to the west; runoff is medium to rapid and the erosion hazard is medium to high.
			Chromic Pelloxererts													
			Fine, montmorillonic, thermic										*Total*	*6.0*		

Notes:

1) Information taken from the most-recent USDA soil survey for the area (1972), and/or Soil Survey Laboratory Data for Some Soils of California (Soil Survey Investigations Report No. 24), 1973. This soil survey generally does not distinguist areas smaller.

2) Hydrologic Soil Groups: A = High infiltration; B = Moderate infiltration; C = Slow infiltration; D = very slow infiltration.

3) USCS = Unified Soils Classification System, commonly used in geotechnical or soil-foundation investigations, and in routine engineering geologic logging.

4) Available Water Capacity = Held water available for use by most plants, usually defined as the difference between the amount of soil water at field capacity (one day of drainage after a rain or recharge event) and the amount at the wilting point.

ground surface in areas furthest from inundated wetland, and transitioning to approaching the ground surface at the wetlands.

3.3.8 Plant Communities on Site

Botanical surveys were conducted on Parcel A of the Haystack Landing site on March 31 and June 6 and 11 2003, and on Parcel B on April 30, 2004. Descriptions of the vegetative communities identified are provided below.

3.3.8.1 Parcel A

A total of 119 species of vascular plants were observed on Parcel A. Of these, 31 species are native to the site, and 86 species are non-native. For two species, it could not be determined whether or not the species is native to the site. One of these species (*Atriplex* sp.) could only be identified to genus at the time the survey was conducted and could be either a native species or a non-native species. Since there are no known rare *Atriplex* species in Sonoma County, a late-summer visit of the site was not made to positively identify the species. In accordance with CDFG's survey protocol, this plant was identified at the level necessary to determine its rarity status (that is, to the genus level). The other species, Pacific madrone (*Arbutus menziesii*), is native to the region, but may have been planted on this site.

Although recognition of habitat types on these parcels is somewhat arbitrary due to their highly disturbed nature, the following five habitat types were recognized: settling ponds, levees, drainage ditches, pond/seasonal wetland, and developed/ruderal. The first three of these habitat types encompasses the settling pond complex in the southern portion of the site. The developed/ruderal habitat type encompasses most of the remainder of the site. The pond habitat type characterizes the two small ponds near the western site boundary. With the partial exception of the pond habitat type, none of these habitat types could be considered "natural"; all have been created and/or maintained by intensive disturbance and large-scale alteration of the site, and they mostly do not resemble native vegetation types, although the drainage ditches habitat type is dominated by native species.

Brief descriptions of each habitat type are presented below.

Settling ponds. The beds that have developed on the settling ponds are gently sloping or somewhat undulating, so that some areas receive more seasonal inundation than others. The vegetation on the pond bottoms is a heterogeneous assemblage of native and non-native species, with both cover and species composition varying considerably over short distances. Much of this variation is clearly correlated with the exact elevation of particular portions of the pond bottom and the degree of seasonal inundation. The northern settling pond, which probably receives relatively little seasonal inundation, is densely vegetated (cover 100 percent or nearly so), primarily with non-native grasses and herbs. Characteristic species include Italian rye grass (*Lolium multiflorum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), curly dock (*Rumex crispus*), bristly ox-tongue (*Picris echioides*), soft chess (*Bromus hordeaceus*), black mustard (*Brassica nigra*), yellow star thistle (*Centaurea solstitialis*), winter vetch (*Vicia villosa* ssp. *varia*), and, in the lowest areas, annual beard grass (*Polypogon monspeliensis*). Scattered individuals of the native shrub coyote brush (*Baccharis pilularis*) occur in this settling pond. One large clump (perhaps a single clone) of arroyo willow (*Salix lasiolepis*) occurs in the northeast portion of this settling pond.

In the southwestern settling pond, which receives more seasonal inundation than the northern settling pond, the higher areas are largely dominated by Italian rye grass, and the associates are mostly non-native, with a species composition similar to that of the northern settling pond. The non-native thistle Italian thistle (*Carduus pycnocephalus*) occurs in scattered dense patches in this area. There is considerable yellow star thistle at the south end, and the escaped ornamental species sweet pea (*Lathyrus odoratus*) is locally abundant in the northeast corner. Lower-lying areas in this settling pond are dominated by the native pickleweed (*Salicornia virginica*), the native perennial grass saltgrass (*Distichlis spicata*), and the non-native species annual beard grass and brass buttons (*Cotula coronopifolia*).

The southeastern settling pond is probably similar to the southwestern settling pond in the degree of seasonal inundation, although the lowest-lying portion on the east side apparently has standing water for a longer period than any other portion of the settling ponds. The higher portions of this settling pond are largely dominated by weedy non-native grasses, including ripgut grass (*Bromus diandrus*), six-weeks fescue (*Vulpia bromoides*), soft chess, slender wild oat (*Avena barbata*), Mediterranean barley, and Italian rye grass, with considerable bird's-foot trefoil and Italian thistle; cut-leaved geranium (*Geranium dissectum*) is also locally abundant. Somewhat lower-lying areas are dominated by bird's-foot trefoil, annual beard grass, and pickleweed, with considerable bare ground, or by annual beard grass and bristly ox-tongue. The lowest-lying area is overwhelmingly dominated by annual beard grass, with sour clover (*Melilotus indica*) and pickleweed the only abundant associates. A small amount of narrow-leaved cattail (*Typha angustifolia*), a species generally indicating prolonged inundation, occurs in the southeast corner.

Levees. The levees are elevated linear features that separate the settling ponds from each other and from bordering areas. These levees could have been included in the developed/ruderal habitat type, but, because they form a distinct part of the settling pond complex, they are treated separately. Dense clumps of coyote brush occur locally on the levees, and a dense patch of the invasive non-native shrub French broom (*Genista monspessulana*) occurs at one location on the levee between the northern and southwestern settling ponds. The levees are otherwise largely vegetated by weedy non-native herbs and grasses, including fuller's teasel (*Dipsacus fullonum*), poison-hemlock (*Conium maculatum*), purple vetch (*Vicia benghalensis*), Italian rye grass, Mediterranean barley, and yellow star thistle. Sweet pea is locally abundant on the levees bordering the southwestern and southeastern settling ponds.

Drainage ditches. Drainage ditches occur adjacent to some of the levees. These ditches are artificially excavated and hold standing water permanently or for varying periods during the season. Where vegetated, the species composition of the drainage ditches consists mostly of native moisture-loving species, principally cosmopolitan bulrush, narrow-leaved cattail, pickleweed, cord grass (*Spartina* sp.), and saltgrass.

Pond. The two small ponds located near the western boundary of the site apparently hold water for all, or at least most, of the season. Narrow-leaved cattail and annual beard grass are relatively abundant, especially around the margins of these ponds, with brass buttons also relatively abundant around the southern pond. Several individuals of arroyo willow occur around the margins of the northern pond.

Developed/ruderal. The developed/ruderal habitat type includes the entire site north of the northern settling pond and its associated levee and ditch, as well as a narrow strip of land between the settling ponds and the Highway 101 right-of-way. The northern, most elevated portion of the site supports an assemblage of species that is quite heterogeneous in both species composition and physiognomy, but that consists primarily of weedy species[4]. Some areas have been repeatedly mowed; these areas are vegetated with a low, rather sparse cover. Where not mowed, the vegetation is tall and generally dense. Numerous large, planted trees of the non-native species English elm (*Ulmus procera*), Northern California black walnut (*Juglans californica* var. *hindsii*, native to Northern California but not indigenous to this site), and non-native blue gum (*Eucalyptus globulus*) are scattered in this area. The first of these is reproducing by suckers, while the latter two species have reproduced from seed. Two large valley oak (*Quercus lobata*) trees, a native species, are located on the north side of the abandoned house. Several dense clumps of the tall, robust non-native grass giant reed (*Arundo donax*) occur near the border of Parcel A.

The north central portion of Parcel A is largely unvegetated; the margins and several adjacent dirt piles are sparsely to moderately densely vegetated by weedy species. Between this parking lot and the northern settling pond is a level area with hard-packed soil, probably graded in the past, with a low to tall, sparse to locally dense vegetation, mostly of weedy species. There are a number of small Pacific madrone trees (*Arbutus menziesii*) in this area, perhaps planted, as well as one small individual of the native tree species coast live oak (*Quercus agrifolia*). The strip of ruderal habitat between the settling ponds and Highway 101, which is interrupted by the two small ponds, is vegetated with a mostly dense cover of weedy species.

3.3.8.2 Parcel B

A botanical survey was conducted on Parcel B on April 30, 2004. In 2004, this parcel was primarily dominated by ruderal grasses and herbs with scattered individuals of the native coyote bush. The narrow and discontinuous strip of land bordering the river

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[4] Note many of these species were cleared from this portion of the site with grubbing activities that occurred in September 2005.

(which is evidently brackish in this area due to tidal flow) is occupied by a coastal brackish marsh habitat type. Within the study area, this habitat type is not well-developed and contains few species, due to its relatively small area and to the frequent flooding and scouring from the river, but it is dominated by native species, particularly three species of tule or bulrush: cosmopolitan bulrush, viscid tule (*Schoenoplectus acutus*), and three-square (*Schoenoplectus americanus*). Associates include the rhizomatous, perennial saltgrass and the succulent pickleweed.

3.3.9 Special-status Plant and Animal Species

3.3.9.1 Special-status Plants

In order to identify special-status plant species and sensitive habitat types with potential to occur in the study area, various sources were consulted and include occurrence records for the project vicinity from the California Natural Diversity Data Base (CNDDB); county occurrence records and USGS quadrangle occurrence records for the Petaluma River quadrangle and the eight quadrangles surrounding it in the CNPS *Inventory of Rare and Endangered Vascular Plants of California.* From the above sources, a target list of special-status plants with potential to occur in the project vicinity was developed.

Thirty-six different special-status plant species were identified for the target list of special-status plants with potential to occur in the project vicinity. These species, their preferred habitats, and federal and state status designations are listed in Table 1 of Appendix A attached.

Field surveys were conducted on Parcel A on March 31 and June 6 and 11, 2003 and on Parcel B on April 30, 2004. These survey dates were chosen to be within the period when most of the special-status plant species with potential to occur in the survey area would have been identifiable. The survey was conducted on foot. All vascular plant species in identifiable condition at the times the surveys were conducted, regardless of regulatory status, were identified to species or infraspecific taxon using keys and descriptions in standard floras. All habitat types occurring on the site were characterized, and data on physiognomy, dominant and characteristic species, topographic position, slope, aspect, substrate conditions, hydrologic regime, and evident disturbance for each habitat type were recorded.

No special-status plant species indigenous to the parcels were observed during the spring 2003 and 2004 surveys and none are expected to occur given the highly disturbed condition of the site. One species present but not indigenous on Parcel A is northern California black walnut which is a special-status species. Northern California black walnut is on List 1B (Plants Rare and Endangered in California and elsewhere) of the CNPS *Inventory* (Tibor 2001; CNPS 2003). However, the species is clearly introduced from planted trees and not native to this site. Because this species is not native to the site, no mitigation would be required for any future impacts to the black walnut trees on this site.

Two species of bird's beak, Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*) and soft bird's beak (*Cordylanthus mollis* spp. *mollis*) occur in tidal salt marsh habitats and thus would have some potential to occur in the coastal marsh habitat on Parcel B. However, at this time, project plans do not call for direct impacts to the tidal salt marsh. If direct impacts were to occur to the salt marsh, further surveys would be conducted to determine if the bird's beak is present on the site. If either species of bird's beak is identified, appropriate mitigation and/or avoidance measures would be developed in coordination with the U.S. Fish and Wildlife Service.

Sensitive Plant Communities

Coastal brackish marsh was formerly recognized as a "high priority" habitat type by the CNDDB (Holland 1986). Although coastal brackish marsh *per se* is not currently recognized as a CNDDB "high priority" habitat type, the small band of coastal brackish marsh on the eastern boundary of Parcel B appears to have a close affinity to the Alkali Bulrush/Pickleweed association, which is currently recognized as a CNDDB "high priority" habitat type (California Department of Fish and Game 2003).

3.3.9.2 Special-status Wildlife

The California Department of Fish and Game's Natural Diversity Data Base (CNDDB, 2003) was reviewed to identify special-status wildlife species potentially occurring on or within the vicinity of the project site. State and Federal resource agency personnel and other environmental consultants familiar with the project area were also contacted regarding the potential occurrence of special-status species within the project area.

Eleven special-status animal species were listed on the Petaluma River CNDDB quadrangle. Based on the habitat characteristics of the site and given that a portion of the Petaluma River is included in the project boundary, it was determined that seven of these species have the potential to occur on or within the vicinity of the project site (Table 2 of Appendix A). These include three special-status birds, the California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), and Salt-marsh common yellowthroat (*Geothlypis trichas sinuosa*), and two special-status fish species, steelhead (*Oncorhynchus mykiss irideus*) and Sacramento splittail (*Pogonichthys macrolepidotus*). In addition, Chinook salmon was included since it is a known resident of San Francisco Bay. The salt marsh harvest mouse (*Reithrodontomys raviventris halicoetes*) (SMHM) was also included given that it is known to occur in the San Francisco Bay salt marshes. The Pacific pond turtle (*Actinemys marmorata marmorata*) was included because it may have the potential to occur within the vicinity of the project site. Finally, nesting raptors including white-tailed kite (*Elanus leucurus*) and northern harrier (*Circus cyaneus*), and nesting egrets (*Egretta thula*, *Ardea alba*) were also identified as having the potential to occur on or within the vicinity of the site. All of these species and their habitat preferences are described below.

Fish

Two fish species potentially occurring in the Petaluma River and estuary adjacent to Parcel B have special-status listing as federally threatened or endangered species or as anadromous species targeted for enhancement under CDFG policies. These species include steelhead trout and Chinook salmon (Macmillan et al, 2003). Sacramento splittail, considered a state species of concern by the California Department of Fish and Game also potentially occurs in the Petaluma River as well as Pacific and River lamprey which are federal species of concern.

Chinook Salmon

There are four main races of chinook salmon in streams draining to San Francisco Bay and include:

- Sacramento River winter-run chinook salmon,
- Central Valley spring run chinook salmon,
- Central Valley fall run chinook salmon, and
- Central Valley late fall run chinook salmon

The Sacramento River winter-run Chinook salmon was listed as a federally threatened species in 1994. Critical habitat for Sacramento winter-run Chinook salmon was designated on June 16, 1993. Sacramento winter-run Chinook were re-classified as an endangered species on January 4, 1994. The status applies to all Sacramento River winter-run Chinook salmon, wherever found. Historically, winter-run Chinook salmon inhabited the Upper Sacramento River and its tributaries the McCloud, Pit, and Little Sacramento. Adult winter-run Chinook salmon migrate up the Sacramento River to spawn from December through May and peak spawning occurs from May to June. Winter-run chinook juveniles emigrate from the upper Sacramento River as smolts from January through May. Peak migration of smolts through the Delta is primarily from January through March.

The Central Valley spring run Chinook salmon was listed as a federally threatened species in 1999 and State Threatened in 1998. Adult spring run Chinook salmon historically migrated up the larger tributaries of the Sacramento, San Joaquin, Klamath and Eel Rivers (Moyle 2002) and remained in deep pools before spawning in early fall. Juveniles reared in the streams for 3 months to over one year, depending on flow. This run was once as abundant as fall run chinook but because the majority of historic spawning areas have been dammed, especially tributaries to the San Joaquin River, their numbers are very depressed.

Central Valley fall run Chinook salmon are being considered as a candidate for Threatened status by NOAA Fisheries. NOAA Fisheries believes that the late-fall run is part of the fall-run, whereas CDFG believes that separate management is necessary and lists them as Species of Special Concern. Historically these runs may have been the most abundant run in California (Moyle 2002). Fall-run Chinook tend to spawn in the lower reaches of large rivers and their tributaries and move up from the ocean in late summer and early fall. Spawning takes place almost immediately. Fry emerge from the gravel in spring and juveniles move down to mainstream rivers or estuaries in summer. This run is unique in that they have a greater propensity to stray from their natal streams and can thus colonize newer areas if hydrologic and geomorphic conditions are more favorable.

Chinook salmon have been observed in many of the tributaries to San Francisco Bay although many if not all of these may be strays of hatchery origin. Historical population levels in the Petaluma River are unknown, but they are now generally low. Chinook salmon have been captured and spawned at the Casa Grande hatchery on Adobe Creek in recent years. However, it is unlikely that these fish are of the endangered Sacramento winter-run as that run is dependent solely on habitats and releases within the upper reaches of the Sacramento River.

Steelhead

Steelhead in the Petaluma River are part of the Central California Coast ESU (evolutionarily significant unit); this species now is federally listed as threatened. Historically, reproducing populations of steelhead were found in most of the tributary and headwater areas of the Petaluma River drainage. Currently, their abundance is reduced. Some juvenile steelhead may spend varying amounts of time in the lower Petaluma River as they move from upstream rearing areas to San Francisco Bay and the ocean. Peak movement occurs during winter and early spring. Estuarine areas can provide important transitional habitat for steelhead juveniles that are undergoing physiological adaptation to seawater. These fish may be found in inshore, slough, and open waters of the estuary where they feed on terrestrial and aquatic insects, amphipods, other small crustaceans, and small fish. Steelhead juveniles may also benefit. Steelhead, both adults and fry, have been recorded in Adobe Creek by the United Anglers of Casa Grande, a rigorous high school program aimed at restoring the creek and its salmonid resources. CDFG has observed steelhead juveniles in Lynch Creek, approximately 4½ miles upstream of the site (Cox per. comm. 2003). CDFG also stated that steelhead are likely in Willow Brook and Lichau creeks, both of which are over 7½ miles upstream of the site; however, detailed spawning and habitat surveys have not been conducted in these two water bodies.

Sacramento Splittail

The Sacramento splittail is a state species of special concern. Splittail are large minnows that live for up to seven years and reach lengths to 12 inches or more. The species is found only in California's Central Valley. Their range in the Central Valley has been restricted since the arrival of Europeans and splittail abundance has declined, particularly during drought periods. Decline in abundance has been attributed to changed estuarine hydraulics, especially reduced outflows; modification of spawning habitat; climatic variation; toxic substances; introduced species; predation; and exploitation.

Splittail are often found at salinities of 10-18 ppt (brackish) and may prefer lower salinities, but they are also able to tolerate salinities up to 29 ppt (Moyle 2002). They appear to prefer shallow water habitat in slow-moving sections of rivers and sloughs. Splittail spawn in the lower reaches of rivers, dead-end sloughs and in larger sloughs, any time from late February to early June, with peaks between March and April. Larvae initially remain in close proximity to spawning sites and move into deeper water as they mature.

Splittail are presently found primarily in the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the Sacramento-San Joaquin estuary (USFWS 2003). Sampling by CDFG between 1992 and 1998 has shown that splittail have continuously lived in the Petaluma River since the 1980's and have successfully spawned in 1992, 1995, and 1998 (Baxter 1999). This species was also captured during construction of the Petaluma Flood Control project; however, it was likely that its presence was a result of high tides and flow, rather than active use of habitat (USACE per. comm.).

Pacific Lamprey

In the August 11, 2004 update, the USFWS designated the Pacific lamprey (*Lampetra tridentata*) as a Species of Concern (USFWS 2004a). As of 2003, it is no longer listed as a California Species of Special Concern (CDFG 2003). The Pacific lamprey has been reduced from historic abundance and it is eliminated from some areas where formerly found. Data for lamprey are generally relatively incomplete since the immature life stage (ammocoetes) live within the substrate and are not easily captured or quantified using standard sampling methods such as electrofishing, seining, or snorkel surveys. Lamprey have received little scientific attention and there is uncertainty regarding their status and biology.

Pacific lamprey are anadromous with a free-swimming parasitic or predatory marine adult stage, where they may feed on ocean fish such as salmon and flatfish, and a freshwater immature stage that is a benthic filter feeder, feeding on benthic detritus. Spawning takes place in higher gradient, gravel/cobble bed, cool water streams primarily between early March and late June (Moyle 2002). Ammocoetes burrow in sand or silt substrates in quieter channel margin, pool, or backwater habitats. The ammocete stage is thought to last 5-7 years (Moyle 2002). Adults in freshwater do not feed. Ammocoetes feed on organic detritus and algae which they gather from the surface of the substrate.

Pacific lamprey still appear to be present in most of their native range though anecdotal evidence indicates that abundance is reduced in many areas and some large runs have nearly disappeared. They are usually absent from highly altered or polluted streams and have been eliminated from many urbanized streams in the southern part of their range. The Petaluma River provides aquatic habitat conditions that are conducive to use by Pacific Lamprey and the species should be considered as potentially occurring in the project area, primarily as a migration corridor into and out of upstream spawning sites.

River Lamprey

The River lamprey (*Lampetra ayresi*) is a Federal Species of Concern (USFWS 2004a) and is on the California Watch List (CDFG 2003). The Watch List includes species that are found in much of their native range but were found in greater numbers historically or may have been more widespread (CDFG 2003). River lamprey have received little scientific attention and there is uncertainty regarding their status and biology. The biology of river lampreys has not been studied in California (Moyle 2002). As with Pacific lamprey, data for lamprey are relatively incomplete because the immature life stage (ammocoetes) live within the substrate and are not easily captured or quantified. It is difficult to distinguish the larval and early adult life stages of river lampreys from Pacific lampreys because the morphologies of these life stages are very similar between species.

River lampreys are found in large Pacific coast drainages from north of Juneau, Alaska, south to San Francisco Bay. In California most records have been for the lower Sacramento-San Joaquin River system. Although there are no widespread efforts to census populations, river lamprey is thought to have become uncommon in California due to loss and degradation of habitat, particularly spawning and rearing habitat in the lower reaches of larger rivers. However, this species has not been thoroughly studied and further investigation is needed to adequately monitor and manage its populations (CDFG 2003; Moyle 2002). The Petaluma River provides aquatic habitat conditions that are conducive to use by River Lamprey and the species should be considered as potentially occurring in the project area, primarily as a migration corridor into and out of upstream spawning sites.

Reptiles

Pacific Pond Turtle

The Pacific pond turtle (*Actinemys marmorata* (previously *Clemmys marmorata*) is considered a federal species of concern by U. S. Fish and Wildlife Service (USFWS) and a species of special concern by CDFG.

Pacific pond turtles have declined over much of their range in the past 75 years. Over grazing, introduced predators, loss of habitat from agriculture, disease, and over-hunting have all been implicated in their decline. The Pacific pond turtle is a habitat generalist, inhabiting a wide range of fresh and brackish, permanent and intermittent water bodies from sea level to about 4,500 feet above sea level (USFWS, 1992).

While there are recorded occurrences for the Pacific pond turtle in the upper reaches of the Petaluma River in quiet backwater channels where basking sites are suitable, the Petaluma River in the vicinity of the project site undergoes periods of heavy flow in the winter and spring and therefore is probably not suitable habitat. Parts of Shollenberger Park and Adobe Creek, which are north and east of the project site respectively, may offer better habitat for this species.

Birds

Special-status bird species having the potential to occur within the vicinity of the project site include the California clapper rail, California black rail, the salt-marsh yellowthroat and two raptor species, the northern harrier and white-tailed kite. In addition, an egret rookery was identified on the project site in 2003. These various species are discussed below.

California Clapper Rail

The California clapper rail is both a state- and federally-listed endangered species. The clapper rail is a locally common resident in coastal wetlands and brackish areas around San Francisco, Monterey, and Morro bays. In the San Francisco Bay area, the clapper rail breeds mid-March through July, nesting in saline emergent wetlands, mostly in the lower zones, where cordgrass is abundant and tidal sloughs are nearby. In brackish water, the clapper rail builds its nest in dense cattail or bulrush (Zeiner *et al.* 1990). There are recent records for this species at Shollenberger Park east of Parcel B across the Petaluma River. The small band of coastal marsh habitat that borders the project site is unlikely to provide nesting habitat for California clapper rail because the marsh is relatively small (0.02 acre) and is adjacent to areas that are currently used for industrial purposes.

California Black Rail

The California black rail is a federal species of concern and state listed as threatened. The Black Rail is a rarely seen, scarce resident of saline, brackish, and freshwater emergent wetlands in the San Francisco Bay area, Sacramento-San Joaquin Delta, coastal southern California at Morro Bay and a few other locations. The black rail nests in dense vegetation, often pickleweed, near the upper limits of tidal flooding. Nesting has been recorded to occur from mid-March to early June (Zeiner *et al.* 1990).

The coastal brackish marsh adjacent to the proposed off-loading facility parcel can be accessed during low tide and provides potential foraging habitat for this species; however, breeding in this area is very unlikely. The wetlands across the river from the project site (located on the eastern side of the river), which provide denser and more extensive cover, provide potential nesting habitat for this species. Black rail have been recorded in Shollenberger Park to the east of the site as well.

Saltmarsh Common Yellowthroat

The saltmarsh common yellowthroat is described as known from only the marshes surrounding San Francisco and Suisun Bays and is considered to be a species of special concern by CDFG. It occurs in *Spartina* and *Salicornia* dominated habitats with the added use of upland, freshwater marshes, and grasslands bordering brackish marshes

(Hobson *et al.* 1986). There also appears to be a preference by this species for channels in marsh habitats (Nur 1997). Its population in the bay area is not well known, but there are historical records north and south of the project site along the Petaluma River (Hobson *et al.* 1986).

The coastal brackish marsh habitat located along the shoreline of Parcel B provides marginal potential nesting and foraging habitat for this species.

Nesting Raptors

Raptor species that could be expected to nest on or within the vicinity of the project site include the white-tailed kite (*Elaneus leucurus*) and northern harrier (*Circus cyaneus*). White-tailed kite is a state "fully protected" species and northern harrier is considered a species of special concern by CDFG. These species frequent meadows, grasslands, open ranges, and fresh and saltwater emergent wetland areas (Zeiner et al, 1990). The open grassland areas on the project site provide potential foraging habitat for these species. Harriers are likely to nest in the project site's grasslands, while white-tailed kites have potential to nest in trees and large shrubs such as coyote brush adjacent to open foraging areas.

Nesting Egrets

Rookeries (colonial breeding sites) of the great egret (*Ardea alba*) and snowy egret (*Egretta thula*) are considered sensitive by the California Department of Forestry. A small rookery with nesting pairs of both species was observed in August of 2003 in the eucalyptus grove located immediately north of the old farmhouse that occurred until recently on Parcel A. At least 5 nests were observed in this grove on April 14, 2004; 4 were great egret and 1 was snowy egret. At least 3 nests and egrets were also observed on March 8, 2005.

Egrets typically feed in shallow water and along shores of wetlands or aquatic habitats. They prefer small fish, crustaceans and large insects but may also feed on amphibians, reptiles, worms, snails, and small mammals. The breeding season in northern California for the snowy egret is generally from April to late August; for the great egret March to July. Both species are highly sensitive to human intrusion and disturbance of nesting colonies; great egrets have been known to abandon active nests if subjected to significant disturbance. Although the rookery on the project site is located near an occupied residence and various light industrial facilities, the nesting birds have obviously accepted this relatively low level of nearby human activity.

Mammals

Salt Marsh Harvest Mouse

The salt marsh harvest mouse (*Reithrodontomys raviventris*) is federally and state listed as endangered and is a California fully protected species. The salt marsh harvest mouse is endemic to the tidal and diked marshes of the San Francisco Estuary, including the San Francisco, San Pablo, and Suisun bays, of northern California. The northern subspecies (*Reithrodontomys raviventris halicoetes*) is found on the Marin Peninsula, through Petaluma, Napa, and Suisun Bay marshes and in northern Contra Costa County (Zeiner *et al.* 1990). This species prefers saline emergent wetland habitats dominated by pickleweed; grasslands adjacent to pickleweed marsh are also used, but only when new grass provides adequate cover in the spring and summer (Zeiner *et al.* 1990). *R. r. halicoetes* breeds from May to November, with litters averaging four young.

Parcel A was studied by Monk & Associates wildlife biologists to determine if portions of the site provide suitable habitat for the salt marsh harvest mouse. Results of the site analysis were submitted to the USFWS in conjunction with a request for technical assistance to determine if trapping studies would be required on the site. USFWS requested trapping studies be conducted on the site to definitively determine if salt marsh harvest mice inhabit the site. A trapping plan was submitted to the USFWS and CDFG and Monk & Associates received authorization to initiate the trapping study in the Fall of 2004. The 5,584 trap-night study was conducted from September 26 through September 30, and October 4 through October 8, 2004. No salt marsh harvest mice were captured. Results of the trapping study were presented in a written report submitted to the USFWS and CDFG (Monk & Associates 2004). On January 13, 2005, the USFWS sent a letter to Monk & Associates stating that based on the trapping study results they have determined that development of the project site is "not likely to result in take of the salt marsh harvest mouse." Hence, no further action regarding this species on the project site will be required (Appendix F).

4.0 MITIGATION DESIGN

The proposed mitigation program for the Haystack site calls for creating and enhancing wetland communities typical of the inner edge of the tidal/freshwater ecotones that were once widespread around the Bay. Based on review of site conditions, it was believed that the three most common ecotypes – tidal wetlands, seasonal brackish wetlands, and seasonally inundated wetlands – could be restored at this site. In our experience it is only possible to do this at very few other sites around the Bay.

The proposed design is based on (a) identifying areas in which sufficient fresh and tidal waters can be sustained during most or nearly all years, (b) locations and depths providing sufficient hydrology for seasonal wetlands (brackish), and (c) preventing all but the most extreme flows from moving from the freshwater emergent wetland to the brackish wetland, protecting the latter from dilution by fresh water or the transfer of freshwater and weedy plants to the brackish wetland area. Additional considerations were (d) to provide a slightly-sloping edge to several wetlands, allowing them to expand and contract with fluctuations in weather or in adjustment to watershed change, and (e) to keep the change in the tidal prism to under 10 percent of the pre-project conditions, so that the restoration/enhancement program will not induce changes in the tidal channels between these wetlands and the Petaluma River. A number of hydrologic studies were conducted at various seasons to quantify factors needed to meet these guidelines.

4.1 Work Conducted

Balance Hydrologics conducted a preliminary hydrologic evaluation of the southern portion of the site (approximately 19 acres) proposed for mitigation. The evaluation included the following as detailed in Appendices C, D and E of this report:

- Tidal elevation and salinity levels were monitored and findings used to estimate tidal height-duration relationships, tidal peaks and percentage of inundation (Appendix C). Three tidal monitoring stations were installed: one station within the boundaries of the Haystack Landing project site in drainage ditch DD2; one station in the off-site railroad drainage ditch at the upstream end of the culvert crossing the tracks; and third, a station at the mouth of the slough where it meets the Petaluma River. At each station water levels, water temperature and specific conductance (a surrogate for salinity) were monitored through two complete 28-day tidal cycles and the highest tides of the dry season. This baseline data documents the nature of the tidal circulation on site and in the tidal channel network connecting the site with the Petaluma River. From the analysis of the data, it was shown that tidal circulation to the project site is muted by the partially blocked culvert under the railroad tracks that form the project's eastern border. Inundation curves (or exceedance plots) were developed to evaluate the hydrologic performance of the existing sloughs and tidal marshes, and used for wetlands restoration design. The success and long-term sustainability of tidal marsh plant and animal communities are strongly influenced by tidal elevations; the inundation curves show the percentage of time that a given water elevation is equaled or exceeded for (a) existing tidal conditions with the impaired culvert and (b) future conditions when the culvert may likely be replaced as part of a different project. Though the culvert will not be replaced or retrofitted as part of this project, both conditions were considered in designing the tidal marsh for mitigation. The curves also demonstrate tidal levels and circulation patterns which were used in establishing the very limited effect of the mitigation tidal marsh on the existing tidal prism (see section 4.2.1C).

- Mid-winter surface ponding, shallow ground-water levels and specific-conductance were assessed at the end of a three-week dry spell that followed a couple of weeks of wet weather, including several major winter storms (Appendix

D). The baseline data document ground-water levels and salinities prior to the proposed re-grading of the site (including excavation of the tidal wetland) and the proposed direction of additional flows into the cattail and seasonal wetlands on portions of the site. The data were established under typical conditions likely to occur in future years, facilitating comparisons between years. From this, it was found that the greatest depth to water and highest salinities were concentrated in the southern portion of the site, where soils have a higher sand content.

- Summarized in Appendix E, potential soil and water salinities levels in the proposed enhanced wetland area were estimated using baseline monitoring and spot measurements of water levels and specific conductance (refer to Appendices C and D for these data). The salinity ranges were used to propose success criteria for the proposed enhanced wetland areas (Section 5).

4.2 Mitigation Approach

The site is located in the historic fringe of tidal water circulation, upland runoff and inundated wetland habitats. Regionally, the 'Bay Fringe' landscape has generally been transformed by human settlement of the region during the past 200 years. Its present size is both limited in extent and often modified from its natural state. The mitigation approach for the proposed project aims to restore a mosaic of wetland habitats and related biologic diversity commonly found in 'Bay Fringe' landscapes by re-grading the site to enhance hydrologic conditions for three wetlands types – tidal marsh, emergent marsh, and seasonally inundated wetland – as well as segments of upland buffer.

4.2.1 Hydrologic Considerations

A. Project upland areas

Onsite, runoff from the proposed 5.82-acre asphalt plant enters a "treatment train" comprising two swales (Drainage ditches 5 and 6) contoured to flow to the emergent marsh. Drainage ditch DD6 flows to drainage ditch DD5 over a 4.2-foot elevation broad weir, where additional runoff from the proposed 2.39-acre recycle area enters DD5. DD5 flows to the emergent marsh (existing Wetland H) over a notch in the existing levee with a 3.5-foot elevation. Both swales drain (purge) high flow through a culvert beneath the access road on the east to the tidally influenced drainage ditches DD1 and DD2. DD6 is connected to drainage ditch DD1 through a culvert with a 4.7-foot elevation invert, and DD5 is connected to DD2 through a culvert with a 3.95-foot elevation invert. The two swales have a 12,000 ft^3 approximate storage volume (or 0.3 acre feet). DD5 flows to the emergent marsh through a 3.5-foot elevation grade control, which is a small notch in the existing levee.

B. Seasonal runoff from west of Highway 101

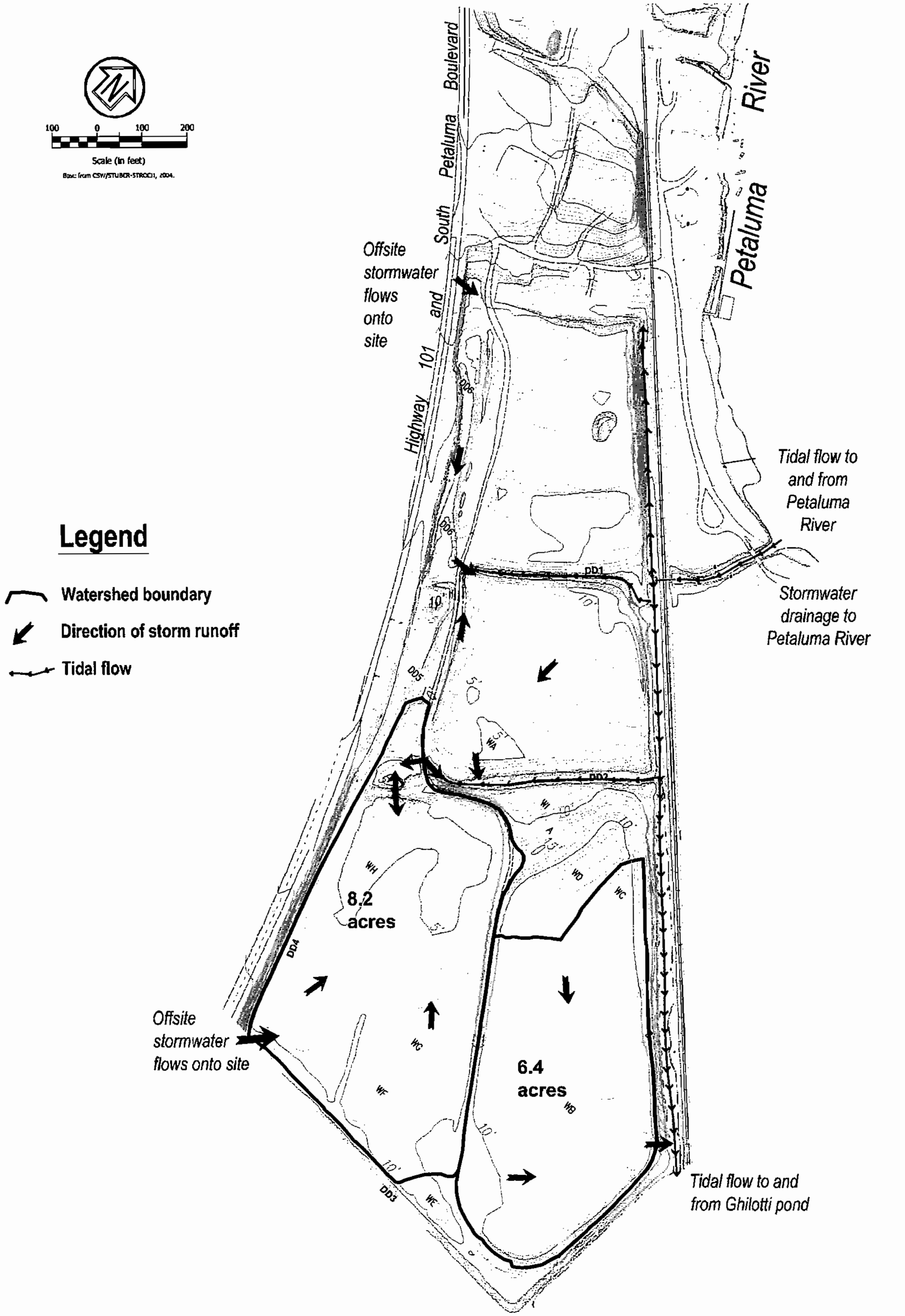
Off-site runoff from the hill west of the site collects in the road and highway ditches west of Highway 101 and enters the site at two locations:

- At the north part of the site, runoff from 53 acres flows through a 30-inch culvert under Highway 101 with an invert at 2.62-foot elevation to a small area between Highway 101 and South Petaluma Boulevard. A cattle tunnel connects the area to drainage ditch DD6 onsite but runoff appears to pond west of South Petaluma Boulevard, and only potentially flows to drainage ditch DD6 when the storage volume is exceeded. Otherwise, the cattle tunnel remains dry. Given the uncertainty of off-site flow volumes to on-site drainage ditch DD6, to be conservative, potential runoff from this area was not included to size the emergent marsh, only onsite runoff.
- At the south part of the site, runoff from 20 acres off site flows through a 30-inch culvert under Highway 101 with an invert at 11.53-foot elevation to ditches and outlet channels at the southwest corner of the site. These 20 acres generate sufficient inflow, together with direct rainfall, that it becomes feasible to enhance and/or create seasonal wetlands with a salinity gradient increasing eastward from fresh to brackish. We are proposing removing portions of the berm between the southwestern and southeastern settling ponds to realize the potential of this gradient, as very few restoration sites in the Bay Area have this potential.

Figures 3, 4 and 5 show the locations where runoff enters the sites, and Figures 6 and 7 diagrams off-site flow onto the site.

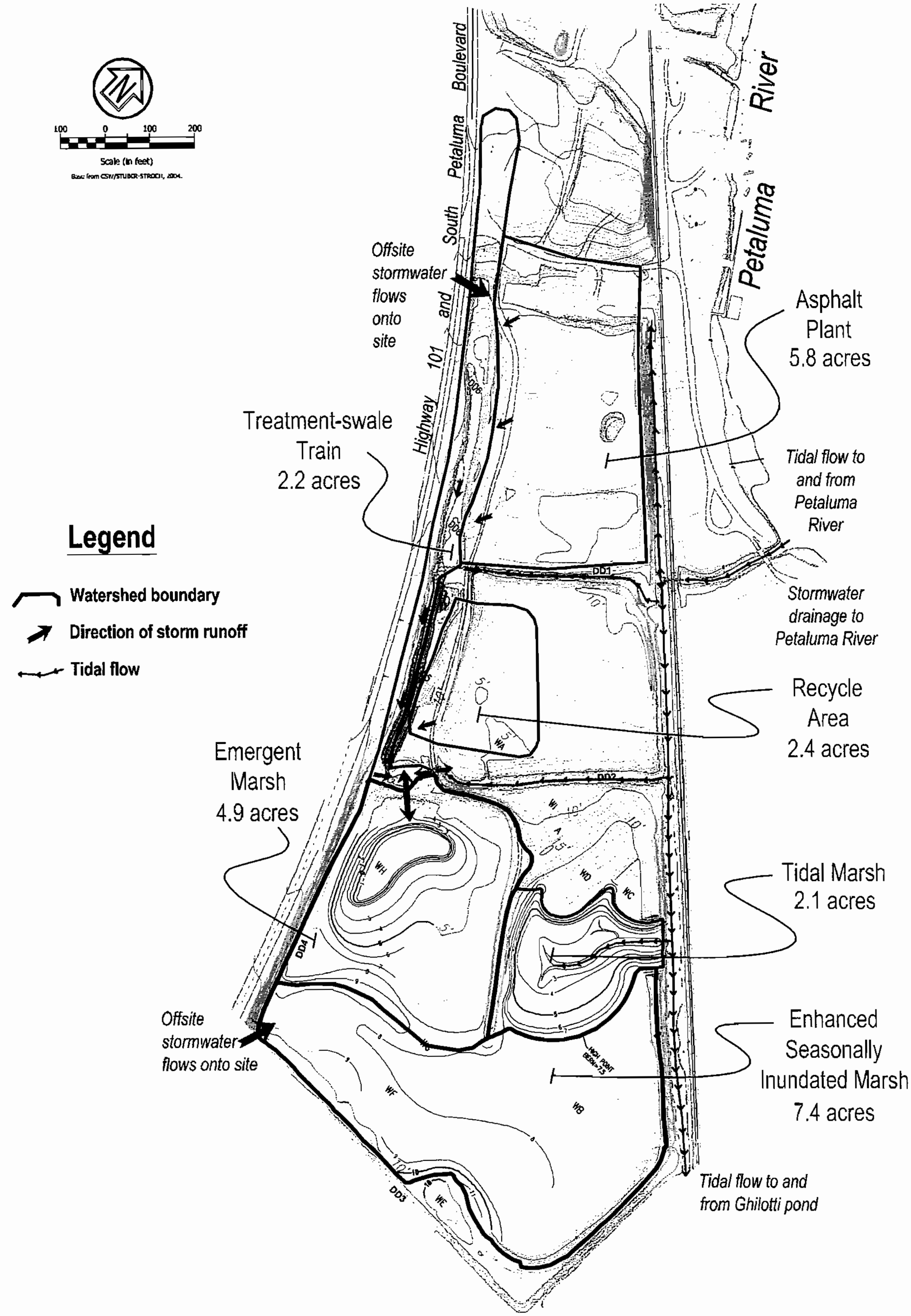
C. Tidal dynamics and prism

Balance Hydrologics monitored tide levels at three stations: (1) in the on-site drainage ditch DD2, (2) in the railroad ditch east of the project site and (3) in the slough that connects the railroad ditch to the Petaluma River, just upstream of its mouth at the Petaluma River (see Appendix C for details). On the rising tide, Petaluma River water flows up the slough when water elevations exceed -2 feet, and then further up the railroad ditch and on-site ditches as the tide continues to rise. The tides also reach an existing pond located immediately southeast of the site. On the receding tide, water flows out of the slough and upstream drainage-ditch network. At elevations below -2 feet in the slough, it is drained to a trickle on the channel bed. At these very low tides, the slough and drainage ditches are not dry and retain water in channel pools. Similarly, the pond located to the southeast of the site remains full of water at tide levels below its



Balance Hydrologics, Inc.

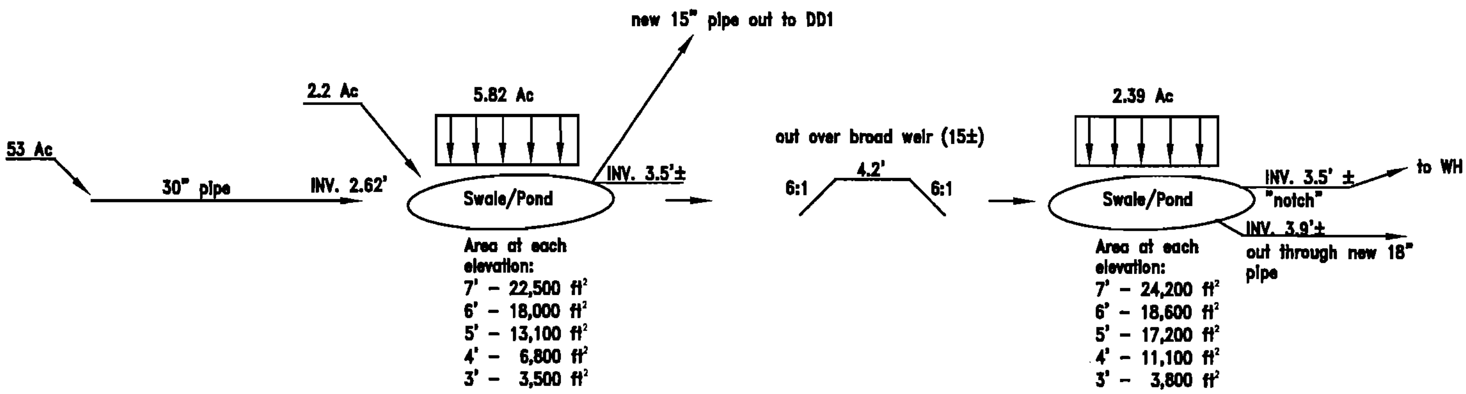
Figure 4. **Existing watersheds and direction of surface flow of areas enhanced for wetland restoration, Haystack Landing, Sonoma County, California.**



Balance Hydrologics, Inc.

Figure 5. Proposed watersheds and direction of surface flow of areas enhanced for wetland restoration, Haystack Landing, Sonoma County, California.

204012 alternate watershed areas.dwg



Conceptual Flow Through Treatment Train
Haystack AC Plant

CSW [St]²
CSW/STUBER-STROEH ENGINEERING GROUP, INC.
CONSULTING ENGINEERS
790 DeLong Ave., Novato, CA. 94945-3246
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REV.	10/28/05
JOB# 591302	SCALE: NTS

Figure 6.

SCHEMATIC OF OFFSITE RUNOFF TO HAYSTACK LANDING FROM THE NORTHWEST AND THROUGH THE ASPHALT FACILITY.

PETALUMA SONOMA CALIFORNIA

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REV.	10/28/05
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Figure 7.

Schematic of off-site runoff to Haystack landing from the southwest, to the perimeter ditches and on the seasonal wetland area.

Petaluma Sonoma CALIFORNIA

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impoundment-control elevation of 2.5 to 2.7 feet[5]. Tidal peaks thus function to replenish water in the pond lost to drainage and evaporation.

Existing tidal-datum statistics and height-duration relations were developed for each of the three monitoring stations (Appendix C) and used in the design of the tidal marsh, specifically the Mean High Water (MHW) and Mean Higher High Water (MHHW)[6]. In the railroad ditch, existing MHHW is an elevation of 3.4 feet, and MHW is 3.06 feet, thus clearing the impoundment-control elevation by as little 0.36 feet (3.06-2.7 elevation) and as much as 0.90 (3.4-2.5 elevation), enabling circulation to the pond. The effect to the tide levels in the ditches and the pond by the increased tidal prism of the brackish tidal marsh enhancement are estimated in Table 2. By increasing the tidal prism, the MHHW is estimated to decrease 0.16 feet (from 3.4 feet to 3.24 feet), leaving more than a half foot of clearance for tide flows, and similarly, the MHW estimate decreases 0.06 feet (from 3.06 to 3.00), leaving 0.3 feet clearance. At these water levels, the pond will be able to continue to fully function, with functions both protected and enhanced by the proposed tidal marsh creation.

West of the culvert beneath the railroad tracks (in the railroad ditch and beyond) tidal flows are currently impaired by barnacle growth and debris in the culvert that constrain flows to and from the railroad ditch and onto the Haystack site. As a result, peak flows are lower in elevation west of the culvert, and have a delay relative to peaks east of the culvert. If the culvert was replaced or rehabilitated, then tidal flows west of the culvert would not be constrained and would become similar to those in the slough east of the culvert. Replacing the off-site culvert is not part of the project but may be part of another future project such as a Sonoma-Marin Area Rail Transit (SMART) project.

4.2.2 Wildlife Considerations

A major factor influencing development of the mitigation plan was consideration of existing wildlife species that may be temporarily displaced by construction associated with implementation of the plan as well as consideration for creating diverse habitats that would provide potential foraging and nesting habitat for terrestrial and avian species. A primary concern of preliminary mitigation planning was to determine if the site currently provides habitat for the federally-listed salt marsh harvest mouse so as to avoid "take" of this species during project implementation. As described in Section 3.3.9.2, a USFWS-authorized trapping program determined that the site does not support this species. One of the goals of the project is to design wetland habitat that will support dense covers of pickleweed which in turn may encourage future salt marsh harvest mouse colonization. In addition, creation of a more permanent wetland habitat in the form of an emergent marsh

[5] The impoundment control to the pond is composed of about two feet of soft mud (CSW level survey).
[6] The Mean High Water (MHW) is the average of all tidal peaks, and the Mean Higher High Water (MHHW) is the average of just the highest peak of each day.

Table 2. Estimated decrease in tide levels west of the Northwestern Pacific railroad tracks by an increased tidal prism of the tidal marsh enhancement, at Haystack Landing, Sonoma County, CA.

Background Information	
Mean Higher High Water in the ditches, brackish marsh and off-site pond (Appendix C)[1]	3.4 feet
Mean High Water in the ditches, brackish marsh and off-site pond (Appendix C)[1]	3.06 feet
Elevation of water-level control at the off-site pond outlet[2]	2.7 feet
Existing tidal clearance at off-site pond	
MHHW - off-site pond control elevation	0.70 feet
MHW - off-site pond control elevation	0.36 feet
Brackish tidal marsh prism	
Volume of tide from bed elevation to MHHW	0.28 acre-feet
Volume of tide from bed elevation to MHW	0.11 acre-feet
Surface water area at high water levels:	
Tidal channel area[2]	33,500 square-feet
Area of off-site pond (1 acre)	43,560 square-feet
Total area (channel + pond)	77,060 square-feet
	1.77 acres
Results	
Effect of marsh prism at MHHW to tide levels in ditches and the off-site pond:	
Decrease of tide depth = (marsh prism) / (total area)	0.16 feet
Estimated MHHW with effect from tidal marsh enhancement (MHHW - effect to depth)	3.24 feet
Revised tide clearance at pond control (MHHW - off-site pond control elevation)	0.54 feet
Effect of marsh prism at MHW to tide levels in ditches and the off-site pond:	
Decrease of tide depth = (marsh prism) / (total area)	0.06 feet
Estimated MHW with effect from tidal marsh enhancement (MHW - effect to depth)	3.00 feet
Revised tide clearance at pond control (MHW - off-site pond control elevation)	0.30 feet

Notes:

1) Preliminary hydrologic evaluation of site (Woyshner and others, 2004). Tide elevations should increase if the flow impairing culvert is properly replaced.

2) Based on a longitudinal survey of railroad ditch (CSW/Stuber-Stroeh, 2005); cross-section elevations at pond outflow varied from 2.5 to 2.7 feet, having about 2 feet of underlying soft mud.

3) 300-foot slough and 20 feet wide; 1300-foot railroad ditch and 15 feet wide; DD1 and DD2, 400 feet long and 10 feet wide.

(with a significant open water component) is proposed to provide foraging and roosting habitat for migrating waterfowl and other wading bird species.

4.2.3 Other Considerations

4.2.3.1 Importance of the landward bay fringe

The Haystack wetlands, once restored, will be a mosaic of perennial freshwater, seasonal brackish marsh, and tidal wetlands that once typified much of the landward bay fringe. Once prevalent throughout the North Bay, this fringe has been widely filled, diked or otherwise altered. Few remnants of this mosaic remain, most notably at China Beach State Park and at several locations between Petaluma and Las Gallinas. There are very few remaining opportunities to restore the landward bay fringe with the types of wetlands that once characterized the edge of the Bay.

4.2.3.2 Opportunity for highway spill containment

The proposed mitigation plan should incorporate provisions for highway spill containment in its design, recognizing that the project site is adjacent to the main commercial arterial serving the North Bay and Redwood Empire. The emergent and brackish wetlands to be enhanced have been sized to retain and store the contents of a typical 8600-gallon (equivalent to 1,140 cubic feet) tanker or industrial carrier to protect the Petaluma Marsh and the San Pablo Bay from the most acute effects of a possible spill. In the event that a spill during a storm, both the emergent marsh and the seasonal wetland areas could easily be closed off at their outlets, and other points both upstream and downstream from the outlets could also be closed. Storage and attenuation of many contaminants is an intrinsic function of wetlands; at this site, adjacent to the freeway, it is a responsible approach to incorporate spill containment into the wetland design.

4.3 Criteria for Design

The design of the wetland mitigation project is governed by the fact that the distribution of wetland/marsh plant species is largely controlled by vertical elevation and water salinity levels. The range of elevations within each wetland/marsh area will govern the depth, duration, and extent of inundation, while the water and soil salinities within each marsh area will select for freshwater, brackish, or salt-tolerant plant species. The proposed criteria for each habitat type to be created and enhanced are provided below.

4.3.1 Freshwater Emergent Marsh

The proposed freshwater emergent marsh will be centered on the existing seasonally inundated Wetland H. Following construction of the project, the emergent marsh will receive storm runoff from the ‘treatment train,’ which is comprised of two swales that receive runoff from the project’s upland areas (Figure 7). The watershed contributing to

Wetland H is 8.2 acres and drains storm water northerly from 9-foot elevation to an elevation of less than 3 feet, and shares the same watershed as seasonal wetlands E, F and G. The watershed is bound by the center access road berm on the east and perimeter berms to the south and west.

Currently, there are two sources of water for Wetland H: direct rainfall on the wetland and its fringes, and to a lesser extent, inflow from drainage ditch DD2 at the highest tidal peaks. A culvert connects wetland WH to drainage ditch DD2, which is tidally influenced and drains to the Petaluma River via the railroad ditch and slough. The invert elevation of the connecting culvert to drainage ditch DD2 is 3.95 feet, so tidal peaks exceeding this elevation spill or mix with water in Wetland H. There is also a notched berm at 3.5-foot elevation between the culvert and the north part of Wetland H. Mid-winter water-level elevation in the wetland is about at notch elevation (Appendix D) and dries down in the summer to a small pool between the culvert and the notch with an elevation of about 3 feet or less. This hydrology pattern has similarities to an emergent marsh community. Salinity of water in the basin varies widely. Surface water ranges from 4 to 11 ppt [7], and shallow ground water (soil water) to about 16 or 17 ppt, with highest levels found in the southern portion of the basin (Appendix D).

Water levels in the existing emergent marsh vary widely; inundated during the wet season with receding water levels during the dry season. The emergent marsh retains storm water and functions hydrologically (1) to attenuate downstream storm surge, particularly for the first storms of the season, and (2) to recharge shallow ground water, primarily seeping laterally into the surrounding tailings, which have higher permeability than the underlying Bay Mud.

Our approach to the emergent marsh design is to: (1) deepen and increase the area of ponded water persisting into the dry season; (2) control the salinity of the ponded water such that typical freshwater emergent species can be supported; and (3) focus colonization of emergent wetland plants on the fringe of the marsh.

[7] Salinities were estimated from measurements of specific conductance using a field meter.

Hydrologic design criteria for the emergent marsh include:

- Bottom elevation of emergent marsh at -1 feet;
- 36" to 42" minimum depth of late-season ponding to inhibit cattail colonization;
- 4:1 pond foreshore slopes, conforming with Building Code safety criteria, with adjacent berms where foreshore and backshore slopes are 10:1
- 3.95-foot elevation of spillway to drainage ditch DD2
- 8-foot elevation of south-end watershed divide with Wetland B watershed
- Truncate watershed area on south portion of site having elevated soil salinities in order to lower salinities of surface water runoff.[8]
- Additional runoff to treatment swale at drainage ditch DD5 from the 2.39-acre watershed on project upland area (west portion of the project recycle yard area) and additional runoff to treatment swale at drainage ditch DD6 from 5.82-acre asphalt plant, both having compacted soils with 0.9 runoff factor. The proposed emergent marsh will serve to retain fine sediment washing in from the treatment swale. Currently these areas drain to drainage ditches DD1 and DD2, and not to Wetland H, therefore the new design will provide additional treatment.

4.3.2 Tidal Marsh

The tidal marsh will be located near the watershed divides for existing seasonally inundated wetlands B, C and D. It will be built mainly within the watershed of Wetland B (Figures 3, 4, and Plates 2 and 3). The marsh will be connected to the ditch along the railroad tracks, at about 350 feet southeast of drainage ditch DD2 and 600 feet north of the pond and associated wetlands located to the southeast of the site, and tidally influenced via the Petaluma River and connecting slough east of the railroad tracks. Tidal circulation to the site is constrained at the culvert beneath the railroad, which has the effect of truncating and delaying tidal peak elevations (Appendix C), and ultimately the capacity of the tidal prism (i.e., the volume of water within the marsh or lagoon between MLLW and MHHW).

The tidal water feeding the marsh varies seasonally in salinity from low levels in winter (about 7 ppt) when runoff in the Petaluma River dilutes salinity, to the highest levels in the dry season (about 25 ppt) when freshwater inflows recede and water from San Pablo Bay dominates tidal flows to the site.

The hydrologic design criteria for the tidal marsh include:

- 1.5-foot elevation of channel bed (thalweg);
- 20-foot wide main channel, tapering to 10-foot wide headwaters;

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[8] This area has gradual grades to Wetland H, drains ponded water slowly, and supports seasonal wetlands E, F and G.

- 2-foot elevation channel bed;
- 3.4-foot Mean Higher High Water datum and 3.1-foot Mean High Water datum under current conditions, and 4.1-foot MHHW and 3.5-foot MHW should the culvert eventually be retrofitted by another future project such as Sonoma-Marin Area Rail Transit (SMART) project;
- 5 to 18 percent inundation standard for pickleweed enhancement, 3.0 to 3.5 foot elevation under current conditions and 3.1 to 4.2 feet, should the culvert be eventually retrofitted by another future project;
- 4-foot elevation upper range of inundation under current conditions, and 5-foot with potential culvert retrofit;
- Higher elevations need consideration for future rise of the tidal regime, given current sea-level trends;
- Given the existing railroad culvert, channel, and adjacent pond and datum conditions, the Mean High Water in the railroad ditch should be greater than the outflow elevation of the pond to safely maintain tidal flow to the adjacent pond.

4.3.3 Seasonally Inundated Wetlands

With the exception of the tidally influenced drainages on the site, the existing wetlands on the project site are seasonal and located in topographic depressions and shallow swales. Depressional wetlands accumulate rainfall during the wet season and later this water recedes during the dry season. Some depressional wetlands, especially those occurring on silty substrate such as those at the Haystack site, often allow infiltration, enhancing ground-water recharge. Swales[9] are similar to depressions but elongated and gently sloped.

Opportunities for enhancing and expanding the seasonal wetlands on site are found on the south portion of the site (south of the proposed emergent marsh and tidal marsh). This area is divided by a bermed access road and smaller berms remnant from construction of the historic siltation ponds. The west portion of the proposed mitigation area is gently sloping and principally drains to the north towards Wetland H, but because of the presence of small shallow flats and poorly drained conditions it also supports seasonal wetlands in the upper portion of the swale. The east portion is gently sloping and drains to the east, to Wetland B. There is also some off-site runoff, from the hill west of the site that flows through a culvert beneath the freeway, and collects in the ditches along the southwest corner of the site. The mitigation area in general has some of the higher elevations on site and (in its eastern portions) some of the highest soil and shallow ground-water salinity on site as well (Appendix D).

The hydrologic design criteria for enhancing and expanding the seasonally inundated wetlands include:

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[9] A swale is a localized gently sloping catchment presenting enhanced water holding capacities that commonly support wetland communities.

- Re-contouring the divide between wetlands B and H to enlarge the watershed for Wetland B and diminish the watershed for Wetland H;
- Establishing a divide elevation at elevation +8.0 between watersheds for wetlands B and H, directing all of the flow from the off-site culvert located on the southern potion of the site away from Wetland H and toward the existing brackish marsh.
- Contouring a broad, shallow swale to: (a) draw water from the southwest corner of the site towards Wetland B; (b) lower base elevations to elevate wetness broadly across the swale; and (c) over the long term, lower salinity levels by flushing salts during the runoff-generating large storms.

4.4 Design

4.4.1 Emergent Marsh

4.4.1.1 Hydrology

The emergent marsh is located at existing seasonally inundated Wetland H, at the mouth of the treatment swale that receives runoff from the project upland areas (Figure 3 and Plate 2). Our approach to the design of the emergent marsh is to: (1) deepen and increase the area of ponded water persisting into the dry season; (2) control the salinity of the ponded water such that plants typical of freshwater emergent wetlands will continue to thrive; and (3) focus colonization of wetland plants on the shores of the ponded areas leaving the center of the pond open water habitat.

Two changes to the contributing watersheds to Wetland H are proposed as a design element for the emergent marsh:

- The existing 8.2-acre drainage area to Wetland H will be decreased by grading 2.9 acres of the southern portion of the watershed towards Wetland B and away from Wetland H. The area has slow drainage and comprises seasonal wetlands F and G. This area also has some of the highest soil water salinities on site, so truncating this portion of the watershed will serve to lower salinities of the emergent marsh. The salinity of Wetland B, however, should not be affected by this added drainage area because (1) Wetland B spills into the railroad ditch, thus removing dissolved solids, and (2) additional runoff from the hills to the west will be directed onto the site, having a dilution effect. The estimated seasonal runoff to the emergent marsh from the remaining 5.3-acre area is 2.9 acre-feet (Table 3).

- Additional runoff from upland areas to the north will also be redirected to the emergent marsh. These areas include the 5.8-acre asphalt plant, the 2.4-acre recycle area and the 2.2-acre treatment swale. The combined 10.4-acre drainage area will serve to increase seasonal runoff to the marsh by 9.5 acre-feet (Table 3).

It was estimated that the total volume of water needed to fill the marsh to the spillway elevation of 3.95 feet is about 3 acre-feet Figure 8. Because the average annual runoff is four times this volume as referenced above, the marsh should fill with water every winter and be adequately flushed, with discharge and removal of dissolved solids (Table 3).

Evapotranspiration from small, seasonally inundated or emergent wetland areas in the project area is estimated at 3.7 feet per year (CIMIS station 144, Petaluma, CA). Given a marsh flush with seasonal rainfall at the beginning of the dry season, we estimate 2 feet of standing water by the end of the dry season (estimated on October 1) for a normal year (Table 4). During years when the dry season begins earlier than a normal year, then the depth of water by the end of the dry season may be as shallow as 1.3 feet (as during a year similar to 1997).

4.4.1.2 Target Vegetation

The emergent marsh will be designed to contain areas of open water habitat and areas of freshwater/brackish marsh vegetation. Plants found in this community type typically require prolonged inundation or saturated soils to persist throughout the growing season, and include cattails (*Typha latifolia, Typha angustifolia*) and hard-stem tule (*Schoenoplectus acutus occidentalis*) (previously known as *Scirpus acutus*). These species are known to grow between MLLW and MHHW (Atwater and Hedel 1976) (which is 1-5 foot elevation at this site).

The range of the elevations within the emergent marsh will be designed to provide both open water habitat, where vegetation growth is suppressed by the duration and depth of inundation, and a freshwater/brackish marsh community, where the depth and duration of inundation will be designed to support cattails and bulrush species. Cattails are most commonly found in areas that remain inundated or submerged for extended periods of time, at least 3 months. The optimal depth of submergence for cattails is 1 to 3 feet. In order to ensure that cattail and bulrush growth is restricted to the outer shelf of the emergent marsh and that the center of the marsh remains open water habitat that cannot become overgrown with cattails, the design elevation for the emergent marsh will range from 3 to 5 feet plus in elevation (Figure 5). Areas that remain inundated for more than 3 months, and/or that are designed to support greater than 3 feet of inundation will develop into open water habitat. The ground surface elevation will range between minus one (-1) to 2 feet in elevation. This will allow those areas to remain inundated for more than 3 months under normal conditions.

4.4.1.3 Target Wildlife

The open water habitat in the emergent marsh will attract waterfowl species and wading birds, and is designed to provide foraging habitat for those species. Species expected to utilize this marsh include mallard, northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), great blue heron, great egret, and greater yellow legs (*Tringa melanoleuca*). The cattail-dominated areas of this marsh will provide nesting habitat and vegetative

Table 3. Rough estimation of average annual runoff to emergent marsh at Haystack Landing, Sonoma County, CA.

Background information		
Average annual rainfall[1]	22	inches
Elevation of culvert spillway to DD2	3.95	feet
Volume of water in emergent marsh when full at culvert spillway elevation.	3	acre-feet
Runoff estimation from project area to the north *(light industrial use)*		
Area of project asphalt area draining to treatment swale	5.82	acres
Area of recycle area draining to treatment swale	2.39	acres
Area of treatment swale	2.2	acres
Combined drainage area of project upland area north of emergent marsh	10.41	acres
Average annual runoff to emergent marsh from upland area to the north (0.5 runoff factor)[2]	9.5	acre-feet
Runoff estimation from emergent wetland watershed *(excluding inflows from the project upland areas to the north)*		
Area of restored emergent marsh (not including project upland area to the north)	5.3	acres
Average annual runoff to emergent marsh (0.3 runoff factor; silty clays and dense clayey sands)[2]	2.9	acre-feet
Total average annual runoff to emergent marsh *(on-site watershed + project upland areas to north)*	12.5	acre-feet

Notes:

1) Rantz, S.E., 1971, Precipitation depth-duration frequency relations for the San Francisco Bay region, California. Menlo Park: U.S. Geological Survey Professional Paper 750-C, 5p. pamphlet, plate 1.

2) Average annual runoff estimated using the rational method with a conservative runoff factor to compensate inherent overestimation by using annual data.

Table 4. Dry season depth of water in emergent marsh, Haystack Landing, Sonoma County.

Dry-season starting (some modest rainfall in spring)	Date at 3-foot depth	Depth on October 1 (feet)
February (as during 1997)	June 25	1.3
March (as during 2004)	July 3	1.4
April (as during 1991)	July 16	1.7
May (nominal)	August 6	2.1

Notes:

1) Based on mean monthly data from California Irrigation Management Information System (CIMIS) reference evapotranspiration station #144, Petaluma, California, and assuming 0.1 feet per month seepage.

2) Modest spring rainfall of an inch or two should raise the depth accordingly and add a week to ten days to noted dates of 3-foot depth.

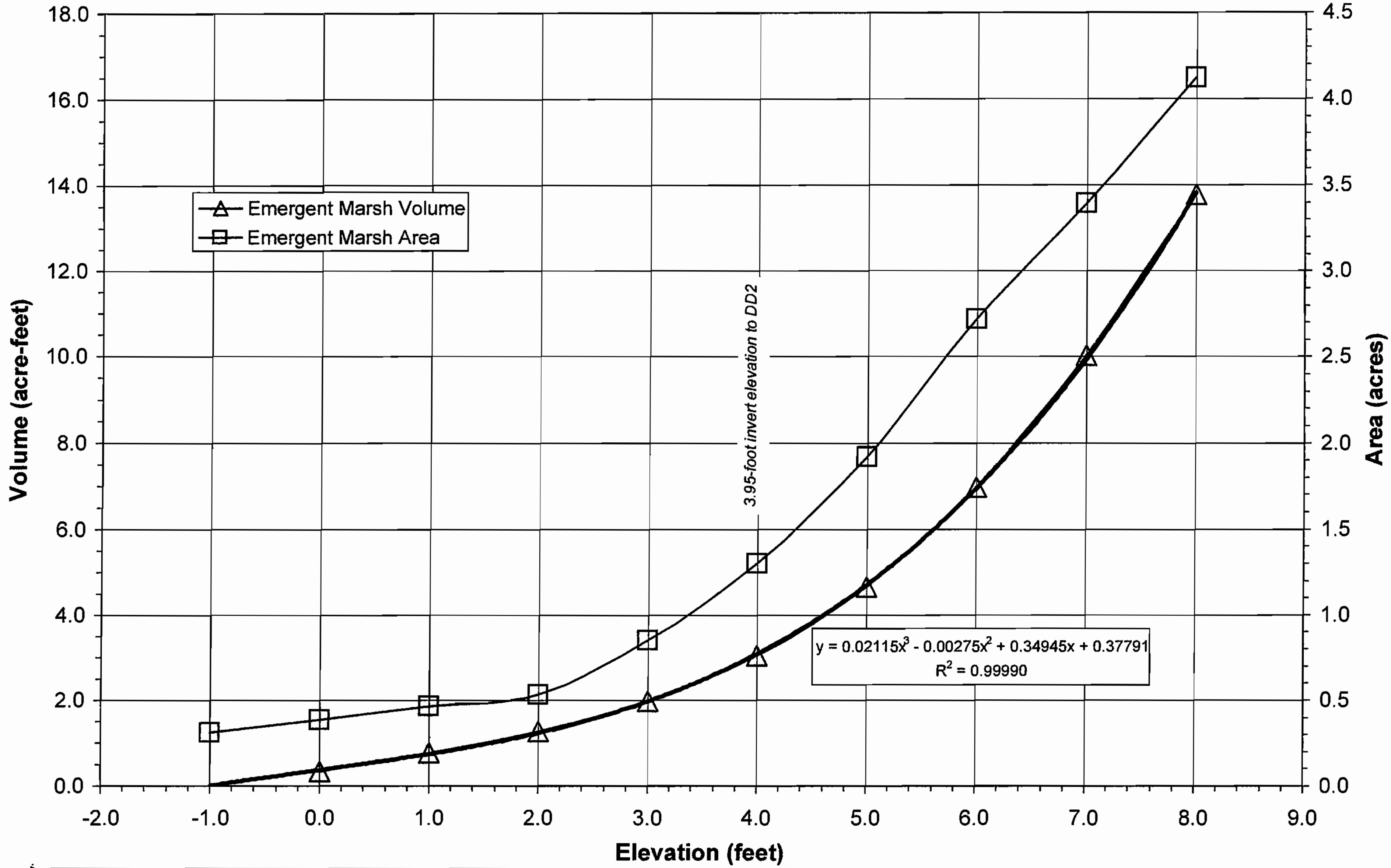

Figure 8. **Area-capacity curves for the proposed emergent marsh at Haystack Landing restoration site, Sonoma County, California.**

Balance Hydrologics, Inc.

204012 depth area capacity.xls, Emergent Marsh Figure, 3/15/2006 cover for species such as red-winged blackbirds (*Agelaius phoeniceus*) and marsh wren (*Cistothorus palustris*).

4.4.2 Tidal Marsh

4.4.2.1 Hydrology

The tidal marsh will be located at the watershed divides for existing seasonally inundated wetlands WB, WC and WD, but mostly within the watershed of Wetland B (Figure 3 and Plate 2). The marsh was designed per the criteria in Section 4.3.2., and specifically to avoid significant effects to the tidal prism[10] of the channel from the mouth of the slough at the Petaluma River to the marsh and pond southeast of the site such that it should continue to function as a tidal marsh unaffected by the on-site tidal marsh enhancement (see section 4.2.1C for details). Figure 9 shows the design area and volume of tidal marsh in relation to Mean High Water and Mean Higher High Water.

4.4.2.2 Target Vegetation

Salt marsh plants are most commonly distributed between MHW and MHHW (2-5 foot elevations at this site).The tidal marsh will be designed to support a dominance of pickleweed and/or other native salt marsh species, such as alkali heath (*Frankenia salina*), salt grass (*Distichlis spicata*), fat hen (*Atriplex triangularis*), fleshy jaumea (*Jaumea carnosa*), alkali bulrush (*Schoenoplectus robustus*), and California sea-blite (*Suaeda californica*).

4.4.2.3 Target Wildlife

The tidal marsh will be restored to provide habitat for target species, such as the salt marsh harvest mouse (*Reithrodontomys raviventris*), which is currently absent from the site. Shellhammer *et al.* (1982) found that salt marsh harvest mice do not use diked marsh areas with low salinities and sparse pickleweed, such as is found in marsh areas that are managed for waterfowl (freshwater marshes). However, if salt marsh vegetation becomes established and provides greater than 50 percent cover on the site, the tidal marsh could provide suitable habitat for the salt marsh harvest mouse and other salt marsh wildlife species, such as salt marsh wandering shrew (*Sorex vagrans halicoetes*), California meadow vole (*Microtus californicus*), and the common yellowthroat (*Geothlypis trichas*).

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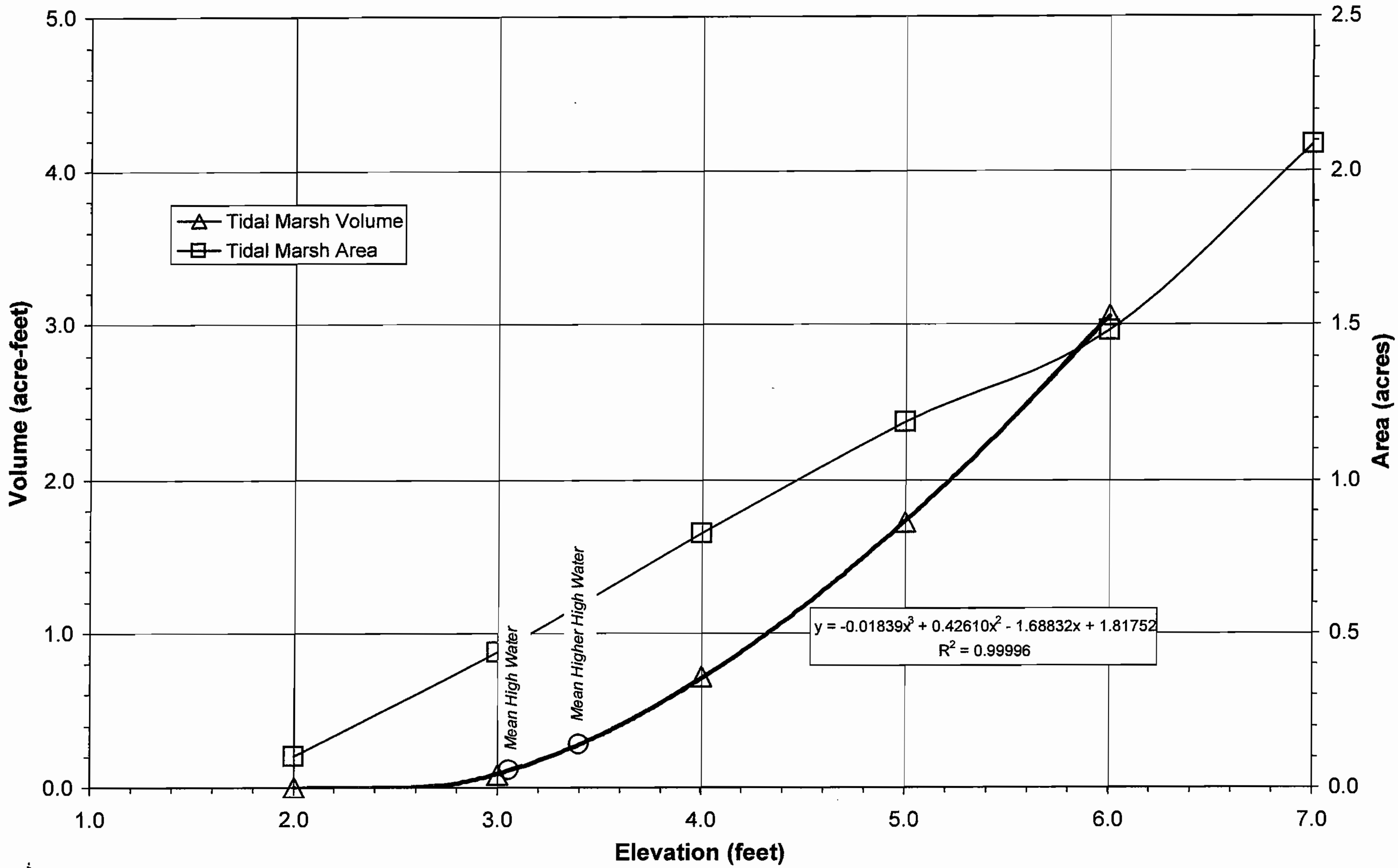
[10] The tidal prism is the volume of water in the marsh between the elevations of Mean Lower Low Water and Mean Higher High Water. Where MLLW was not available the bed elevation was used.



Balance Hydrologics, Inc.

Figure 9. Area-capacity curves for the proposed tidal marsh at Haystack Landing restoration site, Sonoma County, California.

4.4.3 Seasonally Inundated Wetlands

4.4.3.1 Hydrology

Opportunities for enhancing and expanding seasonal wetlands are found on the southern portion of the site, south of the proposed emergent marsh and tidal marsh. These areas will be re-graded per the criteria in Section 4.3.3. The on-site watershed area for Wetland B will increase from the existing 6.4 acres to 7.4 acres, and additional off-site water collecting in the ditches at the southwest corner of the site may potentially spill on site during storm peaks further enhancing these habitats (Table 5).

4.4.3.2 Target Vegetation

The seasonally inundated wetland habitat will be designed to support a dominance of herbaceous wetland species that are adapted to grow in environments that remain inundated or saturated throughout much of the early growing season, but become dry by summer. This wetland will occur at elevations greater than 5 feet. Plants found in the seasonally inundated wetland will include a variety of species, including brackish and salt tolerant species due to the presence to saline pockets in the underlying substrate. Species expected to colonize the seasonally inundated wetland will include rushes *(Juncus* spp.), sedges (*Carex* spp.), brass buttons, salt grass, fat hen (*Atriplex triangularis*), pickleweed, and non-native, naturalized wetland species such as bird's foot trefoil (*Lotus corniculatus*), rabbit's-foot grass (*Polypogon monspeliensis*), and sand spurrey.

The transition zone between the enhanced seasonally inundated wetland and the upland areas will be seeded with alkali heath, salt grass, western marsh-rosemary (*Limonium californicum*), and marsh gumplant (*Grindelia stricta angustifolia*) to enhance native species establishment and improve colonization of the transition zone by target plant species. Areas higher than 7 foot elevations will be seeded with salt marsh baccharis (*Baccharis douglasii*), coyote brush (*Baccharis pilularis*), and California bee plant (*Scrophularia californica*) to further enhance the transition between the marsh and upland habitat areas.

Table 5. Watershed areas to the proposed wetland restoration areas
Haystack Landing, Petaluma, California

Watershed	Area *(acres)*
Existing watershed areas	
Wetlands WB and WC [1]	6.38
Wetlands WH, WG and WF [2]	8.20
Proposed watershed areas	
Emergent marsh	4.91
Tidal marsh	2.07
Enhanced seasonally inundated wetland	7.38
Project project upland areas to the north contributing runoff to the emergent marsh	
Asphalt plant area draining to the treatment swale	5.82
Recycle area draining to the treatment swale	2.39
Treatment swale train area	2.20
Off-site upland areas to the west contributing runoff to bordering ditches	
Northwest of site	53
Southwest of site	20

Notes:

1) The watershed area to existing seasonal wetland WB, which includes seasonal wetland WC in its upper watershed, is proposed for enhancement and to include the tidal marsh as a separate watershed.
2) The watershed to wetland WH, which includes seasonal wetland WG and WF in its upper watershed, is proposed for restoration as an emergent marsh. The southern portion of the watershed that includes WG and WF is proposed for recontouring to redirect runoff towards WB.

4.4.3.3 Target Wildlife

The seasonally inundated wetland will likely attract wading birds that like to probe saturated soils for invertebrates. Birds expected in this wetland include black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), western sandpiper (*Calidris mauri*), killdeer, and greater yellowlegs

4.4.4 Target Salinity Levels for Wetland Areas

The Goals Project (2000) found that most man-made marshes are not managed to maintain their salinity over time. The Goals Project (1999) recommends that the design and management of marsh restoration projects should include an assessment of the salinity regime and tidal exchange.

Water salinity in the wetland/marsh areas will depend on the amount of tidal influence and/or the volume freshwater input from storm water treatment ponds. Salinity will also vary over the course of the year, depending on the amount of rainfall during the winter or prolonged periods of drought during the summer months. Finally, evaporation and transpiration will remove water from the wetland/marsh system, concentrating salt in the soil, while tidal flushing, precipitation, and dew formation will reduce the soil salinity (Coulombe 1970, Kingma 2003).

Water salinities in the emergent marsh are expected to be undetectable or extremely low (0-5 ppt). Brackish marsh species will become established in areas with water salinity less than 15ppt. Pickleweed and alkali bulrush benefit and grow larger under saline conditions (Ungar, 2000), thus hyposaline (low saline) conditions could limit the establishment of these salt-adapted plant species. The optimal range for salt marsh species growth is 10 to 30 ppt (Atwater and Hedel 1976). Therefore, soil salinity levels in the tidal marsh should remain between 10- 30 ppt to enhance and promote the establishment of native salt marsh species (Mall 1969, Kingma 2003).

4.4.5 Upland Enhancement

Upland areas adjacent to the mitigation area will be planted with native trees and shrubs (including but not limited to *Quercus agrifolia*, *Rubus ursinus*, and *Heteromeles arbutifolia*). Native vegetation associated with the upland buffer zones would provide cover (and a food source) for wildlife species and would create a denser buffer between the proposed facility and mitigation area. A detailed planting plan prepared by a qualified restoration specialist will be provided to the permitting agencies for review and approval prior to project construction.

Once the plantings mature, they are expected to provide more cover for medium-sized mammals such as raccoons and opossums, to hide and move about, and the trees and shrubs provide greater nesting opportunities for local bird populations. Once trees and shrubs become established in the uplands it is possible that uncommon species such as the loggerhead shrike (*Lanius ludovicianus*) and the white-tailed kite, which have both been observed foraging onsite, may nest onsite as well.

5.0 SUCCESS CRITERIA

The following success criteria are proposed for the various habitats of the mitigation program.

5.1 Emergent Marsh

1) A minimum of 10 percent increase in total cover by emergent marsh plant species (cattails, hard stem tule, alkali bulrush, and other seasonal marsh species) should occur after a 5-year period;

2) This community should be composed of open water habitat and emergent marsh habitats, preferably approximately 50 percent of each type to encourage wildlife use;

3) Waterbird utilization of open water habitats for foraging;

4) Salinity range: 0 - 15 ppt water or soil.

5.2 Tidal Marsh

1) A minimum of 10 percent increase in total cover by pickleweed and/or other native salt marsh species (e.g., alkali heath, salt grass, fat hen) should occur over a 5-year period.

2) An upward trend in average (mean) pickleweed height in the tidal marsh restoration area should occur over a 5-year period.

3) Soil salinity levels should remain within the optimal range for pickleweed growth (10- 30 ppt measured in water).

5.3 Seasonally Inundated Wetland

1) A minimum of 10 percent increase in total cover by seasonal wetland plant species (rushes, sedges, brass buttons (*Cotula cornopifolia*), and other seasonal wetland species) should occur after a 5-year period;

2) Salinity range: 0 - 15 ppt measured in soil or water.

5.4 Uplands

At least 75 percent of the mitigation plantings should be healthy and vigorous at the end of the 5-year monitoring period. It is expected that there will also be natural colonization of native shrubs such as coyote bush given this species already occurs on the project site.

6.0 MONITORING

Following is the proposed monitoring schedule and program for the proposed wetlands mitigation project.

6.1 Monitoring Duration

After completing the final grading of the mitigation wetlands, intensive monitoring will follow the first rainfall that results in the germination of hydrophytic plant species. Monitoring will continue annually for five years after the completion of the mitigation wetland construction.

6.2 Hydrologic Monitoring Methods

Hydrologic observations will be conducted at least once a month during the months of December, February, April, June, August, and September (six monitoring visits per year). During each site visit, the percent of the mitigation wetland/marsh areas that is dry, saturated, or inundated will be assessed visually. The total area of the mitigation wetlands that is dry, saturated, and inundated will be expressed as a percent of the total graded area (initial wetland areas will be reported in an As-built Report). The aerial extent of open water relative to the extent of emergent marsh vegetation will be assessed during each monitoring visit.

A more extensive hydrologic mapping of the surface water and shallow ground water will be conducted twice a year: (a) during September, and (b) during a mid-winter dry spell, preferably two to three weeks following significant rainfall and runoff. Methods will be similar to those described in Appendix D. Eight points to be located on the boundary of the existing wetlands (by GPS) will be used to assess whether water levels are higher than those observed during pre-project conditions, and whether salinity levels are being maintained as proposed in Sec. 5.3, above.

Water depths in the emergent marsh and tidal marsh will be documented by measuring the water levels on enameled staff plates ('gauges') installed at key locations in the emergent, brackish and tidal wetlands. Staff gauges will be installed in the mitigation wetlands upon completion of the final grading, and will be level-surveyed to hydraulic controls and to local benchmarks or survey controls, such that both relative and absolute elevations may be established.

In addition, during the first water year following construction, water-level elevations, water temperature and specific conductance (a surrogate for salinity) will be monitored in the emergent marsh with a continuous-recording data-logger and staff plate. Data will be used to evaluate runoff and dry-down dynamics to help explain observed rates infiltration and evaporation, and salinity changes. Empirical information on performance of this wetland is needed because it is being constructed largely in heterogeneous quarry fines, such that inflows and outflows of both water and salt can only be estimated at this time. The best and least intrusive approach to monitoring performance of this wetland is to measure how it actually responds. This approach is far preferable to using piezometers or tracer dyes to assess migration into and out of the wetland.

6.3 Plant Monitoring Methods

Vegetation analyses will occur once a month each month during April, May, and July. "Vegetation composition" and "species richness" indices shall be developed for all plant species found in the mitigation wetlands/marshes. For the vegetation composition analysis, a plant list will be made for the mitigation wetlands each year. Based upon this plant list, the habitat affinities of all plants within the mitigation wetlands shall be determined from the "Revision of the national list of plant species that occur in wetlands" (Reed 1997).

Random sampling of 50 one meter square (1 m^2) plots within the mitigation wetland/marsh areas will be conducted to document aerial cover of vegetation, species composition, and species richness. In addition, average vegetation height will be measured (inches or centimeters) in each of the 50 random plots. Over time the vegetation monitoring will detect changes in vegetation structure within the mitigation wetland/marsh areas over time.

6.4 Cordgrass Monitoring

Qualitative assessment of cordgrass (*Spartina* spp.) colonization at the site should be conducted at least once annually. This invasive plant can quickly become established in restoration marshes and has resulted in mitigation project failures. Since the non-native species of cordgrass are nearly impossible to distinguish from the native species, periodically the vegetation monitor should collect some cordgrass samples onsite and take it to the members of the volunteer *Coastal Conservancy Spartina Project* to have the DNA of this plant checked to determine if the non-native cordgrass has become established onsite. If non-native cordgrass is identified within the mitigation area, the *Coastal Conservancy Spartina Project* can implement remedial action measures to remove this plant from the mitigation site as part of its volunteer program.

6.5 Wildlife Monitoring Methods

All wildlife using the created/restored wetlands/marsh areas and/or adjacent uplands will be noted during hydrology and vegetation monitoring efforts. At the end of each monitoring period a complete list of wildlife species that were recorded using the wetland/marsh areas will be prepared and included in annual monitoring reports.

6.6 Soil Organic Matter and Soil Salinity Monitoring Methods

A core sample will be taken in each of the random plots, placed in a zip-lock bag, and submitted to a lab for processing. Soil salinity will be reported in parts per thousand (ppt) and compared to the target salinity levels referenced in Section 4.4.4.

6.7 Photographic Documentation of Wetland Habitats

Once all wetland habitats have been created/enhanced/restored, permanent photo stations will be established at each wetland community. During each hydrology and vegetation monitoring visit, photographs will be taken at the permanently established stations to document the establishment of vegetation over time.

6.8 Upland Vegetation

The project monitor will visit the project site monthly during the first two years to evaluate the health and vigor of the upland plantings in the upland buffer zones. For the remaining three years of the 5-year monitoring program, annual vegetation monitoring of the upland buffer zones will be conducted each spring. Monitoring visits will entail recording details of the existing conditions at the mitigation site. Upland photo stations will be permanently marked in the field using rebar stakes and marked on the as-built plans to ensure that data is collected in the same location during each visit.

Required monitoring data will include:

1) qualitative assessment of health and vigor of plantings

2) percent survival of plantings

3) natural recruitment of native and non-native species in the upland buffer zone

4) representative photographs of plantings

7.0 PROJECT CONSTRUCTION AND IMPLEMENTATION

7.1 Grading and Clearing

Prior to grading the site for construction of the asphalt and recycling plant all wetland areas to remain as part of the project will be fenced with orange construction fencing to avoid accidental intrusion. The asphalt and recycling plant project area will then be cleared and grubbed of vegetation. In order to construct the wetland mitigation project, approximately 24,000 cubic yards of soil from the mitigation area will be removed using standard earthmoving equipment including scrapers, bulldozers, hydraulic excavators, trucks and other construction equipment. As described in this plan, the mitigation area will be excavated to create low areas and develop a separation between the tidally influenced sloughs and fresh water and seasonal wetland areas.

Grading for the asphalt and recycling component of the project and the wetland mitigation project includes additional earth movement of approximately 12,000 cubic yards of soil in the northern portion of the site. Between the excavation and re-contouring of the mitigation area and the excavation and fill for the proposed asphalt and recycling plant, the soil will be balanced on-site and no import or off-haul of soil will be required.

7.2 Avoidance Measures

7.2.1 Wetlands

Wetland areas that are to remain within and adjacent to construction zones will be fenced with high visibility orange construction fencing to prevent accidental intrusion into these areas during construction.

7.2.2 Special-status Species

Based on the habitat characteristics of the site and given that a portion of the Petaluma River is included in the project boundary, it was determined that seven special-status species have the potential to occur on or within the vicinity of the project site. These include three special-status birds, the California clapper rail, California black rail, and salt-marsh common yellowthroat, and three special-status fish species, Chinook, steelhead, and Sacramento splittail. The Pacific pond turtle was also included because it may also have the potential to occur within the vicinity of the project site. Finally, nesting raptors including white-tailed kite (*Elaneus leucurus*) and northern harrier (*Circus cyaneus*), and nesting egrets were also identified as having the potential to occur on or within the vicinity of the site.

Mitigation measures designed to reduce direct and/or indirect impacts to the above referenced special-status species are as follows:

1) For the California clapper rail, the California black rail and the salt-marsh common yellowthroat, construction on the project site may be restricted during these species nesting periods, which occur between February 1st and August 31st. Prior to construction, specific construction schedules would be determined in consultation with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) through the Clean Water Act Section 404 and the DMMO permit processes.

2) If earth-moving/grading activity or construction-related disturbance will occur on the project site during the raptor nesting season (March15 to August 15), a pre-construction raptor nesting survey should be conducted by a qualified biologist to determine if construction activities could disturb nesting raptors. If nesting raptors are identified on the project site, a non-disturbance buffer (determined in coordination with CDFG) should be established around the nest tree. This buffer should be fenced with orange construction fencing. A qualified raptor biologist would need to periodically monitor the nest site(s) to determine if construction activity occurring outside the buffer zone disturbs the birds, and whether the buffer zone should be increased to prevent nest abandonment. No disturbance should occur within the minimum 500-foot buffer zone until a qualified raptor biologist has determined that the young have fledged (left the nest), and are flying well enough to avoid project construction zones, typically by August 1st. Once the young have successfully fledged, no further mitigation would be required.

3) Established suitable rookery sites are typically used by egrets annually. Because of the sensitivity of egret nesting to human disturbance, construction at the project site will have to be restricted within a suitable buffer zone around the rookery from about March 1 to August 31 if egrets are present on the site. Final buffer zone distance and exclusion dates will be determined through consultation with CDFG.

4) For steelhead, Chinook salmon, Sacramento splittail, and Pacific and River lamprey potential impacts may be avoided by scheduling construction activities within the Petaluma River between July 1 and October 15 (or as determined by NOAA and/or CDFG) to protect out-migrating smolts and migrating adults. Prior to construction, the applicant would coordinate specific operating schedules in consultation with NOAA Fisheries and CDFG through the Clean Water Act Section 404 and the DMMO permitting processes.

5) For the Pacific pond turtle, the project applicant would contact the USFWS and the CDFG prior to initiating construction within the Petaluma River to determine if pre-construction surveys to determine presence of the turtle in the area of construction would be required. In addition, if required by the agencies through the Clean Water Act Section 404 and DMMO permit processes, the applicant

would employ an on-site monitor during construction to ensure that any turtles within the area of the proposed work are not harmed during construction.

7.3 Construction Monitoring

7.3.1 Equipment Use

Equipment, vehicles, debris, building materials, and excess soil associated with project construction shall not be stored or parked within 15 feet of the coastal marsh habitat and any wetland habitats to remain after project construction. Wetland areas that are to remain within and adjacent to construction zones will be fenced with high visibility orange construction fencing to prevent accidental intrusion into these areas.

7.3.2 Clearing of Mitigation Areas

Non-native plant species occurring in the proposed mitigation areas will be eradicated by hand or mechanical clearing. Cleared vegetation and waste materials and debris generated during project construction will be removed from the proposed mitigation area.

7.3.3 Grading Mitigation Areas

The grading of the mitigation areas will be done with the equipment described in Section 7.1 above. The operation will be completed simultaneously with the grading for the asphalt plant and recycle areas.

7.3.4 Soil Disposal

The project site will include soil movement of approximately 36,000 cubic yards. All of the soil movement is expected to be balanced on site and no import or export is required.

7.4 Construction Schedule

Construction of the mitigation area will occur in the summer and fall of 2007 and/or when soils in the wetland areas are sufficiently dry. Preparation of the asphalt and recycling plant site can begin prior to that time weather permitting. The grading operation will take approximately six weeks. Installing the site utilities associated with the asphalt and recycling plant will also require approximately 6 weeks to complete. Following the site preparation work, an additional 8 weeks will be required to install the plant and equipment.

8.0 MAINTENANCE

Each of the different wetland habitats may require (a) initial adjustments for up to 3 years, and/or (b) ongoing maintenance. Initial grading adjustments may be required because of the substantial change of the land surface that will occur with transforming the man-made watersheds of the site that have little relationship to the proposed restored functions and ecological units. Nonetheless, the existing seasonal wetlands and emergent marsh on the site have developed seed banks and vegetation which, although sub-optimal, provide some value and therefore should be disturbed as little as possible. While the proposed mitigation plan minimizes initial grading of these two units, it is possible that subsequent grading work may be needed to make adjustments to localized areas, some of which may be large enough to require the use of small-scale mechanized equipment. For example, the enhanced seasonal wetland in the southern portion of the site may locally incise preventing water from spreading to adjacent areas as anticipated, a situation which may be addressed with minor grading that does not disrupt the seed bank.[11]

Maintenance measures specific to each habitat type are described below.

8.1 Emergent marsh

8.1.1 Adjustments maintenance

Make adjustments in marsh profile to accommodate either unexpected summer inflows or outflows or to clear sediment entering from the uplands and treatment train. Work will be done in late summer, maximizing activity feasible from the access road.

8.1.2 Ongoing maintenance

Clear trash or rubbish, and on rare occasions remove sediment as needed to maintain a suitable area of open-water marsh.

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[11] Because the substrate is completely artificial, it is better to plan to configure the ultimate equilibrium profile of the channel with an initial estimate followed by adjustment ('adaptive management')

8.2 Seasonal wetland

8.2.1 Adjustments maintenance

Conduct minor spot grading or reconfiguration, to maximize the area of wetlands that can be sustained. Work will be done in late summer, in a manner minimizing disturbance of the seed bank or existing vegetation.

8.2.2 Ongoing maintenance

Clear trash or rubbish. Make minor adjustments in channel and sill elevations using hand equipment. Clear obstructions as needed from the mouth of the culvert beneath Highway 101.

8.3 Tidal marsh

8.3.1 Adjustments maintenance

Make minor changes in the new channels during the late-summer months, as warranted following the first tidal cycles. This may include biotechnical erosion control if the evolving main channel impinges on the graded side slopes, or adjustments to the outlet level.

8.3.2 Ongoing maintenance

Clear trash or oily scums, using hand labor. Make other minor adjustments as warranted.

8.4 Treatment train

8.4.1 Adjustments maintenance

Remove sediment introduced during the initial rains from uplands, from adjustment of the channel, or from areas west of the highway. Replant vegetation dislodged during the initial years' establishment period. Adjust sill elevations or drainage facilities as needed.

8.4.2 Ongoing maintenance

Clear trash and rubbish. Trim or prune shrubby vegetation which may limit the performance of the BMPs. Check culverts and sills annually to remove obstructions. Perform other maintenance as needed, generally using hand labor.

9.0 SUBMITTAL OF MONITORING REPORTS

9.1 As-built Report and Plans

As-built plans will be prepared depicting finished grades of the various wetland habitats created and enhanced. Methods of construction as well as any problems or unexpected conditions encountered during construction will also be recorded. Permanent photo-points will also be established and recorded on the as-built plans as described in previous sections of this report. Baseline information will be incorporated into a written report describing the as-built status of the project. This report will be submitted with the as-built plans to the Corps within six weeks of completion of construction activities.

9.2 Annual Mitigation Monitoring Reports

Annual monitoring reports will be submitted by the applicant to the Corps by October 1 of the year following the first growing season after planting, and yearly thereafter or as specified by the Corps and the Regional Board.

At the end of each monitoring year (years one through five), a detailed annual monitoring report will be prepared. At a minimum each monitoring report shall contain:

A) Hydrology data summaries;

B) Plant community sampling data and summaries;

and,

C) Photographic documentation of hydrologic functions of the mitigation wetlands.

The monitoring reports will also include analyses of all quantitative monitoring data, prints of monitoring photographs, and maps identifying transect locations and permanent photo points. A qualitative assessment of the success of the upland buffer zone and associated plantings will also be provided. Overall success of the mitigation program will be discussed, and any remedial measures taken during the course of the monitoring period will be described.

10.0 CONTINGENCY MEASURES

If the annual performance criteria are not met for all or any portion of the mitigation program in any year, or if the final success criteria are not met, the applicant, or its assignee, will prepare an analysis of the cause(s) of failure, and, if determined necessary by the Corps, propose remedial measures for approval. Such remedial measures may include further corrective measures to be implemented on the mitigation site, or, if conditions are such that goals for the site may not be met, implementation of mitigation measures in other areas of Sonoma County and/or in the Petaluma River watershed.

If the mitigation site has not met the performance criteria, the applicant's maintenance and monitoring obligations may continue, as deemed necessary by the Corps, until the Corps has given final confirmation.

11.0 COMPLETION OF MITIGATION RESPONSIBILITIES

At the end of the fifth year following project implementation, a report will be submitted to the Corps evaluating the success of the mitigation project and determining whether all the goals of the mitigation plan have been met. If the goals have been met, the report will document completion of the project.

When the project has been deemed complete and documented in a final report, the Corps may require a site visit to confirm completion of the project. The Corps will be the agency responsible for determining whether the final success criteria have been met and will notify the applicant of its determination in writing.

12.0 FISCAL RESPONSIBILITIES AND OTHER ADMINISTRATIVE COMPONENTS

The project applicant, or a legal assignee, shall be solely liable for financing all work associated with mitigation plan implementation, monitoring, remedial actions, and contingency plans as specified in this mitigation plan. Assignee shall mean any affiliate, heirs, successors, joint venture partners, or an assessment district, or other vehicle duly formed to implement this wetland mitigation plan. Fiscal responsibility for these tasks shall remain the sole obligation of the applicant or the assignee until mitigation is considered successful pursuant to success criteria by the resource agencies.

13.0 LONG-TERM PROTECTION AND MANAGEMENT

The applicant proposes to deed the approximately 19-acre mitigation area to a conservation organization such as the Sonoma County Land Trust, the California Coastal

Conservancy, or another organization dedicated to preserving open space areas. If dedication of the property to a non-profit organization is not practicable, the applicant will retain the property and execute a conservation easement on the project site to protect the mitigation area. Management of the project area will occur as specified in the maintenance section of this report.

REFERENCES

Atwater, B.F. and C.W. Hedel. 1976. Distribution of seed plants with respect to tide levels and water salinity in the natural tidal marshes of the northern San Francisco Bay estuary, California. United States Department of the Interior Geological Survey.

Best, C., J. T. Howell, W. Knight, I. Knight, and M. Wells. 1996. A flora of Sonoma County. California Native Plant Society, Sacramento, CA. 347 pp.

California Native Plant Society. 2003. California Native Plant Society's electronic inventory of rare and endangered vascular plants of California. Computer program. Version 1.5.1.

California Native Plant Society, 2001. Inventory of Rare and Endangered Plants of California. August.

CNDDB, 2003. California Natural Diversity Data Base (Petaluma River quadrangle) January.

Coulombe, H.N. 1970. The Role of Succulent Halophytes in the Water Balance of Salt Marsh Rodents. Oecologia Vol 4.

Environmental Laboratory, 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87. Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.

Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, Calif/S.F. Bay Regional Water Quality Control Board, Oakland, Calif.

Goals Project. 2000. Baylands ecosystem species and community profiles: Life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area wetlands ecosystem goals project. P.R. Olofson, editor. S.F. Bay Regional Water Quality Control Board, Oakland, Calif.

Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.

Hobson, K., P. Perrine, E.B. Roberts, M.L. Foster, and P. Woodin. 1985. A breeding season survey of salt marsh yellowthroats (Geothlypis trichas sinuosa) in the San Francisco Bay Region. U. S. Fish and Wildl. Serv. Contract Rept. 84-57. Sacramento, CA. 92 pp.

Kingma, Hope. 2003. Identifying habitat parameters for salt marsh harvest mouse habitat restoration. Unpublished thesis, California State University, Hayward.

Macmillan, L., R. Buck, N. Kawamoto, and J. Winter, 2003. *Biological Constraints Analysis, Landing Way Project Site, Shamrock Materials, Inc., Petaluma, California.* November. 30 pp.

Mall, R.E. 1969. Soil-water-salt relationships of waterfowl food plants in the Suisun Marsh of California. California Department of Fish and Game, Wildlife Bulletin No. 1

Miller Pacific Engineering Group, 2004. Geotechnical Investigation, Haystack Landing Wetlands Restoration, Petaluma, California. October 1, 2004.

Mitsch, William J. and James G. Gosselink, 1986. Wetlands. Van Nostrand Reinhold. New York.

Monk & Associates. 2004. Salt marsh harvest mouse trapping study. Haystack Landing. Petaluma, California. Prepared for the U.S. Fish and Wildlife Service on behalf of Ms. Lucy Macmillan, Wetland Scientist. November 17, 2004. 9 pps. plus datasheets.

Moyle, P. 2002. Inland Fishes of California. Revised and Expanded. University of California Press. Berkeley.

Munz, P. A. and D. D. Keck. 1973. A California flora and supplement. University of California Press, Berkeley, CA.

Reed, P.B. Jr. 1997. Revision of the national list of plant species that occur in wetlands. Department of the Interior, U.S. Fish and Wildlife Service, Washington, DC. 253 pps.

Shellhammer, H.S., R. Jackson, W. Davilla, A. M. Gilroy, H.T. Harvey, and L. Simons. 1982. Habitat preferences of salt marsh harvest mice (*Reithrodontomys raviventris*). The Wasmann Journal of Biology 40(1-2), 1982. pp. 102-114.

Skinner, M. W. and B. M. Pavlik (eds.). 1994. Inventory of rare and endangered vascular plants of California. Calif. Native Plant Soc. Spec. Publ. No.1./ Fifth Edition. Sacramento, CA.

Tibor, D. P. (ed.). 2001. Inventory of rare and endangered vascular plants of California. California Native Plant Society Special Publication No. 1 [6th edition].

Ungar, I.A. 2000. Ecophysiology of vascular halophytes. CRC Press, Boca Raton, FL.

U.S. Army Corps of Engineers. 1987. Corps of Engineers wetlands delineation manual. Environmental Laboratory. Department of the Army. Waterways Experiment Station. Wetlands Research Program. Technical Report Y-87-1. Vicksburg, Mississippi. 100 pp. plus Appendices.

U.S.D.A. 1992. Hydric Soil Lists. Field Office Official List of Hydric Soil Map Units for Sonoma County, California.

U.S.D.A. 1990. Soil Survey. Sonoma County California.

U.S.D.A. 1991. Hydric Soils of the United States. Soil Conservation Service. Miscellaneous Publication Number 1491. 3rd Edition.

Woyshner, M.R., Porras, G., Mallory, B., and Hecht, B. 2004. Preliminary Hydrologic Evaluation of Wetland Restoration Feasibility at Haystack Landing, Petaluma, California. Balance Hydrologics, Inc. report prepared for Lucy Macmillan.

Zeiner, David C., William F Laudenslayer, Jr., Kenneth E. Mayer, and Marshall White. 1990. California's Wildlife, Volume II, Birds. California Statewide Habitat Relationships System.

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

NOV 1 3 2003

Regulatory Branch (1145b)

Subject: File Number 28104N

Lucy Macmillan
28 Bernard Street, Suite 4
Mill Valley, CA 94941

Dear Ms. MacMillan:

Thank you for your submittal of July 29, 2003 requesting confirmation of the extent of Corps of Engineers jurisdiction at the Haystack Landing site, located at 3355 Petaluma Boulevard, in the City of Petaluma, Sonoma County, California (APN 019-320-022 and 019-320-023).

Enclosed is a map, dated November 7, 2003, showing the extent and location of Corps of Engineers jurisdiction, as verified during a site inspection on October 20, 2003. We have based this jurisdictional delineation on the current conditions of the site. A change in those conditions may also change the extent of our jurisdiction. This jurisdictional delineation will expire in five years from the date of this letter. However, if there has been a change in circumstances that affects the extent of Corps jurisdiction, a revision may be done before that date.

All proposed work and/or structures extending bayward or seaward of the line on shore reached by: (1) mean high water (MHW) in tidal waters, or (2) ordinary high water in non-tidal waters designated as navigable waters of the United States, must be authorized by the Corps of Engineers pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Additionally, all work and structures proposed in unfilled portions of the interior of diked areas below former MHW must be authorized under Section 10 of the same statute.

All proposed discharges of dredged or fill material into waters of the United States must be authorized by the Corps of Engineers pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). Waters of the United States generally include tidal waters, lakes, ponds, rivers, streams (including intermittent streams), and wetlands.

Your proposed work appears to be within our jurisdiction and a permit may be required. Application for Corps authorization should be made to this office using the application form in the enclosed pamphlet. To avoid delays it is essential that you enter the file number at the top of this letter into Item No. 1. The application must include plans showing the location, extent and character of the proposed activity, prepared in accordance with the requirements contained in this pamphlet. You should note, in planning your work, that upon receipt of a properly completed application and plans, it may be necessary to advertise the proposed work by issuing a public notice for a period of 30 days.

If an individual permit is required, it will be necessary for you to demonstrate to the Corps that your proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines. A copy is enclosed to aid you in preparation of this alternative analysis.

However, our nationwide or regional permits have already authorized certain activities provided specified conditions are met. Your completed application will enable us to determine whether your activity is already authorized. You are advised to refrain from commencement of your proposed activity until a determination has been made that it is covered by an existing permit. Commencement of work before you received our notification may be interpreted as a violation of our regulations.

You are advised that the Corps has established an Administrative Appeal Process, as described in 33 CFR Part 331 (65 FR 16,486; Mar. 28, 2000), and outlined in the enclosed flowchart and "Notification of Administrative Appeal Options, Process, and Request for Appeal" form (NAO-RFA). If you do not intend to accept the approved jurisdictional determination, you may elect to provide new information to the District Engineer for reconsideration or submit a completed NAO-RFA form to the Division Engineer to initiate the appeal process. You will relinquish all rights to appeal, unless the Corps receives new information or a completed NAO-RFA form within sixty (60) days of the date of the NAO-RFA.

If you have any questions, please call Philip Shannin of our Regulatory Branch at telephone 415-977-8445. All correspondence should reference the file number at the head of this letter.

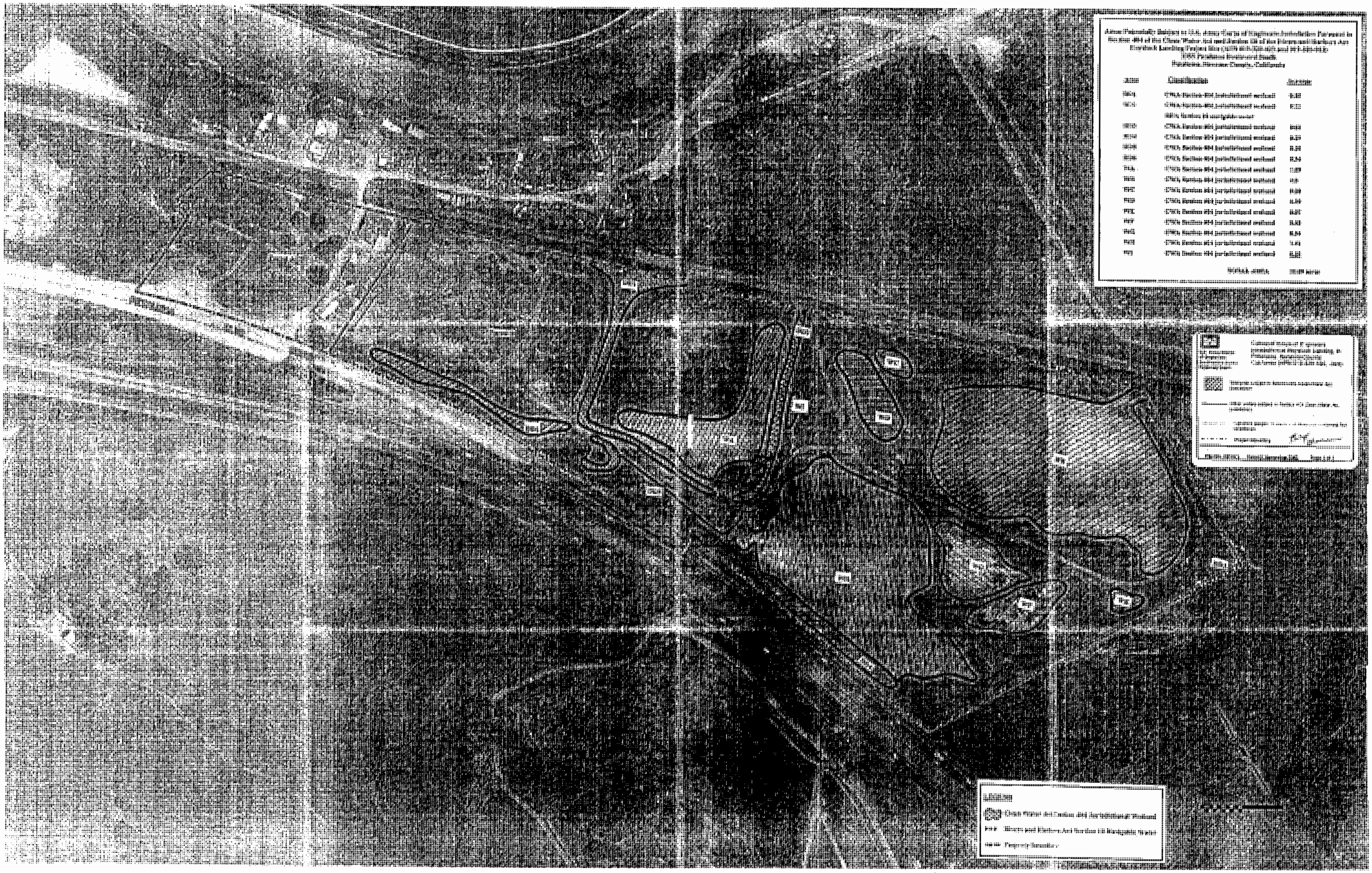
Sincerely,

Peter S. Straub

for Calvin C. Fong
Chief, Regulatory Branch

Enclosure

CF (w/map):
Pagliaio Ventures, LLC, Petaluma, CA



CSW [St]²
CSW/STUBER-STROEH ENGINEERING GROUP, INC.
CONSULTING ENGINEERS
790 DeLong Ave., Novato, CA. 94945-3246
(415) 892-4763 FAX (415) 892-4502

DUTRA HAYSTACK LANDING
WETLAND MITIGATION PLAN

03-13-06

Graphic Scale (in feet)

1 inch = 150 ft.

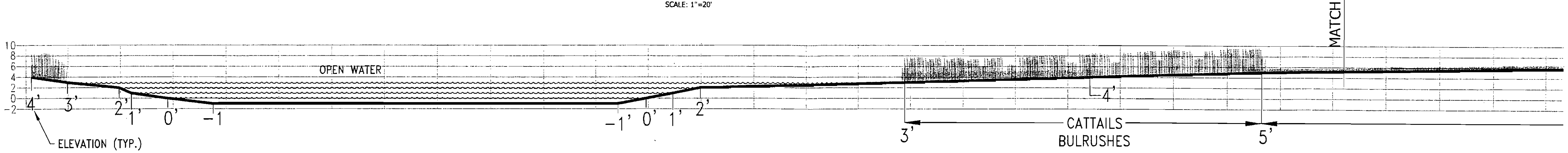
LEGEND:

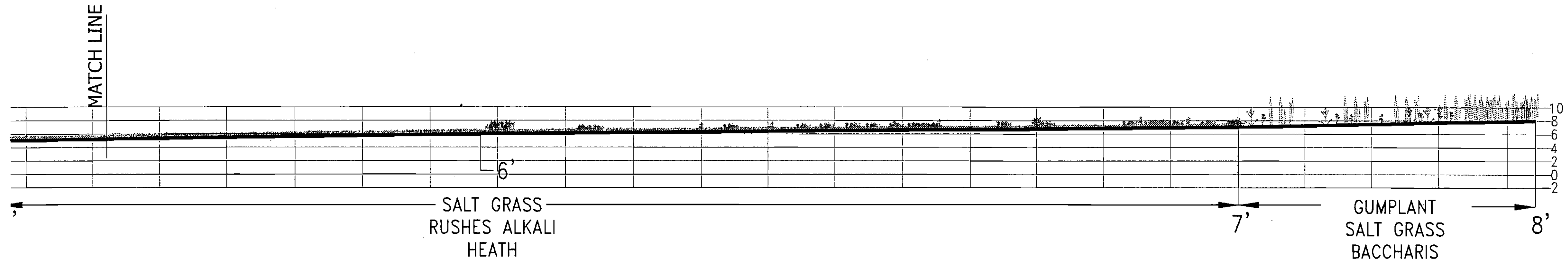
ACRES	SYMBOL	DESCRIPTION
0.67		CREATED TIDAL MARSH
2.04		CREATED SEASONALLY INUNDATED WETLAND
2.71		TOTAL NEW WETLAND HABITAT
0.51		EX. SEASONAL WETLAND-RESTORED TO TIDAL MARSH-
5.47		ENHANCED EX. SEASONALLY INUNDATED WETLAND
2.50		EX. SEASONAL WETLAND-RESTORED TO EMERGENT MARSH- BELOW 6
8.48		TOTAL ENHANCED WETLANDS
2.11		PROPOSED UPLAND ENHANCEMENT/ BUFFER ZONE
		LIMITS OF CORPS JURISDICTIONAL WETLANDS.
0.90		PRESERVED EXISTING WETLANDS
19.0		MITIGATION BOUNDARY
		TIDAL FLOW DIRECTION

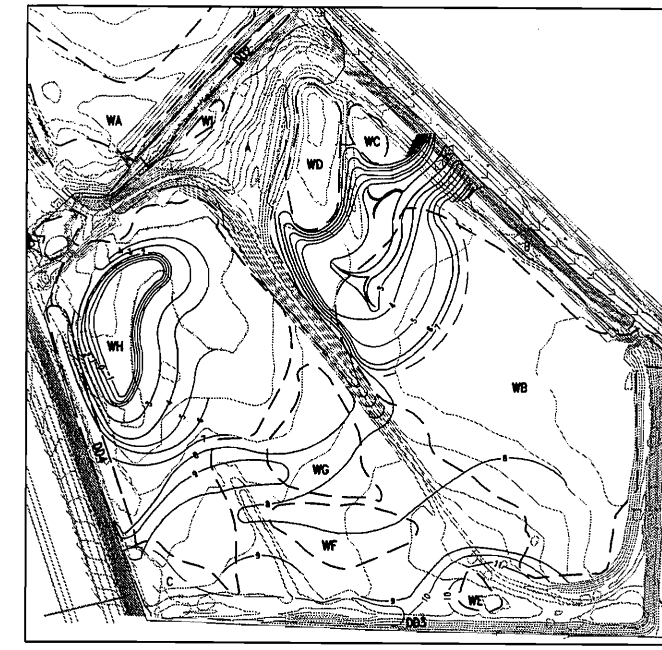
PLATE 2

A-A EMERGENT MARSH TRANSITIONING INTO SEASONALLY INDUNDATED WETLAND

SCALE: 1"=20'

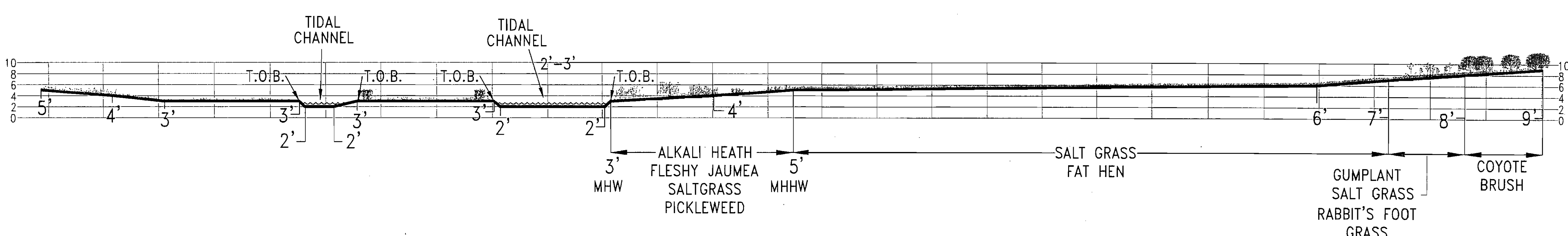






B-B TIDAL MARSH SECTION

SCALE: 1"=20'



NOTE: MHHW--MEAN HIGHER HIGH WATER
MHW-- MEAN HIGH WATER

REVISIONS			
NO.	DATE	DESC.	BY

CSW [St]^2
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PREPARED UNDER THE DIRECTION OF:

03-22-06 SCALE: NTS

DUTRA-HAYSTACK LANDING
ASPHALT & RECYCLING FACILITY
MITIGATION AREA SECTIONS
PLATE 3

PETALUMA SONOMA CALIFORNIA

JOB# 591302

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Appendices

Appendix A – Biological Constraints Analysis, Haystack Landing Project Site, Petaluma California

BIOLOGICAL CONSTRAINTS ANALYSIS
Haystack Landing Project Site
Petaluma, California

Prepared for:

Pagliaio Ventures, LLC.
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Prepared by:

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October 15, 2004

1.0 INTRODUCTION

This report presents the results of a biological constraints analysis conducted on the approximately 38-acre Haystack Landing Project site located at 3355 South Petaluma Boulevard in Petaluma, California. The project site consists of three assessor parcel areas on the Petaluma River USGS quadrangle in the middle portion of Section 2. Two of these parcels combined, parcels A and B, are trapezoidal in shape and are bound to the east by the Northwestern Pacific Railroad tracks southwest of the Petaluma River and to the west by Highway 101. Rangeland abuts parcel B to the south. One additional parcel (parcel C) occurs east of the railroad tracks east of parcel A and is also included in the project area as shown on Figure 1. This parcel fronts the Petaluma River.

The purpose of the biological constraints analysis is to identify special-status plant and animal species that have the potential to occur on or within the vicinity of the project site and to determine if the proposed development of the property may affect these species. Sensitive habitats occurring on the project site are also identified and evaluated, followed by a discussion of mitigation measures designed to offset potential impacts to any special-status species and sensitive habitats.

2.0 Site Description and Background

The 38-acre project site is divided into three parcels: Assessor Parcel Numbers 019-320-023 (covering 4.15 acres) in the northern portion of the site and 019-320-022 (covering 33.02 acres) in the southern portion of the site east of Highway 101. APN 019-320-001 (0.86 acre) occurs east of Parcel A and the railroad tracks and fronts the Petaluma River.

Historically, parcels A and B were used as a dairy farm until 1968 when the site was purchased by a gravel and asphalt quarry located on the west side of Highway 101 just north of the project site. The northern 27 acres of the site were leased back to the dairy rancher at that time and the remaining 10 acres located in the southern portion of the site were used for the disposal of quarry wash water. Since 1968, various dikes and siltation ponds were constructed on the site; eventually five siltation ponds were constructed for settling quarry wash water (see Figure 2). In 1976, the northernmost siltation pond was filled with earthen material excavated from an adjacent hill. The remaining ponds, including the one originally constructed in 1968 at the southernmost portion of the site, were actively used by the quarry until the mid-1970s'. Two of the ponds located on the southwestern portion of the site (shown as ponds 4 and 5 on Figure 2) were in continuous use until at least 1990.[1] According to the current property owners, none of the siltation ponds have been actively used for quarry or other operations since 1990.

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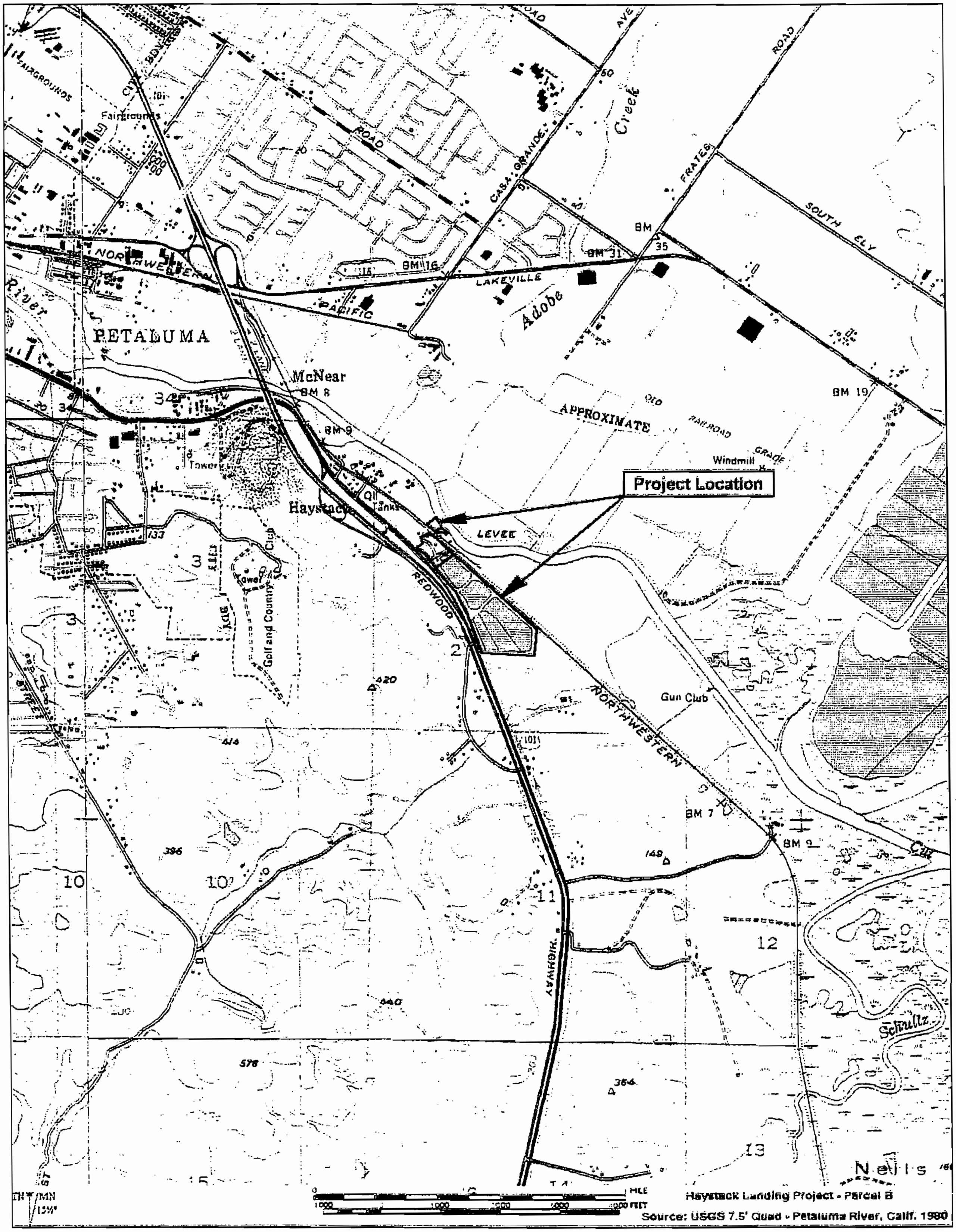
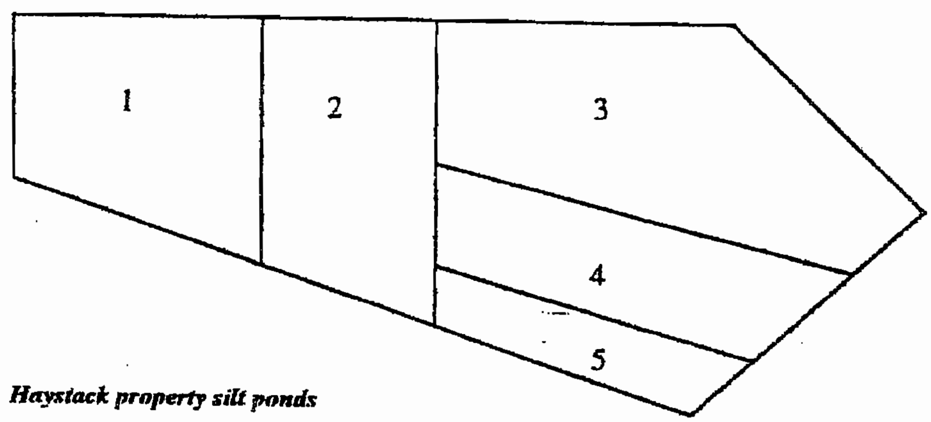
[1] LSA Associates, Inc. 1995. *Determination of Corps Jurisdictional Area, Haystack Landing, Petaluma.*

Figure 1
Site Location Map
Haystack Landing Project Site



(Source: Archeor Archeological Consultants. 2004)



Siltation Ponds
Haystack Landing Project Site
Petaluma, California

Figure 2
(Source: LSA Associates, Inc. 1995)

Parcel C is occupied by a private residence and associated outbuildings and occurs east of the railroad tracks and west of the Petaluma River. Parcel C covers 0.86 acre.

A description of current conditions at the project site is provided below.

Parcel A

Parcel A covers approximately 4 acres in the northern portion of the site directly adjacent to Petaluma Boulevard South. Two small dirt roads provide access to the parcel which is vacant and primarily dominated by ruderal grasses and herbs and mature trees, including eucalyptus.

Parcel B

Parcel B covers approximately 33 acres and is comprised of siltation ponds 2-5 as shown on Figure 2. These ponds have not been actively used for quarry operations or other uses for approximately 10 years and portions of the ponds that are higher in elevation have developed upland characteristics. Various drainage ditches, at last one of which is tidally influenced, traverse portions of the site.

Parcel C

Parcel C fronts the Petaluma River and covers approximately 0.86 acre. A small band of coastal brackish marsh associated with the Petaluma River forms the eastern property boundary of this parcel. A remnant slough bisects a portion of Parcel C for a distance of approximately 110 linear feet, averaging approximately 6 feet wide, and is connected to the Petaluma River.

3.0 Methods of Analysis

Special-status plants and animals are legally protected under the State and Federal Endangered Species Acts or other regulations, and species that are considered rare by the scientific community. They are defined as:

- Plants and animals that are listed or proposed for listing as threatened or endangered under the California Endangered Species Act (Fish and Game Code 1995 §2050 *et seq.*; 14 CCR §670.1 *et seq.*) and/or the Federal Endangered Species Act (50 CFR 17.12 for plants; 50 CFR 17.11 for animals; and various notices in the Federal Register [FR] for proposed species).

- Plants and animals that are Candidates for possible future listing as threatened or endangered under the Federal Endangered Species Act (50 CFR 17.12 for plants; 59 FR 58982 November 15, 1994 for animals).

- Plants and animals that are considered Federal Species of Concern (formerly C2 candidate species).

- Plants and animals that meet the definition of rare or endangered under CEQA (14 CCR §15380), which includes species not found on State or Federal Endangered Species lists.

- Plants occurring on Lists 1A, 1B, 2, 3, and 4 of the *California Native Plant Society's* (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994). California Department of Fish and Game (CDFG) recognizes that Lists 1A, 1B, and 2 of the CNPS inventory contain plants that, in the majority of cases, would qualify for state listing, and CDFG requests their inclusion in EIRs as necessary. Plants occurring on CNPS Lists 3 and 4 are "plants about which more information is necessary," and "plants of limited distribution," respectively (Skinner and Pavlik 1994), and may be included as special-status species on the basis of local significance and/or recent biological information.

- Animals that are designated as "Species of Special Concern" by CDFG (1999).

- Animal species that are "fully protected" in California (Fish and Game Code, §3511, §4700, §5050 and §5515).

- Animal species that are considered sensitive by California Department of Forestry (14 CCR §895.1 pursuant to 14 CCR §898.2[d]) and plants and animals that are considered as sensitive by the U. S. Forest Service (Forest Service Manual §2670) and the U. S. Bureau of Land Management (BLM 6840 Manual).

3.1 Special-status Plant, Fish and Wildlife Species

The California Department of Fish and Game's Natural Diversity Data Base (CNDDB, 2003) was reviewed (Petaluma River quadrangle) to identify special-status wildlife species potentially occurring on or within the vicinity of the project site. State and Federal resource agency personnel and other environmental consultants familiar with the project area were also contacted regarding the potential occurrence of special-status species within the project area.

In order to identify special-status plant species and sensitive habitat types with potential to occur in the study area, various sources were consulted and include occurrence records for the project vicinity from the California Natural Diversity Data Base (CNDDB); county occurrence records and USGS quadrangle occurrence records for the Petaluma River quadrangle and the eight quadrangles surrounding it in the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (Tibor, D. P. (ed.). 2001. Inventory of Rare and Endangered Plants of California, California Native Plant Society Special

Publication No. 1 [6th edition]. California Native Plant Society, Sacramento, CA; California Native Plant Society. 2003. California Native Plant Society's electronic inventory of rare and endangered vascular plants of California. Computer program. Version 1.5.1.); and standard floras (Munz, P. A. and D. D. Keck. 1973. A California flora and supplement. University of California Press, Berkeley, CA. Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.). From the above sources, a target list of special-status plants with potential to occur in the project vicinity was developed.

Reconnaissance-level habitat assessments of the site were conducted on March 31 and April 1, 2003, June 6 and 11, 2003, and January 21, 2004 to generally characterize the habitat types on the project site. The purpose of these assessments was to characterize habitats to determine if any of these habitats have the potential to support special-status plants and animals. Botanical surveys were conducted on Parcels A and B on March 31, 2003 and June 6 and 11, 2003. Botanical surveys were conducted on Parcel C in June 2004. A salt marsh harvest mouse trapping study was conducted on the project site from September 26 through September 30 and October 4 though October 8, 2004.

3.2 Wetlands

A jurisdictional wetlands assessment was conducted on parcels A and B on March 31 and April 1, 2003 and on Parcel C on January 21, 2004 to characterize the nature and extent of habitat types subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Utilizing the methods and procedures prescribed in the Corps Federal Wetlands Delineation Manual (Environmental Laboratory, 1987), the project site was walked and the nature and extent of jurisdictional areas observed were noted. Potential jurisdictional areas were delineated on a base aerial photograph (scale 1" =100').

The San Francisco District Corps of Engineers conducted a jurisdictional wetlands assessment on Parcels A and B on November 7, 2003 to formally verify the limits of Section 404 Clean Water Act jurisdictional wetlands.

4.0 Results

4.1 Habitat Characterization

Parcels A and B on the Haystack Landing site have been substantially altered by intensive and repeated past disturbance. Except for the northern end, the present topography of the site has clearly been modified from the original topography. The southern 20 acres of the project site are primarily occupied by abandoned settling ponds: nearly level, low-lying areas separated by levees and drainage ditches. Portions of the settling ponds hold water during the rainy season, although they were completely dry by June. Some of the ditches contain standing water. North of the settling ponds is a large level area (also a former settling pond, although, at present, it appears to be well-drained, and its vegetation does not resemble that of the other settling ponds), part of which is occupied by a gravel parking area. North of this level area, the topography of the northernmost portion of the site is somewhat elevated and undulating. This portion of the site was occupied by an abandoned house, a mobile home, and outbuildings at the time of the Spring 2003/2004 botanical surveys. Two small, apparently permanent ponds occur along the western margin of the site: one at the west edge of the level area north of the settling ponds and one adjacent to the southwest corner of the northernmost settling pond.

Parcel C fronts the Petaluma River and is occupied by a private residence and is primarily dominated by ruderal grasses and herbaceous species. A small band of coastal brackish marsh associated with the Petaluma River forms the eastern property boundary of this parcel. A remnant slough bisects a portion of Parcel C for a distance of approximately 110 linear feet, averaging approximately 6 feet wide, and is connected to the Petaluma River.

Wildlife species commonly associated with open grasslands and seasonal wetland habitats such as those found on the project site include western meadowlark, savannah sparrow, northern harrier, killdeer, western garter snake, pacific chorus frog, red-tailed hawk, white-tailed kite, and black-tailed jackrabbit. Species associated with coastal marsh and estuarine habitats include clapper rail, California black rail, egret, salt-marsh harvest mouse, and great blue heron. Species observed on the project site in January 2004 include mute swan (*Cygnus olo*r), mallard (*Anas platyrhyncos*), black-necked stilt (*Himantopus mexicanus*), song sparrow (*Meolospiza melodia*), acorn woodpecker (*Melanerpes formicivorous*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferous*), black-tailed hare (*Leupus californicus*), opposum (*Didelphis viginiana*) tracks, cinnamon teal (*Anas cyanoptera*), blue-winged teal (*Anas discors*), northern harrier (*Circus cyaneus*), and Canada goose (*Branta canadensis*).

4.2 Special-status Plants

Thirty-six different special-status plant species were identified for the target list of special-status plants with potential to occur in the project vicinity. These species, their preferred habitats, and federal and state status designations are listed in Table 1 attached. A qualified botanist conducted field surveys on Parcels A and B of the Haystack Landing site on 31 March and 6 and 11 June 2003 and on Parcel C in June 2004. These survey dates were chosen to be within the period when most of the special-status plant species with potential to occur in the survey area (Table 1) would have been identifiable. The survey was conducted on foot. All vascular plant species in identifiable condition at the times the survey was conducted, regardless of regulatory status, were identified to species or infraspecific taxon using keys and descriptions in standard floras. All habitat types occurring on the site were characterized, and data on physiognomy, dominant and characteristic species, topographic position, slope, aspect, substrate conditions, hydrologic regime, and evident disturbance for each habitat type were recorded.

4.2.1 Floristic Inventory

Parcels A and B

A total of 119 species of vascular plants were observed in Parcels A and B. Of these, 31 species are native to the site, and 86 species are non-native. For two species, it could not be determined whether or not the species is native to the site. One of these species (*Atriplex* sp.) could only be identified to genus at the time the survey was conducted and could be either a native species or a non-native species. The other species, Pacific madrone (*Arbutus menziesii*), is native to the region, but may have been planted on this site. A list of vascular plant species observed is presented in Appendix B.

Although recognition of habitat types on this site is somewhat arbitrary due to the highly disturbed nature of Parcels A and B, we recognize the following five habitat types: settling ponds; levees; drainage ditches; pond; and developed/ruderal. The first three of these encompass the settling pond complex in the southern portion of the site. The developed/ruderal habitat type encompasses most of the remainder of the site. The pond habitat type characterizes the two small ponds near the western site boundary. With the partial exception of the pond habitat type, none of these habitat types could be considered "natural"; all have been created and/or maintained by intensive disturbance and large-scale alteration of the site, and they mostly do not resemble native vegetation types, although the drainage ditches habitat type is dominated by native species. Brief descriptions of each habitat type are presented below.

Settling ponds. The bottoms of the settling ponds are gently sloping or somewhat undulating, so that some areas receive more seasonal inundation than others. The vegetation on the pond bottoms is a heterogeneous assemblage of native and non-native species, with both cover and species composition varying considerably over short distances. Much of this variation is clearly correlated with the exact elevation of particular portions of the pond bottom and the degree of seasonal inundation.
The northern settling pond, which probably receives relatively little seasonal inundation, is mostly densely vegetated (cover 100 percent or nearly so), primarily with non-native grasses and herbs. Characteristic species include Italian rye grass (*Lolium multiflorum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), curly dock (*Rumex crispus*), bristly ox-tongue (*Picris echioides*), soft chess (*Bromus hordeaceus*), black mustard (*Brassica nigra*), yellow starthistle (*Centaurea solstitialis*), winter vetch (*Vicia villosa* ssp. *varia*), and, in the lowest areas, annual beard grass (*Polypogon monspeliensis*). Scattered individuals of the native shrub coyote brush (*Baccharis pilularis*) occur in this settling pond. One large clump (perhaps a single clonal individual) of the large arborescent shrub arroyo willow (*Salix lasiolepis*) occurs in the northeast portion of this settling pond.

In the southwestern settling pond, which receives more seasonal inundation than the northern settling pond, the higher areas are largely dominated by Italian rye grass, and the associates are mostly non-native, with a species composition similar to that of the northern settling pond. The non-native thistle Italian thistle (*Carduus pycnocephalus*) occurs in scattered dense patches in this area. There is considerable yellow starthistle at the south end, and the escaped ornamental species sweet pea (*Lathyrus odoratus*) is locally abundant in the northeast corner. Lower-lying areas in this settling pond are dominated by the native subshrub pickleweed (*Salicornia virginica*), the native perennial grass saltgrass (*Distichlis spicata*), and the non-native species annual beard grass and brass buttons (*Cotula coronopifolia*).

The southeastern settling pond is probably similar to the southwestern settling pond in the degree of seasonal inundation, although the lowest-lying portion on the east side apparently has standing water for a longer period than any other portion of the settling ponds. The higher portions of this settling pond are largely dominated by weedy non-native grasses, including ripgut grass (*Bromus diandrus*), six-weeks fescue (*Vulpia bromoides*), soft chess, slender wild oat (*Avena barbata*), Mediterranean barley, and Italian rye grass, with considerable bird's-foot trefoil and Italian thistle; cut-leaved geranium (*Geranium dissectum*) is also locally abundant. Somewhat lower-lying areas are dominated by bird's-foot trefoil, annual beard grass, and pickleweed, with considerable bare ground, or by annual beard grass and bristly ox-tongue. The lowest-lying area is overwhelmingly dominated by annual beard grass, with Indian melilot (*Melilotus indica*) and pickleweed the only abundant associates. A small amount of narrow-leaved cattail (*Typha angustifolia*), a species generally indicating prolonged inundation, occurs in the southeast corner.

Levees. The levees are elevated linear features that separate the settling ponds from each other and from bordering areas. These levees could have been included in the developed/ruderal habitat type, but, because they form a distinct part of the settling pond complex, they are here treated separately. Dense clumps of coyote brush occur locally on the levees, and a dense patch of the invasive non-native shrub French broom (*Genista monspessulana*) occurs at one location on the levee between the northern and southwestern settling ponds. The levees are otherwise largely vegetated by weedy non-native herbs and grasses, including fuller's teasel (*Dipsacus fullonum*), poison-hemlock (*Conium maculatum*), purple vetch (*Vicia benghalensis*), Italian rye grass, Mediterranean barley, and yellow starthistle. Sweet pea is locally abundant on the levees bordering the southwestern and southeastern settling ponds.

Drainage ditches. Drainage ditches occur adjacent to some of the levees. These ditches are artificially excavated and hold standing water permanently or for varying periods during the season. Where vegetated, the species composition of the drainage ditches consists mostly of native moisture-loving species, principally cosmopolitan bulrush (*Scirpus maritimus*), narrow-leaved cattail, pickleweed, and saltgrass.

Pond. The two small ponds located near the western boundary of the site apparently hold water for all, or at least most, of the season. Narrow-leaved cattail and annual beard grass are relatively abundant, especially around the margins of these ponds, with brass buttons also relatively abundant around the southern pond. Several individuals of arroyo willow occur around the margins of the northern pond.

Developed/ruderal. The developed/ruderal habitat type includes the entire site north of the northern settling pond and its associated levee and ditch, as well as a narrow strip of land between the settling ponds and the Highway 101 right-of-way. Where not occupied by the abandoned house and other buildings, the northern, most elevated portion of the site supports an assemblage of species that is quite heterogeneous in both species composition and physiognomy, but that consists primarily of weedy species. Some areas have been repeatedly mowed; these areas are vegetated with a low, rather sparse cover. Where not mowed, the vegetation is tall and generally dense. Numerous large, planted trees of the non-native species English elm (*Ulmus procera*), Northern California black walnut (*Juglans californica* var. *hindsii*, native to Northern California but not indigenous to this site), and blue gum (*Eucalyptus globulus*) are scattered in this area. The first of these is reproducing by suckers, while the latter two species have reproduced from seed. Two large valley oak (*Quercus lobata*) trees, a native species, are located on the north side of the abandoned house. Several dense clumps of the tall, robust non-native grass giant reed (*Arundo donax*) occur near the outbuildings south of the abandoned house.
The central portion of large gravel parking lot south of the outbuildings is largely unvegetated; the margins and several adjacent dirt piles are sparsely to moderately densely vegetated by weedy species. Between this parking lot and the northern settling pond is a level area with hard-packed soil, probably graded in the past, with a low to tall, sparse to locally dense vegetation, mostly of weedy species. There are a number of small Pacific madrones in this area, perhaps planted, as well as one small individual of the native tree species coast live oak (*Quercus agrifolia*). The strip of ruderal habitat between the settling ponds and Highway 101, which is interrupted by the two small ponds, is vegetated with a mostly dense cover of weedy species.

Parcel C

Botanical surveys were conducted by a qualified botanist on Parcel C on April 30, 2004. Parcel C is primarily dominated by ruderal grasses and herbs with scattered individuals of the native coyote bush (*Baccharis pilularis*). The narrow and discontinuous strip of land bordering the river (which is evidently brackish in this area due to tidal flow) is occupied by a coastal brackish marsh habitat type. Within the study area, this habitat type is not well-developed and contains few species, due to its relatively small area and to the frequent flooding and scouring from the river, but it is dominated by native species, particularly three species of tule or bulrush: alkali bulrush (*Scirpus maritimus*), viscid tule (*Scirpus acutus* var. *occidentalis*), and three-square (*Scirpus americanus*). Associates include the rhizomatous perennial saltgrass (*Distichlis spicata*) and the succulent subshrub pickleweed (*Salicornia virginica*).

4.3 Special-Status Plant Species Survey Results

No special-status plant species indigenous to parcels A, B or C on the Haystack Landing site were observed during the Spring 2003 and 2004 surveys and none are expected to occur given the site's disturbed nature. One species present but not indigenous on Parcel A, northern California black walnut, is a special-status species. Northern California black walnut is on List 1B (Plants Rare and Endangered in California and Elsewhere) of the CNPS *Inventory* (Tibor 2001; CNPS 2003). However, the species is clearly adventive from planted trees and not native to this site. Because this species is not native to the site, no mitigation would be required for any future impacts to the trees on this site.

Two species of bird's beak listed in Table 1, Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*) and soft bird's beak (*Cordylanthus mollis* spp. *mollis*) occur in salt marsh habitats and thus would have some potential to occur in the coastal brackish marsh habitat in the study area. However, at this time, project plans do not call for direct impacts to the salt marsh. If direct impacts were to occur to the salt marsh, further surveys may need to be conducted to determine if the bird's beak is present on the site and if appropriate mitigation or avoidance measures would be required.

4.4 Sensitive Habitats

The drainage ditches and a number of low-lying areas of varying size within the settling ponds, including both of the ponds herein described as the pond habitat type, have been identified as wetlands potentially subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps) under Section 404 of the federal Clean Water Act. These areas are more extensive in the two southern settling ponds, where they constitute the majority of the area of each settling pond. In the northern settling pond, the single potential jurisdictional wetland area occupies less than half the area. One drainage ditch, separating the northern and southeastern settling ponds, was also determined to be potentially subject to Corps jurisdiction under Section 10 of the federal Rivers and Harbors Act of 1899. The small slough and associated coastal brackish marsh habitat located on Parcel C are also potentially subject to Corps jurisdiction pursuant to Section 404 of the Clean Water Act. The slough may also be subject to Corps jurisdiction as a navigable water.

The small band of coastal brackish marsh habitat on the eastern boundary of Parcel C was formerly recognized as a "high priority" habitat type by the CNDDB (Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Nongame-Heritage Program, California Department of Fish and Game, Sacramento, CA). Although coastal brackish marsh *per se* is not currently recognized as a CNDDB "high priority" habitat type, the coastal brackish marsh on this site appears to have a close affinity to the Alkali Bulrush/Pickleweed association, which is recognized as a CNDDB "high priority" habitat type (California Department of Fish and Game. 2002).

4.5 Special-status Fish and Wildlife

Eleven special-status animal species were listed on the Petaluma River CNDDB quadrangle. Based on the habitat characteristics of the site and given that a portion of the Petaluma River is included in the project boundary, it was determined that seven of these species have the potential to occur on or within the vicinity of the project site (Table 2). These include three special-status birds, the California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), and Salt-marsh Common Yellowthroat (*Geothlypis trichas sinuosa*) and two special-status fish species, steelhead (*Oncorhynchus mykiss irideus*) and Sacramento splittail (*Pogonichthys macrolepidotus*). In addition, Chinook salmon was included given is a known resident of San Francisco Bay. The salt marsh harvest mouse (*Reithrodontomys raviventris*) (SMHM) was also included given it is known to the San Francisco Bay salt marshes. The western pond turtle (*Clemmys marmorata marmorata*) was also included because it may also have the potential to occur within the vicinity of the project site. Finally, nesting raptors including white-tailed kite (*Elaneus leucurus*) and northern harrier (*Circus cyaneus*), and nesting egrets were also identified as having the potential to occur on or within the vicinity of the site. All of these species and their habitat preferences are described below.

4.5.1 Fish

Three fish species potentially occurring in the Petaluma River and estuary adjacent to Parcel C have special-status listing as federally threatened or endangered species or as anadromous species targeted for enhancement under CDFG policies. These species include steelhead trout, Sacramento splittail, and Chinook salmon.

Steelhead Trout

Steelhead trout in the Petaluma River are part of the Central California Coast ESU (evolutionarily significant unit); this species now is federally listed as threatened. Historically, reproducing populations of steelhead were found in most of the tributary and headwater areas of the Petaluma River drainage. Currently, their abundance is reduced. Some juvenile steelhead may spend variable amounts of time in the lower Petaluma River as they move from upstream rearing areas to San Francisco Bay and the ocean. Peak movement occurs during winter and early spring. Estuarine areas can provide important transitional habitat for steelhead juveniles that are undergoing physiological adaptation to seawater. These fish may be found in inshore, slough, and open waters of the estuary where they feed on terrestrial and aquatic insects, amphipods, other small crustaceans, and small fish. Steelhead juveniles may also benefit. Steelhead, both adults and fry, have been recorded in Adobe Creek by the United Anglers of Casa Grande, a rigorous high school program aimed at restoring the creek and its salmonid resources. CDFG has observed steelhead juveniles in Lynch Creek, approximately 4½ miles upstream of the site (Cox per. comm. 2003). CDFG also stated that steelhead are likely in Willow Brook and Lichau creeks, both of which are over 7½ miles upstream of the site; however, detailed spawning and habitat surveys have not been conducted in these two water bodies.

Sacramento Splittail

The Sacramento splittail is a state species of special concern. Splittail are large minnows that live for up to seven years and reach lengths to 12 inches or more. The species is found only in California's Central Valley. Their range in the Central Valley has been restricted since the arrival of Europeans and splittail abundance has declined, particularly during drought periods. Decline in abundance has been attributed to changed estuarine hydraulics, especially reduced outflows; modification of spawning habitat; climatic variation; toxic substances; introduced species; predation; and exploitation.

Splittail are often found at salinities of 10-18 ppt (brackish) and may prefer lower salinities, but they are also able to tolerate salinities up to 29 ppt (Moyle 2002). They appear to prefer shallow water habitat in slow-moving sections of rivers and sloughs. Splittail spawn in the lower reaches of rivers, dead-end sloughs and in larger sloughs, any time from late February to early June, with peaks between March and April. Larvae initially remain in close proximity to spawning sites and move into deeper water as they mature.

Splittail are presently found primarily in the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the Sacramento-San Joaquin estuary (USFWS 2003). Sampling by CDFG between 1992 and 1998 has shown that splittail have continuously lived in the Petaluma River since the 1980's and have successfully spawned in 1992, 1995, and 1998 (Baxter 1999). This species was also captured during construction of the Petaluma Flood Control project; however it was likely that its presence was a result of high tides and flow, rather than active use of habitat (USACE per. comm.)

Chinook Salmon

There are four main races of chinook salmon in streams draining to San Francisco Bay and include:

- Sacramento River winter-run chinook salmon,
- Central Valley spring run chinook salmon,
- Central Valley fall run chinook salmon, and
- Central Valley late fall run chinook salmon

The Sacramento River winter-run chinook salmon were listed as a federally threatened species in 1994. Critical habitat for Sacramento winter-run was designated on June 16, 1993. Sacramento winter-run chinook were re-classified as an endangered species on January 4, 1994. The status applies to all Sacramento River winter-run chinook salmon, wherever found. Historically, winter-run chinook salmon inhabited the Upper Sacramento River and its tributaries the McCloud, Pit, and Little Sacramento. Adult winter-run salmon migrate up the Sacramento River to spawn from December through May and peak spawning occurs from May to June. Winter-run chinook juveniles emigrate from the upper Sacramento River as smolts from January through May. Peak migration of smolts through the Delta is primarily from January through March.

The Central Valley spring run chinook salmon was listed as a federally threatened species in 1999 and State Threatened in 1998. Adult spring run salmon historically migrated up the larger tributaries of the Sacramento, San Joaquin, Klamath and Eel Rivers (Moyle 2002) and remained in deep pools before spawning in early fall. Juveniles reared in the streams for 3 months to over one year, depending on flow. This run was once as abundant as fall run chinook but because the majority of historic spawning areas have been dammed, especially tributaries to the San Joaquin River, their numbers are very depressed.

Central Valley fall run chinook are being considered as a candidate for Threatened status by NOAA Fisheries. NOAA Fisheries believes that the late-fall run is part of the fall-run, whereas CDFG believes that separate management is necessary and lists them as Species of Special Concern. Historically these runs may have been the most abundant run in California (Moyle 2002). Fall-run chinook tend to spawn in the lower reaches of large rivers and their tributaries and move up from the ocean in late summer and early fall. Spawning takes place almost immediately. Fry emerge from the gravel in spring and juveniles move down to mainstem rivers or estuaries in summer. This run is unique in that they have a greater propensity to stray from their natal streams and can thus colonize newer areas if hydrologic conditions are more favorable.

Chinook salmon have been observed in many of the tributaries to San Francisco Bay although many if not all of these may be strays of hatchery origin. Historical population levels in the Petaluma River are unknown, but they are now generally low. Chinook salmon have been captured and spawned at the Casa Grande hatchery on Adobe Creek in recent years. However, it is unlikely that these fish are of the endangered Sacramento winter-run as that run is dependent solely on habitats and releases within the upper reaches of the Sacramento River.

4.5.2 Reptiles

The western pond turtle (*Clemmys marmorata marmorata*) is considered a federal species of concern by U. S. Fish and Wildlife Service (USFWS) and a Species of Special Concern by CDFG.

Western pond turtles have declined over much of their range in the past 75 years. Over grazing, introduced predators, loss of habitat from agriculture, disease, and over hunting have all been implicated in their decline. The western pond turtle is a habitat generalist, inhabiting a wide range of fresh and brackish, permanent and intermittent water bodies from sea level to about 4,500 feet above sea level (USFWS, 1992).

While there are recorded occurrences for the western pond turtle in the upper reaches of the Petaluma River in quiet backwater channels where basking sites are suitable, the Petaluma River in the vicinity of the project site undergoes periods of heavy flow in the winter and spring and therefore is probably not suitable habitat. Parts of Shollenberger Park and Adobe Creek, which are north and east of the project site respectively, may offer better habitat for this species.

4.5.3 Birds

Special-status bird species having the potential to occur within the vicinity of the project site include the California Clapper Rail, California Black Rail, the Salt-marsh Yellowthroat and two raptor species, the northern harrier and white-tailed kite. In addition, an egret rookery was identified on the project site in 2003. These various species are discussed below.

California Clapper Rail

The California Clapper Rail is both a state- and federally-listed endangered species. The clapper rail is a locally common resident in coastal wetlands and brackish areas around San Francisco, Monterey, and Morro bays. In the San Francisco Bay area, the clapper rail breeds mid-March through July, nesting in saline emergent wetlands, mostly in the lower zones, where cordgrass is abundant and tidal sloughs are nearby. In brackish water, the clapper rail builds its nest in dense cattail or bulrush (Feiner *et al.* 1990). There are recent records for this species at Shollenberger Park east of Parcel C across the Petaluma River.

California Black Rail

The California Black Rail is a federal species of concern and state listed as threatened. The Black Rail is a rarely seen, scarce resident of saline, brackish, and fresh emergent wetlands in the San Francisco Bay area, Sacramento-San Joaquin Delta, coastal southern California at Morro Bay and a few other locations. The Black Rail nests in dense vegetation, often pickleweed, near the upper limits of tidal flooding. Nesting has been recorded to occur from mid-March to early June (Feiner *et al.* 1990).

The coastal brackish marsh adjacent to Parcel C can be accessed during low tide and provides potential foraging habitat for this species; however, breeding in this area is very unlikely. The wetlands across the river from the project site (located on the eastern side of the river), which provide denser and more extensive cover, provide potential nesting habitat for this species. Black rail have been recorded in Shollenberger Park to the east of the site as well.

Saltmarsh Common Yellowthroat

The Saltmarsh Common Yellowthroat is described as known from only the marshes surrounding San Francisco and Suisun Bays and is considered to be a species of special concern by CDFG. It occurs in *Spartina* and *Salicornia* dominated habitats with the added use of upland, freshwater marshes, and grasslands bordering brackish marshes (Hobson *et al.* 1986). There also appears to be a preference by this species for channels in marsh habitats (Nur 1997). Its population in the bay area is not well known, but there are historical records north and south of the project site along the Petaluma River (Hobson *et al.* 1986).

The coastal brackish marsh habitat located along the shoreline of Parcel C provides marginal potential nesting and foraging habitat for this species.

Nesting Raptors

Raptor species that could be expected to nest on or within the vicinity of the project site include the white-tailed kite (*Elaneus leucurus*) and northern harrier (*Circus cyaneus*). White-tailed kite is a State Fully Protected species and northern harrier is considered a species of special concern by CDFG. These species frequent meadows, grasslands, open ranges, and fresh and saltwater emergent wetland areas (Zeiner et al, 1990). The open grassland areas on the project site provide potential foraging habitat for these species. Harriers are likely to nest in grasslands, while white-tailed kites nest in trees adjacent to open foraging areas.

Nesting Egrets

Rookeries (colonial breeding sites) of the great egret (*Ardea alba*) and snowy egret (*Egretta thula*) are considered sensitive by the California Department of Forestry. A small rookery with nesting pairs of both species was observed in August of 2003 in the eucalyptus grove located immediately north of the old farmhouse that occurred until recently on Parcel A. At least 5 nests were observed in this grove on April 14, 2004; 4 were great egret and 1 was snowy egret. Egrets typically feed in shallow water and along shores of wetlands or aquatic habitats. They prefer small fish, crustaceans and large insects but may also feed on amphibians, reptiles, worms, snails, and small mammals. The breeding season in northern California for the snowy egret is generally from April to late August; for the great egret March to July. Both species are highly sensitive to human intrusion and disturbance of nesting colonies; great egrets have been known to abandon active nests if subjected to significant disturbance. Although the rookery on the project site is located near an occupied residence, the nesting birds have obviously accepted this relatively low level of nearby human activity.

4.5.4 Mammals

Salt Marsh Harvest Mouse

The salt marsh harvest mouse is federally and state listed as endangered and is a California fully protected species. The salt-marsh harvest mouse is found only in saline emergent wetlands of San Francisco Bay and its tributaries. The northern subspecies (*R. r. halicoetes*) is found on the Marin Peninsula, through Petaluma, Napa, and Suisun Bay marshes and in northern Contra Costa County (Feiner *et al.* 1990). This species prefers saline emergent wetland habitats dominated by pickleweed; grasslands adjacent to picklweed marsh are also used, but only when new grass provides adequate cover in the spring and summer (Feiner *et al.* 1990). *R.r. halicoetes* breeds from May to November, with litters averaging four young.

Parcels A and B were evaluated by wildlife biologists from Monk & Associates to determine if portions of these parcels may provide suitable habitat for the salt marsh harvest mouse. Results of the site analysis were submitted to the USFWS in conjunction with requesting technical assistance to determine if trapping studies would be required on the site. USFWS requested trapping studies be conducted on the site to definitively determine if salt marsh harvest mice inhabit the site. A trapping plan was submitted to the USFWS and CDFG and Monk & Associates received authorization to initiate the trapping study in the Fall 2004. The 10-day trapping study was conducted between September 26 through September 30 and October 4 through October 8, 2004. No salt marsh harvest mice were captured. Results of the trapping study will be presented in a written report to be submitted to the USFWS for final documentation. Because no salt marsh harvest mice were found, no further action regarding this species on Parcels A and B will be required.

The small band of coastal brackish salt marsh located on the eastern boundary of Parcel C provides marginal habitat for the salt marsh harvest mouse. However, the salt marsh harvest mouse is unlikely to occur in this area because of the scarcity of pickleweed and the somewhat isolated nature of the marsh habitat on the site.

4.6 Wetlands

<u>Parcels A and B</u>

A jurisdictional wetlands determination was conducted on Parcels A and B on November 7, 2003 with the San Francisco District of the Corps of Engineers. The purpose of the jurisdictional wetlands determination was to formally verify the nature and extent of jurisdictional wetlands on the site. Fifteen wetland areas were identified.

Drainage Ditches

Several drainage ditches were observed on the project site. Most of these ditches had standing water at the time of survey and two of the drainage ditches appear to be tidally influenced. Illustrated on Plate 1 as DD1 and DD2 in the central portion of the property, these areas drain into a larger drainage ditch that parallels the eastern property boundary. This drainage ditch is located within the railroad easement outside the project area and therefore is not mapped on the project site. Aerial photograph review indicates that the railroad ditch drains to the Petaluma River via another ditch and therefore may be tidally influenced.

A smaller drainage ditch, delineated as DD3, parallels the southern property line for approximately 500 feet and is approximately 3 feet wide as shown on Plate 1. Saturated soils were observed in the eastern portion of the ditch where it appears to be connected to a pond located east of the property. This area also appears to be marginally tidally influenced.

The remaining ditches (DD4 and DD5) are probably brackish given the composition of vegetation growing in these areas. However, it appears that the most northern of the ditches (DD6) may be freshwater as there appears to be no direct hydrologic connection to any of the other ditches on the project site.

Limits of the drainage ditches were determined by the limits of the ordinary high water mark or high tide line. Actual acreages were planimetered from the base map. In total, ditches on Parcels A and B cover approximately 1.53 acres subject to Corps jurisdiction.

Wetland Areas

A total of nine wetland areas were identified on the project site ranging in size from 0.07 acres to 4.0 acres as illustrated on Plate 1. All of these areas occur within the former siltation ponds.

Wetland A is located on the eastern portion of siltation pond 2 and covers approximately 1.09 acre. No standing water was observed in this area at the time of survey; however, the presence of algal matting in the western and northern edges indicates that water ponds in this area for a significant duration during the growing season. Soils in this area may be classified as moist clay loam, with some gleying observed at approximately 16 inches. Hydrophytes including alkali heath (*Frankenia salina*), rye grass (*Lolium multiflorum*), birdfoot trefoil (*Lotus corniculatus*), and bristly ox tongue (*Picris echiodes*) were the dominant plant species observed growing in this area. A small seasonal wetland (WI) covering 0.03 acres occurs as a small depression south of Wetland A and drainage ditch DD2.

Wetland areas B, C, and D occur within siltation pond 3. Wetland B is the largest of these areas (measuring 4.0 acres) and had standing water in the eastern portion where it connects to a small ditch that drains to the ditch adjacent to the railroad track east of the project site. Obligate wetland plants including cattail (*Typha domingensis*), pickleweed (*Salicornia virginica*), and an unidentifiable grass were observed within this area. Significant algal matting in the lower portions of this area and marginal debris flow at the outlet of the drainage ditch connecting to wetland B indicate this area ponds water during the wetter months and may be tidally influenced at certain times. Soil texture, color, and structure greatly varied throughout the soil profile at the data sampling point. This is mostly attributed to the fact that the soils in this area resulted from an accumulation of sediments from quarry wash water in the 1970's and 1980's. Gleying and mottling observed throughout the soil profile suggest that soils in this area are saturated for an extended duration.

Wetland areas C and D (covering 0.08 and 0.39 acre respectively) are located north of Wetland B and are dominated primarily by facultative plant species including bristly ox tongue and birdfoot trefoil, and facultative-wet species, most notably peppergrass (*Lepidium latifolium*). Occasional bulrush (*Scirpus maritimus*) and cattail were also observed, though these species were sparse. Soils in these areas were less varied in composition than those observed in area B and exhibited significant mottling, especially in the surface soils. Algal matting was also observed. The areas adjacent to these wetland areas that were not mapped as potential jurisdictional wetlands are primarily dominated by Italian thistle (*Carduus pycnocephalus*), vulpia (*Vulpia bromoides*), and geranium (*Geranium dissectum*).

Wetland areas E-H occur within ponds 4 and 5. These areas range in size from 0.07 to 3.51 acres as shown on Plate 1. These potential jurisdictional areas exhibited algal matting, and soil texture, structure, and color varied significantly given that this portion of the site had also been used for quarry siltation ponds. Mottling (varied colors) and oxidized rhizospheres were observed at all wetland sampling points. Vegetation in these areas was comprised mostly of obligate and facultative-wet plant species, including pickleweed, toad rush (*Juncus bufonius*), salt grass (*Distichlis spicata*), and sand spurrey (*Spergularia marina*). Patches of bare ground were also observed within these potential wetland areas, perhaps because the salt content of the soils is too high for some species to tolerate.

A small pond with several feet of standing water is located at the northwestern edge of Wetland H and is connected to drainage ditch DD2 (which is tidally influenced) via a small culvert that passes under a levee road. In addition, standing water (up to 2 inches) and saturated soils were observed in several lower depressions in the northern portion of Wetland I. Plant species composition was similar to that of Wetlands E-H; however, more obligate species including cattail and rush were observed, particularly in the areas with standing water. Wetlands A-I cover a total area of 10.16 acres subject to Corps jurisdiction.

A total of 11.69 acres of jurisdictional wetland areas was identified on Parcels A and B.

Parcel C

A jurisdictional wetlands delineation was conducted on Parcel C on January 21, 2004. One remnant slough was identified on Parcel C. This area measures approximately 120 feet in length and approximately 6-8 feet in width, covering a total area of approximately 0.0002 acre potentially subject to Corps jurisdiction. In addition, approximately 200 linear feet of coastal brackish marsh averaging about 20 feet wide were also identified on the eastern boundary of the two parcels. The coastal brackish marsh habitat covers about 0.10 acre potentially subject to Corps jurisdiction. The extent of jurisdictional wetlands on Parcel C will be verified by the Corps during the Section 404 application process.

5.0 CONCLUSIONS & MITIGATION

Provided below is a discussion of the potential for occurrence of special-status species and the presence of sensitive habitats on the project site. Recommended mitigation measures designed to offset any potential impacts are also provided.

5.1 Special-status Plants

No special-status plant species were observed on Parcels A and B during the Spring 2003 and Parcel C during the Spring 2004 surveys and are not expected to occur as discussed in the results section of this report. Therefore, no mitigation measures are prescribed at this time.

5.2 Special-status Fish

Steelhead trout

Steelhead in the Petaluma River are part of the Central California Coast ESU (evolutionarily significant unit); this species now is federally listed as threatened. If project plans result in impacts to the Petaluma River, the applicant would need to consult with NOAA Fisheries and the California Department of Fish and Game to develop appropriate mitigation prior to project implementation. Most construction-related impacts could be avoided by scheduling construction activity between June to September 15 to protect out-migrating smolts and migrating adults.

Sacramento Splittail

Sacramento splittail are a state species of concern; therefore, if project plans result in impacts to the Petaluma River, the applicant would need to consult with the California Department of Fish and Game to develop appropriate mitigation prior to project implementation. It should be noted that most construction related impacts could be avoided by scheduling construction activity to occur during the June to October time period, outside the peak runoff periods.

Chinook Salmon

Chinook salmon from the Sacramento Winter-run (federally endangered), Central Valley Spring-run (federally threatened), and Central Valley Late Fall-run (candidate threatened) do not spawn within the project area. However, juvenile chinook salmon of any run may find their way into the lower Petaluma River while rearing as they migrate to sea. If project plans call for instream construction in the Petaluma River, the applicant would need to consult with NOAA Fisheries and the CDFG to develop appropriate mitigation prior to project implementation. Most construction-related impacts could be avoided by scheduling construction activity to occur after smolts have left the Bay. This would be from June through August (Hagar Environmental Science, 2003).

5.3 Special-status Birds

California Clapper Rail

The California Clapper Rail is a state and federally-listed endangered species. Potential impacts to this species and its habitat would have to be reviewed by both USFWS and CDFG prior to construction. Construction on the project site may be restricted during California clapper rail nesting periods, which occur between February 1st and August 31st. Prior to construction, specific construction schedules would be determined in consultation with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG)

California Black Rail

The California black rail is a federal species of concern and state listed as threatened. Potential impacts to this species and its habitat, including potential disturbance from noise associated with construction on the site, would have to be discussed with the CDFG and appropriate mitigation measures designed accordingly. It is likely that an LOP similar to that required for the California clapper rail may be required during construction. Formal surveys for this species may be required at the discretion of CDFG prior to construction.

Salt Marsh Common Yellowthroat

The coastal brackish marsh located on Parcel C may provide marginal habitat for salt marsh common yellowthroat. An LOP may be imposed during the breeding season (early March to late July) to ensure minimal disturbance to salt marsh common yellowthroat during construction.

Nesting Raptors

The project site may provide suitable nesting habitat for raptors, including white-tailed kite (*Elaneus leucurus*) and northern harrier (*Circus cyaneus*). Raptors are protected under the federal Migratory Bird Treaty Act (50 CFR 10.13). Their nest, eggs, and young are also protected under California Fish and Game Code (§3503, §3503.5, and §3800). Finally, raptors such as the white-tailed kite are "fully protected" under Fish and Game Code (§3511). Fully protected raptors cannot be taken or possessed (that is, kept in captivity) at any time.

If earth-moving/grading activity or construction-related disturbance will occur on the project site during the raptor nesting season (March15 to August 15), a pre-construction raptor nesting survey should be conducted by a qualified biologist to determine if this activity could disturb nesting raptors. If nesting raptors are identified on the project site, a non-disturbance buffer (determined in coordination with CDFG) should be established around the nest tree. This buffer should be fenced with orange construction fencing. A qualified raptor biologist would need to periodically monitor the nest site(s) to determine if construction activity occurring outside the buffer zone disturbs the birds, and whether the buffer zone should be increased to prevent nest abandonment. No disturbance should occur within the minimum 500-foot buffer zone until a qualified raptor biologist has determined that the young have fledged (left the nest), and are flying well enough to avoid project construction zones, typically by August 1st. Once the young have successfully fledged, no further mitigation would be required.

Nesting Egrets

Established suitable rookery sites are typically used by egrets annually. Because of the sensitivity of egret nesting to human disturbance, construction at the project site will have to be restricted within a suitable buffer zone around the rookery from about March 1 to August 31 if egrets are present on the site. Final buffer zone distance and exclusion dates will be determined through consultation with CDFG.

5.4 Special-status Mammals

Salt-Marsh Harvest Mouse

No salt marsh harvest mice were found to occur on Parcels A and B during a USWS/CDFG approved trapping study conducted in September/October 2004. Therefore no mitigation measures for this species are prescribed for this portion of the site.

The small band of coastal brackish marsh on the eastern property boundary of Parcel C provides marginal habitat for the salt-marsh harvest mouse. Because the salt-marsh harvest mouse is a federally-listed endangered species, any potential impacts to this species and its habitat would have to be reviewed by the USFWS prior to construction.

5.5 Special-status Reptiles

Western Pond Turtle

Because the western pond turtle is considered a federal species of concern by USFWS and a species of special concern by CDFG, potential impacts to this species and its habitat would need to be discussed with these agencies. While western pond turtle presence is unlikely on the project site, additional surveys could be conducted to confirm presence or absence if required. These surveys would have to be conducted during the summer months (June through August) of the year development is proposed on the project site. If western pond turtles were identified during appropriately timed surveys, it may also be prudent to conduct turtle nest surveys in upland areas that are scheduled for construction. If nests are located, construction should be delayed until young hatch. If turtles were to be found on the site, a biological monitor would be required during all in-stream work within the Petaluma River to ensure that no turtles were present within the construction zone (Monk & Associates, 2003).

5.6 Wetlands

Activities resulting in the fill of the jurisdictional wetland areas identified on the project site will require Clean Water Act Section 404 authorization from the Corps and Clean Water Act Section 401 authorization from the Regional Water Quality Control Board (RWQCB). Mitigation measures designed to compensate for potential wetlands-related impacts will be developed in consultation with the Corps and RWQCB in accordance with these agency's mitigation policies. The Corps typically requires wetland impacts to be mitigated at a minimum 1:1 replacement ratio (i.e., for each acre filled, one acre must be created) and the RWQCB at a 2:1 replacement ratio.

Preliminary plans for on-site wetland mitigation include the creation of brackish marsh habitat on the southern 16 acres of the project site. A significant goal of the proposed wetlands mitigation plan would be to restore historic hydrologic conditions by reintroducing tidal circulation to the mitigation area, which includes existing wetland areas. The newly created marsh habitat and restored wetland areas could provide wildlife habitat for rare, coastal marsh dependent species, including the federal and state endangered California clapper rail, the state threatened Black rail, possibly the federal and state endangered salt marsh harvest mouse, as well as the northern harrier, salt marsh common yellow throat, and other species.

Activities that result in the substantial modification of the bed, bank or channel of the Petaluma River would also require a Streambed Alteration Agreement from CDFG. Mitigation measures designed to offset construction-related impacts may include planting of native riparian vegetation along the banks of the river outside of the area of impact. These mitigation measures, in addition to any required for offsetting potential impacts to special-status species, would be incorporated as conditions of approval into the Streambed Alteration Agreement issued for the project.

In addition, project activities occurring on the banks of the Petaluma River would require authorization from the San Francisco Bay Conservation and Development Commission (BCDC) for work within areas that are subject to tidal action, including submerged lands, tidelands, and marshlands up to five feet above mean sea level. If a BCDC permit would be required as a result of the proposed project, the applicant would submit a Joint Aquatic Resources Permit Application (JARPA) to BCDC and other resource agencies as appropriate.

Literature Cited

Best, C., J. T. Howell, W. Knight, I. Knight, and M. Wells. 1996. A flora of Sonoma County. California Native Plant Society, Sacramento, CA. 347 pp.

California Native Plant Society. 2003. California Native Plant Society's electronic inventory of rare and endangered vascular plants of California. Computer program. Version 1.5.1.

Hagar Environmental Science, 2003. In Macmillan et al *Biological Constraints Analysis, Landing Way Project, Petaluma, California.*

Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.

Munz, P. A. and D. D. Keck. 1973. A California flora and supplement. University of California Press, Berkeley, CA.

Tibor, D. P. (ed.). 2001. Inventory of rare and endangered vascular plants of California. California Native Plant Society Special Publication No. 1 [6th edition]. California Native

Baxter, R. 1999. Splittail Abundance and Distribution Update. California Department of Fish and Game, Central Valley Bay-Delta Branch. January 13, 1999.

California Department of Fish and Game (CDFG). 2003. Personal communication, Bill Cox.

CDFG, 2002. List of California terrestrial natural communities recognized by the Natural Diversity Data Base. http://www.dfg.ca.gov/whdab/natcomlist.pdf [May 2002]).

CDFG and Interagency Program for the San Francisco Estuary, years 1980-1987. Unpublished beach seine data.

California Native Plant Society, 2001. Inventory of Rare and Endangered Plants of California. August.

CNDDB, 2003. California Natural Diversity Data Base (Petaluma River quadrangle) January.

Environmental Laboratory, 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87.

Hobson, K., P. Perrine, E.B. Roberts, M.L. Foster, and P. Woodin. 1985. A breeding season survey of salt marsh yellowthroats (*Geothlypis trichas sinuosa*) in the San

Francisco Bay Region. U. S. Fish and Wildl. Serv. Contract Rept. 84-57. Sacramento, CA. 92 pp.

Leidy, R.A. 1984. Distribution and Ecology of Stream Fishes in the San Francisco Bay Drainage. Hilgardia. Vol. 52, No. 8. October.

Leidy, R.A. 1999. Robert A. Leidy Fish Survey 1992-1998. Bay Area Stream Fishes, Version 1.2. Released July 9, 1999.

Mitsch, William J. and James G. Gosselink, 1986. *Wetlands*. Van Nostrand Reinhold. New York.

Monk & Associates, 2003. Special-Status Wildlife Evaluation, Soscol Ferry Road Project Site, Napa County, California. Letter report to Lucy Macmillan. March 19.

Moyle, P. 2002. Inland Fishes of California. Revised and Expanded. University of California Press. Berkeley.

Nur, N. 1997. Tidal songbirds. Observer-Point Reyes Bird Observatory 110: 1-3.

Pacific Aerial Surveys. Aerial photograph of project site 1" = 100' (AV6540-121-38).

Skinner, M. W. and B. M. Pavlik (eds.). 1994. Inventory of rare and endangered vascular plants of California. Calif. Native Plant Soc. Spec. Publ. No.1./ Fifth Edition. Sacramento, CA.

United Anglers of Casa Grande. 2003. Website: U.S. Army Corps of Engineers. 2003. Personal communication, Peter La Civita.

U.S.D.A. 1992. Hydric Soil Lists. Field Office Official List of Hydric Soil Map Units for Sonoma County, California.

U.S.D.A. 1990. Soil Survey. Sonoma County California.

U.S.D.A. 1991. Hydric Soils of the United States. Soil Conservation Service. Miscellaneous Publication Number 1491. 3rd Edition.

U.S. Fish and Wildlife Service. 2003. Sacramento splittail. http://sacramento.fws.gov/es/animal_spp_acct/sac_splittail.htm.

U.S. Fish and Wildlife Service 1992. Endangered and threatened wildlife and plants; commencement of status review for a petition to list the western pond turtle and California red-legged frog. Federal Register, Vol. 57, No. 193, pp. 45761-45762.

Zeiner, David C., William F Laudenslayer, Jr., Kenneth E. Mayer, and Marshall White. 1990. *California's Wildlife, Volume II, Birds*. California Statewide Habitat Relationships System.

Appendix A – State and Federal Status Designations

Provided below is an explanation of the status designations given to the species listed in Table 1 and 2 and the implication of these designations for the environmental review process.

Status Designations

Federal Status

1) Federally listed Endangered and Threatened species are legally protected under the federal Endangered Species Act (ESA), and potential impacts to these species require formal consultation with the United State Fish and Wildlife Service (USFWS).

2) Federally Proposed Endangered or Threatened species are also legally protected under ESA, and potential impacts to these species require informal consultation with the USFWS.

3) Federal Species of Concern have no federal legal status, although federal agencies may choose to give them special management consideration. For plants, a federal Species of Concern indicates former C1 and C2 candidates that changed status in 1996 when the USFWS abandoned the C1/C2 model. However, these taxa may still meet the criteria for future listing by the USFWS and are important to include in "potential lists".

State Status

4) State listed Endangered and Threatened animal species are legally protected pursuant to Section 2080 of the California Fish and Game Code.

5) State listed Endangered and Threatened plant species are legally protected pursuant to Section 1904 (Native Plant Protection Act) and Sections 2074.2 and 2075.5 (California Endangered Species Act) of the California Fish and Game Code.

6) Plant species listed by the California Native Plant Society (CNPS) as List 1B or 2 species must be considered by state agencies during the California Environmental Quality Act (CEQA) review process.

7) State Fully Protected species may not be taken or possessed without a permit from the California Fish and Game Commission and/or CDFG.

8) CDFG's designation of California Species of Special Concern is an administrative designation given to vertebrate species that appear to be vulnerable to extinction because of declining populations, limited ranges, and or continuing threats.

Appendix B - Vascular Plant Species Observed on Parcels A and B

FLOWERING PLANTS
(ANGIOSPERMAE -
DICOTYLEDONEAE)

AMARANTHACEAE
Amaranthus blitoides

APIACEAE
*Anthemis cotula
*Conium maculatum
*Foeniculum vulgare
*Torilis arvensis

APOCYNACEAE
*Vinca major

ASTERACEAE
Baccharis pilularis
*Carduus pycnocephalus
*Centaurea solstitialis
*Conyza floribunda
*Cotula coronopifolia
*Filago gallica
*Gnaphalium luteo-album
Grindelia camporum var. camporum
*Hypocharis glabra
*Lactuca serriola
*Leontodon taraxacoides ssp. longirostris
Madia exigua
*Picris echioides
*Senecio vulgaris
*Silybum marianum
*Sonchus asper
*Sonchus oleraceus
*Tragopogon porrifolius
Xanthium strumarium

BORAGINACEAE
Amsinckia menziesii var. intermedia

BRASSICACEAE
*Brassica nigra
*Brassica rapa
Cardamine oligosperma
*Cardaria chalepensis
*Lepidium latifolium
*Raphanus sativus

CARYOPHYLLACEAE
*Silene gallica
Spergularia marina (= S. salina)
*Spergularia rubra
*Stellaria media

CHENOPODIACEAE
(*?) Atriplex sp.
Salicornia virginica

CONVOLVULACEAE
*Convolvulus arvensis

CRASSULACEAE
*Crassula tillaea

DIPSACACEAE
*Dipsacus fullonum

ERICACEAE
(*?) Arbutus menziesii

EUPHORBIACEAE
*Euphorbia peplus

FABACEAE
*Genista monspessulana
*Lathyrus odoratus
*Lotus corniculatus
Lupinus bicolor
*Medicago polymorpha
*Melilotus alba
*Melilotus indica
*Trifolium glomeratum
*Trifolium hirtum
Trifolium microcephalum
*Vicia benghalensis
*Vicia sativa ssp. nigra
*Vicia sativa ssp. sativa
*Vicia villosa ssp. varia

FAGACEAE
Quercus agrifolia
Quercus lobata

FRANKENIACEAE
Frankenia salina

GENTIANACEAE
Centaurium davyi

GERANIACEAE
*Erodium moschatum
Geranium carolinianum
*Geranium dissectum
*Geranium molle

JUGLANDACEAE
*Juglans californica var. hindsii

LAMIACEAE
*Marrubium vulgare

LYTHRACEAE
*Lythrum hyssopifolium

MALVACEAE
*Lavatera cretica
*Malva nicaeensis

MYRTACEAE
*Eucalyptus globulus

ONAGRACEAE
Epilobium brachycarpum
Epilobium ciliatum ssp. ciliatum

PAPAVERACEAE
Eschscholzia californica
*Papaver rhoeas

PLANTAGINACEAE
*Plantago lanceolata

POLYGONACEAE
*Polygonum arenastrum
*Rumex crispus
*Rumex pulcher

PRIMULACEAE
*Anagallis arvensis

ROSACEAE
Heteromeles arbutifolia
*Prunus sp.

RUBIACEAE
*Galium aparine
*Galium parisiense

SALICACEAE
Salix exigua
Salix lasiolepis

SCROPHULARIACEAE
*Bellardia trixago
Castilleja densiflora ssp. densiflora
*Parentucellia viscosa

SOLANACEAE
*Petunia sp.

ULMACEAE
*Ulmus procera

ZYGOPHYLLACEAE
*Tribulus terrestris

FLOWERING PLANTS (ANGIOSPERMAE - MONOCOTYLEDONEAE)

CYPERACEAE
Cyperus eragrostis
Scirpus californicus
Scirpus maritimus

IRIDACEAE
Sisyrinchium bellum

JUNCACEAE

Juncus bufonius var. bufonius

LILIACEAE
*Allium sp.

POACEAE
*Arundo donax
*Avena barbata
*Briza minor
*Bromus diandrus
*Bromus hordeaceus
Distichlis spicata
*Ehrharta erecta
*Holcus lanatus
Hordeum brachyantherum
*Hordeum marinum ssp.
gussoneanum
*Hordeum murinum ssp.
leporinum
*Lolium multiflorum
*Parapholis incurva
*Phalaris aquatica
*Phalaris paradoxa
*Poa annua
*Polypogon maritimus
*Polypogon monspeliensis
*Vulpia bromoides
*Vulpia myuros

TYPHACEAE
Typha angustifolia

*Species introduced or naturalized in the study area.

Appendix C – Wildlife Species Observed on Parcels A and B

Wildlife Observed[1] at Haystack Project Site Between September 26 and October 8, 2004

Reptiles

Western fence lizard	*Sceloporus occidentalis*

Birds

Green heron	*Butorides virescens*
White-tailed kite	*Elanus leucurus*
Northern harrier	*Circus cyaneus*
Red-tailed hawk	*Buteo jamaicensis*
Killdeer	*Charadrius vociferus*
Greater yellowlegs	*Tringa melanoleuca*
Rock dove	*Columba livia*
Anna's hummingbird	*Calypte anna*
Acorn woodpecker	*Melanerpes formicivorus*
Nuttall's woodpecker	*Picoides nuttallii*
Western scrub jay	*Aphelocoma californica*
Common raven	*Corvus corax*
Bushtit	*Psaltriparus minimus*
Northern mockingbird	*Mimus polyglottos*
California towhee	*Pipilo crissalis*
Savannah sparrow	*Passerculus sandwichensis*
Song sparrow	*Melospiza melodia*
White-crowned sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Red-winged blackbird	*Agelaius phoeniceus*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*

Mammals

Black-tailed hare	*Lepus californicus*
Botta's pocket gopher	*Thomomys bottae*
Western harvest mouse	*Reithrodontomys megalotis*
Norway rat	*Rattus norvegicus*
House mouse	*Mus musculus*
California meadow vole	*Microtus californicus*
Coyote	*Canis latrans*
Raccoon	*Procyon lotor*

[1] Monk & Associates, 2004.

Table 1

Special-Status Plant Species Potentially Occurring in the Vicinity of the Haystack Landing Site (Parcels A and B) Petaluma, California

Plant Species	Status	Habitat	Flowering Period	Potential for Occurrence on Project Site
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	CNPS 1B	Cismontane woodland, valley and foothill grassland in clay soils, often on serpentine.	May-June	No suitable habitat exists on project site.
Napa false indigo (*Amorpha californica* var. *napensis*)	CNPS 1B	Broadleafed upland forest, chaparral, cismontane woodland.	April-July	No suitable habitat exists on project site.
Bent-flowered fiddleneck (*Amsinckia lunaris*)	CNPS 1B	Coastal bluff scrub, cismontane woodland, valley and foothill grassland.	March-June	No suitable habitat exists on project site.
Sonoma manzanita (*Arctostaphylos canescens* ssp. *sonomensis*)	CNPS 1B	Chaparral, lower montane coniferous forest.	January-April	No suitable habitat exists on project site.
Alkali milk-vetch (*Astragalus tener* var. *tener*)	CNPS 1B	Alkali playa, valley and foothill grassland, vernal pools.	March-June	None observed during 2003 surveys. Habitat limited and disturbed; not expected to occur.
Sonoma sunshine (*Blennosperma bakeri*)	FE, SE, CNPS 1B	Vernal pools and seasonal wetlands.	March-May	No suitable habitat exists on project site.
Narrow-anthered California brodieaea (*Brodiaea californica* var. *leptandra*)	CNPS 1B	Broad-leafed upland forest, chaparral, lower montane coniferous forest.	May-July	No suitable habitat exists on project site.
Sonoma ceanothus (*Ceanothus sonomensis*)	CNPS 1B	Chaparral. Sandy, volcanic or serpentine soils.	February-April	No suitable habitat exists on project site.
Sonoma spineflower (*Chorizanthe valida*)	FE, SE, CNPS 1B	Coastal prairie. Known only from Marin and Sonoma counties.	June-August	Extinct in Sonoma County.

Plant Species	Status	Habitat	Flowering Period	Potential for Occurrence on Project Site
Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*)	CNPS 1B	Coastal salt marsh. Usually in coastal salt marsh with *Salicornia*, *Distichlis*, *Jaumea*, and *Spartina*, etc.	June-October	None observed during 2003 surveys. Habitat limited and disturbed; not expected to occur.
Soft bird's beak (*Cordylanthus mollis* spp. *mollis*)	FE, SR, CNPS 1B	Coastal salt marsh with *Salicornia*, *Distichlis*, and *Frankenia*, etc.	July-November	None observed during 2003 surveys. Habitat limited and disturbed; not expected to occur.
Baker's larkspur (*Delphinium bakeri*)	FE, SR, CNPS 1B	Coastal scrub	March-May	No suitable habitat exists on project site.
Yellow larkspur (*Delphinium luteum*)	FE, SR, CNPS 1B	Chaparral, coastal prairie, coastal scrub. Endemic to a couple of occurrences remaining in Sonoma county.	March-May	No suitable habitat exists on project site.
Western leatherwood (*Dirca occidentalis*)	CNPS 1B	Mesic sites, broadleafed upland forest, closed-cone conifer forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland	January-April	No suitable habitat exists on project site.
Dwarf downingia (*Downingia pusilla*)	CNPS 2	Valley and foothill grassland (mesic sites), vernal pools.	March-May	No suitable habitat exists on project site.
Streamside daisy (*Erigeron biolettii*)	CNPS 3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest (rocky, mesic).	June-September	No suitable habitat exists on project site.
Round-leaved filaree (*Erodium macrophyllum*))	CNPS 2	Cismontane woodland, valley and foothill grassland.	March-May	No suitable habitat exists on project site.
Marin checker lily (*Fritillaria lanceolata* var. *tristulis*)	CNPS 1B	Coastal bluff scrub, coastal prairie, coastal scrub	February-April	No suitable habitat exists on project site.
Fragrant fritillary (*Fritillaria liliacea*)	CNPS 1B	Coastal scrub, valley and foothill grassland, coastal prairie. Often on serpentine.	February-April	No suitable habitat exists on project site.
Hayfield tarplant (*Hemizonia congesta* ssp. *leucocephala*)	CNPS 3	Coastal scrub, valley and foothill grassland.	April-October	No suitable habitat exists on project site.

Plant Species	Status	Habitat	Flowering Period	Potential for Occurrence on Project Site
Marin western flax (*Hesperolinon congestum*)	FT, ST, CNPS 1B	Chaparral, valley and foothill grassland. Known only from Marin, San Francisco, and San Mateo counties. In serpentine barrens and in serpentine grassland chaparral.	April-July	No suitable habitat exists on project site.
Legenere (*Legenere limosa*)	CNPS 1B	Vernal pools.	April-June	No suitable habitat exists on project site.
Woolly-headed lessingia (*Lessingia hololeuca*)	CNPS 3	Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland (clay or serpentine); elevation 15-305 meters.	June-October	No suitable habitat exists on project site.
Sebastopol meadowfoam (*Limnanthes vinculans*)	FE, SE, CNPS 1B	Mesic meadows, vernal pools, valley and foothill grasslands. Swales, wet meadows and marshy areas in valley oak savanna. On poorly drained soils of clays and sandy loam; elevation 15-305 meters.	April-May	No suitable habitat exists on project site.
Jepson's linanthus (*Linanthus jepsonii*)	CNPS 1B	Chaparral, cismontane woodland, open to partially shaded grassy slopes, on volcanics or periphery of serpentine substrates; elevation 100-500 meters.	April-May	No suitable habitat exists on project site.
Cobb Mountain lupine (*Lupinus sericatus*)	CNPS 1B	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest; elevation 275-1525 meters.	March-June	No suitable habitat exists on project site.
Mt. Diablo cottonweed (*Micropus amphibolus*)	CNPS 3	Broadleafed upland forest, Chaparral, cismontane woodland, valley and foothill grassland (rocky); elevation 275-1525 meters.	March-May	No suitable habitat exists on project site.
Marsh microseris (*Microseris paludosa*)	CNPS 1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland; elevation 5-300 meters.	April-June	No suitable habitat exists on project site.

Plant Species	Status	Habitat	Flowering Period	Potential for Occurrence on Project Site
Baker's navarretia (*Navarretia leucocephala* spp. *bakeri*)	CNPS 1B	Cismontane woodland, meadows and seeps, vernal pools, valley and foothill grasslands, lower montane coniferous forest. Adobe or alkaline soils; elevation 5-950 meters.	May-July	None observed during 2003 surveys. Habitat limited and disturbed; not expected to occur.
Petaluma popcorn-flower (*Plagiobothrys mollis* var. *vestitus*)	CNPS 1A	Wet sites in valley and foothill grassland, possibly coastal marsh margins.	June-July	Presumed extinct in California.
North Coast semaphore grass (*Pleuropogon hooverianus*)	ST, CNPS 1B	Broad-leafed upland forest, meadows and seeps, north coast coniferous forest; wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments; elevation 10-635 meters.	May-August	No suitable habitat exists on project site.
Marin knotweed (*Polygonum marinense*)	CNPS 3	Marshes and swamps. Coastal salt marshes and brackish marshes.	April-October	None observed during 2003 surveys. Habitat limited and disturbed; not expected to occur.
Point Reyes checkerbloom (*Sidalcea calycosa* ssp. *rhizomata*)	CNPS 1B	Marshes and swamps. Freshwater marshes near the coast.	April-September	No suitable habitat exists on project site.
Showy Indian clover (*Trifolium amoenum*)	FE, CNPS 1B	Coastal bluff scrub, valley and foothill grassland (sometimes serpentinite).	April-June	No suitable habitat exists on project site.
Saline clover (*Trifolium depauperatum* var. *hydrophilum*)	CNPS 1B	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools.	April-June April-June	None observed during 2003 surveys. Habitat limited and disturbed; not expected to occur.
Oval-leaved viburnum (*Viburnum ellipticum*)	CNPS 2	Chaparral, cismontane woodland, lower montane coniferous forest.	May-June	No suitable habitat exists on project site.

Table 2
Special-status Animal Species Potentially Occurring on or within Vicinity of Project Site
Haystack Project Site
Petaluma, California

Animal*	**Status**	**Habitat**	**Potential for Occurrence on Project Site**
Reptiles			
Northwestern pond turtle (*Clemmys marmorata marmorata*)	FSC, CSC	Associated with permanent or nearly permanent water in a variety of habitats.	Likelihood of occurrence low. Surveys may be required by CDFG to confirm presence/absence on the site.
Fish			
Chinook salmon (*Oncorhynchus tshawytscha*)	SE, FE (winter-run)	Anadromous. Spawns in main stem Sacramento River and larger Central Valley tributaries. Juveniles rear in upstream river reaches, Delta, and San Francisco Bay. Smolts emigrating to ocean at various times of the year. Adults recorded in upstream portions of Adobe Creek.	Migration through project area adjacent to Parcel C.
Steelhead-Central California Coast ESU (*Oncorhynchus mykiss*)	FT	Anadromous. Adults and fry recorded in upstream portions of Adobe Creek. Juveniles may rear in lower Petaluma River and Bay before moving out to sea	Migration through project area adjacent to Parcel C.
Splittail (*Pogonichthys macrolepidotus*)	SC	Prefers shallow water habitat in slow-moving sections of rivers and sloughs. Found primarily in Delta, Suisun Bay, Suisun Marsh, Napa River, occasionally Petaluma River	Migration through project area adjacent to Parcel C. May forage on the project site on occasion.

*List of special-status species has been compiled based on animal species listed in the CNDDB (Petaluma River quadrangle 2003) and general knowledge of project area. Note: FSC = U.S. Fish and Wildlife Service Species of Concern; FE = federally listed as endangered; FT = federally listed as threatened; SE = state listed as endangered; ST = state listed as threatened; SFP = State fully protected (may not be taken or possessed without a permit from the Fish and Game Commission and/or CDFG). CSC = California species of special concern; CDFS = considered sensitive by the California Department of Forestry.

Table 2
Special-status Animal Species Potentially Occurring on or within Vicinity of Project Site
Haystack Project Site
Petaluma, California

Animal	Status	Habitat	Potential for Occurrence on Project Site
Birds**			
California black rail (*Laterallus jamaicensis coturniculus*)	FSC, ST	Mainly inhabits salt marshes bordering larger bays. Microhabitat includes tidal salt marsh, freshwater and brackish marshes, all at low elevations.	Coastal marsh on Parcel C may be accessed during low tide and provide potential foraging habitat. The wetlands across the river from the project site (located on the eastern side of the river) provide potential nesting habitat for this species.
California clapper rail (*Rallus longirostris obsoletus*)	FE, SE	Salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Microhabitats associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	The coastal marsh adjacent to Parcel C provides marginal nesting habitat. Wetlands across the river from the project site east of the project site may provide potential nesting habitat.

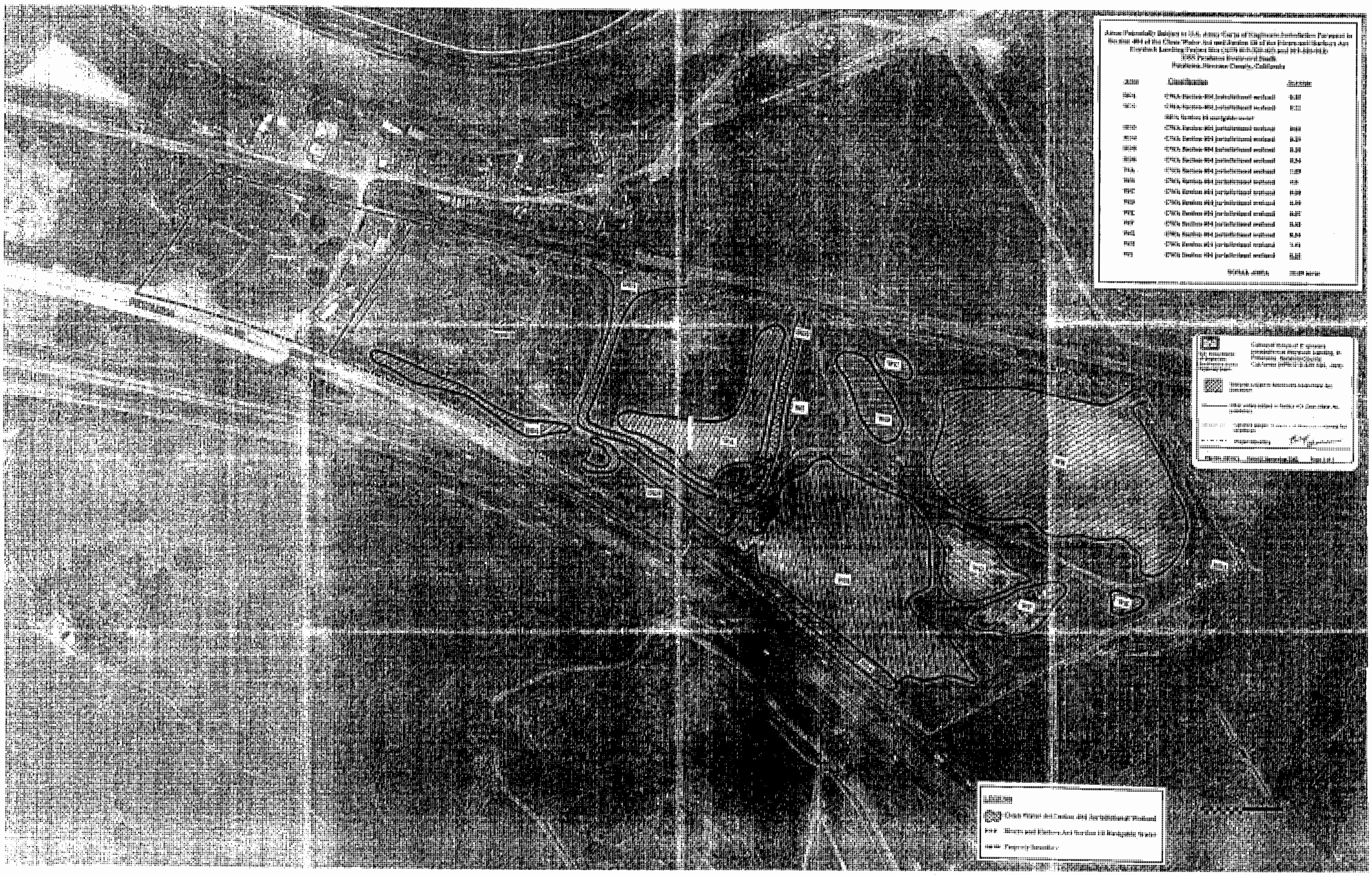
**All migratory birds are protected by the Migratory Bird Treaty Act (50 CFR 10), which makes it unlawful to take, possess, buy, sell, purchase or barter any migratory bird, including feathers or other parts, nests, eggs or products, except as allowed by implementing regulations (50 CFR 21). In addition, Section 2080 of the California Fish and Game Code prohibits the killing of a listed species, and Sections 3503, 3503.5, and 3800 of the Fish and Game Code prohibit the take, possession, or destruction of birds, their nests, or eggs. Therefore, prior to development of the site, pre-construction surveys should be conducted to determine presence/absence of nesting birds. Any active nest sites should be avoided during construction under the supervision of a qualified biologist.

Table 2
Special-status Animal Species Potentially Occurring on or within Vicinity of Project Site
Haystack Project Site
Petaluma, California

Animal	**Status**	**Habitat**	**Potential for Occurrence on Project Site**
Birds			
Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)	FSC, CSC	Mostly breeds and winters in wet meadows, fresh emergent wetland, and saline emergent wetland habitats in the San Francisco Bay region. Microhabitat includes thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	Coastal marsh adjacent to Parcel C provides marginal potential nesting and foraging habitat.
White-tailed kite *(Elanus leucurus)*	SFP	Forages in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. Uses trees with dense canopies for cover and nesting.	Grasslands provide foraging habitat. Potential nesting in trees on project site.
Northern harrier (*Circus cyaneus*)	CSC	Frequents meadows, grasslands, open ranges, and fresh and saltwater emergent wetland areas. Nests on ground in shrubby vegetation.	Grasslands provide foraging habitat. Potential nesting in trees on project site.
Great egret (*Ardea alba*) and Snowy egret (*Egretta thula*)	CDFS	Typically feed in shallow water and along shores of wetlands or aquatic habitats. Nests in large trees usually near water.	Nesting habitat occurs in eucalyptus grove on northern portion of Parcel A. This area will be monitored in Spring 2004.

Table 2
Special-status Animal Species Potentially Occurring on or within Vicinity of Project Site
Haystack Project Site
Petaluma, California

Animal	Status	Habitat	Potential for Occurrence on Project Site
Mammals			
Salt-marsh Harvest Mouse (*Reithrodontomys raviventris*)	FE, SE	Only in the saline emergent wetlands of San Francisco bay and its tributaries. Pickleweed is primary habitat.	Coastal marsh on Parcel C provides marginal potential nesting and foraging habitat. Parcels A and B will be evaluated for suitability to provide habitat.



Appendix B – Geotechnical Investigation Haystack Landing Wetlands Restoration, Petaluma, California

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GEOTECHNICAL INVESTIGATION
HAYSTACK LANDING WETLANDS RESTORATION
PETALUMA, CALIFORNIA

October 1, 2004

Project 1139.01

Prepared For:
Ms. Lucy Macmillan
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CERTIFICATION

This document is an instrument of service, prepared by or under the direction of the undersigned professionals, in accordance with the current ordinary standard of care. The service specifically excludes the investigation of radon, asbestos or other hazardous materials. The document is for the sole use of the client and consultants on this project. No other use is authorized. If the project changes, or more than two years have passed since issuance of this report, the findings and recommendations must be reviewed by the undersigned.

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GEOTECHNICAL INVESTIGATION
HAYSTACK LANDING WETLANDS RESTORATION
PETALUMA, CALIFORNIA

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GEOTECHNICAL INVESTIGATION
HAYSTACK LANDING WETLANDS RESTORATION
PETALUMA, CALIFORNIA

I. INTRODUCTION

This report presents the results of our geotechnical investigation for the planned restoration of wetlands to the south of the proposed recycled materials/asphalt plant for Dutra Materials, located in Petaluma, California. The project site location is shown on Figure 1. The wetlands restoration will include excavation of sediments that overlay the Bay Mud found at the site. The excavated sediments will be used as structural fill to raise pads for the new plant.

We are also currently providing our geotechnical services to Dutra Materials on the recycled materials/asphalt plant under a separate contract. This report represents the completion of our Phase 1 services for the wetlands restoration as described in our proposal dated March 5, 2004. The scope of our Phase 1 services includes the following geotechnical services:

- Perform a subsurface exploration with soil borings;
- Geologic and geotechnical hazards evaluation;
- Laboratory testing to evaluate the engineering properties of the sediments;
- Evaluate settlement potential from placement of new fill loads;
- Develop criteria for site grading, including new fill quality and compaction criteria;
- Preparation of this geotechnical investigation report

Additional geotechnical services for the wetlands restoration project may include supplemental consultation as project planning moves forward.

This report is intended for the exclusive use of Lucy Macmillan, Dutra Materials and the project design team for this project and site. No other use is authorized without the written consent of Miller Pacific Engineering Group.

II. PROJECT DESCRIPTION

The proposed wetlands restoration will occur on the 11-acre southern portion of the 37-acre Haystack site. Based on discussions with others on the project team, we understand the 11 acres that will be restored were filled between 1968 and 1990 to wash quarry aggregates. The clays, silts and sands deposited as part of the washing operation will be excavated and placed in the northern portions of the site to raise elevations and create building pads for a recycling facility and asphalt plant. As appropriate, topsoil from the excavated areas may be stockpiled for use in the wetland restoration project.

We are also preparing a Geotechnical Investigation Report for the recycling plant on the northern portion of the site. That report includes detailed discussions of settlement and stability calculations for placing the excavated soils on the northern portion of the site. It also includes recommendations for placing fill soils for that project.

The Owner of the project site is Dutra Materials of San Rafael, California. DCC Engineering, Inc. of Walnut Creek, California is the Project Architect, Civil Engineers, and Structural Engineers.

III. SITE CONDITIONS

A. Regional Geology

The site is located within the Coast Range Geomorphic Province of California. The regional bedrock geology consists of complexly folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock of the Jurassic-Cretaceous age (65-190 million years ago) Franciscan Complex.

Northwest-southeast trending mountain ridges and intervening valleys that were formed from tectonic activity between the North American Plate and the Pacific Plate characterize the regional topography. Extensive faulting during the Pliocene Age (1.8-7 million years ago) formed the uneven depression that is now the San Francisco Bay. More recent tectonic activity is concentrated along the San Andreas Fault zone, a complex group of generally parallel faults.

For the last 15,000 years, the sea level has continually risen (due to melting of glaciers from the Wisconsin glaciation) and flooded the lower topography. For the last 8,000 years, silt and clay particles carried in suspension in floodwater have been deposited in the San Francisco Bay to form the highly compressible "Bay Mud." This process continues today.

Regional geologic mapping by Huffman and Armstrong indicates that the project site is located on an alluvial deposit (Qal). Alluvial materials are deposited by rivers and generally consist layers of varying thickness and of any combination of sands, silts, and clays. Young Bay Mud (Qbm) is mapped adjacent to the site. Bay Mud is a soft, highly compressible marine deposit with fine intermittent silt seams. Intermittent lenses of eolian (wind deposited) sands and organics are also found within Young Bay Mud deposits.

B. Surface Conditions

The northern half (+/-) of the 37-acre project site is used as an aggregate processing area for the Dutra Materials plant. Currently the site is lightly vegetated with brush and shrubs. A small natural hill with a peak elevation of about +32.0-feet is located on the northern most portion of the property. The existing structures atop of the hill are to be removed or relocated. The remainder of the site gently slopes to the south from an elevation of +15.0-feet to about +5.0-feet. The 11-acres at the southern end of the property slope gently to the southeast and embankment fill berms, up to about 8-feet in height, separate the area into “detention basins”. Topography and the “basins” are shown on Figure 2.

C. Field Exploration and Laboratory Testing

Our subsurface exploration was performed on May 21 and 26, 2004 and consisted of drilling 12 soil borings utilizing truck-mounted drilling equipment with 6-inch hollow stem continuous flight augers. Borings 1 though 6 were drilled for the wetland restoration phase and Borings 7 through 12 were drilled for the asphalt and recycled material plant phase. The locations of our borings are shown on Figure 2.

The soils encountered were logged and select samples were obtained for laboratory testing. The subsurface exploration program is discussed in more detail in Appendix A. A Soil Classification Chart and Rock Classification Chart are shown on Figures A-1 and A-2, respectively. The boring logs are presented on Figures A-3 through A-20 of Appendix A.

Laboratory testing of relatively “undisturbed” samples from the exploratory borings included moisture content, dry density, plasticity, compaction and sieve analysis. The results of the moisture content and dry density tests are presented on the boring logs. The results of the plasticity testing are presented on Figure A-21 and the compaction test results are presented on Figure A-22. The sieve analysis test results are presented on Figure A-23. The laboratory testing program is discussed in more detail in Appendix A. We also performed salinity testing on bulk samples that were provided by Lucy Macmillan. The salinity test results are included in Appendix B.

The purpose of the exploration and laboratory testing was to determine the approximate depths of the wash sediments/fill soils over the bay mud and to evaluate those sediments for their re-use as compacted fill for the recycling plant. We also present a brief discussion of the site geologic hazards, including settlements that could be induced as a result of new fill placement.

D. Subsurface Conditions and Groundwater

The subsurface conditions are consistent with the mapped geology. In the northern and western portion of the site, subsurface conditions consist of approximately 3.0 to 5.0-feet of colluvium, consisting of stiff to very stiff, low to medium plasticity sandy and gravely clay, overlying highly weathered sandstone of the Franciscan Assemblage. The bedrock grades harder and less weathered with depth.

The southern and eastern portions of the site, where the wetlands restoration will occur, are seasonal wetland marsh areas. Subsurface conditions consist of a 6.5 to 11.0-feet of variable artificial fill/wash sediments. The fill materials encountered consisted of soft to very stiff, high to low plasticity sandy and silty clays and dense clayey sands. Soft, highly-compressible Bay Mud varying in thickness from 8.0 to 13.5-feet underlie the fill. Old alluvial deposits underlie the Bay Mud. These deposits consist of very dense sandy clays and stiff, medium to highly plastic, sandy silts and clays.

Utilizing the data from our subsurface exploration and a late 1800's topographic survey of the adjacent marshes to the Petaluma River in the vicinity of the project site, we interpolated a contour map indicating the varying thickness of Bay Mud. The Bay Mud thickness contours are shown on Figure 2.

Groundwater was observed in borings 9 and 10 at depths of 14.5 and 11.0-feet, respectively. Since borings were not left open long enough to allow the groundwater significant time to equalize, the measured groundwater level may not represent the actual groundwater level. Groundwater levels will also fluctuate with time with the highest levels during periods of intense and sustained rainfall. The lowest groundwater levels (late summer and fall) are expected to be near the bay mud surface elevation or slightly higher.

E. Seismicity

1.) Active Faults in the Region- The project site is located within a seismically active area and will therefore experience the effects of future earthquakes. Earthquakes are the product of the build-up and sudden release of strain along a "fault" or zone of weakness in the earth's crust. Stored energy may be released as soon as it is generated or it may be accumulated and stored for long periods of time. Individual releases may be so small that only sensitive instruments detect them, or they may be violent enough to cause destruction over vast areas.

Faults are braids of breaks that comprise shatter zones which link to form networks of major and minor faults. Within the Bay Area, faults are concentrated along the San Andreas Fault zone.

The movement between rock formations along either side of a fault may be horizontal, vertical, or a combination and is radiated outward in the form of energy waves. The amplitude and frequency of earthquake ground motions partially depends on the material through which it is moving. The earthquake force is transmitted through hard rock in short, rapid vibrations, while this energy movement becomes a long, high-amplitude motion when moving through soft ground materials, such as Bay Mud.

An "active" fault is one that shows displacement within the last 11,000 years and, therefore, is considered more likely to generate a future earthquake than a fault that shows no sign of recent rupture. The locations of the currently known active faults relative to the project site are shown on Figure 3.

2.) Historic Fault Activity- Numerous earthquakes have occurred in the region within historic times. The results of our computer database search indicate that 38 earthquakes (Richter Magnitude 5.0 or larger) have occurred within 100 kilometers (62 miles) of the site area between 1735 and 2004. Using empirical attenuation relationships, the median peak ground acceleration (PGA) within the study area is approximately 0.33g. The five most significant historic earthquakes to affect the project site are summarized in Table A. Because the project site contains areas classified as both stiff soil and soft soil sites, the actual PGA for the listed historical seismic event would most likely be a range between the two PGA values given in Table A below.

TABLE A
SIGNIFICANT HISTORIC SEISMIC ACTIVITY[1]
HAYSTACK LANDING WETLANDS RESTORATION
PETALUMA, CALIFORNIA

Fault	Richter Magnitude	Year	Distance	Median PGA (Stiff Soil)[2]	Median PGA (Soft Soil)[3]
Rodgers Creek	6.2	1898	17 km	0.15 g	0.26 g
San Andreas	8.3	1906	58 km	0.13 g	0.33 g
West Napa	5.5	1891	19 km	0.08 g	0.18 g
Hayward	6.8	1836	58 km	0.07 g	0.18 g
San Andreas	7.0	1838	7.0 km	0.06 g	0.17 g

References:
(1) USGS (2001), (2) Abrahamson and Silva (1997), (3) Idriss (1991)

3.) Probability of Future Earthquakes - The historical records do not directly indicate either the maximum credible earthquake or the probability of such a future event. To evaluate earthquake probability in this region, the USGS has assembled a group of researchers into the "Working Group on California Earthquake Probabilities" (2002) to estimate the probabilities of earthquakes on active faults. Potential sources were analyzed considering fault geometry, geologic slip rates, geodetic strain rates, historic activity, and micro-seismicity, to arrive at estimates of probabilities of earthquakes with a Moment Magnitude greater than 6.7 by 2032.

The probability studies focus on seven "fault systems" within the Bay Area. Fault systems are composed of different, interacting fault segments capable of producing earthquakes within the individual segment or in combination with other segments of the same fault system. The probabilities for the individual fault segments in the San Francisco Bay Area are presented on Figure 3.

In addition to the seven fault systems, the studies included probabilities of "background earthquakes." These earthquakes are not associated with the identified fault systems and may occur on lesser faults (i.e., West Napa) or previously unknown faults (i.e., the 1989 Loma Prieta and 2000 Mt. Veeder - Napa earthquakes). When the probabilities on all seven fault systems and the background earthquakes are combined mathematically, there is a 62 percent chance for a magnitude 6.7 or larger earthquake to occur in the Bay Area by the year 2030. Smaller earthquakes (between magnitudes 6.0 and 6.7), capable of considerable damage depending on proximity to urban areas, have about an 80 percent chance of occurring in the Bay Area by 2032 (USGS, 2002).

Additional studies by the USGS regarding the probability of large earthquakes in the Bay Area are on going. These current evaluations include data from additional active faults and updated geological data.

IV. GEOLOGIC HAZARDS

A. General

This section identifies potential geologic hazards at the property site, their significant adverse impacts, and recommended mitigation measures. The significant geologic hazard at the project site is seismic ground shaking, slope instability, potentially expansive soils and settlement. Other geologic hazards, such as seismic induced ground settlement, lurching and ground cracking and seiche and tsunami are not considered significant at the site. A brief description of geologic hazards and mitigation measures is listed in the following sections.

B. Fault Surface Rupture

Under the Alquist-Priolo Special Studies Zone Act, the California Division of Mines and Geology (CDMG) produced 1:2000 scale maps showing all active faults. The site is not located within an Alquist-Priolo Special Studies Zone and is not near any of the known active faults. The potential for fault surface rupture at the site is remote.

No mitigation measures are required.

C. Seismic Shaking

The site will experience seismic ground shaking similar to other areas in the seismically active Bay Area. The intensity of ground shaking will depend on the characteristics of the causative fault, distance from the fault, the earthquake magnitude and duration, and site-specific geologic conditions. Table B presents the expected ground accelerations at the site are shown for earthquakes on various nearby active faults. These acceleration values are for an earthquake originating on the closest portion of the fault to the site.

TABLE B
ESTIMATED PEAK GROUND ACCELERATIONS
HAYSTACK LANDING WETLANDS RESTORATION
PETALUMA, CALIFORNIA

Fault	Max. Credible Moment Magnitude[1]	Distance to Fault[1]	Median PGA (Stiff Soil)[2]	Median PGA (Soft Soil)[3]
Rodgers Creek	7.1	8 km	0.36 g	0.44 g
San Andreas	7.9	24 km	0.21 g	0.40 g
Hayward	7.1	26 km	0.16 g	0.30 g
Maacama	6.9	29 km	0.13 g	0.27 g
West Napa	6.5	27 km	0.12 g	0.23 g
San Gregorio	7.3	48 km	0.10 g	0.25 g

References:
(1) CDMG (1998), USGS (1999)
(2) Abrahamson and Silva (1997)
(3) Idriss (1991)

The most likely sources for future earthquakes closest to the site are the Rodgers Creek and the San Andreas Faults, which are located 8 km and 24 km, respectively.

Seismic Shaking Mitigation Measures - Mitigation measures include designing the improvements and structures in accordance with the California Building Code. The recommended seismic design criteria are present in Section V of this report.

D. Liquefaction Potential

Liquefaction refers to the sudden, temporary loss of soil strength during strong ground shaking. This phenomenon can occur where there are saturated, loose, granular (sandy) deposits subjected to seismic shaking. Liquefaction-related phenomena include settlement, flow failure, and lateral spreading. Saturated, relatively clean, granular deposits were not encountered at the project site.

There is a low potential for liquefaction to occur in sand seams stratified in the Bay Mud. Sand seams and meandering old channels may be present under the site even though they were not encountered in the exploration. Depending on the seismic ground acceleration and the sand layer depth, fines content, and density, localized sand boils may occur from ejection of pore pressure.

Sand boils occurring at the site after a strong seismic event may locally disrupt pavements in the access roads and the slab under plant operation equipment, but could be quickly and economically repaired. The possibility of significant failure at the site from liquefaction is low.

No mitigation measures are required.

E. Erosion

Sandy soils on moderate slopes or clayey soils on steep slopes are susceptible to erosion when exposed to concentrated surface water flow. The potential for erosion is increased when established vegetation is disturbed or removed. The site is relatively level with little relief thus the potential for significant erosion at the site is minimal.

Erosion Mitigation Measures - The project Civil Engineer should design the site drainage to collect surface water into a storm drain system and discharge water at an appropriate location. Re-establishing vegetation on disturbed areas will also be required to minimize erosion. Erosion control measures during and after construction should conform to the most recent version of the Erosion and Sediment Control Field Manual (California Regional Water Quality Control Board, 2002).

F. Flooding

Typical adverse impacts from flooding are water damage to structures and furnishings. Although the lowest elevation at the project site is approximately +5 msl, the Federal Emergency Management Agency (FEMA) maps do not indicate the site as being within a 100-year or 500-year flood zone because of the presence of the levee along the Petaluma River. Therefore the risk of large scale flooding is low. However, there is the potential for localized flooding due to future settlement or a levee failure.

Flooding Mitigation Measures - Mitigation measures include designing the surface grades above flood elevations and utilities with adequate slope to account for future site settlement. Site grading and drainage is generally the responsibility of the project Civil Engineer.

G. Settlement

Settlement occurs from structure and fill loads that cause deformation of the subsurface soils. Soft, compressible Bay Mud ranges in thickness from 0 to 15-feet across at the project site. This clay layer has the potential to compress under moderate foundation loads or placement of new fill or stockpiles. Therefore the potential for settlement is significant.

Settlement Mitigation Measures - Surface drainage and gravity flow utilities should be designed with adequate slopes to ensure proper performance after settlement. A discussion of expected settlement is presented in Section V of this report.

H. Expansive Soil

During our site reconnaissance, we did not observe indications, such as ground cracking, that the surface soils are highly expansive. Plasticity testing of the wash sediments include liquid limits ranging from 43 to 56 and plasticity indices ranging from 7 to 28, suggesting low to moderate expansive potential. The Bay Mud that underlies the fill has a moderate to high expansion potential. Expansive silts and clays, when located near the ground surface, can exhibit shrink-swell behavior that can be detrimental to structures and flatwork during periods of fluctuating soil moisture content.

As the wash sediments are excavated and placed in the northern portion of the site, we anticipate they will be well-mixed and areas of medium plasticity (clay) soils will be blended with lower plasticity (sands and silts) soils. Provided this mixing occurs, we do not anticipate the wash sediments/fill soils will be expansive. If large zones of clayey sediments are placed at low moisture contents and compacted to a relatively high level, there is some potential for expansive soil behavior, which could result in damage to structures or other surface improvements.

Expansive Soil Mitigation Measures – Mitigation measures for expansive (clayey) soils include moisture conditioning (expansive) clayey soils to above optimum moisture and compacting these soils to a lower range of densities. Additional discussion regarding placement of expansive soils is included in Section V of this report. Where possible, expansive soils should be placed outside of building areas or other structural areas, such as beneath parking lots. If the expansive soils are used as fill in structural areas, they could be placed at depths greater than 4 feet to reduce seasonal moisture fluctuations.

I. Slope Stability

The project site consists of nearly flat slopes and traditional slope stability is not a geologic hazard. However, due to the presence of soft compressible Bay Mud, placement of heavy stockpile loads could result in deep rotational failures within the Bay Mud. More discussion on slope stability is provided in our report for the recycling/asphalt plant.

Slope Stability Mitigation Measures – Mitigation measures for placing heavy stockpile (ie fills greater than about 6 to 8 feet high), are included in our Geotechnical Report for the recycling/asphalt plant. Mitigation will not be required for placing a few feet of fill excavated from the wetland restoration area. Cut and fill slopes within the restoration area should be designed as discussed in Section V of this report.

V. DISCUSSION AND RECOMMENDATIONS

A. General

Based on the results of our site investigation and laboratory testing, we conclude that the quarry wash sediments proposed for re-use as fill soils in the northern portion of the site are suitable for that purpose. The sediments will be variable in nature and will be sandier in some areas and more clayey in other areas. We did not encounter zones of highly plastic soils or organics in our borings that would restrict the use of the excavated materials, however, the variable nature of the sediments could include zones of these undesirable soil types.

The primary geotechnical issues with the excavation of soils to restore wetlands are potentially saturated soils that will need drying prior to placement as structural fill, stability of new cut slopes and zones of potentially unsuitable materials that could be encountered during the work. Recommendations to address these issues are presented in the subsequent sections of this report.

B. Settlement

Placement of new fill over bay mud will result in settlements over time of the finished ground surface. A detailed discussion, including expected settlements from specific loads for the recycling facility/asphalt plant is included in our geotechnical design report for that portion of the project. The amount of settlement will depend on the unit weight, thickness, and aerial extent of the new fill, as well as the thickness and compressive properties of the Bay Mud. Because the Bay Mud is relatively thin, settlement will also be relatively small and will occur over a shorter period of time when compared to deep mud layers. Where there is no Bay Mud (as shown on Figure 2), we anticipate no significant settlement from the placement of new fill.

Settlement, for the purpose of the wetlands restoration, could result in adverse drainage patterns or water ponding if the surface of the new fill is not sloped adequately to drain. We recommend sloping the fill surface at a minimum of 2% in the direction of deepening Bay Mud as shown on Figure 2. Therefore, the surface of the fill should slope so that surface drainage is directed toward the east. As settlement occurs, the 2% slope should theoretically increase, but variations in the Bay Mud thickness and compressibility could result in differential settlements. Gravity-flow pipes, such as sewers or storm drains should also be sloped to anticipate the effects of long-term settlement.

Areas where Bay Mud is not present will experience minor to no settlements. Likewise, “unloading” the Bay Mud by removing the wash sediments will not result in settlements of the excavated surface. Differential settlements can be expected in transition areas where fill is placed between Bay Mud and stiff ground areas.

C. Slope Stability

Numerical slope stability analysis was performed for the significant new fill loads (stockpiles) anticipated at the recycling facility and discussed in detail in the report for that project. Slope stability, as it relates to the wetlands reclamation, should be limited to design of new cut slopes as we do not anticipate fill will be placed for the restoration work. These cut slopes are anticipated to be only a few feet in height, but could be subjected to tidal and small wave action, resulting in decreased performance. Recommendations for cut and fill slopes is included in subsequent sections of this report.

D. Site Grading

1. Excavation. Site preparation should include scraping grass, weeds and their root crowns from the material to be excavated. The anticipated depth of this clearing is only a few inches, but deeper grubbing may be required where heavier brush is located or where organic materials have collected in deeper layers over the years. These strippings will not be suitable for use as structural fill in the northern portion of the site and should be off-hauled or stockpiled for re-use in the wetlands restoration project as appropriate or in landscape areas.

Excavation of the soft and loose sediments will be possible with conventional excavation equipment, i.e. excavators and scrapers, but depending on the time of year, soils may be wet and rubber-tired equipment could sink/become stuck. As the excavations approach the soft bay mud, rubber-tired equipment will have difficulty operating regardless of the season. Additional discussion to dry out or otherwise improve wet soils is included in subsequent sections of this report.

Fill recommendations are discussed in our report for the recycling plant, but in general, stripping organic material from the existing ground surface will be required prior to placing new fill. The subgrade that will be filled should also be prepared as recommended in that report, including scarifying, moisture conditioning and recompaction. Relative compaction, maximum dry density and optimum moisture content of fill materials should be determined in accordance with ASTM Test Method D 1557, "Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using a 10-lb. Rammer and 18-in. Drop."

2. Fill Materials. Based on our borings in the area to be restored as wetlands, the soils that will be excavated appear suitable for use as compacted fill. Some moderately plastic clays may be encountered, but by the time they are blended with the sandier and siltier soils, we anticipate their expansive potential will be relatively low.

Clayey soils, such as those with a plasticity index >25, should be moisture conditioned to 2-percent over optimum and compacted to between 88- and 92-percent relative compaction (ASTM D 1557). The Geotechnical Engineer should identify these materials during site grading. Compaction of the expansive clayey materials at low moisture levels or outside the range given above could increase the expansive potential of the on-site soils and is not acceptable for the project conditions.

We do not anticipate oversized materials (cobbles or boulders) will be encountered in the areas to be excavated based on our understanding of the historic usage. If oversize materials are encountered (i.e. >6 inch diameter), they will need to be processed to reduce their size or removed from the fill. In general, fill should meet the gradations listed below:

TABLE D
FILL GRADATION LIMITS
HAYSTACK LANDING WETLANDS RESTORATION
PETALUMA, CALIFORNIA

Particle Size	Percent Finer by Dry Weight
6 inch	100
No. 4 sieve	20 - 100
No. 200 sieve	0 - 50

3. Compaction. Fill should be conditioned to near the optimum moisture content, which depending on the season, will likely require drying as the excavation becomes deeper. Properly moisture conditioned and cured materials should subsequently be placed in loose horizontal lifts of 8 inches thick or less, and uniformly compacted to a minimum of 90 percent relative compaction to produce

a firm non-yielding surface. Expansive soils, as described above, should be placed at a minimum 2% over optimum moisture and compacted to between 88 and 92% relative compaction.

4 Cut and Fill Slope Construction. Cut slopes will occur for the wetlands restoration and will be constructed into relatively soft and/or loose sediments. These cuts will be relatively shallow and should therefore perform reasonably well at steeper inclinations. Slopes of 2:1 (horizontal:vertical) will likely perform adequately, but the risk of erosion and minor sloughing is increased in the soft soils. We instead recommend flattening the slopes to 3:1 and revegetating to reduce the risk of erosion of surficial sloughing.

Where small fill slopes are planned, horizontal benching into firm materials will be required. For small fills (i.e. less than 4 feet high), subdrainage will probably not be required, but we should review the location and details of the fill areas to verify that subdrainage is not required. The keyway depths, benching and need for and location of subdrains should be verified during constructing by the project Geotechnical Engineer. Maximum inclination of fill slopes should be 2:1 (horizontal:vertical). For small fills planned at the site, we anticipate fills may be placed directly on a subgrade that has been stripped of organic material and compacted as previously described.

E. Drying Wet Soils

Depending on when construction occurs, excavated sediments may be well above optimum moisture content and may not be suitable for placement as structural fill. Drying and/or dewatering of these soils may therefore be required. The drying could be as simple as scarifying or disking the surface layer and allowing natural air-drying to occur. Wet soils could also be blended with dryer soils to reduce moisture contents. Sandy soils will be easier to dewater and dry than clayey soils.

Soils could also be lime- or cement-treated to reduce moisture contents and to decrease the expansive potential of clayey soils. Lime would be the preferred additive in clayey soils and cement would be preferred in sandier soils. The amount of lime or cement required to dry the soils would be relatively small and would be determined when the beginning moisture contents are known.

VI. ADDITIONAL GEOTECHNICAL SERVICES

We will be available during the design and permitting process to respond the geotechnical issues and provide supplemental consultation. As the construction plans near completion, we can review them, if requested, to verify that the intent of our geotechnical recommendations have been incorporated.

During construction, we need to observe placement of structural fill materials, but this will most likely be performed as part of our services for the recycling/asphalt plant.

LIST OF REFERENCES

American Society for Testing and Materials, "2000 Annual book of ASTM Standards, Section 4, Construction, Volume 4.08, Soil and Rock; Dimension Stone; Geosynthetics," ASTM, Philadelphia, 2000.

Abrahamson, N. and Silva, W., "Empirical Response Spectral Attenuation Relations for Shallow Crustal Earthquakes," Seismologic Research Letters, Vol. 68, No. 1, 1997

Bonaparte, M. and Mitchell, J.K. (1979), "The Properties of San Francisco Bay mud at Hamilton Air Force Base, California," Department of Civil Engineering Institute of Transportation and Traffic Engineering, University of California, Berkeley, April 1979.

California Building Code (2001 Ed.), California Building Standards Commission, Sacramento, California, California Code of Regulations, Title 24, Part 2, Volume 2, Chapter 16.

California Department of Conservation, Division of Mines and Geology, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada to be Used with the 1997 Uniform Building Code, International Conference of Building Officials, Whittier, California, February 1998.

California Department of Conservation, Division of Mines and Geology, "Geology for Planning: in Sonoma County, California," Special Report 120, 1980 (reprinted 2000).

California Department of Transportation (Caltrans), Standard Specifications, 2000.

Idriss, I.M., "Earthquake Ground Motions at Soft Soil Sites," Second International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, 1991

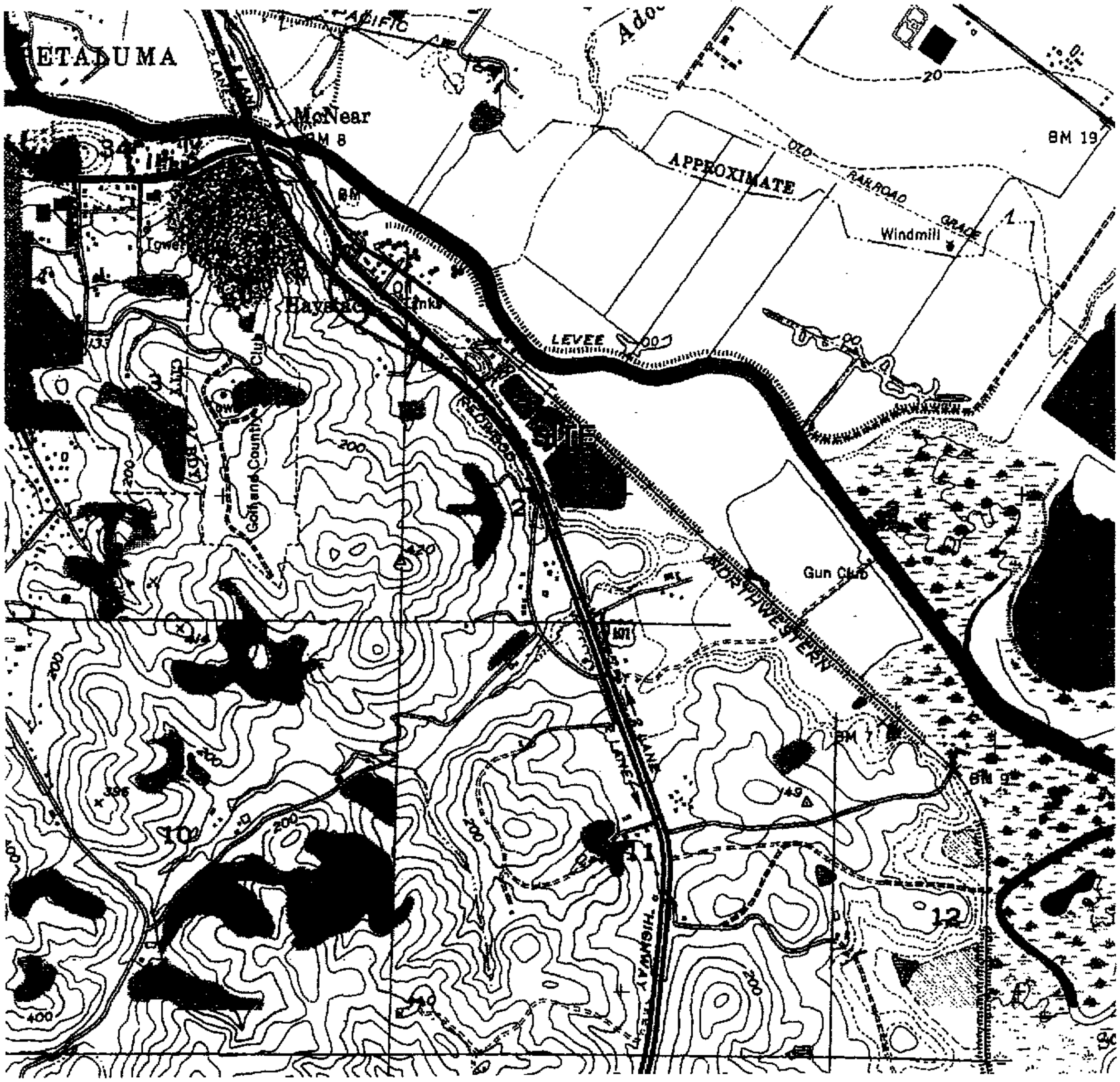
Uniform Building Code, 1997 Edition, International Conference of Building Officials, Whittier, California.

U.S. Geological Survey, "Database of Potential Sources for Earthquakes Larger than Magnitude 6 in Northern California," The Working Group on Northern California Earthquake Potential, Open File Report 96-705, 1996.

U.S. Geological Survey, "Earthquake Probabilities in the San Francisco Bay Region, 2000 to 2032 – A Summary of Finding," The Working Group on California Earthquake Probabilities, Open File Report 99-517.

U.S. Geological Survey web site. 04/02/2004. http://neic.usgs.gov/neis/epic/epic_circ.html.

Wesnousky, Stephen G., "Earthquakes, Quaternary Faults, and Seismic Hazards in California," Journal of Geophysical Research, Vol. 91, No. B12, pp. 12587-12631, 1986.



SITE LOCATION

SCALE

0 1000 2000 4000 FEET

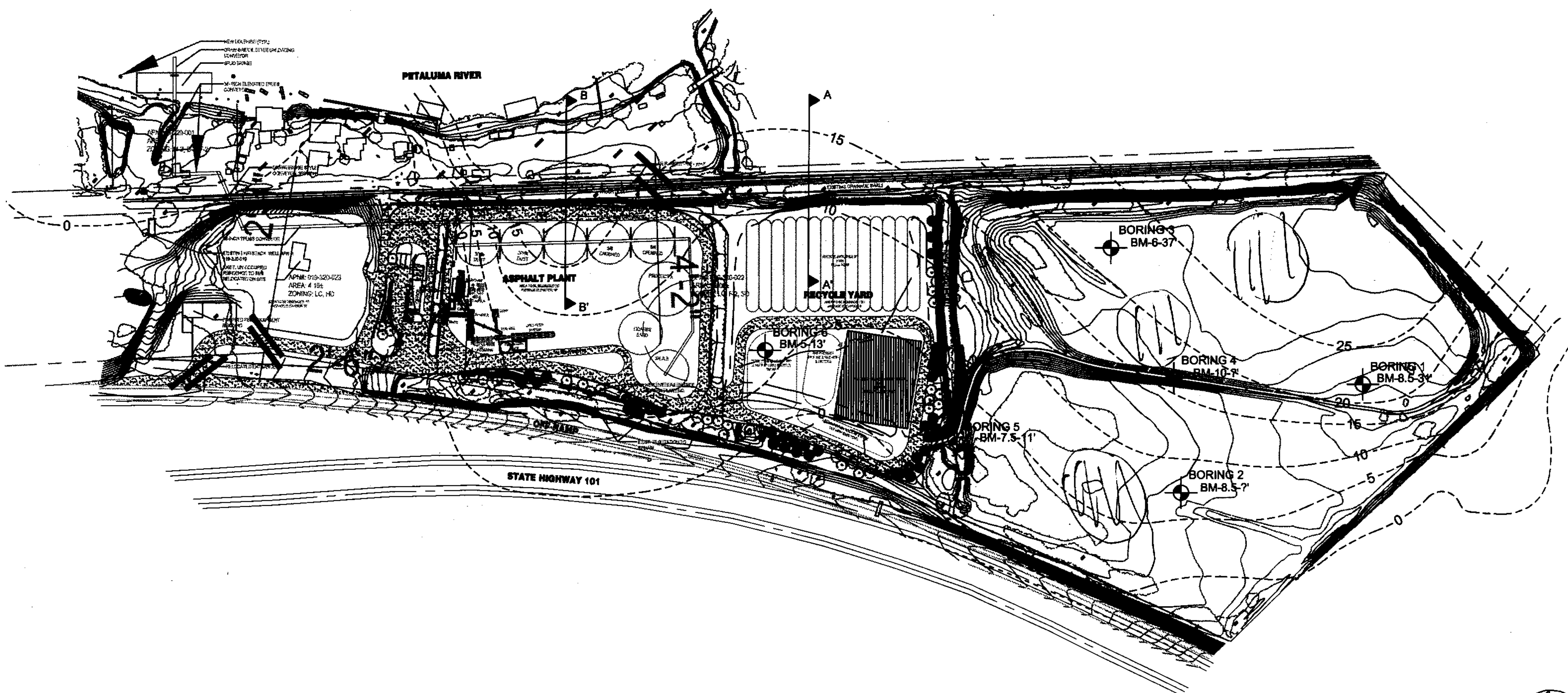
0 500 1000 METERS

NORTH

REFERENCE: DeLorme 3D TopoQuads, 1999

FILE: Site Map.dwg

Miller Pacific ENGINEERING GROUP	SITE LOCATION MAP Haystack Landing Wetlands Restoration Petaluma, California	1
Project No. 1139.01	Date 8/12/04 Approved By: [signature]	Figure



LEGEND

- BORING PERFORMED BY MPEG
- BAY MUD THICKNESS CONTOUR

REFERENCE: DCC ENGINEERING CO., INC
PROPOSED DEVELOPMENT PLAN, 2/20/04

FILE: 1139.01SP.dwg

Miller Pacific
ENGINEERING GROUP

SITE PLAN
Haystack Landing Wetlands Restoration
Petaluma, California

Figure 2

Project No. 1139.01 | Date 8/18/04 | Approved By: [signature]

APPENDIX A
SUBSURFACE EXPLORATION AND LABORATORY TESTING

1.0 Subsurface Exploration

We explored the subsurface conditions by drilling 12 soil borings utilizing a truck mounted drilling equipment with 6-inch hollow stem continuous flight augers on May 21 and 26, 2004. The locations of our borings are shown on Figure 2.

The soils encountered were logged and identified in general accordance with ASTM Standard D 2487, "Field Identification and Description of Soils (Visual-Manual Procedure)." This standard is briefly explained on Figures A-1 and A-2, Soil Classification Chart and Rock Classification Chart, respectively. The exploratory boring logs are presented on Figures A-3 to A-20.

We obtained “undisturbed” samples using a 3-inch diameter, split-barrel California sampler with 2.5 by 6-inch brass tube liners. The 2-inch Standard Penetration Test (SPT) split-barrel sampler was intermittently used to aid in soil property indexing and identification. The samplers were driven with a mechanical trip hammer. The number of blows required to drive the samplers 18 inches was recorded and is reported on the boring logs as blows per foot for the last 12 inches of driving. We also utilized a Shelby tube sampler to obtain less disturbed samples of Bay Mud. Shelby tubes are thin walled brass tubes 2.5-inches in diameter and 18-inches long that are slowly pressed into the Bay Mud under the hydraulic pressure of the drill rig. The samples obtained were examined in the field, sealed to prevent moisture loss, and transported to our laboratory.

2.0 Laboratory Testing

We conducted laboratory tests on selected intact samples to verify field identifications and to evaluate engineering properties. The following laboratory tests were conducted in accordance with the ASTM standard test method cited:

- Laboratory Compaction Characteristics of Soil Using Modified Effort, ASTM D-1557;
- Liquid Limit, Plastic Limit, and Plasticity Index of Soils, ASTM D 4318.
- Particle-Size Analysis of Soils, ASTM D 422; and
- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216;
- Density of Soil in Place by the Drive-Cylinder Method, ASTM D 2937; and

The moisture content and dry density test results are shown on the exploratory boring logs, Figures A-2 and A-20. The results of our plasticity testing are summarized on Figure A-21 and the compaction test results are on Figure A-22. Particle size (sieve) test results are summarized on Figure A-23.

The boring logs, description of soils encountered and the laboratory test data reflect conditions only at the location of the boring explorations and soil borings at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate and changes in surface and subsurface drainage.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		SYMBOL	DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW	Well-graded sands or gravely sands, little or no fines
		SP	Poorly-graded sands or gravely sands, little or no fines
	SAND with fines	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS		PT	Peat, muck, and other highly organic soils
ROCK			Undifferentiated as to type or composition

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

AL	ATTERBERG LIMITS TEST
SA	SIEVE ANALYSIS
HYD	HYDROMETER ANALYSIS
P200	PERCENT PASSING NO. 200 SIEVE
P4	PERCENT PASSING NO. 4 SIEVE

STRENGTH TESTS

TV	FIELD TORVANE (UNDRAINED SHEAR)
UC	LABORATORY UNCONFINED COMPRESSION
TXCU	CONSOLIDATED UNDRAINED TRIAXIAL
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL
	UC, CU, UU = 1/2 Deviator Stress

SAMPLER TYPE

UNDISTURBED CORE SAMPLE: MODIFIED CALIFORNIA OR HYDRAULIC PISTON SAMPLE

STANDARD PENETRATION TEST SAMPLE

X DISTURBED OR BULK SAMPLE

ROCK OR CORE SAMPLE

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in locations and with the passage of time. Lines defining interface between differing soil or rock description are approximate and may indicate a gradual transition.

FILE: 1139.01SE.dwg

Miller Pacific ENGINEERING GROUP

SOIL CLASSIFICATION CHART
Haystack Landing Wetlands Restoration
Petaluma, California

A-1

Project No. 1139.01 Date 8/18/04 Approved By: [signature] Figure

FRACTURING AND BEDDING

Fracture Classification	Spacing	Bedding Classification
Crushed	less than 3/4 inch	Laminated
Intensely fractured	3/4 to 2-1/2 inches	Very thinly bedded
Closely fractured	2-1/2 to 8 inches	Thinly bedded
Moderately fractured	8 to 24 inches	Medium bedded
Widely fractured	2 to 6 feet	Thickly bedded
Very widely fractured	greater than 6 feet	Very thickly bedded

HARDNESS

Low	Carved or gouged with a knife
Moderate	Easily scratched with a knife, friable
Hard	Difficult to scratch, knife scratch leaves dust trace
Very hard	Rock scratches metal

STRENGTH

Friable	Crumbles by rubbing with fingers
Weak	Crumbles under light hammer blows
Moderate	Indentations <1/8 inch with moderate blow with pick end of rock hammer
Strong	Withstands few heavy hammer blows, yields large fragments
Very strong	Withstands many heavy hammer blows, yields dust, small fragments

WEATHERING

Complete	Minerals decomposed to soil, but fabric and structure preserved
High	Rock decomposition, thorough discoloration, all fractures are extensively coated with clay, oxides or carbonates
Moderate	Fracture surfaces coated with weathering minerals, moderate or localized discoloration
Slight	A few stained fractures, slight discoloration, no mineral decomposition, no affect on cementation
Fresh	Rock unaffected by weathering, no change with depth, rings under hammer impact

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in other locations and with the passage of time.

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ROCK CLASSIFICATION CHART
Haystack Landing Wetlands Restoration
Petaluma, California

A-2

Project No. 1139.01 Date 8/18/04 Approved By: [signature]

Figure

BORING 1

EQUIPMENT: Mobile B-53 truck mounted drill rig with 6-inch hollow stem augers

DATE: May 21, 2004

ELEVATION: 21 feet

*REFERENCE: PCC Engineering

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0	0			SILTY SAND (SM) light brown, moist, medium dense, with occasional rootlets and coarse-grained sand lenses
		19	14.5	77					
					1				grades wet and loose
		5	18.9			5			
		4			2				grades red-brown, wet, with approx. 5 % bay mud mixed in with sand
		2/22"							
					3	10			BAY MUD (MH) blue-green-gray, wet, soft, high plasticity
					4				
					5	15			pushed rods to 31ft.
					6	20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

A-3

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

Figure

BORING 1 (CONTINUED)

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	
						20			BAY MUD (MH) blue-green-gray, wet, soft, high plasticity
					7				
						25			pushed rods to 31ft.
					8				
					9				
						30			
		50/3"	15.8				☒		CLAYEY SAND (SC) (ALLUVIUM) tan-brown, wet, very dense, with approx. 5% subrounded gravels (up to 0.5" in dimension)
					10				Bottom of boring at 31.5 ft. No groundwater reading taken due to boring cave-in
						35			
					11				
					12				
						40			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m³ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

A-4

Project No. 1139.01 | Date 08/12/04 | Approved By: [signature] | Figure

BORING 2

EQUIPMENT: Mobile B-53 truck mounted drill rig with 6-inch hollow stem augers

DATE: May 21, 2004

ELEVATION: 7 feet

*REFERENCE: PCC Engineering

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0	0			
		33							SANDY CLAY (CL) medium brown, moist, very stiff, low plasticity, with well graded sand and gravel (up to 1" in dimension)
		19	10.6	93	1				CLAYEY SAND (SC) with GRAVEL medium brown, wet, dense
		10	45.3	84		5			SANDY CLAY (CL) dark brown, very moist, medium stiff, medium plasticity, with approx. 30 % medium to coarse-grained sand
		14			2				dark red-brown, grades to wet, stiff, with approx. 20% gravel (up to 0.5" in dimension)
		9							BAY MUD (MH) gray with black inclusions, medium stiff, wet, high plasticity, with organic odor
					3	10			Bottom of boring at 9.5ft. No groundwater encountered during drilling
					4				
						15			
					5				
					6	20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

Figure A-5

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

BORING 3

EQUIPMENT: Mobile B-53 truck mounted drill rig with 6-inch hollow stem augers

DATE: May 21, 2004

ELEVATION: 21 feet

*REFERENCE: PCC Engineering

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0	0			WELL GRADED SAND (SW) red-brown, moist, loose, with silt
		8	52	66					
		4	73.2	54	1				
									SAND & CLAY (SW & CL/CH) dark brown and gray, wet, loose/soft, high plasticity clay, finely layered
						5			
		7	69.4	58					
					2				BAY MUD (MH) blue-green-gray, wet, soft, high plasticity
					3	10			
					4				
						15			pushed rods to 37ft.
					5				
					6	20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

A-6

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

Figure

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters / feet	SAMPLE	SYMBOL (3)	BORING 3 (CONTINUED)
					20			BAY MUD (MH) blue-green-gray, wet, soft, high plasticity
					7			
					25			
					8			pushed rods to 37ft.
					9			
					30			
					10			
					35			
					11			
		50/3"	21.1			☒		SANDY CLAY (CL) gray and red-brown, wet, very stiff, low to medium plasticity, with pockets of gray clayey sand
					12			Bottom of boring at 37.5 ft. No groundwater encountered during drilling
					40			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma , California

A-7

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

Figure

BORING 4

EQUIPMENT: Mobile B-53 truck mounted drill rig with 6-inch hollow stem augers

DATE: May 21, 2004

ELEVATION: 16 feet

*REFERENCE: PCC Engineering

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters / feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0 / 0			GRAVELLY CLAY (CL) with sand red-brown, black, white, moist, very stiff, low plasticity, with angular rock fragments (up to 1.5" in dimension)
		67	12.3	108				
					1			grades with less rock fragments
		30	18	85				
					5			grades mottled brown, stiff with sandstone rock fragments (>2.5" in dimension)
		17	11.9	106				
					2			grades dark brown, medium stiff, wet
		14						
		8			3 / 10			SANDY CLAY (CH) gray, wet, soft, high plasticity
								Bottom of boring at 10.5ft. No groundwater encountered during drilling
					4			
					15			
					5			
					6 / 20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3= 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

A-8

Project No. 1139.01 Date 08/12/04 Approved By: [signature] Figure

BORING 5

EQUIPMENT: Mobile B-53 truck mounted drill rig with 6-inch hollow stem augers

DATE: May 21, 2004

ELEVATION: 3 feet

*REFERENCE: PCC Engineering

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0	0			SANDY CLAY (CL) red-brown, moist, stiff, low plasticity, with approx. 20% subrounded to subangular rock fragments (up to 0.5" in dimension)
		29	17.8	90	1				
		39	13.3	119		5			
		36	17.7	101	2				grades green-brown
		16	39.2	78					BAY MUD (MH) gray and black, very moist, high plasticity, stiff, with organic odor
					3	10			
		36	29.2		4				SANDY CLAY (CL) (ALLUVIUM) light brown, moist, very stiff, low plasticity
		22				15			
		19			5				WEATH. ROCK (CLAYSTONE) / RESIDUAL SOIL? medium plasticity with relict rock texture
									Bottom of boring at 17.5ft. No groundwater encountered during drilling
					6	20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m³ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

A-9

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

Figure

BORING 6

EQUIPMENT: Mobile B-53 truck mounted drill rig with 6-inch hollow stem augers

DATE: May 21, 2004

ELEVATION: 6 feet

*REFERENCE: PCC Engineering

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0	0			SANDY SILT (ML) medium brown, very moist, soft, low plasticity, with approx. 20% fine to medium-grained sand
		5	54.8	60					
		3	73.2	42	1				SILTY SAND (SM) red-brown, very moist, loose
						5			BAY MUD (MH) gray and black, wet, soft, high plasticity
		1	140.8	35					
					2				
					3	10			
					4				SANDY CLAY (CL) gray and brown, moist, very stiff, medium plasticity, with subrounded sand (up to 1/8" in dimension)
						15			
		40			5				
									Bottom of boring at 16.5ft. No groundwater encountered during drilling
					6	20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: boringlogs(1-6).dwg

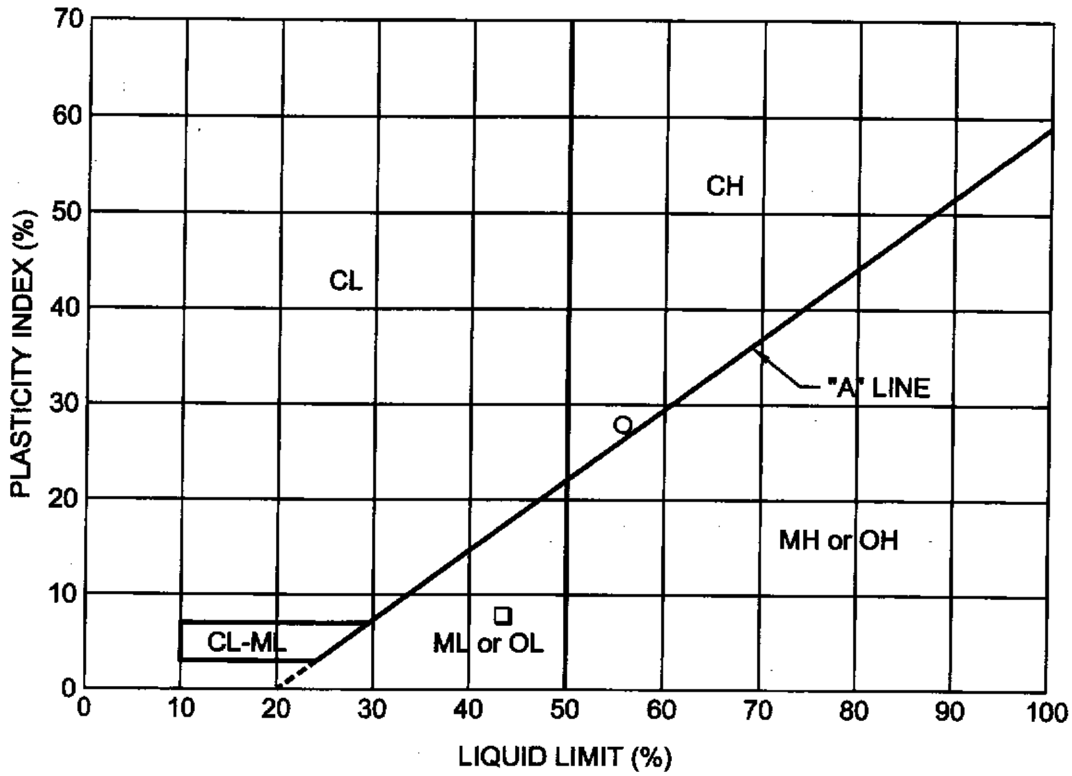
Miller Pacific ENGINEERING GROUP

BORING LOG
Haystack Landing Wetlands Restoration
Petaluma, California

A-10

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

Figure



SYMBOL	SAMPLE SOURCE	CLASSIFICATION	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)
❑	Borings 2 & 3 composite of 0 to 3 Feet	SANDY SILT (ML) light brown	43	36	7
○	Boring 4 composite of 2 & 4 Feet	CLAYEY SAND (CH) greenish-yellow	56	28	28

REFERENCE: Liquid Limit, Plastic Limit, and Plasticity Index of Soils, ASTM D 4318

FILE: Plasticity Index.dwg

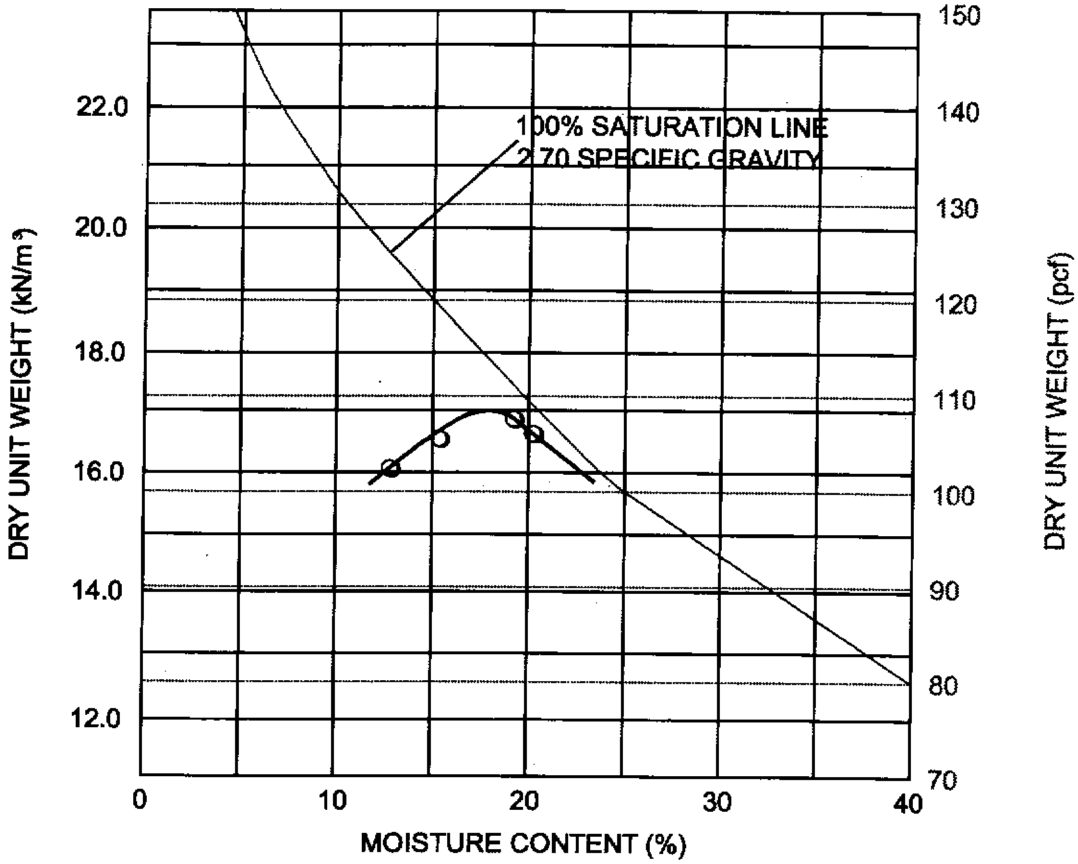
Miller Pacific ENGINEERING GROUP

PLASTICITY CHART
Haystack Landing Wetlands Restoration
Petaluma, California

A-11

Project No. 1139.01 Date 8/12/04 Approved By:

Figure



NOTE: pcf x 0.157 = kN/m³ (rounded to 3 significant figures)

SYMBOL	SAMPLE SOURCE	CLASSIFICATION	OPTIMUM MOISTURE CONT. (%)	MAXIMUM DRY UNIT WEIGHT (kN/m³)	(pcf)
O	BORINGS 2 & 3	SILTY SAND (SM) light brown	18	17.1	109

REFERENCE: ASTM D-1557

Miller Pacific ENGINEERING GROUP

COMPACTION TEST
Haystack Landing Wetlands Restoration
Petaluma, California

A-12

Project No. 1139.01 Date 08/12/04 Approved By: [signature]

Figure

Analytical Sciences
.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128
Fax (707) 769-8093

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 4061403
CLIENT'S PROJECT NAME: DUTRA Haystack
CLIENT'S PROJECT NUMBER: 1139.01

CLIENT INFORMATION

COMPANY NAME: Miller Pacific Engineers
ADDRESS: 165 N. Redwood Drive Suite 120
San Rafael, CA. 94903
CONTACT: Mike Morisoli
PHONE#: (415) 491-1338
FAX #: (415) 491-1831

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___ Y X N
GLOBAL ID:

COOLER TEMPERATURE Cool/RT °C
COC
PAGE 1 OF 1

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	Leachable Na / Cl-	TOTAL Cl + Sodium											COMMENTS	LAB SAMPLE #
1	Haystack #1	6/11/04		S	1	N	X	X												22900
2	Haystack #2	6/11/04		S	1	N	X	X												22901
3	Haystack #3	6/11/04		S	1	N	X	X												22902
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				

SIGNATURES

SAMPLED BY:

RELINQUISHED BY: [signature]
SIGNATURE — DATE 6-14-04 — TIME 1:20 pm

RECEIVED BY LABORATORY: Mark A. Valentini
SIGNATURE — 6/14/04 — 1:20pm

Appendix C – Preliminary hydrologic evaluation of wetland restoration feasibility at Haystack Landing, Petaluma, California

Preliminary Hydrologic Evaluation of Wetland Restoration Feasibility at Haystack Landing, Petaluma, California

Prepared for:

Lucy Macmillan

Prepared by:

Mark Woyshner

Gustavo Porras

Bonnie Mallory

Barry Hecht

Balance Hydrologics, Inc.

October 2004

A report prepared for:

Lucy Macmillan
28 Bernard Street, Suite 4
Mill Valley, California, 94941

Preliminary Hydrologic Evaluation of Wetland Restoration Potential at Haystack Landing, Petaluma, California

Balance Project Assignment 204012

by

Mark Woyshner
Senior Hydrologist / Hydrogeologist

Gustavo Porras
Hydrologist / Geologist

Bonnie Mallory
Water Quality Specialist

Barry Hecht, CEG 1245; CHg 50
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October 18, 2004

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1. INTRODUCTION

1.1 Background and Purpose

This study presents the results of our preliminary evaluation for restoration of brackish (oligohaline) marsh habitat at the former quarry fines disposal site in the southern part of the Haystack Landing parcel in the City of Petaluma, Sonoma County, California (Figure 1).

The project proponent wishes to restore approximately 11 acres of tidal wetlands, plus fringe buffers of brackish and freshwater wetlands at locations where water enters from adjoining uplands. Target habitat types include pickleweed (*Salicornia virginica*) dominated communities and upland refuge areas for the salt marsh harvest mouse. If feasible, restoration of a more diverse marsh which also includes stands of Pacific cordgrass (*Spartina foliosa*) and low marsh habitat suited for clapper-rail foraging will be pursued. Restoration of these habitat types and their long-term sustainability is dependent on the presence and/or creation of specific tidal and salinity regimes.

This evaluation is intended to identify the nature of existing tidal circulation at the site such that more specific restoration opportunities and constraints can be evaluated during a later phase of the project. It presents the results of field monitoring and related hydrologic analyses, and literature review to generate the necessary background data. Recommendations on how to proceed with the proposed tidal wetland restoration project are put forth in Section 3.0 of this report.

1.2 Location and Description

Haystack Landing is located at 3355 Petaluma Boulevard South in the southeast corner of the City of Petaluma (Figure 1). The 37-acre site is about 5 times longer than it is wide and extends southeast to northwest, bordered by Highway 101 on the southwest and the Northwestern Pacific Railroad (NWPRR) on the northwest, both of which extend the full length of the project site. Beyond the tracks to the east are private parcels fronting a tidal and brackish reach of the Petaluma River. Agricultural , rangeland and open space abut the southern portion of the site and wrap around the east and west sides, interrupted by Highway 101 and the railroad tracks.

Land use history at Haystack Landing is described in the Wetland Delineation report (Macmillan, 2003). The site supported a dairy operation until 1968, when it was purchased for use as a sediment collection and disposal area for aggregate wash water from the quarry located west of Highway 101. Various dikes and siltation ponds were constructed on the site for this purpose, which continued until about 1990. During this period, drainage activities and deposition of fine-grained material altered the hydrology of the site.

Wetland restoration is currently proposed on the southern portion of the site. A number of outbuildings and storage facilities formerly occupied the 4-acre northern section of the site but have recently been demolished or removed. The 33-acre southern section where tidal marsh restoration is planned will remain as open space.

1.3 Existing Wetlands

The deposition of quarry fines on former historic histosols and likely wetlands appears to have raised topographic elevations and hydrologic controls for the existing tidal channel network. Approximately 11.69 acres of jurisdictional wetlands have been delineated on the project site as confirmed by the U.S. Army Corps of Engineers on November 7, 2003 (Corps file No. 28104N). Many of these wetlands are located within the former siltation ponds and drainage ditches that were constructed as part of the industrial operations. Some of the existing wetlands (notably DD1 and DD2, see Figure 2) are part of the tidal channel network[1]. Water levels in these wetlands rise and fall in response to tidal fluctuations. During the wet season, salinities in these wetlands are likely lower from lower salinities in the Petaluma River, from local rainfall and runoff to the wetlands from upland areas, and temporary flow exchange with other on-site wetlands. Hydrologic conditions of non-tidal wetlands on-site appear to function directly by rainfall and/or stormwater runoff from non-tidal uplands.

1.4 Local Climate Characteristics

The Haystack Landing project site has climate characteristics similar to other locations on the plains surrounding the northwest corner of San Pablo Bay. In general, the site is located in the Mediterranean climate zone typical of coastal, central California. This climate zone is characterized by cool, wet winters and hot, dry summers tempered, in this case by proximity to San Pablo Bay and by the occurrence of occasional coastal fog, especially in late spring and summer. The windiest months are May and June, when turbidities in the Bay and Petaluma Creek can frequently persist at levels of 200 to 500 nephelometric turbidity units (NTUs).

---

[1] Wetland DD3 drains to an off-site pond located to the southeast of the project site (Macmillan, 2003). The main slough that accesses DD1 and DD2 via the channel southwest along the railroad tracks also flows to this off-site pond.

Situated in the 'rain shadow' of coastal mountains, the project site receives a mean annual precipitation of approximately 22 inches (Rantz, 1971). The average rainfall value is the statistical mean of rainfall totals that show a wide range of values strongly influenced by global weather patterns, such as the El Nino Southern Oscillation and prolonged periods of drought. The location of the site north and east of Bolinas and Big Rock Ridges, Mount Burdell and Chileno Valley hills, and west of the Sonoma Mountains strongly influences event totals.

1.5 Work Conducted and Methods

Staff from Balance Hydrologics, Inc. (Balance) initially walked the site on January 21, 2004 with Lucy Macmillan (independent wetlands consultant) and Sarah Lynch (Monk & Associates). About eleven inches of rain had fallen for the season and surface water had ponded on the site at several locations beyond the dry-season tidal circulation observed later that year. Sites with water that had dried later in the season included "Drainage Ditch #6" (DD6) and "Seasonal Wetlands B and I" (WB and WI), both delineated as jurisdictional wetlands under Clean Water Act (CWA) Section 404 (Macmillan, 2003). DD6 drains to DD1; WI drains to DD2 and then to the channel along the NWPRR tracks (also jurisdictional wetlands but off site); and WB drains to the NWPRR tracks channel beyond the confluence of DD2 (see Figure 2). From its mouth at the Petaluma River, tides convey flow through a short slough and a culvert under the NWPRR tracks to the project site in DD1 and DD2. Field observations indicate that the culvert is the only means through which tidal flows can access the project site, as well as drain storm flows. We measured specific conductance (a proxy for salinity) and temperature across the site with a field meter. Specific conductance ranged from 4 mmhos per centimeter at 25 degrees Celsius (mmhos/cm @ 25°C) at WB, to 15 mmhos/cm @ 25°C at WI.[2] All measurements and observations from this and subsequent visits are tabulated by date and time in the 'observers log' (Appendix A).

On May 7, 2004, following review of previous reports (LSA Associates, Inc., 1990), the project wetland delineation (Macmillan, 2003), and topographic mapping, we visited the site to select and install monitoring stations. During the site visit, we focused on hydrologic characteristics of existing wetlands, identification of tidal connections, flow response to tidal fluctuations in on- and off-site sloughs, and high water marks from recent high tides. Three monitoring stations at which to install continuous-monitoring equipment were selected based on their respective locations within the tidal network (Figure 2).

[2] For comparison, the specific conductance of sea water is usually given as approximately 53 mmhos/cm@25°C, equal to 53,000 µmhos/cm@25°C (c.f., Hem, 1985).

- **Station #1** is located beneath a privately owned bridge at the mouth of the main slough through which tidal waters flow onto and off the Haystack Landing wetland restoration site (Figure 10). The mouth of the slough is located on the right bank of the Petaluma River approximately 10 miles upstream of San Pablo Bay, Highway 37 and Black Point (Figure 1).

- **Station #2** is located on the main slough about 250 feet upstream of Station #1 at the upstream end of the culvert beneath the NWPRR tracks (Figure 11). It is at the confluence of three channels: channel DD1 which accesses the project site, and channels to the east and west along the railroad tracks. The channel extending to the east along the tracks is longer and drains jurisdictional areas DD2 and WB, and drains most of the wetland restoration area. It also conveys water to and from an off-site pond east of WB.

- **Station #3** is located on-site approximately 730 feet upstream of Station #2 in channel DD2 (Figure 12).

At each station, we installed a Campbell Scientific CR10X datalogger equipped with probes to monitor the water level (stage), specific conductance and temperature at 6-minute intervals. We installed a staff plate at each station to manually measure the stage and calibrate the continuous record downloaded from the datalogger. During a subsequent site visit we surveyed the staff plates to a benchmark elevation (NGVD [3]) identified on the site topographic map. We also calibrated the specific conductance and temperature records to field measurements conducted with a portable meter that was previously calibrated to laboratory standards.

Water levels, specific conductance and temperature were recorded by the dataloggers from May 7 to July 26, 2004. During this time period we visited the gages several times to download data and take manual readings for calibrating the continuous record. Wet-season ponding progressively diminished into the summer, leaving only DD1 and DD2 with tidally inundated water. Two complete 28-day tidal cycles were monitored, including the highest tides of the dry season. On July 26, 2004, we removed the monitoring equipment but left the staff plates in place in the event that additional monitoring is warranted. We processed the raw datalogger data and converted the stage record to elevations based on survey data. Based on errors inherent in calibrating wind-blown water data and in conducting the surveys, we estimate that the accuracy of the water-surface elevation values presented in this report are within +/- 0.05 feet.

[3] All elevations cited in this report are given in the National Geodetic Vertical Datum of 1929 (NGVD) unless otherwise noted.

Data were further reduced to present statistical elevations of key tidal metrics – mean higher high water (MHHW) and mean high water (MHW) -- calculated over a representative 28-day cycle during the monitoring period, June 10 through July 7, 2004, as well as the frequency of inundation at these target elevations. A frequency of inundation from 18 and 5 percent at MHW and MHHW elevations, respectively, are standard criteria to support pickleweed habitat.

1.6 Existing Gages on the Petaluma River

The locations of gages used in planning the Haystack Landing wetland restoration on the Petaluma River are shown on Figure 1. The closest active gage is the Petaluma River at D Street Bridge (Station PTB), maintained by the City of Petaluma and California Department of Water Resources. We used the record for this long-term station to compare to water levels monitored on site. Water level monitoring at the three National Ocean Service tidal stations[4] shown in Figure 1 have been discontinued, and datum elevations are maintained using correlations to San Francisco Golden Gate gage.

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[4] A division of National Oceanic and Atmospheric Administration.

2. HYDROLOGIC FINDINGS

Results of our monitoring program are presented graphically in Figures 3 through 9. Table 1 presents statistical elevations of tidal crests and other key metrics at each monitoring station, and Table 2 presents the frequency of inundation. Field measurements and observations are included in Appendix A.

2.1 Tidal Elevations at Haystack Landing and Petaluma River

Water-level elevations at the three monitoring stations on Haystack Landing wetlands restoration site and in the Petaluma River are presented in Figure 3, 4 and 5. Figure 3 shows the tidal record for the three stations during the entire monitoring period, from May 7 to July 26, 2004, and Figure 4 shows the tidal record during the same period at the Petaluma River at the D Street Bridge station, located approximately two miles up river. We selected the consecutive 28-day period with the highest seasonal tidal peaks – from June 10 through July 7 – to calculate the Mean High Water (MHW) and Mean Higher High Water (MHHW), and percent time of tidal inundation. The tidal elevation statistics are presented for each station in Table 1.

The tidal peaks are more muted at Stations #2 and #3 on-site (showing lower peaks) than at Station #1 at the mouth of the slough (Figure 3). This difference is detailed in the 48-hour plot of the highest tides of the season, July 2 to 4 (Figure 5) – illustrating muted and delayed peaks at Stations #2 and #3. We attribute this response to clogging of the old wooden box culvert beneath NWPRR tracks by sediment, aquatic growth and floating debris. During a site visit at low tide when the channel was nearly drained, we observed accumulated mud in the lower portion of the culvert and considerable growth of barnacle-like marine life on the insides the culvert (see photo Figure 11). The growth also appears to obstruct floating debris. The rising tide clearly backed up downstream of the culvert and drained upstream water at the latter portion of the downstream receding tide.

The lower low water (LLW) elevation of each day are not present on site because the channel elevations are higher than the elevation of the tidal low water, and appear truncated in the water level record. For example, at the lowest tides of each day, the bed is exposed at the mouth of the slough immediately downstream of Station #1 with only a trickle flowing out to the Petaluma River, which is at an even lower level. In the record at Station #1 the LLW elevations are at the same level each day (Figure 3), as they also are at Station #2, as would be expected. At Station #3 in DD2, both low tide elevations (the lower low water and the low water) are truncated. Truncation for Station #3 is at a much higher elevation because the bed elevation is higher, well above the low tides. The truncated record from the Petaluma River D Street gage seems to be due to instrumentation placement rather than bed elevation; the sensor appears not to be placed at bed level.

2.2 Height-Duration Relationships

Exceedance plots are used to evaluate the hydrologic performance of sloughs and tidal marshes. These curves show the percent of time that a given water elevation is equaled or exceeded, and demonstrate tidal heights and circulation patters. The success and long-term sustainability of tidal marsh plant and animal communities are strongly influenced by tidal elevations, thus, mitigation plans typically prescribe the percent of time at which particular elevations should be inundated, depending on habitat goals. As an example, optimal elevations for pickleweed colonization range between MHW and MHHW. To create a diverse tidal marsh community with upland refuge zones and deeper water, one might grade the portions of site such that there is a range of elevations. In such a system, given current conditions, the area planned for pickleweed habitat would be at an elevation ranging between MHW and MHHW. Based on the data we collected at stations #2 and #3, we would expect these elevations to be inundated about 18 to 6 percent of the time.

Table 2 and Figure 6 show the duration of inundation at all four stations during the seasonal high-tide monitoring index period of June 10 through July 7, 2004. At Stations #2 and #3, the range of elevations between MHW and MHHW is inundated 18 to 6 percent of the time. In contrast, the MHW to MHHW elevation range at Station #1 is inundated only 13 to 5 percent of the time. After repairing the flow-constraining culvert, inundation frequencies on site should resemble Station #1. These statistics describing existing conditions – or existing conditions with only culvert repair -- will be especially useful during development of more detailed plans and grading specifications.

2.3 Specific Conductance

We measured specific conductance (a proxy for salinity) across the site on our January 21, 2004 initial site visit, and field values ranged from 4 mmhos per centimeter at 25 degrees Celsius (mmhos/cm @ 25C) at WB, to 15 mmhos/cm @ 25C at WI (see Appendix A for details). Tidally influenced wetland DD1 was 5.6 mmhos/cm @ 25C, and DD2 was 6.9 mmhos/cm @ 25C. As the dry season progressed, specific conductance of the tidal waters entering the site from the Petaluma River increased as increasing proportions of sea water advanced upstream from San Pablo Bay. Specific conductance increased at Station #1 (at the mouth of the slough) from about

18 mmhos/cm @ 25C in early June to about 37 mmhos/cm @ 25C by late July (Figure 7). A similar trend was observed on site at Station #2 and #3 (Figures 8 and 9).

3. CONCLUSIONS AND RECOMMENDATIONS

All tidal drainage at Haystack Landing appears to flow through a single slough system. Balance staff established two monitoring stations in this channel network within the boundaries of the Haystack Landing project site, as well as one station immediately off-site, at the mouth of the tidal slough. At each station we monitored water level, water temperature and specific conductance (a proxy for salinity) during a nearly three-month observation period (from May 7 through July 26, 2004) including two complete 28-day tidal cycles and the highest tides of the dry season. Tidal circulation on the project site is muted by the partially blocked culvert under the Northwestern Pacific Railroad that forms the project's eastern border. Replacement of the partially blocked culvert would allow sufficient tidal flows to enter the site, thus creating one of the essential conditions necessary to restore tidal wetlands. We recommend culvert replacement as part of the mitigation plan.

The site shows excellent hydrologic potential to support a diverse tidal marsh community with long-term sustainability. The timing, capacity and logistics related to replacement of the NWPRR culvert may guide restoration decisions, and should precede development of grading plans for wetland restoration and creation. Similarly, assessment of water quality and the physical and chemical properties of the deposited sediment – to be considered in a subsequent phase -- will also shape the feasibility of restoration. We look forward to discussing with the ecological team the attributes which enhance the distribution of pickleweed or other tidal wetland types.

4. LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice for initial evaluation of such sites in northern California for projects of similar scale at the time the investigations were performed. No other warranties, expressed or implied, are made.

As is customary, we note that readers should recognize that the interpretation and evaluation of factors affecting the hydrologic context of any site is a difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive or extended studies can reduce the inherent uncertainties, but may delay implementation of the project.

We have used standard environmental information -- such as wetland and topographic mapping -- in our analyses and approaches without verification or modification, in conformance with local custom. New information or changes in regulatory guidance could influence the plans or recommendations, perhaps fundamentally. As updated information becomes available, the interpretations and recommendations contained in this report may warrant change. Further assessment of the properties of sediments at the site will also be needed.

Concepts, findings, interpretations and recommendations contained in this report are intended for the exclusive use of our client under the conditions presently prevailing at Haystack Landing. Their use beyond the boundaries of the site could lead to environmental or structural damage, and/or to noncompliance with water-quality policies, regulations or permits.

Finally, we ask once again that readers who have additional pertinent information, who observed changed conditions, or who may note material errors should contact us with their findings or concerns at the earliest possible date, so that timely changes may be made.

5. REFERENCES

Baye, P.R., Faber, P.M., Grewell, B., 2000, Tidal marsh plants of the San Francisco Estuary: in Goals--Project 2000, Baylands ecosystem species and community profiles: Life histories and environmental requirements of key plants, fish and wildlife, prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project, Olofson, P.R. (Ed.), San Francisco Bay Regional Water Quality Control Board, Oakland California, p. 9-33.

Hem, J.D.,1985, Study and interpretation of the chemical characteristics of natural water: U.S. Geol. Survey Water-Supply Paper 2254, 3rd ed. , 264 p.

LSA Associates, Inc., 1995, Determination of Corps jurisdictional area, Haystack Landing, Petaluma: Consulting report prepared for Haystack Landing Associates (included as appendix to Macmillan, 2003), 13 p. + appendices.

Macmillan, L., 2003, Clean Water Act jurisdictional wetlands assessment, Haystack Landing project site, Petaluma, Sonoma County, California: Consulting report prepared for Pagliaio Ventures, LLC, submitted to U.S. Army Corps of Engineers, 10 p. + appendices.

Pacific Aerial Surveys, Marsh 1, 1958, black and white aerial photo of site, scale 1:2400

Rantz, S.E., 1971, Precipitation depth-duration frequency relations for the San Francisco Bay region, California. Menlo Park: U.S. Geological Survey Map MF-613 plus 24 p. pamphlet.

Steven J. Lafranchi & Associates, March 9, 2004, Site constraints exhibit: Topographic survey map prepared for Dutra-Haystack Landing asphalt and recycling facility, Petaluma Boulevard South, APN 019-320-022, 023, Petaluma, California, sheet 1, scale 1"=140'

Table 1. Tidal elevation statistics at Haystack Landing wetland restoration site and Petaluma River, Petaluma, CA

	Petaluma River at D Street Bridge [1] (feet, NGVD)	Haystack Station #1: Mouth of slough at bridge (feet, NGVD)	Haystack Station #2: Slough above train tracks (feet, NGVD)	Haystack Station #3: Jurisdictional area DD2 (feet, NGVD)
Mean Higher High Water (MHHW)	5.11	4.16	3.47	3.41
Mean High Water (MHW)	4.44	3.49	3.06	---
Mean Low Water (MLW)	---	-1.86	-1.16	---
Mean Lower Low Water (MLLW)	---	---	---	---

Notes:

1. California Department of Water Resources Petaluma River At D Street Bridge (PTB) station is operated by the City of Petaluma. The data are reported in feet above the 1929 National Geodetic Vertical Datum (NGVD) and recorded at variable intervals. Some high water levels conceivably may have occurred between long time-interval readings.

2. Haystack Landing statistics were based on a continuous water-level monitoring record from June 10 through July 7, 2004.

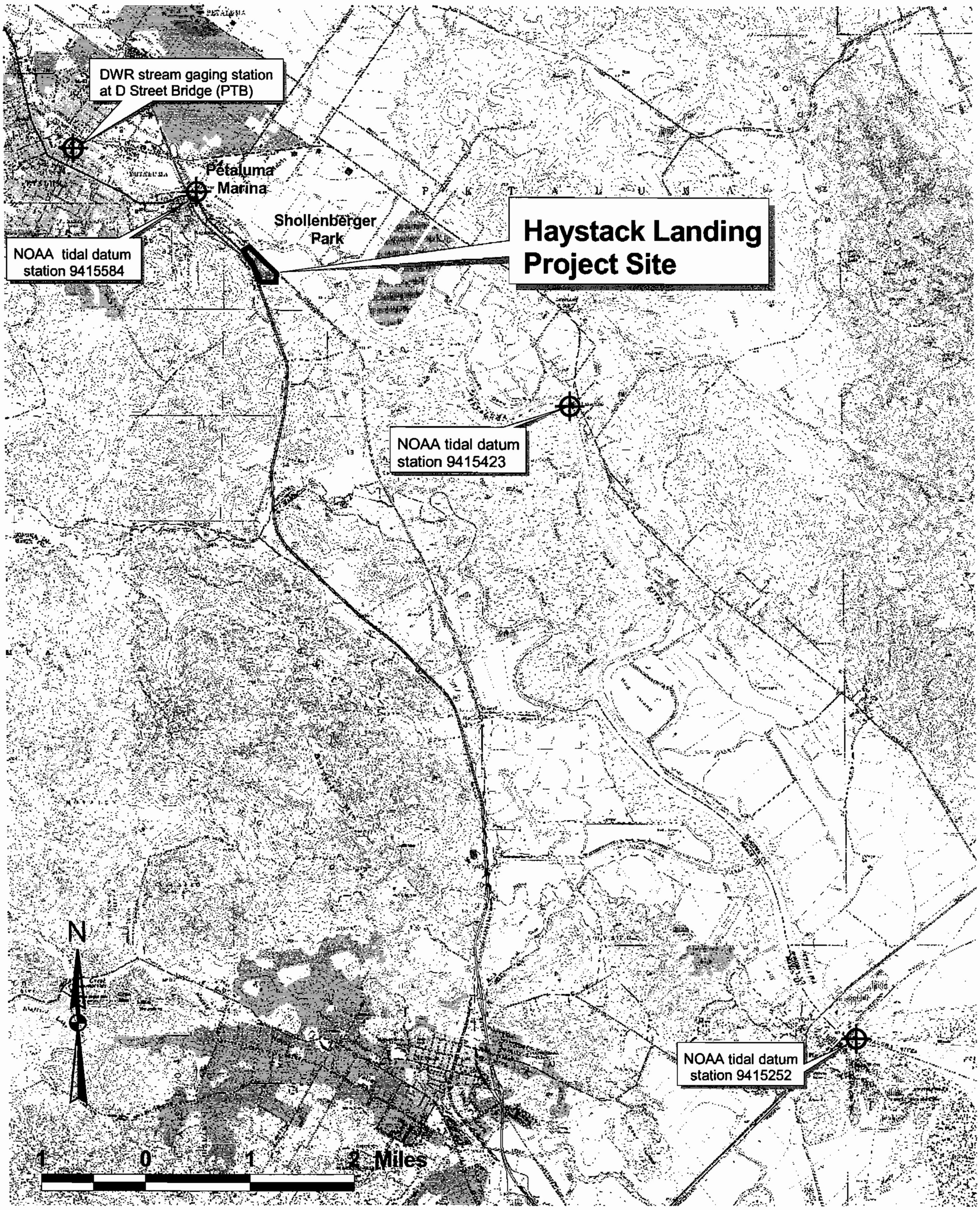
3. Tidal statistics were not calculated where channel elevations were above tide levels. For example, the elevation of the lower low water (LLW) trough for each day was not recorded at the monitoring stations because the channel elevations were higher than the LLW elevations which truncated the record.

Table 2. Tidal peaks and percent of time exceeded at Haystack Landing wetland restoration site, Petaluma, CA

Station Location	Elevation range from MHW to MHHW[1] *(feet, NGVD)*	Percent of time exceeded
Petaluma River at D Street Bridge[2]	4.44 to 5.11	9 to 4%
Haystack Landing[3]		
Mouth of slough at bridge	3.49 to 4.16	13 to 5%
Slough above train tracks culvert	3.06 to 3.47	18 to 7%
Jurisdictional area DD2[4]	3.41	6%

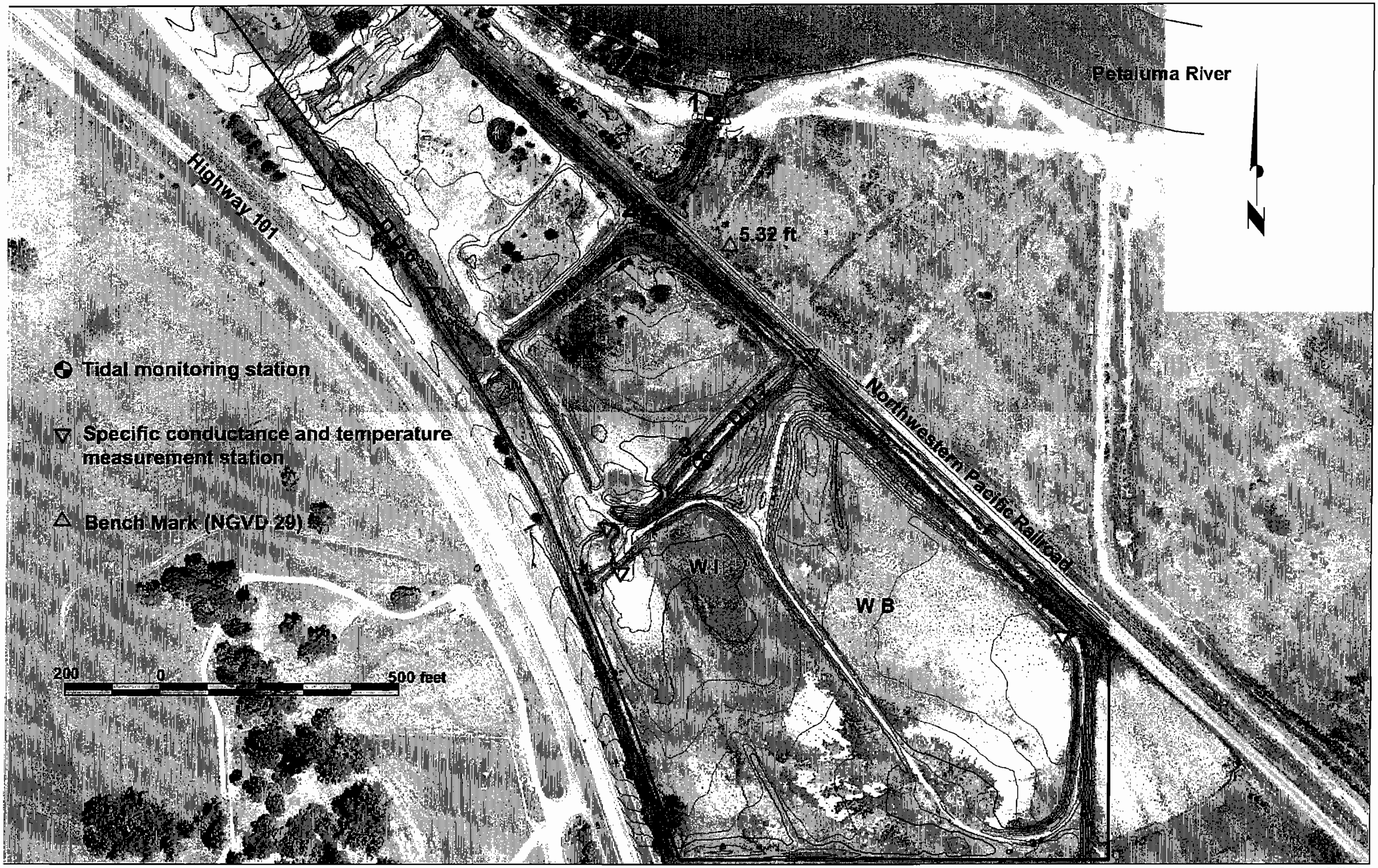
Notes:

1. Elevation range of interest for pickleweed is Mean High Water (MHW) to Mean Higher High Water (MHHW) having a inudation range from 18 to 5 percent.
2. California Department of Water Resources Petaluma River At D Street Bridge (PTB) station is operated by the City of Petaluma. The data are reported in feet above the 1929 National Geodetic Vertical Datum (NGVD) and recorded at variable intervals. Some high water levels conceivably may have occurred between long time-interval readings.
3. Haystack Landing statistics were based on a continuous water-level monitoring record from June 10 through July 7, 2004.
4. Channel elevation of jurisdictional area DD2 is above the Mean High Water (MHW) tide and thus cannot be calculated.



Balance

Figure 1. Location map of Haystack Landing project site, tidal datum and stream gaging stations



Source of map and aerial photo: Steven J. Lafranchi & Associates, Inc. Civil Engineers-Land Surveyors, Petaluma California

Figure 2. Existing site plan and locations of monitoring stations, Haystack Landing, Petaluma, California.

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204012 Loc Map.dwg

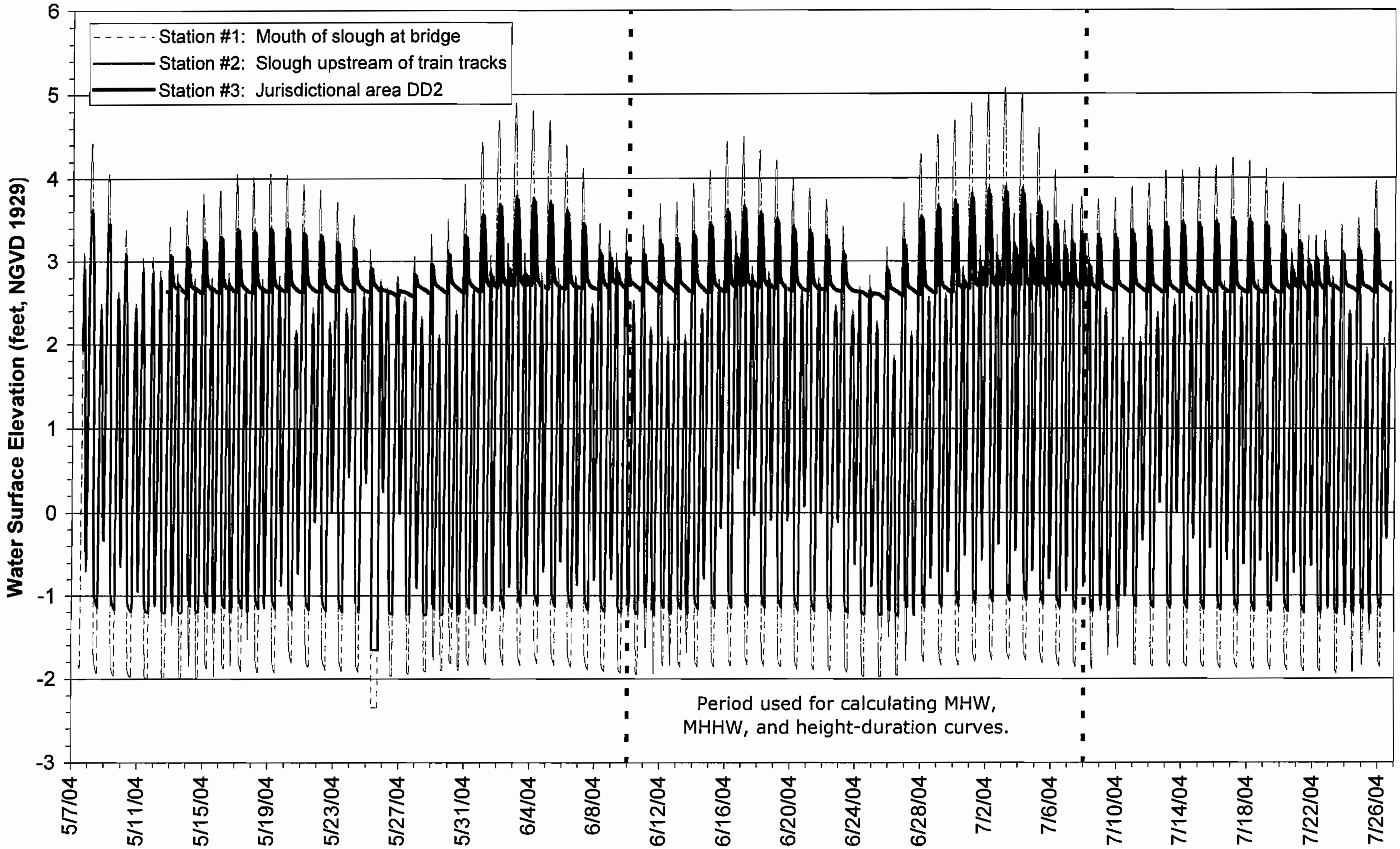

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Figure 3. Water surface elevations at tidal monitoring stations installed on the Haystack Landing wetland restoration site, May 7 to July 26, 2004, Petaluma, CA.
Mean High Water (MHW) and Mean Higher High Water (MHHW) elevations were calculated for each station using the seasonally highest peaks during a 28 day period (June 10 through July 7).

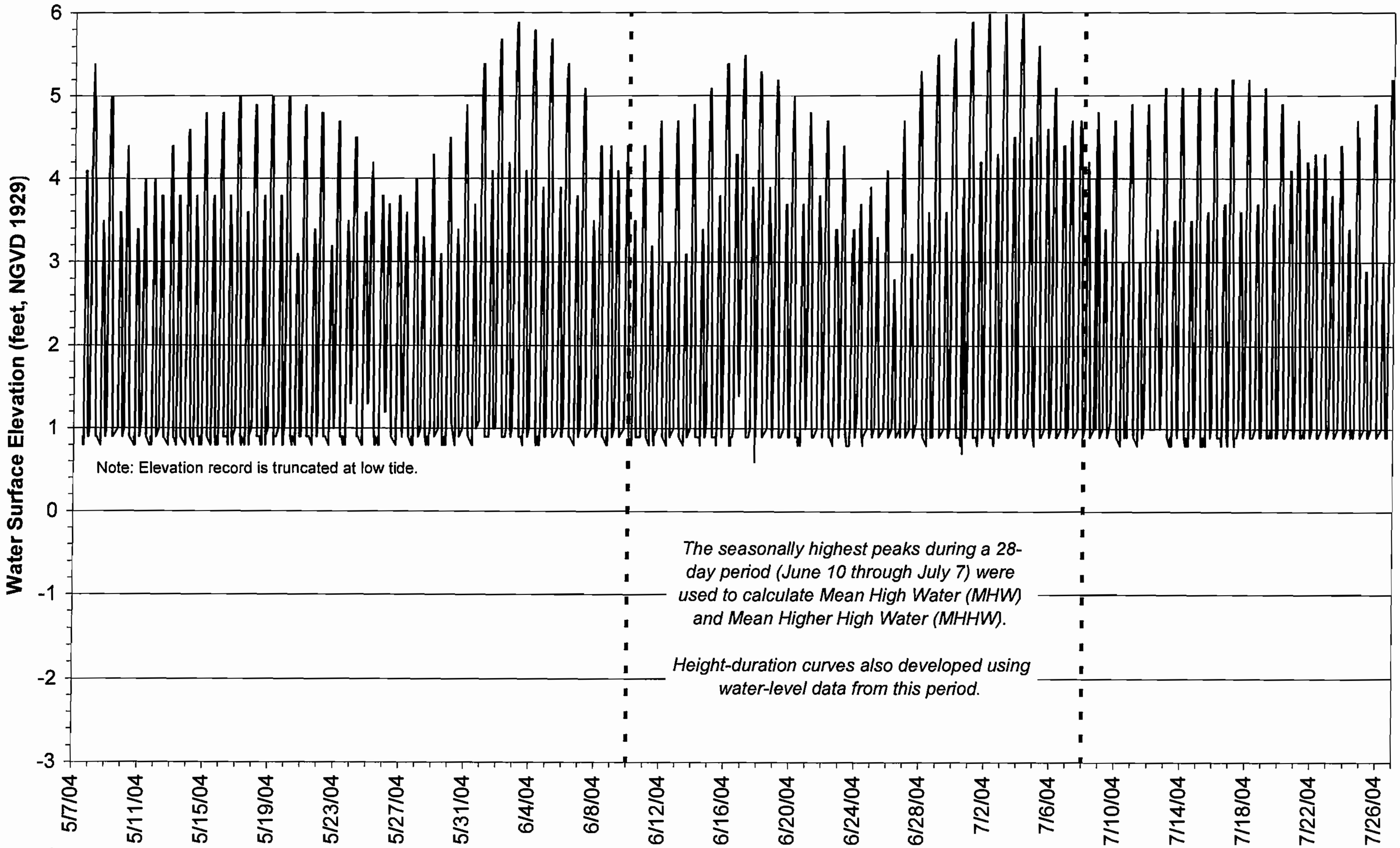

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Figure 4. Petaluma River water surface elevations at the D Street Bridge gaging station during tidal monitoring on the Haystack Landing wetland restoration site, May 7 to July 26, 2004, Petaluma, CA.
Data source: California Department of Water Resources gaging station PTB.

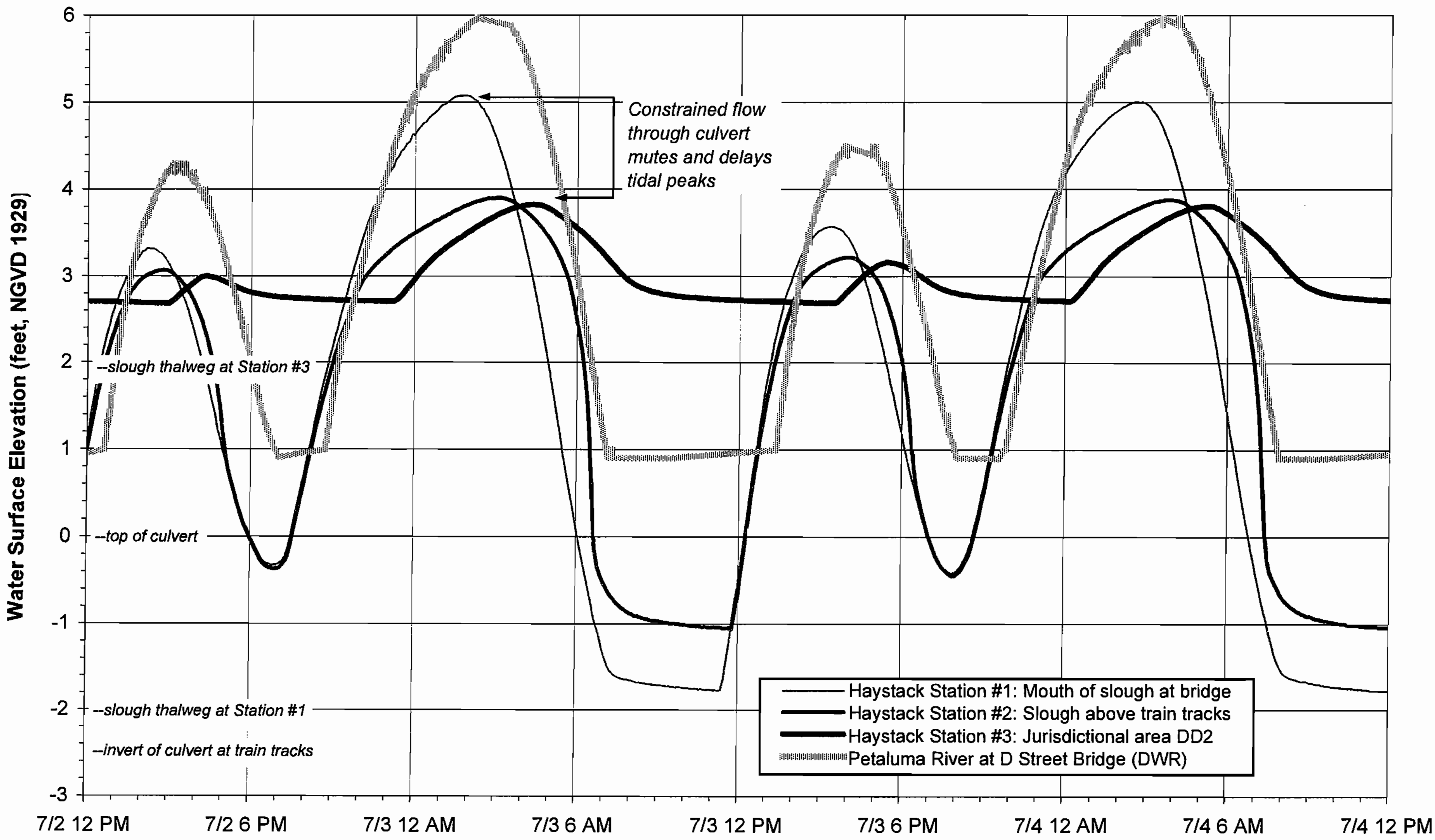

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Figure 5. Elevation of the Petaluma River and tidal drainages at Haystack Landing wetland restoration site during the highest seasonal tides, July 2 to 4, 2004, Petaluma, CA. The clogged culvert beneath the train tracks constrains tidal circulation onto the restoration site west of the tracks, as evidenced by the broad lower peaks at Stations #2 and #3, delaying filling and draining.

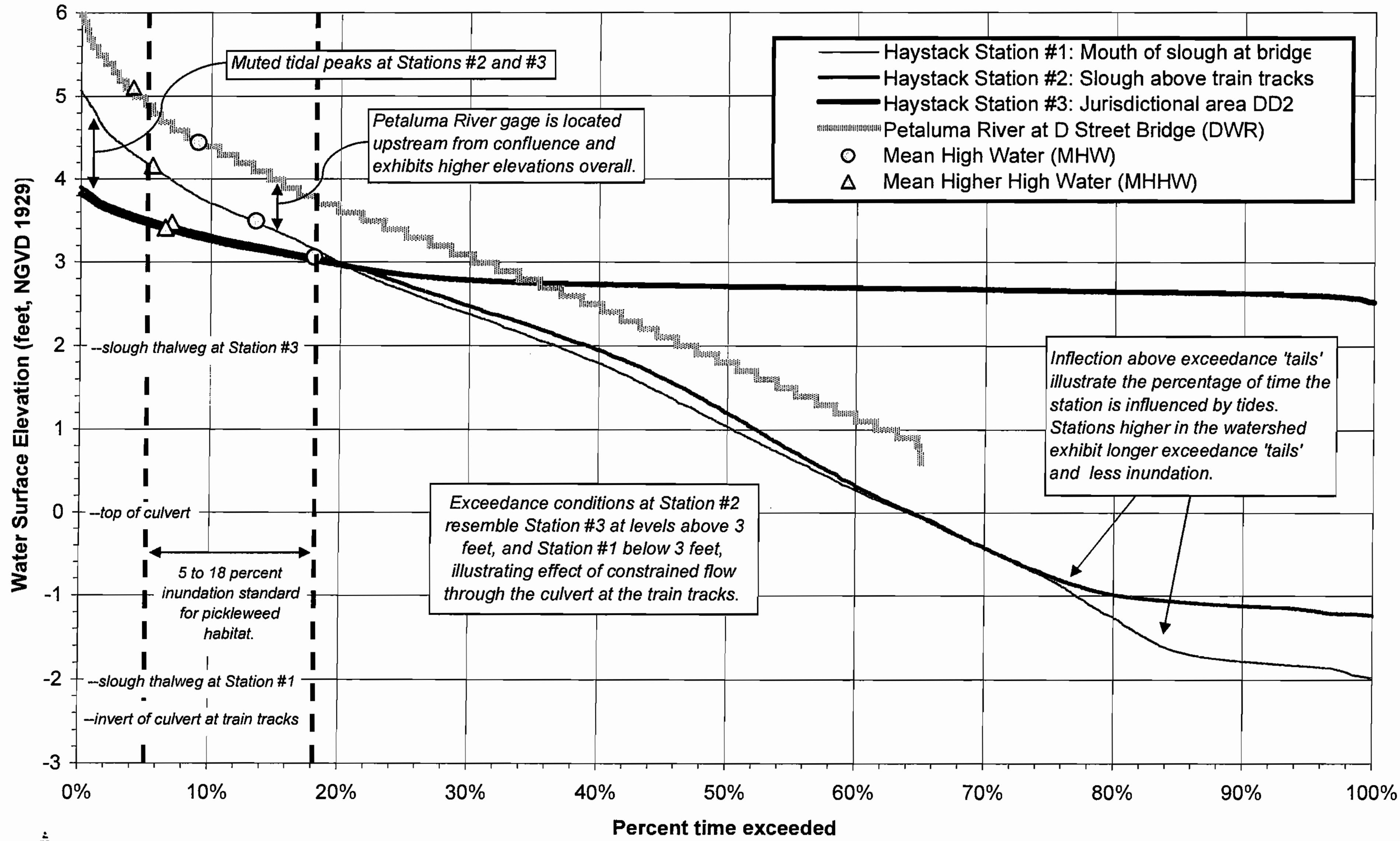

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Figure 6. Height-duration curves for the Petaluma River and gaging stations on Haystack Landing wetland restoration site, June 10 to July 7, 2004, Petaluma, CA.
Mean tidal peaks (MHW and MHHW elevations) are plotted on each station curve to illustrate exceedance ranges and characterize hydrologic conditions for each channel.

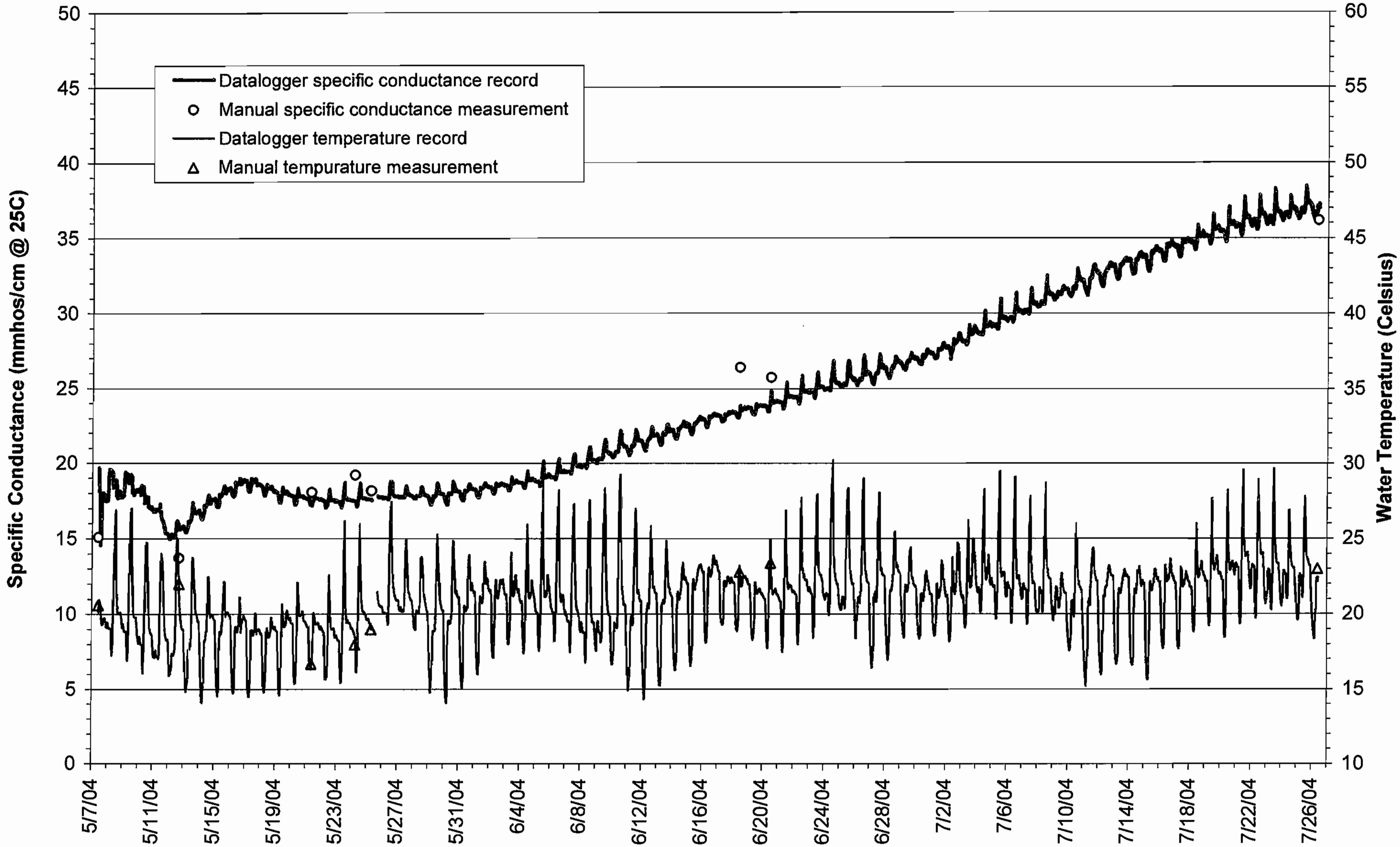

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Figure 7. Specific conductance and water temperature at monitoring station #1, mouth of slough connecting Haystack Landing wetland restoration site with Petaluma River, May 7 to July 26, 2004, Petaluma, CA. Specific conductance is responding to receding streamflow in the Petaluma River and seasonally increasing proportions of sea water advancing upstream from San Pablo Bay.

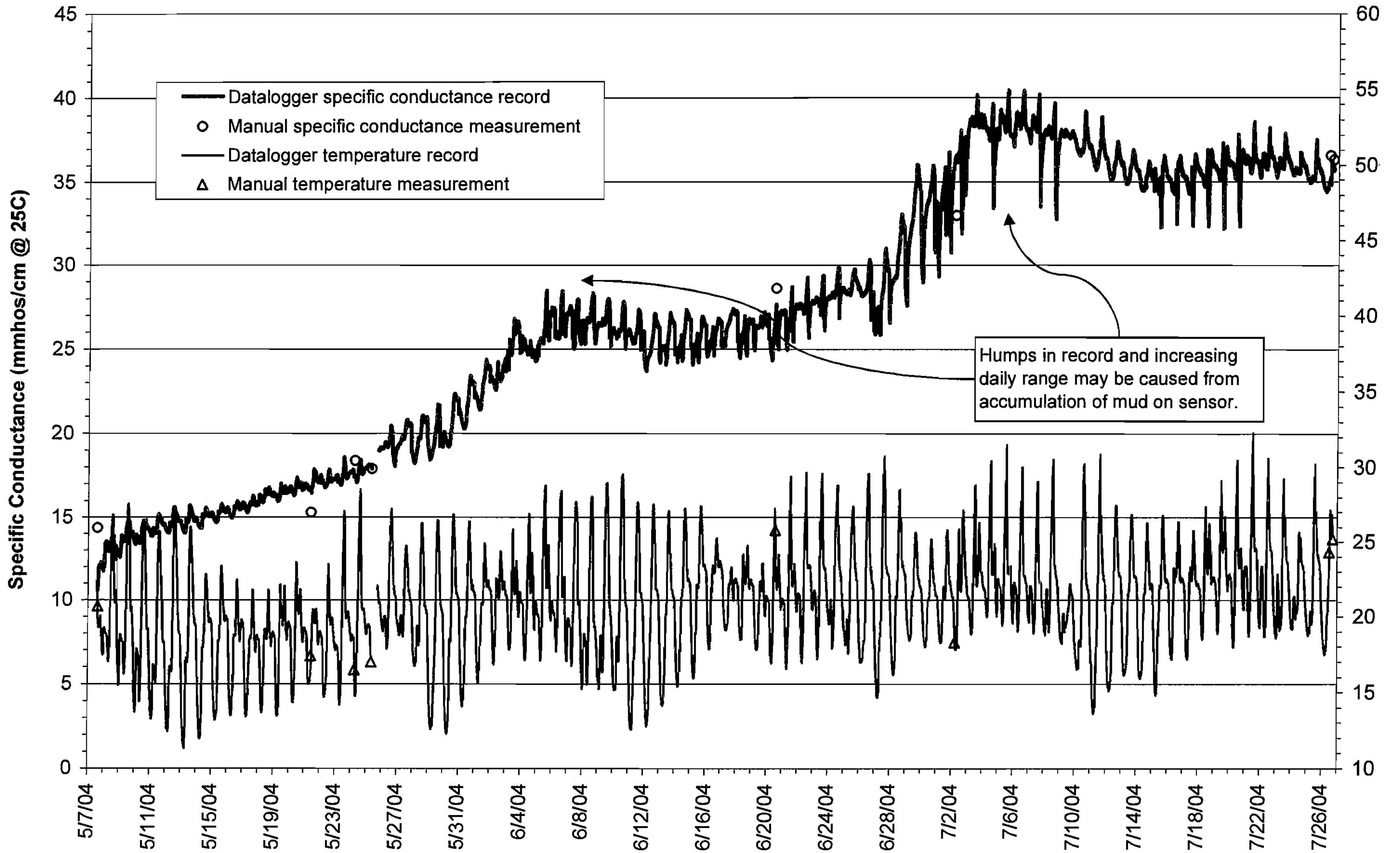

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Figure 8. Specific conductance and water temperature at monitoring station #2, upstream of culvert beneath train tracks on slough connecting Haystack Landing wetland restoration site with Petaluma River, May 7 to July 26, 2004, Petaluma, CA. Specific conductance is responding to receding streamflow in the Petaluma River and seasonally increasing proportions of sea water advancing upstream from San Pablo Bay.

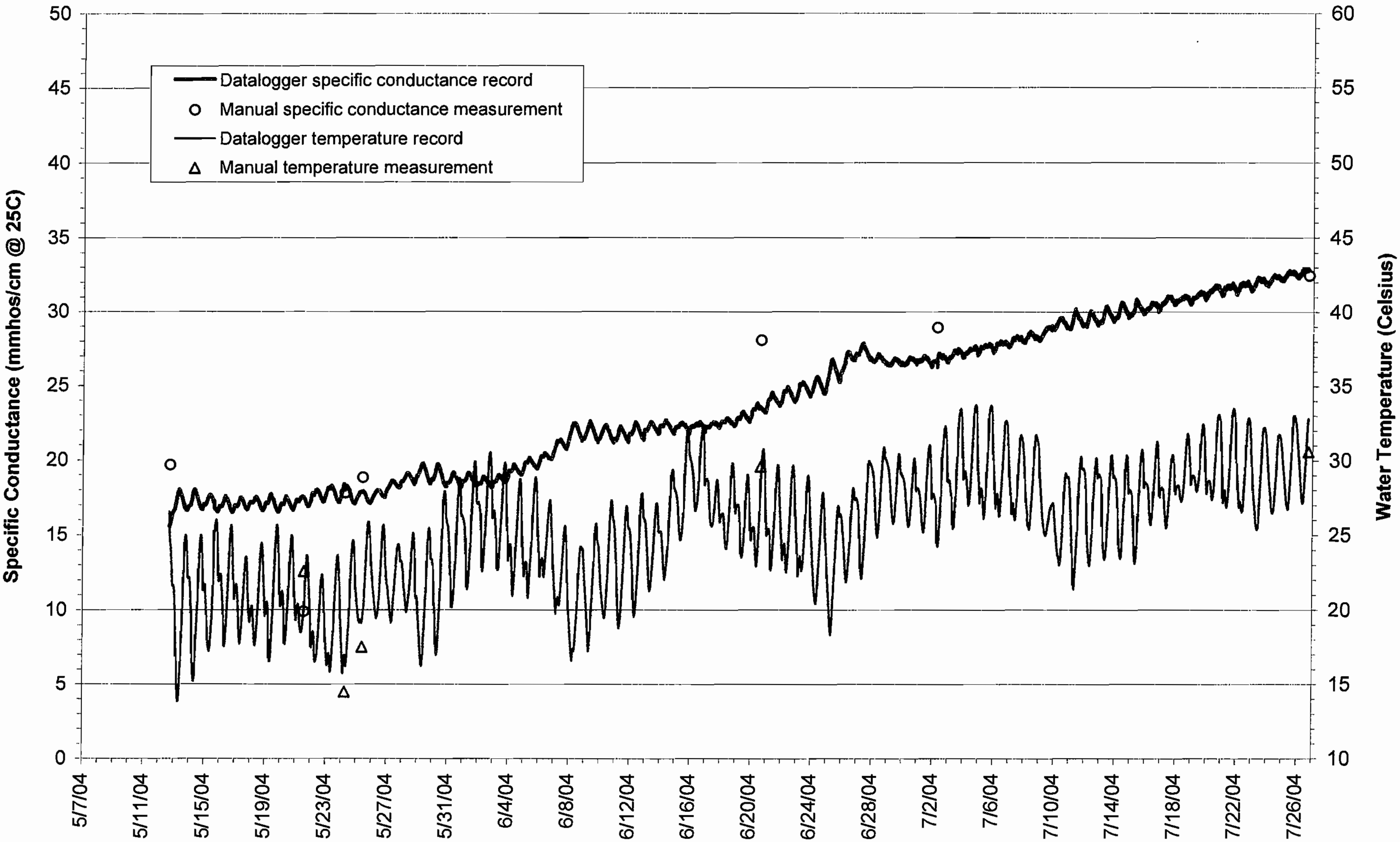

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Figure 9. Specific conductance and water temperature at monitoring station #3, jurisdictional area DD2 on Haystack Landing wetland restoration site, May 7 to July 26, 2004, Petaluma, CA. Specific conductance is responding to receding streamflow in the Petaluma River and seasonally increasing proportions of sea water advancing upstream from San Pablo Bay.

← View of the channel upstream of Station #1 located at the bridge in the distance. *Photo taken at train tracks looking downstream towards the Petaluma River.*

Gaging Station #1 →

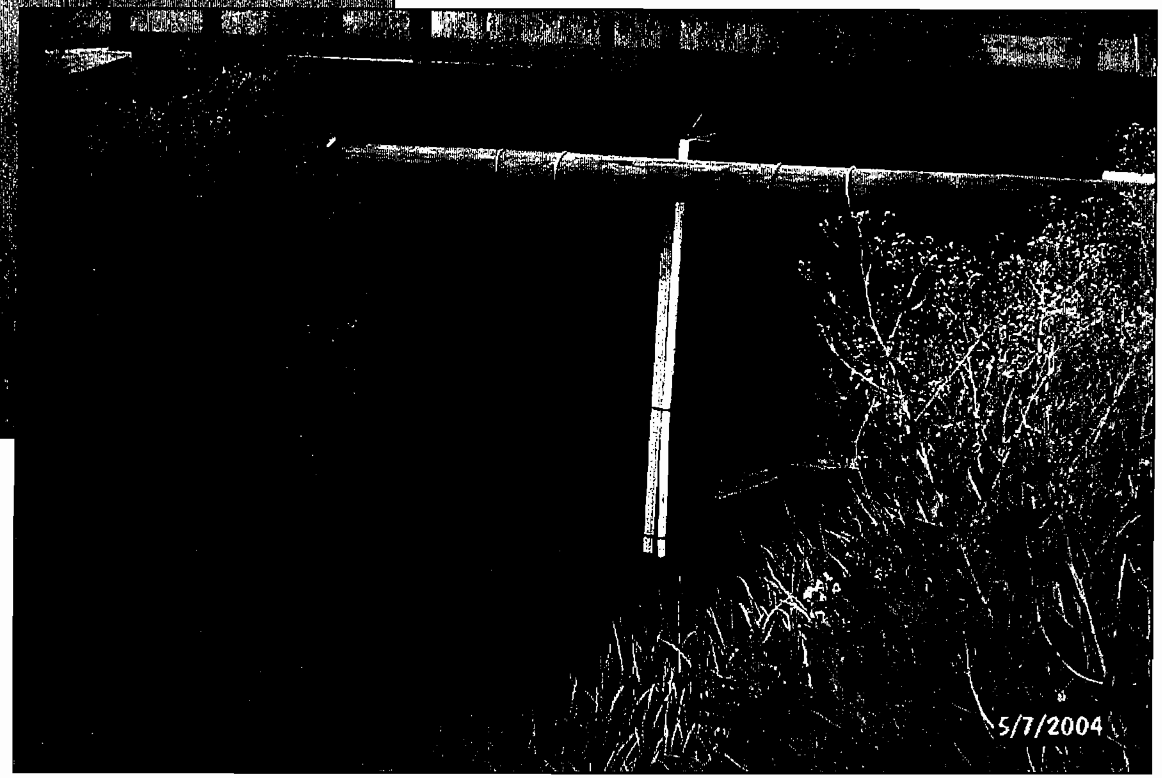

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Figure 10. Photos of gaging Station #1 located at the mouth of the slough connecting Haystack Landing wetland restoration site with Petaluma River, Petaluma, CA.

High tide, train tracks seen in distance ↑

Culvert seen at low tide →

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Figure 11. Photos of gaging Station #2 located upstream of the culvert beneath the train tracks on the slough connecting Haystack Landing wetland restoration site with Petaluma River , Petaluma, CA.

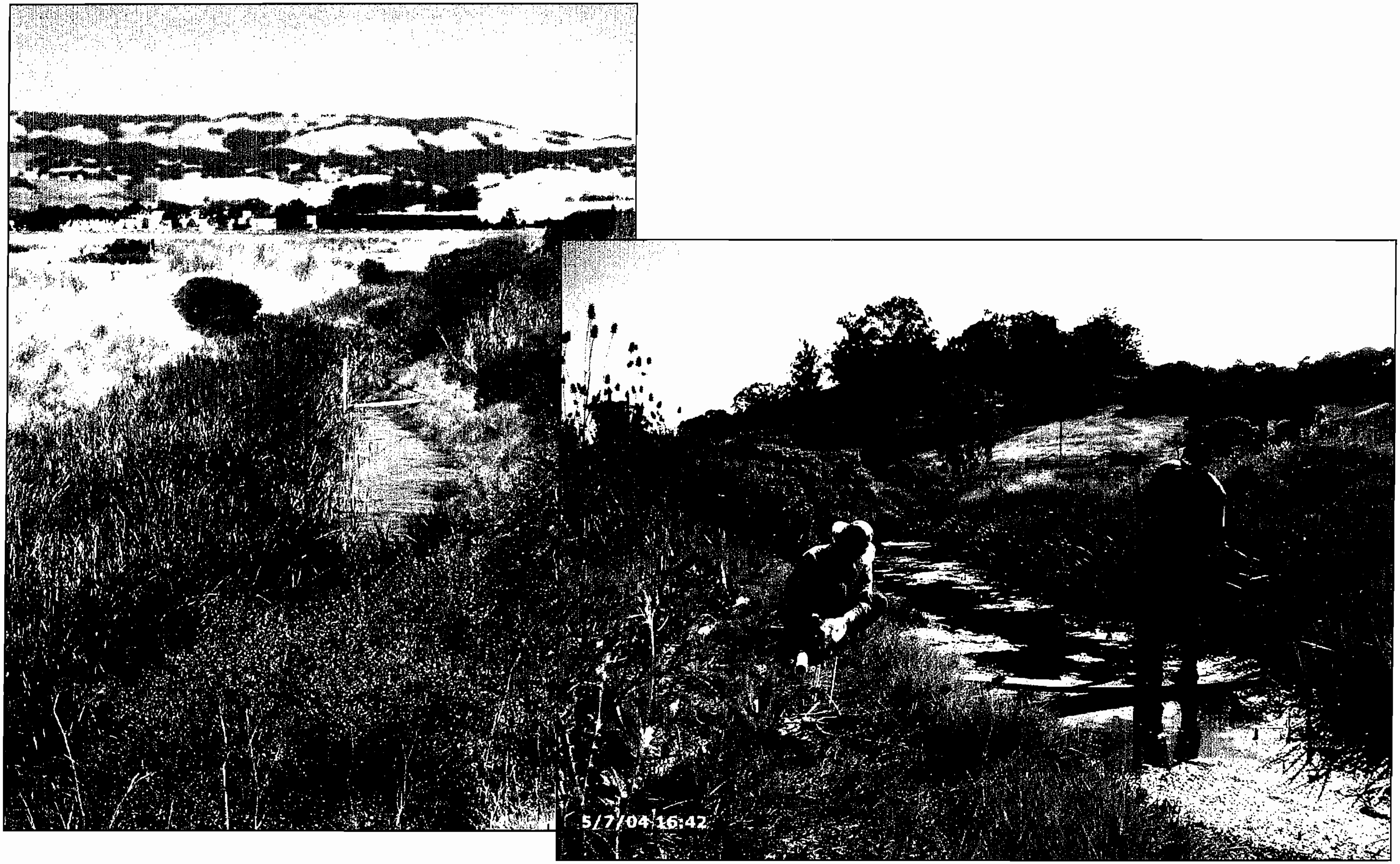

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Figure 12. Photos of gaging Station #3 located in jurisdictional wetland DD2 on Haystack Landing wetland restoration site, Petaluma, CA.

APPENDIX A

Station Observer Log 2004: Haystack Landing Wetland Restoration Site, Petaluma, California

Appendix A. Station observer log 2004: Haystack Landing wetland restoration, Petaluma, California.

Site Conditions						Datalogger Readings				High-Water Marks	Water Quality Measurments			Remarks
Observer Date Time (DST)	Datalogger Date Time (PST)	Observer	Stage	Stage NGVD29 Elevation	Hydrograph	Pressure Transducer #1	Pressure Transducer #2	Field Specific Conductance	Water Tempurature	Estimated stage at staff plate	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	
(mm/dd/yr hh:mm)	(mm/dd/yr hh:mm)		(feet)	(feet)	(R/F/S/B)	(feet)	(feet)	(µmhos/cm)	(oC)	(feet)	(oC)	(µmhos/cm)	(at 25 oC)	
GAGING STATION #1: Mouth of slough at bridge														
5/7/04 11:30	5/7/04 10:30	gp, bm, mw	0.53	-1.81	F	0.422	0.335	14230	20.5		20.6	13830	15090	installed datalogger; set at standard time; GPS N38 13.225, W122 36.095, 14 ft accuracy
5/7/04 12:40	5/7/04 11:40	gp, bm, mw	0.50	-1.84		0.395	0.307	13537	20.7					
5/12/04 18:24	5/12/04 17:24	mw	0.90	-1.44	R	0.919	0.834	12100	21.6		22.0	13000	*13719*	downloaded data
5/21/04 9:56	5/21/04 8:59	gp, mw	0.53	-1.81	F	0.410	0.324	11813	16.6		16.7	15210	*18070*	downloaded data; level survey; 0 on staff plate = -2.34 feet elev
5/21/04 12:18	5/21/04 11:21	gp, mw	0.52	-1.82	F	0.409	0.323	12420	18.0					width of water surface = 3.15 feet
5/24/04 5:45	5/24/04 4:45	mw	5.34	3.00	F	5.295	5.226	12570	18.8					
5/24/04 5:50	5/24/04 4:50	mw	5.32	2.98	F	5.211	5.142	12580	18.8					
5/24/04 6:43	5/24/04 5:43	mw	4.25	1.91	F	4.105	4.032	12577	18.8		18.0	16500	*19195*	downloaded data
5/25/04 7:52	5/25/04 6:52	gp, mw	3.41	1.07	F	3.269	3.194	12813	19.4		19.0	16000	*18153*	downloaded data; resurveyed staff plate
5/25/04 8:36	5/25/04 7:36	gp, mw	2.55	0.21	F	2.472	2.394	12700	19.2		19.0	16000	*18153*	downloaded data; resurveyed staff plate
6/18/04 12:52	6/18/04 11:49	gp	2.65	0.31	F	2.592	2.514	18188	23.0		22.8	25280	*26370*	Did not download data
6/20/04 13:42	6/20/04 12:39	gp	2.00	-0.34	R	1.950	1.869	19055	24.0		23.4	24890	25700	
7/2/04 6:10	7/2/04 5:07	gp	2.38	0.04	F	2.281	2.198	19377	19.8					
7/2/04 7:19	7/2/04 6:16	gp	0.88	-1.46	F	0.762	0.676	18753	18.6					
7/26/04 11:02	7/26/04 9:59	gp	3.49	1.15	R	3.475	3.399	27348	22.5		23.0	34750	*36150*	
GAGING STATION #2: Main branch of slough above train tracks culvert														
5/7/04 15:49	5/7/04 14:49	gp, bm, mw	3.86	2.02	R	3.741	3.727	12177	20.9		20.7	13150	14370	installed datalogger; set at standard time; GPS N38 13.193, W122 36.120, 13 ft accuracy
5/7/04 15:55	5/7/04 14:55	gp, bm, mw	3.99	2.15	R	3.834	3.819	12160	20.6					
5/12/04 17:52	5/12/04 16:52	mw	0.66	-1.18	F	0.457	0.446	16620	24.7					half of wood box culvert exposed showing barnacle-like growth blockage; downloaded data
5/21/04 10:59	5/21/04 10:03	gp, mw	0.71	-1.14	F	0.524	0.511	15280	17.0	3.75, 5.20	17.4	13050	15270	downloaded data; level survey; 0 on staff plate = -1.84 feet elev
5/21/04 13:08	5/21/04 12:12	gp	0.68	-1.16	R	0.495	0.484	16460	19.4					
5/24/04 5:54	5/24/04 4:58	mw	4.90	3.06	F	4.734	4.717	16630	19.1					
5/24/04 6:23	5/24/04 5:27	mw	4.71	2.87	F	4.513	4.496	16465	18.7					
5/24/04 6:24	5/24/04 5:28	mw	4.70	2.86	F	4.502	4.485	16460	18.7		16.5	15200	*18372*	downloaded data
5/24/04 6:27	5/24/04 5:31	mw	4.68	2.84	F	4.468	4.450	16445	18.7					
5/25/04 9:00	5/25/04 8:00	gp, mw	1.66	-0.18	F	1.485	1.470	16520	17.9		17.0	15000	*17899*	downloaded data
6/20/04 14:14	6/20/04 13:12	gp	2.40	0.56	F	2.207	2.192	26280	25.6		25.8	29030	28600	
7/2/04 6:34	7/2/04 5:32	gp	2.95	1.11	F	2.777	2.759	30520	19.4		18.3	28720	32970	
7/26/04 11:23	7/26/04 10:21	gp	2.71	0.87	R	2.577	2.557	30485	20.8					
7/26/04 12:49	7/26/04 11:47	gp	2.03	0.19	R	1.854	1.834	32243	23.0		24.3	36180	*36560*	
7/26/04 18:19	7/26/04 17:17	gp	4.47	2.63	R	4.374	4.353	34497	25.6		25.2	36490	*36320*	

Site Conditions						Datalogger Readings				High-Water Marks	Water Quality Measurments			Remarks
Observer Date Time (DST)	Datalogger Date Time (PST)	Observer	Stage	Stage NGVD29 Elevation	Hydrograph	Pressure Transducer #1	Pressure Transducer #2	Field Specific Conductance	Water Tempurature	Estimated stage at staff plate	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	
(mm/dd/yr hh:mm)	(mm/dd/yr hh:mm)		(feet)	(feet)	(R/F/S/B)	(feet)	(feet)	(µmhos/cm)	(oC)	(feet)	(oC)	(µmhos/cm)	(at 25 oC)	
Lower jurisdictional area DD1														
5/7/04 14:15		gp, bm, mw			F						18.4	11300	12930	
Upper jurisdictional area DD1														
1/21/04 0:00		lm, bh, mw									15.0	4500	*5655*	
		mm, ns, mw									12.0	4600	*6258*	
5/7/04 13:10		gp, bm, mw			-									damp
Jurisdictional area DD6														
		mm, ns, mw									12.0	3400	*4626*	above culvert to DD1
5/7/04 13:00		gp, bm, mw			-						17.1	1473	1733	isolated pool; depth about 12";
Petaluma Blvd. box culvert														
5/7/04 13:00		gp, bm, mw												culvert is dry
Main branch slough above DD1 confluence														
5/7/04 14:03		gp, bm, mw			F						21.1	15170	16370	
GAGING STATION #3: Jurisdictional area DD2														
5/7/04 16:57		gp, bm, mw	5.14	2.67	R									installed staff plate; GPS N38 13.105, W122 36.097, 15 ft accuracy
5/12/04 17:30	5/12/04 17:30	mw	5.11	2.64	F	0.715	0.942	18250	22.5	5.54	30.0	22000	*19700*	installed datalogger; set at daylight-savings time
5/21/04 12:33	5/21/04 12:33	gp, mw	5.16	2.69	F	0.772	0.947	16745	18.1					width of water surface = 11.1 feet
5/21/04 13:30	5/21/04 13:30	gp, mw	5.15	2.68	F	0.763	0.940	16890	18.3		22.6	9450	*9920*	level survey; 0 on staff plate = -2.47 feet elev
5/24/04 5:59	5/24/04 5:59	mw	5.59	3.12	F	1.221	1.372	16490	17.1					
5/24/04 6:07	5/24/04 6:07	mw	5.57	3.10	F	1.198	1.378	16407	17.1		14.5	14000	*17825*	downloaded data
5/24/04 6:12	5/24/04 6:12	mw	5.56	3.09	F	1.196	1.380	16290	17.1					
5/25/04 9:24	5/25/04 9:24	gp, mw	5.20	2.73	F	0.820	0.991	17080	18.1		17.5	16000	*18850*	downloaded data
6/20/04 14:39	6/20/04 14:39	gp	5.16	2.69	F	0.766	0.965	25250	21.1		29.6	30800	28100	
7/2/04 6:21	7/2/04 6:21	gp	5.60	3.13	F	1.233	1.416	28270	21.0		19.3	25770	28950	
7/26/04 11:15	7/26/04 11:15	gp	5.14	2.67	R	0.752	0.955	34980	21.5					
7/26/04 17:41	7/26/04 17:41	gp	5.10	2.63	F	0.709	0.937	37850	23.6		30.6	6640	*5940*	
Jurisdictional area DD2 below culvert to WI														
1/21/04 0:00		lm, bh, mw									15.0	5500	*6912*	
5/7/04 13:13		gp, bm, mw									18.4	13600	15600	
North arm of jurisdictional area WI														
1/21/04 0:00		lm, bh, mw									15.0	7500	*9425*	
		mm, ns, mw									11.0	4800	*6708*	
5/7/04 13:15		gp, bm, mw									18.0	4920	5670	culvert to DD2 does not appear to have tidal circulation; south portion dry

Site Conditions						Datalogger Readings				High-Water Marks	Water Quality Measurments			Remarks
Observer Date Time (DST)	Datalogger Date Time (PST)	Observer	Stage	Stage NGVD29 Elevation	Hydrograph	Pressure Transducer #1	Pressure Transducer #2	Field Specific Conductance	Water Tempurature	Estimated stage at staff plate	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	
(mm/dd/yr hh:mm)	*(mm/dd/yr hh:mm)*		*(feet)*	*(feet)*	*(R/F/S/B)*	*(feet)*	*(feet)*	*(µmhos/cm)*	*(oC)*	*(feet)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	
Jurisdictional area WI														
1/21/04 0:00		lm, bh, mw									15.0	12000	*15080*	
5/7/04 13:15		gp, bm, mw												dry
Main branch slough above DD2 confluence														
1/21/04 0:00		lm, bh, mw									13.0	4300	*5696*	
Jurisdictional area WB														
1/21/04 0:00		lm, bh, mw									13.0	3000	*3974*	spilling to slough
		mm, ns, mw									14.0	2900	*3741*	
5/7/04 13:20		gp, bm, mw												dry
Pond on adjacent parcel														
1/21/04 0:00		lm, bh, mw									13.0	7000	*9273*	

Notes:
Observer Key: Gustavo Porras (gp), Bonnie Mallory (bm); Mark Woyshner (mw); Lucy MacMillan (lm), Barry Hecht (bh)
Stage: Water level observed at outside staff plate
Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)
Instrument: If measured, typically made using a standard (AA) or pygmy (PY) bucket-wheel ("Price-type") current meter. If estimated, from rating curve (R) or visual (V).
Estimated measurement accuracy: Excellent (E) = +/- 2%; Good (G) = +/- 5%; Fair (F) = +/- 9%; Poor (P) estimated percent accuracy given
High-water mark (HWM): Measured or estimated at location of the staff plate
Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance
Additional Sampling: Qbed = Bedload, Qss = Suspended sediment, Nutr = nutrients; other symbols as appropriate

Appendix D. Establishment of a winter ground-water baseline, Haystack Landing Wetland Restoration, Sonoma County, California

Purpose

A winter baseline for ground-water levels, salinity and temperature was established on February 4, 2005. The ground-water canvass provides a basis for assessing the causes and roles of changes in ground-water conditions in future evolution of the marsh. The baseline documents ground-water levels and salinities prior to re-grading of the site, including excavation of the tidal wetland, or direction of additional flows into the cattail and seasonal wetlands portions of the site. It also offers a basis for re-assessing and/or repairing site conditions following a major disturbance such as a seismic event.

Ambient Conditions

The baseline was established under typical conditions likely to occur in future years, facilitating comparisons between years. Measurements were made approximately 3 weeks after a two-week period of heavy rainfall during early January. Minimal rainfall was recorded during this typical mid-winter drought. Seasonal precipitation to date at the time of measurement was approximately 125 percent of normal. Measurements were made on a day with fog in the morning, clear in the afternoon. A low tide of 3.3 feet (at Golden Gate) occurred locally at approximately 3:00 AM, preceded by high tides of 3.9 feet, and followed by a high tide of 6.3 feet, and a subsequent low tide of -0.4 feet.

Measurements Made

At approximately 20 locations within the restoration site, temporary borings were hand-augered to ground water. A conventional 1.0-inch orchard auger or a standard AMS auger with a 3-1/2 inch barrel were used to advance the borings (Appendix D1). Water levels were measured with a Solinst depth probe approximately 30 minutes following completion of the boring, and in no case with less than 20 minutes for equilibration (Appendix D2).

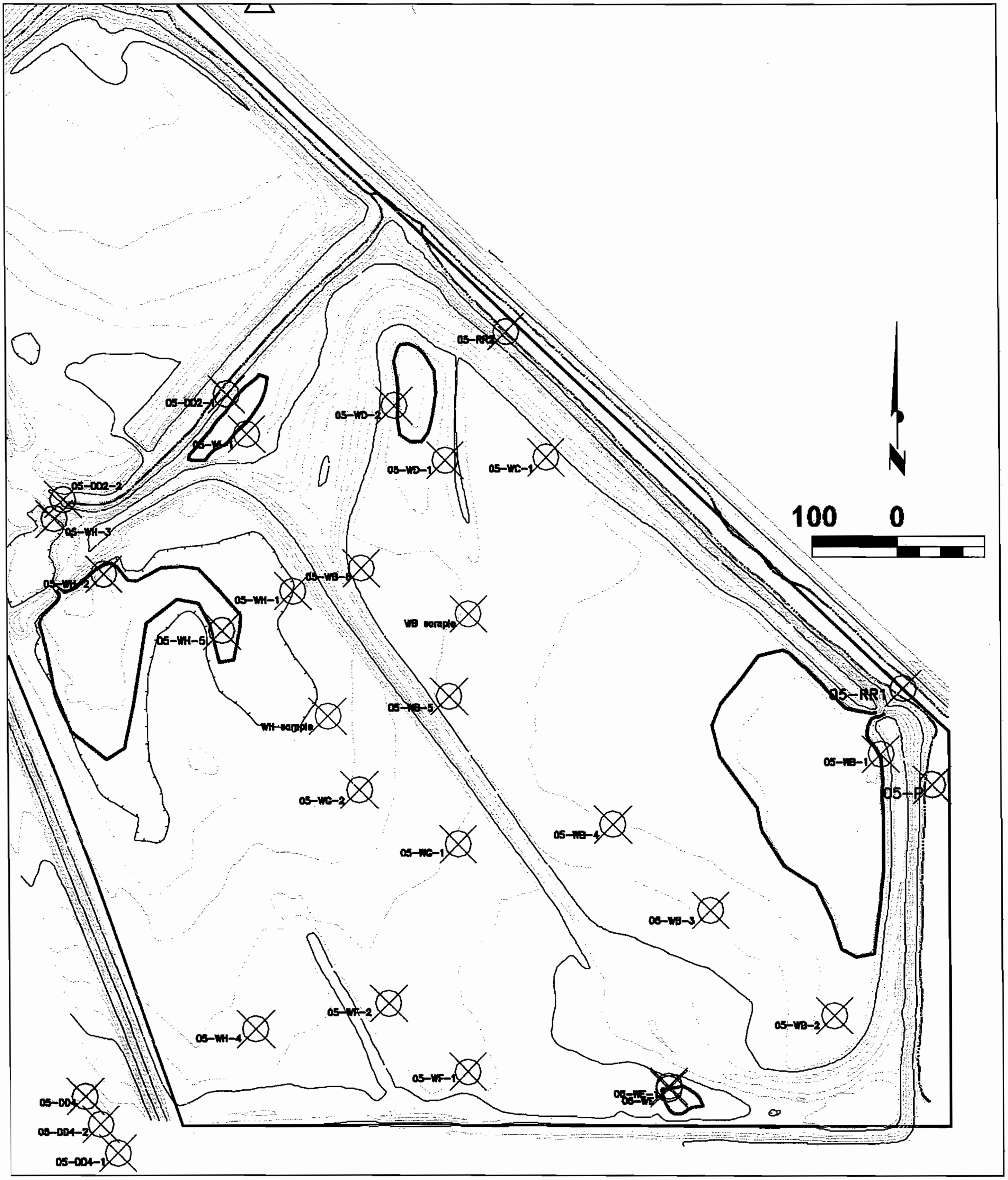
Boring locations were mapped with a Garmin Model V GPS system, with a nominal resolution of 14 feet. Most boring locations were located near the boundary of delineated wetlands, such that they describe conditions under which there is a 50 percent probability of hydrologic parameters supporting wetlands will be encountered. Presumably, depths to ground water less than those encountered at the boundaries will lead to successful attainment of hydrologic conditions likely to sustain wetlands, while deeper ground water would be less likely to do so. We also believe that ground-water salinities near wetland boundaries are less likely to be distorted by localized infiltration from the ponded area.

Ground-water salinities and temperatures were measured as specific conductance using a YSI Model 30 digital S-C-T meter, calibrated with commercially-prepared KCl standards (Appendix D3).

A number of boring sites were selected in the field simply to help fill in the envisioned ground-water level map, and had no connection to delineated wetland boundaries (Appendix D4).

Similar measurements were made of surface waters at several sites, including a few at standard locations where water level, salinity, or temperature had been previously recorded. At stations likely to be affected by tidal action, measurements were made both upon arrival at the site and just prior to departure.

Samples Collected
Virtually all measurements were made in the field using portable meters. One sample from near the middle of each of the two debris basins being restored was collected, stored in double Ziplock bags, and then placed in frozen storage upon return to Balance's laboratory. These samples were subsequently tested for trace elements using methods and commercial analytical laboratories as described in the text of this report.



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Appendix D1. Sampling locations on February 4, 2005, Haystack Landing, Petaluma, California.

204012 Loc Map:dwg/sampling locations layout

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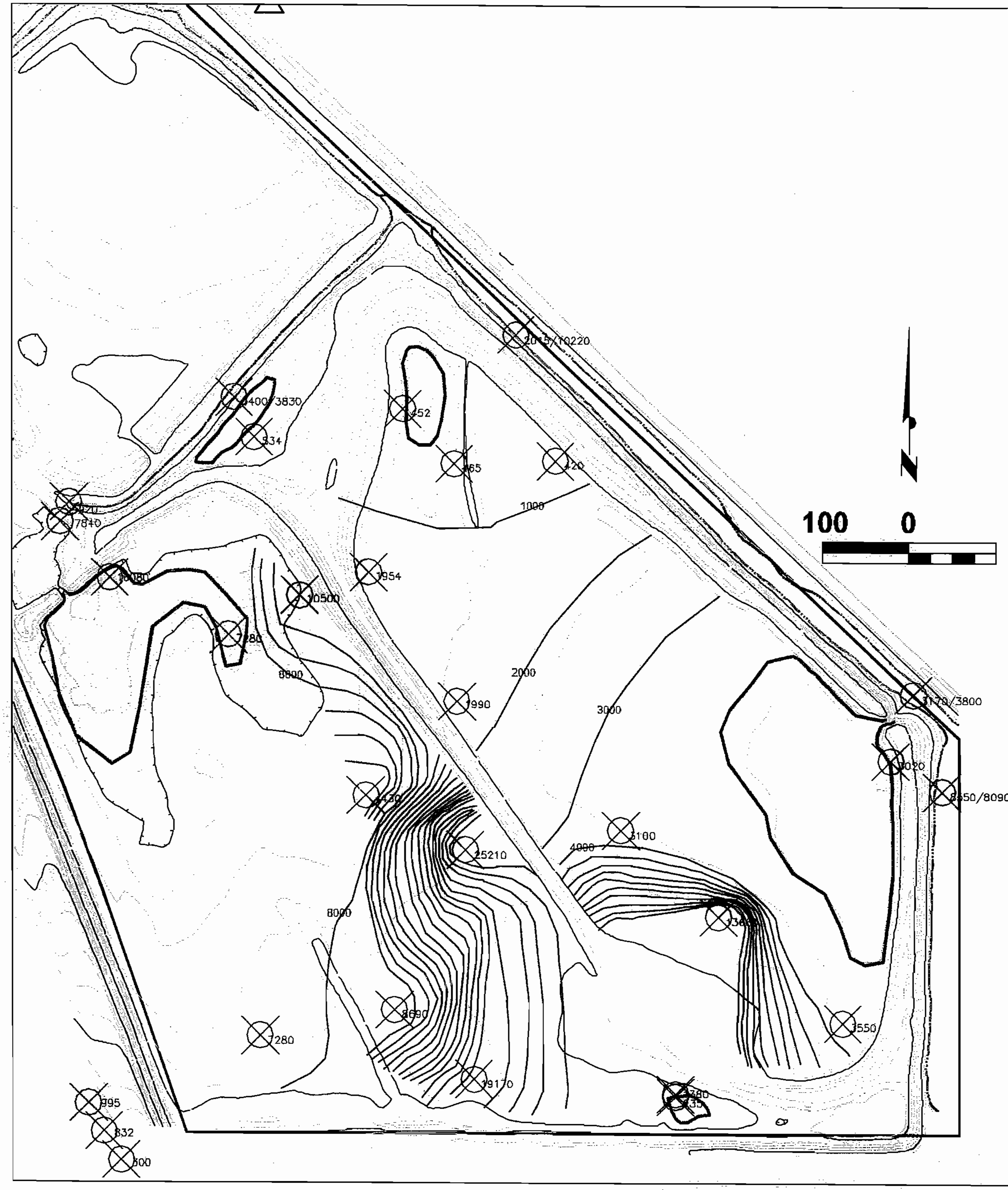
Appendix D2. Water table elevation contours on February 4, 2005, Haystack Landing, Petaluma, California.

204012 Loc Map.dwg/water table elevation layout



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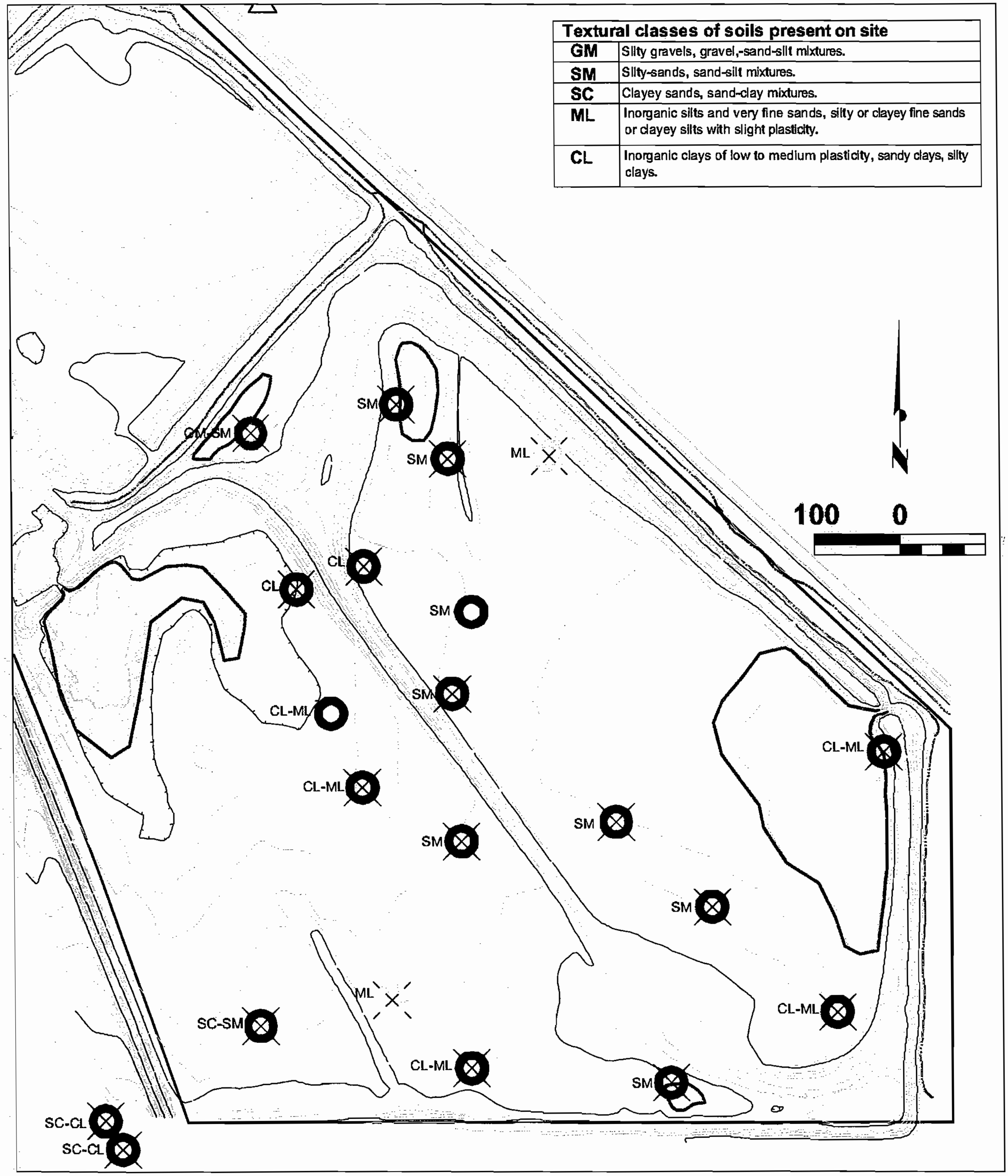
Appendix D3. Contours of specific conductance corrected to 25°C on February 4, 2005, Haystack Landing, Petaluma, California.

204012 Loc Map.dwg/specific conductance layout



Textural classes of soils present on site	
GM	Silty gravels, gravel,-sand-silt mixtures.
SM	Silty-sands, sand-silt mixtures.
SC	Clayey sands, sand-clay mixtures.
ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity.
CL	Inorganic clays of low to medium plasticity, sandy clays, silty clays.

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Appendix D4. **Textural class of upper 1-2 feet, Haystack Landing, Petaluma, California.**

204012 Loc Map.dwg/textural class layout

Appendix D5: Winter Ground-Water Baseline Conditions
Haystack Landing Wetland Restoration, 2005

	Way Point	Name	Time sampled	Coordinates Latitude	Longitude	Wetland Boundary (Y/N)	Ground-surface elevation (ft)	Depth to water (ft)	Water-surface elevation (NGVD 29 ft)	Specific Conductance µS (at 25°C)	Water Temp. °C	Textural Class (USCS)
	A. Isolated Ponded Surface Waters											
1	190	05-WH-3	11:27	N38° 13' 04.7"	W122° 36' 12.0"	N	---	---	4.5	7840	11.0	---
2	191	05-WH-2	11:36	N38° 13' 04.0"	W122° 36' 11.4"	N	---	---	4.5	16080	16.8	---
3	192	05-WH-5	11:43	N38° 13' 03.4"	W122° 36' 09.7"	N	---	---	4.5	7280	10.2	---
4	194	05-WB-1	12:03	N38° 13' 02.0"	W122° 35' 59.9"	N	---	---	7.1	2690	11.7	---
5	197	05-DD4	13:06	N38° 12' 58.1"	W122° 36' 10.1"	N	---	---	---	995	11.3	---
6	201	05-WE	12:12	N38° 12' 58.2"	W122° 36' 03.2"	N	---	---	9.0	235	11.0	---
	B. Tidally-Influenced Surface Waters											
1	185	05-P	10:57	N38° 13' 01.6"	W122° 35' 59.3"	N	---	---	4.0 est.	8550	11.2	---
3	187	05-RR2	11:11	N38° 13' 06.8"	W122°36' 05.5"	N	---	---	3.6 est.	2015	9.5	---
5	188	05-DD2-1	11:17	N38° 13' 06.1"	W122°36' 09.6"	N	---	---	3.5	5400	6.8	---
7	189	05-DD2-2	11:24	N38° 13' 04.8"	W122°36' 12.0"	N	---	---	4.0 est.	4920	9.7	---
8	193	05-RR1	11:58	N38° 13' 02.7"	W122°35' 59.8"	N	---	---	3.8 est.	3170	9.9	---
6	188	05-DD2-1	18:40	N38° 13' 06.1"	W122°36' 09.6"	N	---	---	2.6	3830	9.8	---
9	193	05-RR1	18:45	N38° 13' 02.7"	W122°35' 59.8"	N	---	---	2.7 est.	3800	12.9	---
2	185	05-P	19:10	N38° 13' 01.6"	W122° 35' 59.3"	N	---	---	3.1 est.	8090	13.1	---
4	187	05-RR2	19:20	N38° 13' 06.8"	W122°36' 05.5"	N	---	---	2.9 est.	10220	11.9	---
	C. Points Within the Debris Basins											
1	194	05-WB-1	14:30	N38° 13' 02.0"	W122°35' 59.9"	Y	10.3	0.2	10.1	3020	10.9	CL-ML
2	195	05-DD4-1	15:19	N38° 12' 57.5"	W122°36' 09.9"	N	---	0.7	---	300	11.0	SC-CL
3	196	05-DD4-2	15:25	N38° 12' 57.8"	W122°36' 10.2"	Y	---	0.4	---	832	10.4	SC-CL
4	198	05-WH-4	15:34	N38° 12' 58.8"	W122°36' 09.2"	Y?	8.2	1.7	6.5	7280	11.5	SC-SM
5	199	05-WF-2	15:04	N38° 12' 59.1"	W122°36' 07.3"	Y?	8.5	2.4	6.1	8690	11.9	ML
6	200	05-WF-1	15:10	N38° 12' 58.3"	W122°36' 06.1"	Y?	8.9	2.6	6.3	19170	12.1	CL-ML

	Way Point	Name	Time sampled	Coordinates Latitude	Longitude	Wetland Boundary (/N)	Ground-surface elevation (ft)	Depth to water (ft)	Water-surface elevation (NGVD 29 ft)	Specific Conductance µS (at 25°C)	Water Temp. °C	Textural Class (USCS)
7	202	05-WE-1	14:43	N38° 12' 58.2"	W122°36' 03.2"	Y	9.2	0.2	9.0	1380	9.8	SM
8	203	05-WB-3	16:05	N38° 13' 00.2"	W122°36' 02.6"	Y	8.9	1.2	7.7	13660	10.6	SM
9	204	05-WB-2	14:50	N38° 12' 59.0"	W122°36' 00.8"	Y	7.7	0.2	7.4	3550	10.7	CL-ML
10	205	05-WB-4	17:23	N38° 13' 01.2"	W122°36' 04.0"	Y	8.1	0.4	7.7	3100	10.1	SM
11	206	05-WG-1	17:29	N38° 13' 00.9"	W122°36' 06.3"	Y	8.1	1.3	6.8	25210	10.9	SM
12	207	05-WG-2	17:34	N38° 13' 01.6"	W122°36' 07.7"	Y	6.2	0.9	5.3	4430	10.5	CL-ML
13	208	05-WB-5	17:39	N38° 13' 02.6"	W122°36' 06.4"	Y	8.8	1.1	7.7	1990	10.3	SM
14	209	05-WB-6	17:46	N38° 13' 04.1"	W122°36' 07.6"	Y	9.6	1.7	7.9	1954	11.1	CL
15	210	05-WH-1	17:51	N38° 13' 03.8"	W122°36' 08.6"	Y	5.0	0.5	4.5	10500	10.6	CL
16	212	05-WH sample	18:05					---	---	---	---	CL-ML
17	213	05-WB sample	18:10					---	---	---	---	SM
18	214	05-WC-1	18:32	N38° 13' 05.3"	W122°36' 04.9"	Y	8.7	0.9	7.8	420	9.5	ML
19	215	05-WD-1	18:39	N38° 13' 05.3"	W122°36' 06.4"	Y	8.9	0.1	8.8	465	9.6	SM
20	216	05-WD-2	18:47	N38° 13' 05.9"	W122°36' 07.1"	Y	8.0	0.6	7.4	452	10.5	SM
21	217	05-WI-1	18:57	N38° 13' 05.6"	W122°36' 09.3"	Y	7.5	0.5	7.0	534	9.9	GM-SM

Note

1. Wetland boundary indicates measurements made at locations on or very near to boundary of delineated wetlands. Measurements were made about 21 days after significant rainfall during a mid-season drought.

Appendix E. Estimated salinities in the restored wetland area, Haystack Landing, Sonoma County.

Enhanced Wetland Area	Soil Salinity ppt	Water Salinity ppt	Remarks
Tidal	0.2 to 5	7 to 25	higher in the summer
Seasonally inundated	2 to 6	2 to 5	locally higher
Emergent	0.2 to 4	0.2 to 2	initially higher until flushed and at the southerly portion

Notes:
Salinity values were based on a qualitative degree of flushing for each wetland area, and measurements made during the preliminary hydrologic evaluation (Woyshner and others, 2004), a subsequent water quality survey on February 4, 2005 during winter baseflow conditions, and during the geotechnical investigation by Miller Pacific (2004).

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-05-TA-0185

JAN 13 2005

Ms. Sarah Lynch
Senior Associate Biologist
Monk & Associates
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595

Subject: Request for No Take Determination for the Haystack Landing Project Site, City of Petaluma, Sonoma County, California

Dear Ms. Lynch:

This letter is in response to your November 17, 2004, request that the U.S. Fish and Wildlife Service (Service) determine that development of the Haystack Landing Project site in Petaluma, California, is not likely to result in take of the salt marsh harvest mouse (*Reithrodontomys raviventris*) in accordance with the requirements of the Endangered Species Act of 1973, as amended (16U.S.C. 1531 *et seq.*)(Act). Your letter was received in our office on November 18, 2004.

The proposed 37-acre Haystack Landing Project site is located at 3355 Petaluma Boulevard South on the southern edge of the City of Petaluma. The project site is an irregularly shaped rectangle located on the east side of Highway 101 and is composed of two parcels. The site is bordered by commercially zoned lots and commercial buildings to the north, Petaluma Boulevard South and Highway 101 to the west, and the Northwestern Pacific Railroad tracks, commercial buildings, and agricultural fields to the east. The Petaluma River lies east of the commercial buildings and agricultural fields bordering the east side of the project site.

The project proponent is proposing to establish an asphalt plant and related operations on the northern portion of the Haystack Landing Project site. About 1.76 acres of wetland habitats would be filled to accommodate the facility. The southern portion of the project site would be used to create and enhance wetland habitats to offset the proposed filling of 1.76 acres of wetlands. The project site has been used previously as a dairy farm and for the disposal of quarry wash water as part of a gravel and asphalt quarry operation. As a result of these land uses, most pickleweed (*Salicornia virginica*) dominated wetlands that probably historically occurred on the project site have been eliminated and the quality of the remaining wetlands have been greatly diminished. Presently, pickleweed cover on the project site is minimal and patchy, and overall vegetation cover is low.

To determine the presence or absence of salt marsh harvest mice on the project site, Monk & Associates conducted trapping surveys approved by the Service prior to their implementation. These surveys were extensive and designed specifically to determine the presence/absence of salt marsh harvest mice on the project site. A total of 698 Sherman live-traps were set each night over an eight-night period from September 26 through October 8, 2004. Trap lines and trapping grids were established in wetland areas and adjacent uplands that appeared to have the greatest potential for supporting salt marsh harvest mice. A total of 5,584 trap-nights were completed under the purview of Recovery Permit TE776608-4 issued by the Service and a Memorandum of Understanding with the California Department of Fish and Game. No salt marsh harvest mice were trapped during the surveys. A total of 761 house mice *(Mus musculus)*, 210 western harvest mice (*Reithrodontomys megalotis*), and three California meadow voles (*Microtus californicus*) were trapped during the surveys.

The Service has determined that development of the Haystack Landing Project site is not likely to result in take of the salt marsh harvest mouse. We base this determination on the following: (1) the project site is fairly isolated, (2) substantial barriers and distance exist between the project site and other suitable harvest mouse habitat, (3) habitat conditions for salt marsh harvest mice on the project site are highly degraded, (4) the presence of non-native rodents which could preclude salt marsh harvest mice from inhabiting the wetland, and (5) your extensive surveys did not detect the presence of salt marsh harvest mice in the wetland. This determination is made solely for the Haystack Landing Project site and has no implications for any other project site within the range of the salt marsh harvest mouse. Therefore, unless new information reveals effects of the project that may affect federally listed species or critical habitat in a manner not identified to date, or if a new species is listed or critical habitat is designated that may be affected by the proposed development, no further action pursuant to the Act is necessary.

Please contact Jim Browning of my staff at (916) 414-6625, if you have questions regarding this response on the Haystack Landing Project.

Sincerely,

Cliff Nagano

fn

Catrina Martin
Deputy Assistant Field Supervisor

MONK & ASSOCIATES
Environmental Consultants

November 17, 2004

U.S. Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way, W2605
Sacramento, California 95825

Attention: Mr. Jim Browning

RE: Salt Marsh Harvest Mouse Trapping Study
Haystack Landing Project Site, Petaluma, Sonoma County, California

Dear Mr. Browning:

Monk & Associates, Inc. (M&A) has completed a presence/absence study for the salt marsh harvest mouse (*Reithrodontomys raviventris*) (SMHM) at the proposed Haystack Landing project site in Petaluma, Sonoma County, California. This trapping study was completed after receiving your authorization to proceed on September 21, 2004. No SMHM were trapped during this eight-night (5,584 trap night) trapping study. Please see the attached report for complete details.

Based on our survey results presented in the attached report, we would greatly appreciate a letter from you (a memo or an email is also fine) stating that a proposed development and wetland restoration project on this project site would have no effect on the SMHM. If you have any questions or wish to discuss the project further before you prepare such a letter, please do not hesitate to call me at (925) 947-4867, ext. 203. Thank you.

Sincerely,

Sarah Lynch

Sarah Lynch
Senior Associate Biologist

Enc.: One copy of the Salt Marsh Harvest Mouse Trapping Study, Haystack Landing, Petaluma.

cc: Ms. Lucy Macmillan, Wetlands Specialist
Mr. Dave Ripple, Shamrock Materials, Inc.

1136 Saranap Ave., Suite Q ♦ Walnut Creek ♦ California ♦ 94595
(925) 947-4867 ♦ FAX (925) 947-1165

MONK & ASSOCIATES
Environmental Consultants

SALT MARSH HARVEST MOUSE TRAPPING STUDY HAYSTACK LANDING PETALUMA, CALIFORNIA

November 17, 2004

Prepared on Behalf of:

Ms. Lucy Macmillan
Wetlands Specialist
28 Bernard St., #4
Mill Valley, CA 94941

Prepared For:

The U.S. Fish and Wildlife Service
Sacramento Endangered Species Office
2800 Cottage Way, Room W2605
Sacramento, California 95825
Attention: Mr. Jim Browning

Prepared By:

Monk & Associates, Inc.
1136 Saranap Avenue, Suite Q
Walnut Creek, CA 94595
Attention: Ms. Sarah Lynch

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ATTACHMENT

1. INTRODUCTION

Monk & Associates, Inc. (M&A) has completed a small mammal live-trapping study on the Haystack Landing project site in Petaluma, California (herein referred to as the project site). The purpose of this study was to determine if the federal and state listed endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) (SMHM) could occur on the project site. No SMHM were captured during a 5,584 trap-night study. Below, we discuss the project site and our trapping study.

2. PROJECT SITE LOCATION, SURROUNDING LAND USES AND SETTING

The project site is located in Sonoma County on the southern edge of Petaluma at 3355 Petaluma Boulevard South (Figure 1). The project site is an irregularly shaped rectangle located on the east side of Highway 101 (Figure 2). It is composed of two legal parcels: Parcels A and B. These parcels are shown on the attached aerial photograph (Figure 3). The site is bounded to the north by commercially zoned lots and commercial buildings. Petaluma Boulevard South and Highway 101 occur immediately west of the project site. There are rural residences further west of Highway 101. The Northwestern Pacific Railroad tracks and commercial buildings lie east of Parcel A, and agricultural fields occur directly east of Parcel B (see Figure 3). The Petaluma River is located east of and adjacent to these commercial buildings and agricultural fields. Rangeland is located immediately south of the project site. This field is planted with hay crops.

3. PROPOSED PROJECT

The applicant is proposing to establish an asphalt plant and related operations on the northern portion of the project site. Approximately 1.76 acres of wetland habitats on Parcel B would be filled to accommodate this facility. The southern portion of Parcel B, including all existing, degraded wetland features would be used to create and otherwise enhance wetland habitats to mitigate the proposed filling of 1.76 acres of wetland habitat. The restoration plan is currently in preparation.

4. LAND USE HISTORY

Historically, the 37-acre site was used as a dairy farm. In 1968, the site was purchased by a gravel and asphalt quarry that was then in operation on the west side of Highway 101 just north of the project site. Subsequently, the northern 27 acres of the site were leased back to the original dairy rancher and the remaining 10 acres at the south end of the site were used for the disposal of quarry wash water (siltation basins 3, 4, and 5 were constructed in these 10 acres; Figure 4). Since 1968, various dikes and siltation basins were constructed on the site. Five siltation basins were eventually constructed on approximately 33 acres. The siltation basins were used for settling quarry wash water. In 1976, the northernmost siltation basin (Basin 1) was filled with earthen material excavated from an adjacent hill. The quarry actively used the four remaining basins until the mid-1970s. Two of the basins located on the southwestern portion of the site were in continuous use into the 1990s. According to the current property owners, none of the siltation basins have been actively used by the quarry or other operations since the early 1990s.

5. METHODS

5.1 California Natural Diversity Database Search

Prior to preparing a SMHM habitat assessment for the project site and conducting a trapping study, M&A reviewed the most recent version of the California Department of Fish and Game's (CDFG) Natural Diversity Data Base (RareFind 3 application) (CNDDB) to document historic and recent records of SMHM in the region of the project site. This database search included the Haystack Landing 7.5 minute USGS quadrangle, and all surrounding areas within five miles of the project site (Figure 5).

5.2 Field Reconnaissance

On January 21, 2004, M&A biologist Ms. Sarah Lynch walked the entire project site in order to characterize the site and to document plant species composition and percent vegetative cover. All surface water hydrologic connections to the Petaluma River or other isolated wetlands were also documented.

SMHM habitat suitability at the project site was assessed based upon plant species composition and percent cover, combined with information on known locations of SMHM in the project vicinity. Typically, in tidal areas, M&A biologists gather information on adjacent areas and habitats, and the potential escape refugia provided by such areas. On the Haystack project site, M&A's efforts centered on documenting the degree of isolation of the project site from tidally influenced areas and the suitability of the project site for supporting the SMHM. Isolation of the project site was assessed based upon surrounding land cover features and potential corridors between suitable SMHM habitat on and off site. M&A also noted the degraded nature of the site due to past land uses.

Most of the project site is not under tidal influence, rather there are only two ditches (DD1 and DD2) that have hydrologic connectivity with tidally influenced areas. Most of the project site is separated from tidal influence by the railroad bed and tracks, and earthen berms along the eastern side of the site. DD1 and DD2 are connected to muted tidally influenced areas via a culvert under the railroad tracks which is in a state of disrepair and is partially blocked. This culvert allows muted tidal flows to enter these two ditches on the project site.

5.3 Trapping Study Plan

Prior to conducting the SMHM presence/absence survey, M&A submitted a trapping study design (study plan) to California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS) requesting concurrence with M&A's proposed survey methods. On September 16, 2004, Mr. Carl Wilcox of CDFG in Yountville, California approved M&A's study plan. Similarly, on September 21, 2004, Mr. J. Browning of USFWS in Sacramento, California approved M&A's study plan. M&A then conducted the SMHM presence/absence survey on the project site over an eight-night period, excluding weekends, from September 26, 2004 through October 8, 2004. The trapping study was completed under M&A's federal permit TE776608-6, and a Memorandum of Understanding with CDFG.

Due to past land uses pickleweed (*Salicornia virginica*) cover on the project site is minimal, and overall native vegetative cover is low. Past land uses including diking, grazing, native soil removal to create wash water basins, and subsequent filling of these basins with quarry wash water fines have eliminated most pickleweed dominated wetlands and have greatly altered the quality of remaining wetlands. To complete the SMHM survey, trap lines and trapping grids were established in wetland areas and their adjacent uplands that appeared to have the greatest potential for supporting the SMHM. Most of these areas were dominated (60 to 100%) by pickleweed. However, in some of the trapped areas, pickleweed was a co-dominant with salt grass (*Distichlis spicata*), another native salt marsh species known to support the SMHM when growing in association with pickleweed. Due to the limited amount of pickleweed on the project site, it was necessary to establish trap lines and grids in areas that are not only dominated by pickleweed (60 to 100 % cover), but also in areas where the pickleweed is co-dominant with salt grass. Where possible, traplines were also extended into upland ruderal habitats alongside dirt roads and the railroad tracks on the project site.

Scattered over this 37-acre project site, M&A identified enough pickleweed cover to place 698 Sherman live traps. Traps were set on approximate 10-foot centers throughout all suitable habitats. The 698 Sherman live-traps were set for 8 nights for a total of 5,584 trap-nights.

Ms. Sarah Lynch, Ms. Hope Kingma, and Mr. Geoff Monk of M&A conducted the trapping survey. All traps were opened (set) each evening at sunset and closed each morning shortly after sunrise. No trap remained set (open) during the day. Bait consisted of a mixture of rolled oats, osterized walnuts and walnut oil, and wild bird seed. Synthetic fiber insulation was also placed into each trap. All trap locations were flagged, and all were set above the high water mark of nearby waters (this was only a concern along the edge of the two ditches). Traps were checked beginning at sunrise and all captured animals were identified to species as encountered, recorded by trap-date, and then immediately released. All harvest mice trapped during the trapping study were also processed to check for the morphological characteristics consistent with those of SMHM as identified by Fisler (1965) and Shellhammer (1984). Processing including preparation of data sheets for each harvest mouse captured. All harvest mice datasheets completed during this trapping study are attached along with a table that summarizes the harvest mouse trapping results (Table 1, attached).

6. RESULTS

6.1 California Natural Diversity Database Search

There are two SMHM records within five miles of the project site (CDFG 2003) (Figure 5). One is located approximately 0.25- to 0.5-mile north of the project site, in the Petaluma River Marsh, east of the Northwestern Pacific Railroad tracks (CNDDB Occurrence Number 44). In this location, at the McNear Bridge (1.4 miles south of Petaluma), 19 SMHM were trapped in a total of 915 trap nights. The year of this trapping study is not given in the CNDDB record. However, it does state that numerous UC Berkeley Museum of Vertebrate Zoology specimens were trapped here between 1927 and 1940. The CNDDB record does not provide recent information on SMHM numbers at this location. This SMHM trapping location is separated from the project site not only by the railroad tracks that lie immediately east of the project site, but also by commercial buildings that abut the Petaluma River Marsh (see Figure 4). It should be noted that the Petaluma River Marsh at the SMHM record location is a tidally influenced coastal brackish marsh dominated by pickleweed, whereas the Haystack project site does not share these characteristics.

The second SMHM record in the area is also in the Petaluma River Marsh, east of the railroad tracks, yet south of the project site. This sighting is a minimum of two miles south of the project site. The railroad tracks and large expanses of rangeland separate this sighting from the project site (see Figures 4 and 5). The locational description of this sighting is: "on the west bank of Petaluma River from two miles south of Petaluma to Black Point" (CNDDB Occurrence Number 18; Figure 5). It also states that this SMHM record includes "a narrow portion of the east bank of the Petaluma River opposite the mouth of Black John Slough and in the Bahia, Novato." There are many trapping records from the 1980s in this marsh by CDFG, Dr. Shellhammer, and others. Again, the record location is for a tidally influenced, coastal brackish marsh dominated by pickleweed. The Haystack project site does not share these characteristics.

6.2 Trapping Habitat Characterizations

The project site's native vegetation communities have been greatly altered due to past land uses. However, since cessation of use of the quarry wash water basins in the early 1990s, native vegetative cover, such as pickleweed, is re-establishing onsite. However, a critical component of SMHM habitat is tidal flows, which are mostly absent from the project site. The project site is mostly separated from tidal influence by the raised railroad bed, earthen levees along the east side of the project site, and a partially blocked wooden box culvert underneath the railroad tracks which mutes most tidal action in the two ditches on the project site. Accordingly, re-establishment of pickleweed on the project site has been slow. Pickleweed growth is also hampered by the rapid growth of non-native grasses and forbs onsite, which are found in less brackish/more freshwater conditions and which directly compete with pickleweed for space and nutrients.

Regardless of the project site's limitations for supporting expansive picklweed habitats, M&A was able to find enough pickleweed habitat on the project site to establish multiple traplines with a minimum of 50 traps per line (50 per line along ditches DD1 and DD2, and 75 along DD3), and grids with a minimum of 5 rows of 10 traps for a 50 trap grid (please see Figure 6, attached, for trap line locations and trap numbers). Along ditches DD1 and DD2, pickleweed provided 35 to 80 % of the total vegetative cover (35% along DD2, 80% along the southern portion of DD1) at the trap locations. Where possible we attempted to place most traps in areas along these ditches that supported 100 % pickleweed cover. Where traps could not be placed along these ditches in areas with 100 % pickleweed cover, they were placed just above the pickleweed line in areas supporting a mixture of gum plant (*Grindelia* sp.), salt grass, and coyote brush (*Baccharis pilularis*). Along DD3, traps were placed in 100% pickleweed cover. In other portions of the project site traps were placed in areas with 35 to 50 % pickleweed, and 40 to 50 % salt grass. When traplines transitioned out of the dominant pickleweed habitat into other wetland habitats, fat hen (*Atriplex triangularis*) provided approximately 15 to 20 % of the vegetative cover, and rabbit's foot grass (*Polypogon monspilensis*) provided approximately 5 to 15 % of the cover. Please see Table 2, attached, for plant species and percent cover along each trap line.

6.3 Trapping Results

No SMHM were trapped during this 5,584 trap-night study. The only native rodents trapped were the California meadow vole (*Microtus californicus*) (n = 3) and the western harvest mouse (*Reithrodontomys megalotis*) (n = 210) (this number does not include recaptures). Using morphological diagnostic criteria developed by Fisler (1965) and Shellhammer (1984), M&A concluded that of the 210 harvest mice captured, none had distinct SMHM characteristics (M&A's harvest mice data sheets are attached to this report for review).

M&A used non-toxic, permanent ink to mark the dorsal and ventral surface of the western harvest mice tails to determine the number of recaptures caught each day. Tail marking was not initiated until day 2, so out of the 10 harvest mice captured on day 1, it is unknown how many were recaptured during the remaining nights. Captured western harvest mice were marked during 7 of the 8 days that traps were checked. On average, 26 western harvest mice recaptures were trapped each night.

The western harvest mouse's population size can be calculated using mark-recapture data. Using the Schumacher-Eschmeyer Statistical Method (Krebs 1999) to estimate the western harvest mouse population size in trapped areas of the project site, we determined that the estimated population of western harvest mice was approximately 269 animals (95% confidence level)[1].

Using Shellhammer's (1984) numeric values for tail characters, the average score for western harvest mice captured on the project site was 6. The majority of the adult harvest mice caught had tail diameters of 2.0 millimeters or less , their tails were indistinctly bicolored, with white or gray hairs on the tail's ventral surface, and the tail had a good point and taper (see Table 1 for a data summary for each harvest mouse). Two harvest mice had cumulative tail scores of 3. Both had a tail diameter of 2.2 millimeters, the tail was indistinctly bicolored, with intermediate colored ventral hairs and intermediate tip and taper (see Table 1 and data sheets 24 and 60). While these two mice are conceivably considered intergrades between a SMHM and a western harvest mouse (SMHM scores are typically 0 to 2; Shellhammer 1984), it is necessary to look at the overall harvest mouse population on any given site to determine if lower scoring mice that scored higher than a 2 could be regarded as SMHM. Since there were only two "3" scores captured out of 210 captures, and all other harvest mice captured typically had considerably higher scores (5 to 8), the two western harvest mice with scores of 3 were simply considered to be at the lower scoring range of western harvest mice found on the project site.

Few California meadow voles were trapped. This may be due to a population low at the time of trapping. The non-native house mouse (*Mus musculus*) was abundant onsite. Numerous house mice were trapped. Since M&A did not toe clip or otherwise mark the house mice, it is unknown

[1] Please note that the trapping study violated several of the assumptions of this statistical method: the population was not "closed" (mice could move into the trapping areas from outside sources), the mice were not equally "catchable" (some mice became "trap-happy" while others may have avoided the traps), and the site was not randomly sampled (the traps were only placed within the pickleweed-dominated areas of the site). Nonetheless, the trapping study was conducted over a significant portion of the site, and the statistical analysis provides a rough population estimate based on the mark-recapture data obtained during this study.

how many trapped house mice were recaptures. Due to the shear number of house mice trapped each day (greater than 90 most days), it is assumed that many of these mice were recaptures.

7. DISCUSSION AND CONCLUSIONS

Historically the project site was a salt marsh with tidal flow and native vegetation cover. To make the site useable for agriculture and other uses, the eastern property boundary was diked to remove tidal action. This disturbance combined with years of cattle grazing, followed by excavation of large amounts of soil to create quarry wash water basins onsite has not only removed all native plant communities onsite, but also displaced and altered the native fauna. After conducting a 5,584 trap-night study on the project site, M&A trapped 210 western harvest mice (this number does not include recaptures) and 761 non-native house mice (this number likely includes recaptures). No SMHM were trapped. The average cumulative tail score of the western harvest mice captured was 6 (see Table 1). A cumulative score of 6 or higher is a definite western harvest mouse (Shellhammer 1984).

During this trapping study two harvest mice were captured that had cumulative tail scores of 3. These mice had tail diameters of 2.2, their tails were indistinctly bicolored with intermediate colored ventral hairs, and an intermediate tail tip and taper (see Table 1). To determine if these cumulative scores of 3 would assign these harvest mice to either the salt marsh or western species, one needs to look at the overall harvest mouse population trapped. Because 208 harvest mice were trapped on the project site with cumulative tail scores ranging from 4 to 8, it makes sense to also classify these two 3 scores as the western harvest mouse. In Shellhammer's 1984 paper he states that "western harvest mice generally score a five or a six, sometimes a seven or eight. Salt marsh harvest mice generally score zero to two." He makes no mention of mice that score three or four.

Dr. Shellhammer has told M&A in the past that until electrophoresis analyses are completed that distinguish the genetic characteristics of SMHM and western harvest mouse, it may be best to assume that intergrades could be either SMHM or western harvest mice (H. Shellhammer, pers. comm. with G. Monk of M&A, 1994). In that context, it is most important to consider the overall occurrences of low vs. high scores within the trapped population. Because there is natural variation within any population, and there will always be a few animals that score both high and low within any cohort of mice examined, (i.e., there are outliers in the data set) it is most important to see which group the outlier likely belongs to. In this case, we did not trap a dominance of SMHM with two outliers in the western harvest mice scoring range. Rather just the opposite; that is, we captured 210 western harvest mice and only two had relatively low tail scores. Therefore we have concluded that the two 3 scores were clearly western harvest mice.

To further support our conclusion that the harvest mice trapped on the Haystack site with cumulative tail scores of 3 are western harvest mice, it is also helpful to look at other trapping results from live-trapping studies in nearby areas. When Mr. Fred Botti of CDFG trapped harvest mice along the Petaluma River Marsh directly south of the project site, the SMHM he captured generally had a cumulative tail score of 1 or 2 (F. Botti, pers. comm. with G. Monk of M&A, 1992). Also, in 2000, M&A conducted a 22,200 trap-night study along the Sonoma Creek marsh at Highway 37. During this study we captured 115 SMHM (Monk & Associates 2000). All of these mice had a cumulative tail score of 0, 1, or 2. Again, the scores of 2 were simply at the high end of the range of many SMHM that were captured.

Fisler (1965) and Shellhammer (1984) diagnostic criteria were used to evaluate harvest mice trapped on the Haystack Landing project site. Using these criteria M&A biologists concluded that no SMHM were captured during the 5,584 trap-night effort. None of the harvest mice captured during this study was assigned a cumulative tail score of less than 3 (and only two animals were a 3). Most of the scores were between 5 and 8, clearly indicating these animals were western harvest mice.

Based upon our discussions with agency personnel (J. Browning and P. Sorensen, USFWS, pers. comm. with Geoff Monk), and our own trapping experiences, 5,584 trap-nights spread over a 14-day period is a sufficient trapping period that will produce captures of SMHM if they are present. Because no SMHM were captured during 8 nights of trapping over a 14 day period, and because the trapping grids represented saturated trapping in all suitable SMHM habitats, M&A conclude that SMHM are absent from the project site and will remain unaffected by the proposed project and wetland restoration activities.

8. LIST OF STUDY PARTICIPANTS

Ms. Hope Kingma
Ms. Sarah Lynch
Mr. Geoff Monk

9. LITERATURE CITED

Fisler, G.F. 1965. Adaptation and speciation in Harvest Mice of the Marshes of San Francisco Bay. Publ. in Zool., University of California, Berkeley. 77:1-108.

Krebs, C. 1999. Ecological methodology. Addison-Welsey Education Publishers, Inc.

Shellhammer, H.S. 1984. Identification of salt marsh harvest mice, *Reithrodontomys raviventris,* in the field and cranial characteristics. California Department of Fish and Game 70(2) 113-120.

Monk & Associates. 2000. Sonoma Creek bridge salt marsh harvest mouse trapping relocation project. Sonoma and Solano Counties, California. August 17, 2000. Report prepared for State of California Department of Transportation. District 4. Environmental Planning North, Oakland, California. 11 pps.

MONK & ASSOCIATES

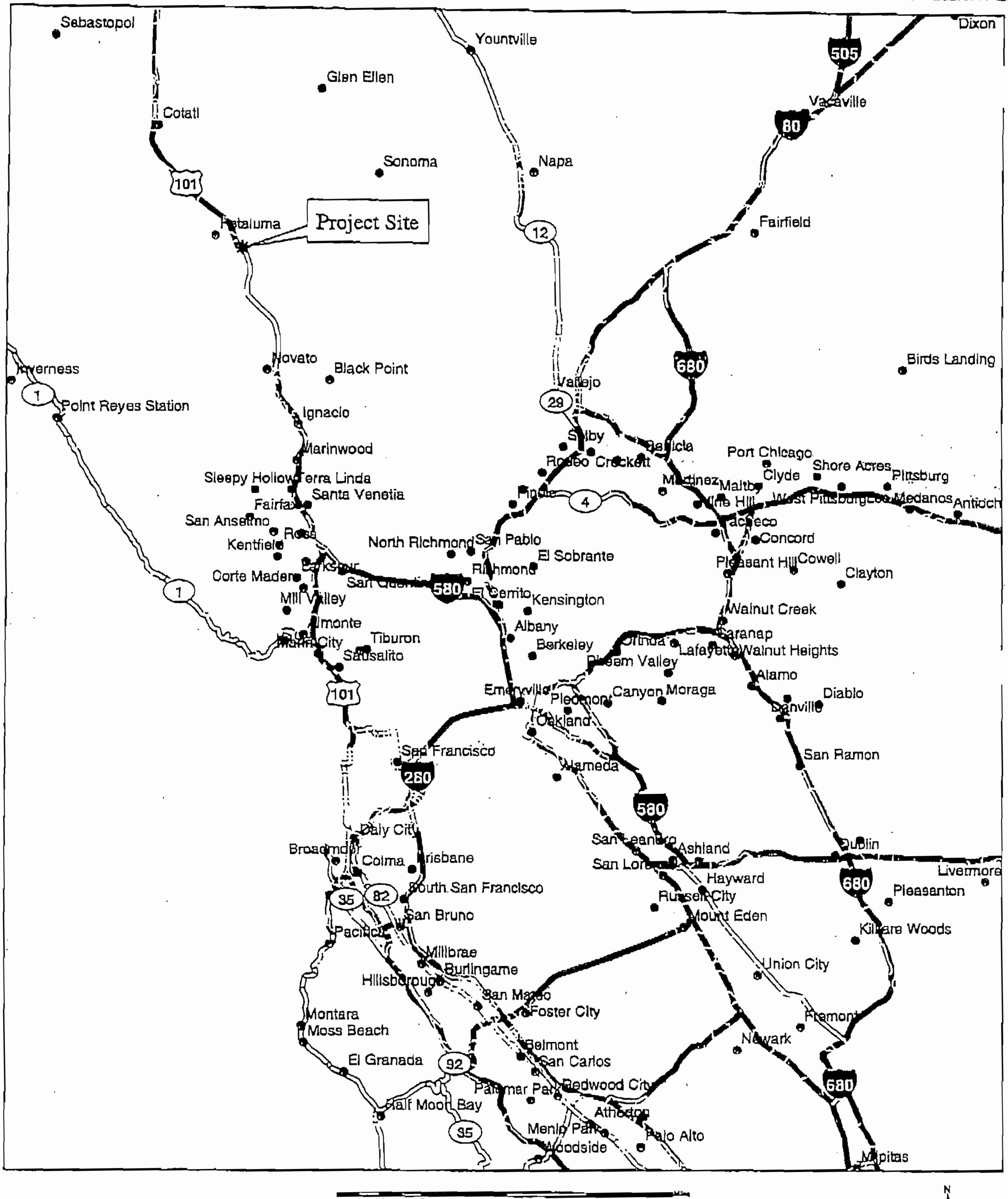

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Figure 1. Regional Map
Haystack Landing Project Site
Petaluma, California

County: Sonoma
Map Preparation Date: April 28, 2004

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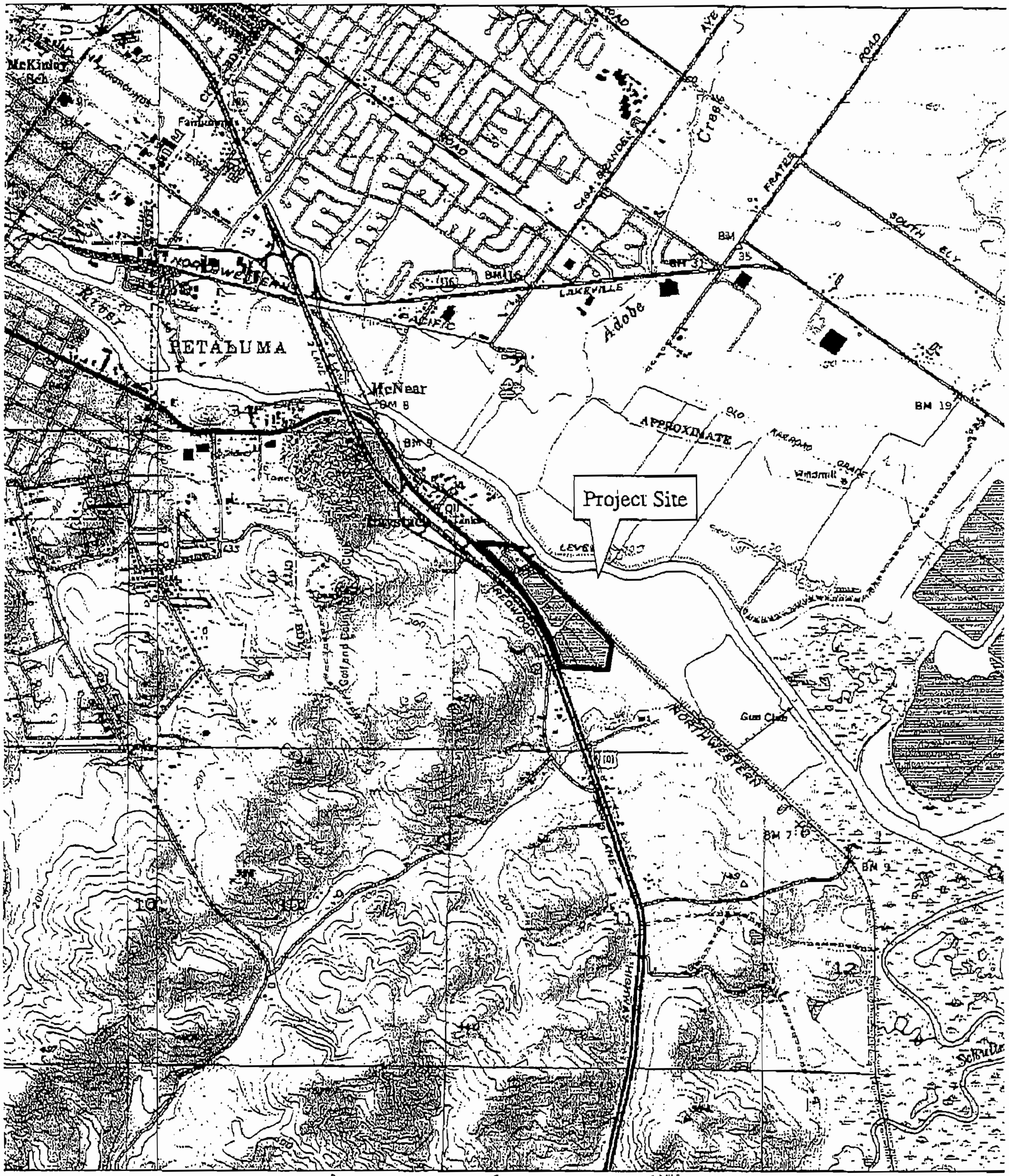

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Figure 2. Location Map
Haystack Landing Project Site
Petaluma, California

Map Preparation Date: April 28, 2004
7.5-Minute Petaluma River Quadrangle.
Source: California Natural Diviersity Data Base. 2003

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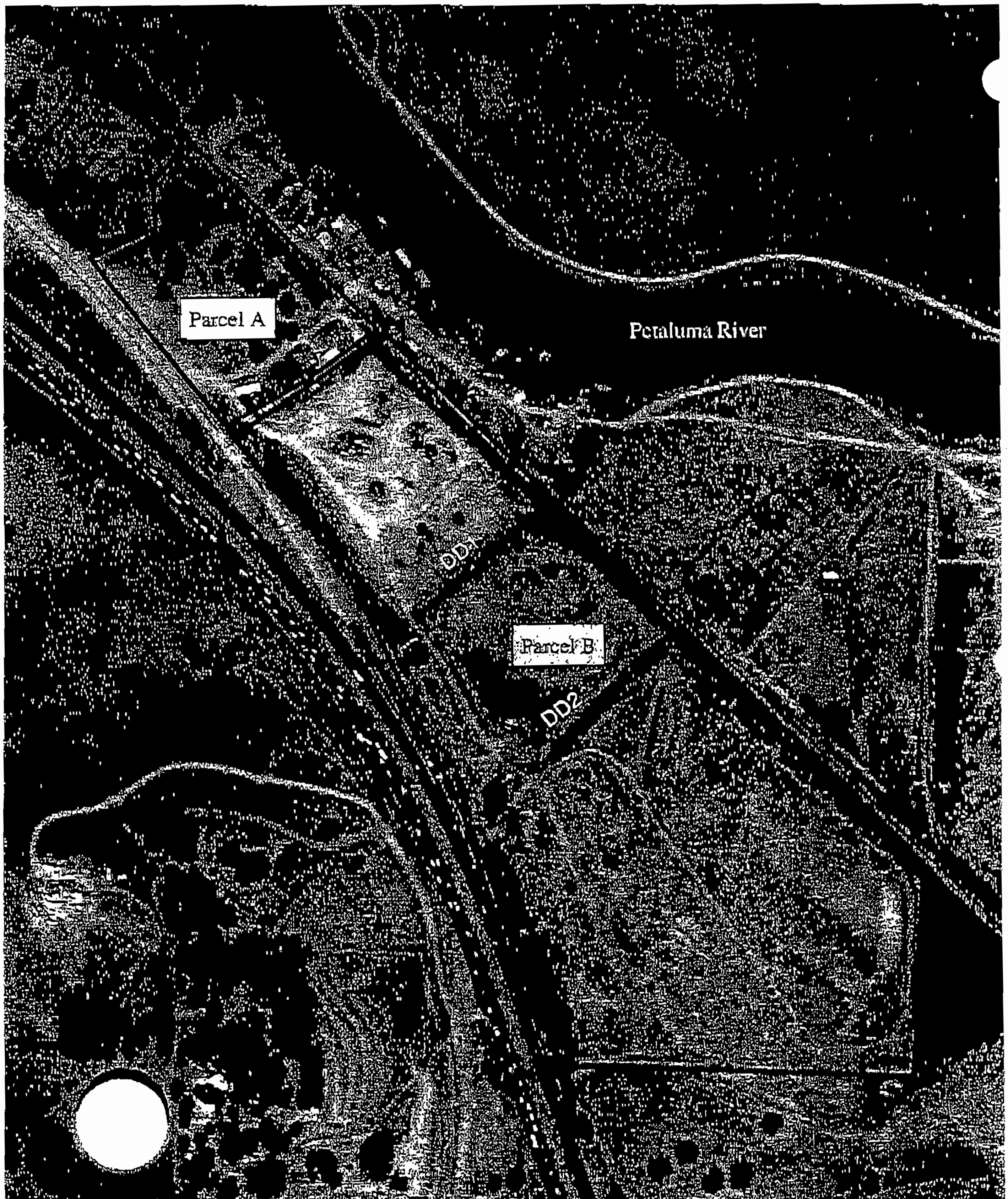

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Figure 3. Parcels A & B
Haystack Landing Project Site
Petaluma, California

Map Preparation Date: April 28, 2004
Source: globexplorer.com
Aerial Photograph Date: June 15, 2002

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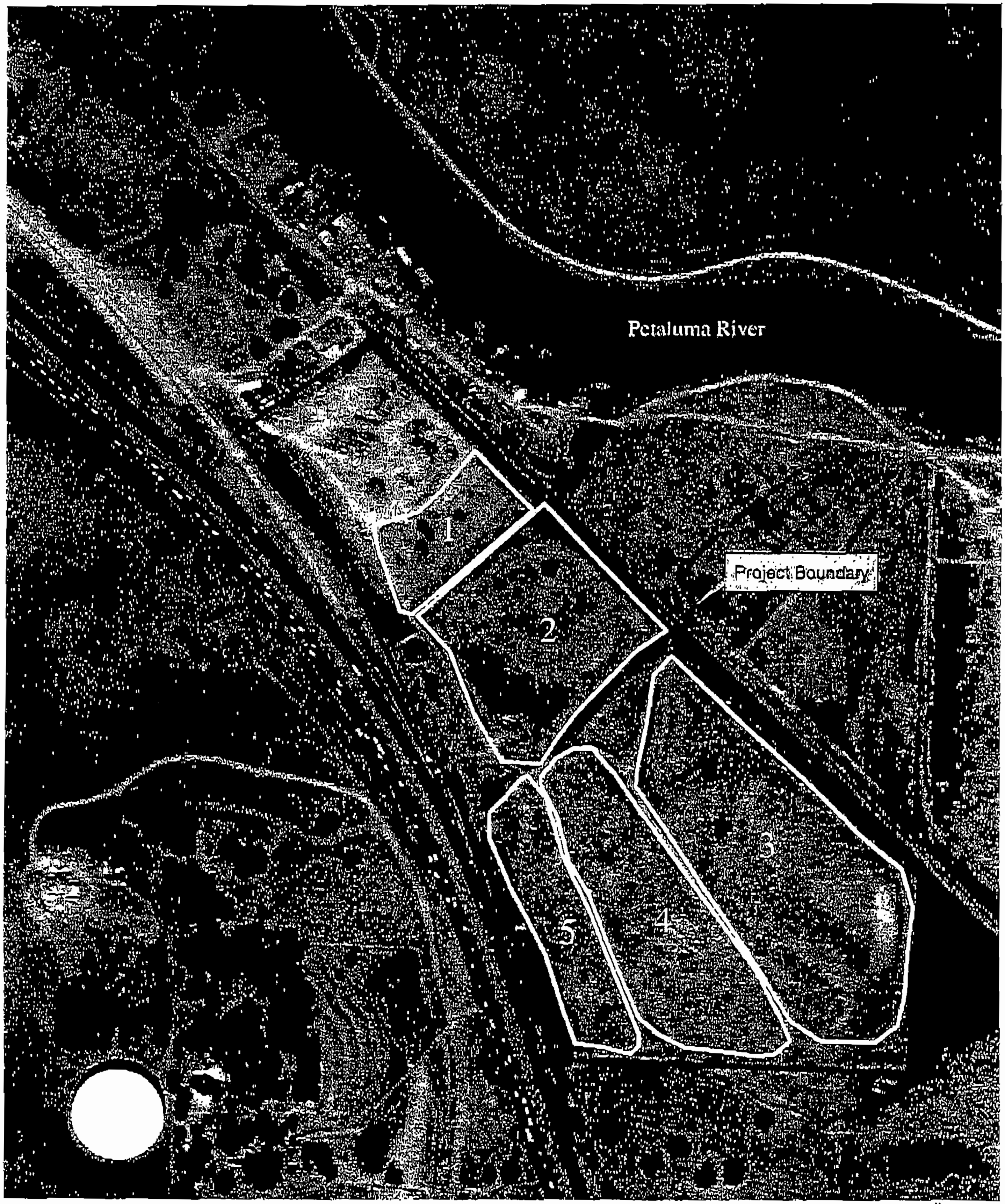

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Figure 4. Siltation Ponds
Haystack Landing Project Site
Petaluma, California

Map Preparation Date: April 28, 2004
Source: globexplorer.com
Aerial Photograph Date: June 15, 2002

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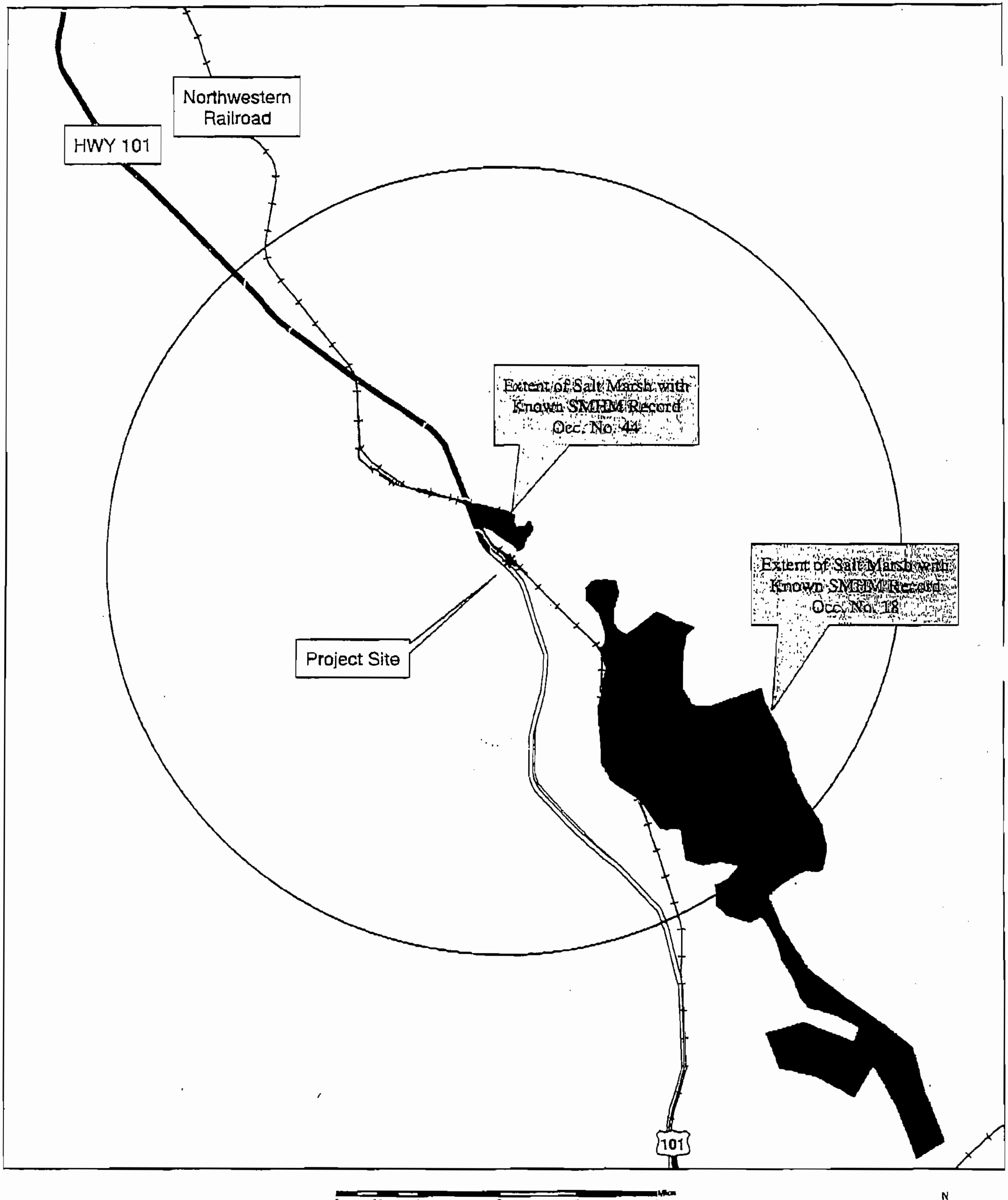

Figure 5. SMHM Locations in the Vicinity of the Haystack Landing Project Site, Petaluma, California.

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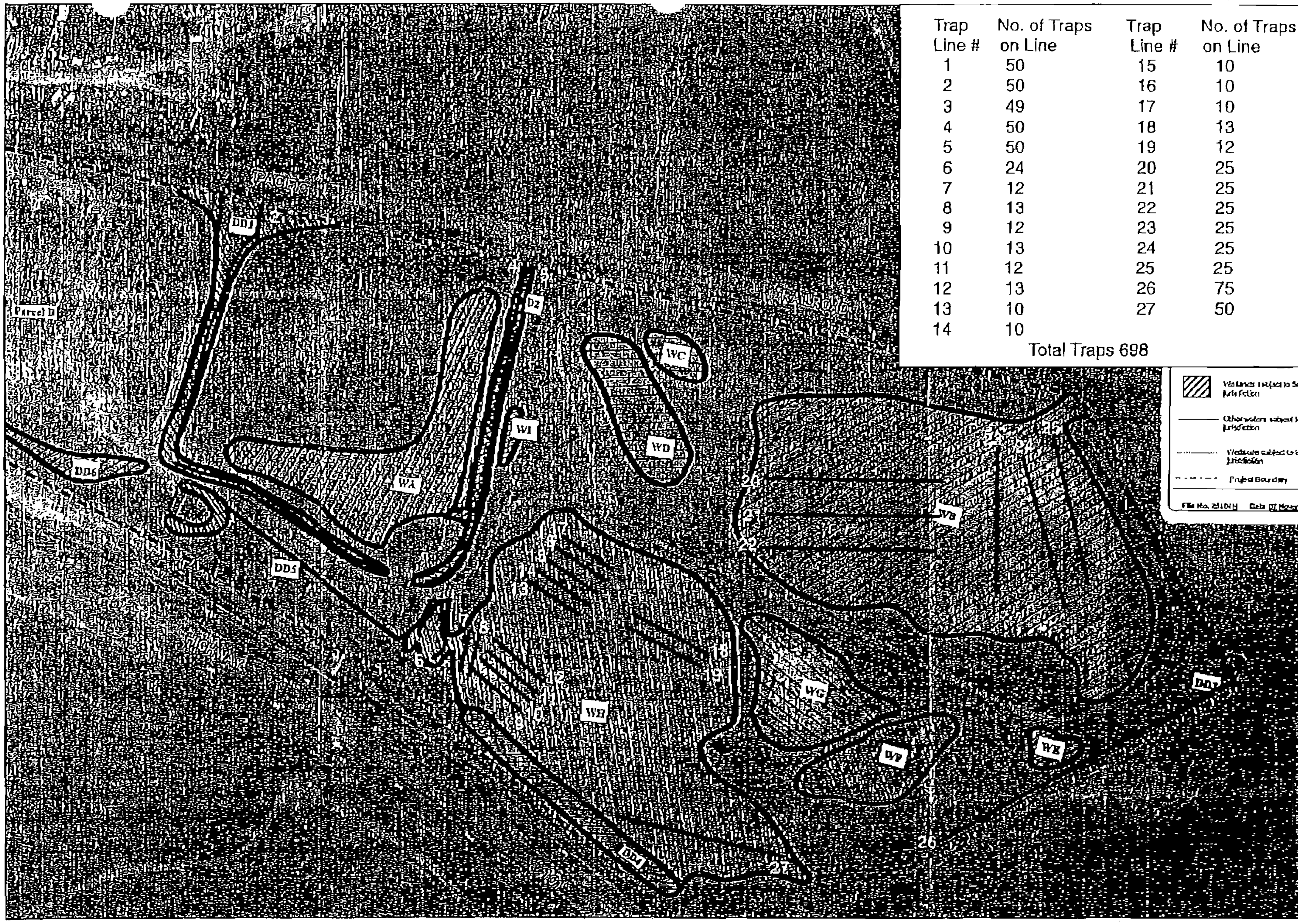
— 5-mile radius
Source: California Natural Diviersity Data Base, 2003
7.5-Minute Cuttings Wharf Quadrangle.
Map Preparation Date: February 6, 2004



Trap Line #	No. of Traps on Line	Trap Line #	No. of Traps on Line
1	50	15	10
2	50	16	10
3	49	17	10
4	50	18	13
5	50	19	12
6	24	20	25
7	12	21	25
8	13	22	25
9	12	23	25
10	13	24	25
11	12	25	25
12	13	26	75
13	10	27	50
14	10		

Total Traps 698

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Figure 6. SMHM Trap Line Locations
Haystack Landing Project Site
Petaluma, California

Trap Line #
Trap Line
Map Preparation Date: September 17, 2004

Table 1. Harvest Mouse Data Collected at the Haystack Landing Project Site Between September 26 and October 8, 2004.

		Morphological Characteristics				Cumulative score	Species designation
Capture number	Belly coloration*	Tail diameter	Dorsal/Ventral contrast	Color of ventral hairs	Tail tip and taper		
1	1	1.9	Indistinct	gray	pointed/good	7	WHM
2	2	1.9	Indistinct	white/gray	pointed/good	7	WHM
3	2	1.8	Indistinct	white/gray	pointed/good	7	WHM
4	2	1.5	Indistinct	white/gray	pointed/good	7	WHM
5	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
6	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
7	2	1.9	Indistinct	white/gray	pointed/good	7	WHM
8	2	1.8	Indistinct	white/gray	pointed/good	7	WHM
9	2	2.0	Indistinct	white/gray	pointed/good	6	WHM
10	3	1.8	Distinct bicolor	white/gray	pointed/good	8	WHM
11	2	1.5	Indistinct	white/gray	pointed/good	7	WHM
12	2	2.0	Distinct bicolor	white/gray	pointed/good	8	WHM
13	1	1.8	Distinct bicolor	white/gray	pointed/good	8	WHM
14	3	1.8	Distinct bicolor	white/gray	Intermediate	7	WHM
15	2	2.1	Distinct bicolor	white/gray	pointed/good	7	WHM
16	1	1.7	Distinct bicolor	white/gray	pointed/good	8	WHM
17	2	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
18	2	2.0	Distinct bicolor	white/gray	Intermediate	6	WHM
19	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
20	1	1.8	Indistinct	white/gray	pointed/good	7	WHM
21	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
22	3	2.1	Indistinct	white/gray	pointed/good	6	WHM
23	3	1.8	Distinct bicolor	white/gray	pointed/good	8	WHM
24	3	2.2	Indistinct	Intermediate	Intermediate	3	WHM
25	escaped-	hole in bag					
26	3	2.0	Indistinct	Intermediate	pointed/good	5	WHM
27	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
28	3	1.7	Distinct bicolor	white/gray	pointed/good	8	WHM
29	3	1.6	Indistinct	white/gray	pointed/good	7	WHM
30	3	1.7	Indistinct	Intermediate	Intermediate	5	WHM
31	3	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
32	5	1.8	Indistinct	white/gray	pointed/good	7	WHM
33	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
34	6	1.5	Distinct bicolor	Intermediate	Intermediate	6	WHM
35	3	1.6	Unicolor	white/gray	pointed/good	6	WHM
36	3	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
37	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
38	3	1.8	Indistinct	white/gray	Intermediate	6	WHM
39	3	1.7	Indistinct	white/gray	pointed/good	7	WHM
40	3	2.1	Indistinct	white/gray	pointed/good	6	WHM
41	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
42	3	1.7	Indistinct	white/gray	pointed/good	7	WHM
43	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
44	3	1.8	Distinct bicolor	white/gray	Intermediate	7	WHM
45	3	1.7	Indistinct	white/gray	pointed/good	7	WHM
46	3	1.8	Indistinct	Intermediate	pointed/good	6	WHM

Table 1. Harvest Mouse Data Collected at the Haystack Landing Project Site Between September 26 and October 8, 2004.

	Morphological Characteristics					Cumulative score	Species designation
Capture number	Belly coloration*	Tail diameter	Dorsal/Ventral contrast	Color of ventral hairs	Tail tip and taper		
47	2	1.7	Distinct bicolor	white/gray	Intermediate	7	WHM
48	3	2.1	Indistinct	white/gray	blunt/no taper	4	WHM
49	3	1.9	Indistinct	Intermediate	pointed/good	6	WHM
50	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
51	3	2.0	Indistinct	white/gray	Intermediate	5	WHM
52	3	1.9	Indistinct	Intermediate	Intermediate	5	WHM
53	3	1.8	Indistinct	Intermediate	Intermediate	5	WHM
54	2	2.0	Indistinct	Intermediate	pointed/good	5	WHM
55	4	1.6	Indistinct	Intermediate	Intermediate	5	WHM
56	4	1.8	Indistinct	Intermediate	Intermediate	5	WHM
57	4	2.1	Indistinct	white/gray	blunt/no taper	4	WHM
58	1	2.2	Indistinct	white/gray	Intermediate	4	WHM
59	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
60	3	2.2	Indistinct	Intermediate	Intermediate	3	WHM
61	2	2.0	Indistinct	white/gray	Intermediate	5	WHM
62	1	2.0	Indistinct	white/gray	pointed/good	6	WHM
63	3	2.0	Indistinct	Intermediate	pointed/good	5	WHM
64	Recapture	No tail	data collected.				WHM
65	3	1.7	Indistinct	white/gray	Intermediate	6	WHM
66	Recapture	No tail	data collected.				WHM
67	3	1.6	Indistinct	white/gray	pointed/good	7	WHM
68	3	1.9	Indistinct	Intermediate	pointed/good	6	WHM
69	1	1.9	Indistinct	white/gray	pointed/good	7	WHM
70	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
71	3	2.0	Indistinct	Intermediate	Intermediate	4	WHM
72	Recapture	No tail	data collected.				WHM
73	3	2.1	Indistinct	Intermediate	Intermediate	4	WHM
74	Recapture	No tail	data collected.				WHM
75	3	1.8	Indistinct	Intermediate	pointed/good	6	WHM
76	3	1.6	Indistinct	white/gray	Intermediate	6	WHM
77	3	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
78	Recapture	No tail	data collected.				WHM
79	5	1.9	Indistinct	Intermediate	pointed/good	6	WHM
80	3	1.6	Indistinct	white/gray	Intermediate	6	WHM
81	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
82	5	1.9	Indistinct	white/gray	pointed/good	7	WHM
83	Recapture	No tail	data collected.				WHM
84	3	1.8	Indistinct	white/gray	Intermediate	6	WHM
85	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
86	Recapture	No tail	data collected.				
87	Recapture	No tail	data collected.				
88	3	1.8	Indistinct	Intermediate	Intermediate	5	WHM
89	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
90	4	1.9	Unicolor	white/gray	Intermediate	5	WHM
91	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
92	Recapture	No tail	data collected.				

Table 1. Harvest Mouse Data Collected at the Haystack Landing Project Site Between September 26 and October 8, 2004.

		Morphological Characteristics				Cumulative score	Species designation
Capture number	Belly coloration*	Tail diameter	Dorsal/Ventral contrast	Color of ventral hairs	Tail tip and taper		
93	2	2.0	Distinct bicolor	white/gray	pointed/good	7	WHM
94	Recapture	No tail	data collected.				
95	4	1.8	Indistinct	Intermediate	Intermediate	5	WHM
96	Recapture	1.8	No other data	collected.			
97	3	1.8	Indistinct	white/gray	Intermediate	6	WHM
98	Recapture	No tail	data collected.				
99	3	1.7	Distinct bicolor	white/gray	pointed/good	8	WHM
100	Recapture	No tail	data collected.				
101	3 to 4	1.9	Indistinct	white/gray	pointed/good	7	WHM
102	2	1.8	Distinct bicolor	white/gray	pointed/good	8	WHM
103	3	1.7	Indistinct	Intermediate	pointed/good	6	WHM
104	3	1.8	Indistinct	white/gray	Intermediate	6	WHM
105	2	1.9	Unicolor	white/gray	Intermediate	5	WHM
106	4	1.7	Indistinct	Intermediate	pointed/good	6	WHM
107	Recapture	No tail	data collected.				
108	3	1.8	Indistinct	white/gray	Intermediate	6	WHM
109	Recapture	No tail	data collected.				
110	Recapture	No tail	data collected.				
111	Recapture	No tail	data collected.				
112	2	1.9	Indistinct	white/gray	Intermediate	6	WHM
113	3	1.7	Indistinct	white/gray	pointed/good	7	WHM
114	Recapture	No tail	data collected.				
115	2	1.8	Indistinct	white/gray	pointed/good	7	WHM
116	Recapture	No tail	data collected.				
117	Recapture	No tail	data collected.				
118	Recapture	No tail	data collected.				
119	Recapture	No tail	data collected.				
120	Recapture	No tail	data collected.				
121	2	1.9	Indistinct	white/gray	pointed/good	7	WHM
122	3	1.9	Distinct bicolor	Intermediate	Intermediate	6	WHM
123	3	2.2	Distinct bicolor	white/gray	blunt/no taper	4	WHM
124	Recapture	No tail	data collected.				
125	2	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
126	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
127	3	2.0	Distinct bicolor	Intermediate	pointed/good	6	WHM
128	3	1.9	Indistinct	Intermediate	pointed/good	6	WHM
129	3	1.9	Distinct bicolor	white/gray	Intermediate	7	WHM
130	3	1.9	Indistinct	white/gray	Intermediate	6	WHM
131	Recapture	No tail	data collected.				
132	Recapture	No tail	data collected.				
133	3	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
134	2	1.7	Distinct bicolor	white/gray	pointed/good	8	WHM
135	2	1.8	Indistinct	white/gray	pointed/good	7	WHM
136	3	2.0	Indistinct	Intermediate	pointed/good	5	WHM
137	3	2.0	Indistinct	white/gray	Intermediate	5	WHM
138	Recapture	No tail	data collected.				

Table 1. Harvest Mouse Data Collected at the Haystack Landing Project Site Between September 26 and October 8, 2004.

Capture number	Belly coloration*	Tail diameter	Dorsal/Ventral contrast	Color of ventral hairs	Tail tip and taper	Cumulative score	Species designation
139	Recapture	No tail	data collected.				
140	3	2.0	Indistinct	Intermediate	pointed/good	5	WHM
141	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
142	Recapture	No tail	data collected.				
143	escaped						
144	3	1.8	Distinct bicolor	Intermediate	Intermediate	6	WHM
145	2	1.9	Indistinct	white/gray	pointed/good	7	WHM
146	3	1.7	Indistinct	Intermediate	pointed/good	6	WHM
147	Recapture	No tail	data collected.				
148	Recapture	No tail	data collected.				
149	2	1.9	Indistinct	Intermediate	pointed/good	6	WHM
150	Escaped	two mice	in same trap				
151	3	1.9	Indistinct	Intermediate	pointed/good	6	WHM
152	3	1.8	Indistinct	Intermediate	Intermediate	5	WHM
153	Recapture	No tail	data collected.				
154	Recapture	No tail	data collected.				
155	2	1.7	Distinct bicolor	white/gray	pointed/good	8	WHM
156	Recapture	No tail	data collected.				
157	2	2.1	Indistinct	Intermediate	Intermediate	4	WHM
158	3	1.7	Indistinct	Intermediate	Intermediate	5	WHM
159	Recapture	No tail	data collected.				
160	3	2.0	Distinct bicolor	white/gray	pointed/good	7	WHM
161	Recapture	No tail	data collected.				
162	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
163	2	1.8	Indistinct	white/gray	pointed/good	7	WHM
164	3	2.0	Indistinct	Intermediate	Intermediate	4	WHM
165	Recapture	No tail	data collected.				
166	3	2.0	Indistinct	Intermediate	Intermediate	4	WHM
167	3	2.0	Indistinct	white/gray	Intermediate	5	WHM
168	3	1.9	Distinct bicolor	Intermediate	pointed/good	7	WHM
169	3	1.9	Distinct bicolor	white/gray	pointed/good	8	WHM
170	3	2.0	Distinct bicolor	Intermediate	Intermediate	5	WHM
171	Recapture	No tail	data collected.	(2nd time	recaptured)		
172	Recapture	No tail	data collected.				
173	3	2.1	Indistinct	white/gray	Intermediate	5	WHM
174	Recapture	No tail	data collected.				
175	3	2.2	Distinct bicolor	white/gray	pointed/good	6	WHM
176	3	2.1	Indistinct	white/gray	pointed/good	5	WHM
177	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
178	3	1.8	Indistinct	Intermediate	Intermediate	5	WHM
179	3	1.7	Distinct bicolor	Intermediate	Intermediate	6	WHM
180	1	1.6	Indistinct	white/gray	pointed/good	7	WHM
181	3	1.9	Indistinct	white/gray	Intermediate	6	WHM
182	3	2.0	Distinct bicolor	white/gray	Intermediate	6	WHM
183	3	1.9	Indistinct	Intermediate	pointed/good	6	WHM
184	Recapture	No tail	data collected.				

Table 1. Harvest Mouse Data Collected at the Haystack Landing Project Site Between September 26 and October 8, 2004.

			Morphological Characteristics			Cumulative score	Species designation
Capture number	Belly coloration*	Tail diameter	Dorsal/Ventral contrast	Color of ventral hairs	Tail tip and taper		
185	Recapture	No tail	data collected.				
186	3	2.0	Distinct bicolor	white/gray	pointed/good	7	WHM
187	1	2.0	Indistinct	Intermediate	pointed/good	5	WHM
188	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
189	3	2.0	Distinct bicolor	white/gray	Intermediate	6	WHM
190	Recapture	No tail	data collected.				
191	3	2.0	Indistinct	white/gray	pointed/good	7	WHM
192	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
193	2	2.2	Indistinct	white/gray	pointed/good	5	WHM
194	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
195	2	1.7	Indistinct	white/gray	pointed/good	7	WHM
196	3	1.7	Indistinct	white/gray	pointed/good	7	WHM
197	3	2.2	Distinct bicolor	white/gray	Intermediate	5	WHM
198	Recapture	No tail	data collected.				
199	3	1.7	Indistinct	white/gray	Intermediate	6	WHM
200	3	2.1	Distinct bicolor	whip	pointed/good	7	WHM
201	Recapture	No tail	data collected.				
202	3	1.9	Indistinct	white/gray	Intermediate	6	WHM
203	3	2.0	Indistinct	white/gray	Intermediate	5	WHM
204	3	2.0	Indistinct	Intermediate	Intermediate	4	WHM
205	1	1.7	Unicolor	Intermediate	Intermediate	4	WHM
206	Recapture	No tail	data collected.				
207	Recapture	No tail	data collected.				
208	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
209	3	2.0	Indistinct	white/gray	Intermediate	5	WHM
210	2	1.8	Indistinct	white/gray	pointed/good	7	WHM
211	3	2.0	Distinct bicolor	white/gray	pointed/good	7	WHM
212	Recapture	No tail	data collected.				
213	1	1.8	Indistinct	Intermediate	Intermediate	5	WHM
214	Recapture	No tail	data collected.				
215	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
216	Recapture	No tail	data collected.				
217	1	2.2	Indistinct	white/gray	Intermediate	4	WHM
218	2	1.9	Distinct bicolor	white/gray	Intermediate	7	WHM
219	2	2.1	Indistinct	white/gray	Intermediate	5	WHM
220	3	1.8	Indistinct	white/gray	pointed/good	7	WHM
221	3	1.9	Indistinct	white/gray	pointed/good	7	WHM
222	5	2.1	Indistinct	white/gray	pointed/good	6	WHM
223	3	2.0	Distinct bicolor	white/gray	pointed/good	7	WHM
224	4	2.0	Distinct bicolor	Intermediate	Intermediate	5	WHM
225	3	1.8	Indistinct	white/gray	Intermediate	6	WHM
226	3	1.9	Indistinct	white/gray	Intermediate	6	WHM
227	1	1.9	Indistinct	white/gray	pointed/good	7	WHM
228	3	2.0	Indistinct	white/gray	pointed/good	6	WHM
229	3	2.0	Indistinct	Intermediate	Intermediate	4	WHM
230	3	1.6	Indistinct	white/gray	pointed/good	7	WHM

Table 1. Harvest Mouse Data Collected at the Haystack Landing Project Site Between September 26 and October 8, 2004.

	Morphological Characteristics					Cumulative score	Species designation
Capture number	Belly coloration*	Tail diameter	Dorsal/Ventral contrast	Color of ventral hairs	Tail tip and taper		
231	3	1.5	Indistinct	white/gray	pointed/good	7	WHM
232	3	1.7	Indistinct	white/gray	Intermediate	6	WHM
233	2	1.5	Indistinct	white/gray	pointed/good	7	WHM
234	3	1.9	Distinct bicolor	white/gray	Intermediate	7	WHM
235		1.6	Indistinct	white/gray	Intermediate	6	WHM
236	3	2.1	Distinct bicolor	white/gray	Intermediate	6	WHM
237	2	1.5	Indistinct	white/gray	pointed/good	7	WHM
238	3	2.0	Indistinct	white/gray	Intermediate	5	WHM
239	4	2.0	Indistinct	white/gray	Intermediate	5	WHM
240	2	1.6	Distinct bicolor	white/gray	Intermediate	7	WHM
241	3	1.7	Indistinct	white/gray	pointed/good	5	WHM
242	2	1.8	Indistinct	white/gray	Intermediate	6	WHM
243	Recapture	No tail	data collected.				
244	2	1.4	Indistinct	white/gray	pointed/good	7	WHM
245	2	1.6	Indistinct	white/gray	pointed/good	7	WHM
246	1	1.9	Indistinct	white/gray	Intermediate	6	WHM
247	2	1.6	Indistinct	white/gray	Intermediate	6	WHM

Table 2. Plant Species Composition and Percent Cover Along Placed Trap Lines

Trapline No.	Species and Percent Cover	Comments
1	*Typha angustifolia* 10% *Scirpus maritimus* 45% *Salicornia virginica* 45%	50 traps placed Trapline located along northern edge of ditch (DD1)
2	*Typha angustifolia* 10% *Scirpus maritimus* 45% *Salicornia virginica* 45%	50 traps placed Trapline located along southern edge of ditch (DD1)
3	*Salicornia virginica* 80% *Polypogon maritimus* 10% *Scirpus maritimus* 10%	50 traps placed Trapline oriented along southern arm of DD1
4	*Salicornia virginica* 35% *Baccharis pilularis* 20% *Grindelia camporum* 1% *Scirpus maritimus* 40% *Spartina foliosa* 5%	50 traps placed
5	*Salicornia virginica* 35% *Baccharis pilularis* 20% *Grindelia camporum* 1% *Scirpus maritimus* 40% *Spartina foliosa* 5%	50 traps placed
6	*Atriplex triangularis* 5% *Typha angustifolia* 55% *Scirpus maritimus* 5% *Salicornia virginica* 25% *Distichlis spicata* 10%	25 traps placed. *Typha* is in the middle of this "ponded" area. Traps set outside the *Typha* in the *Salicornia*.
7	*Salicornia virginica* 35% *Distichlis spicata* 45% *Atriplex triangularis* 15% *Polypogon monspeliensis* 5% *Cotula cornopifolia* present	12 traps placed; part of a grid with Trap line 8.
8	*Salicornia virginica* 35% *Distichlis spicata* 45% *Atriplex triangularis* 15% *Polypogon monspeliensis* 5% *Cotula cornopifolia* present	13 traps placed; part of a grid with Trap line 7.

SMHM Traplines
Haystack Landing

MONK & ASSOCIATES

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Trapline No.	Species and Percent Cover	Comments
9	*Salicornia virginica* 40% *Lolium multiflorum* 10% *Distichlis spicata* 30% *Frankenia salina* <5% *Polypogon monspeliensis* 10% *Scirpus maritimus* 5% *Atriplex triangularis* 5%	12 traps placed. Part of a grid pattern w/ rows 10-12.
10	*Salicornia virginica* 40% *Lolium multiflorum* 10% *Distichlis spicata* 30% *Frankenia salina* <5% *Polypogon monspeliensis* 10% *Scirpus maritimus* 5% *Atriplex triangularis* 5%	13 traps placed
11	*Salicornia virginica* 40% *Lolium multiflorum* 10% *Distichlis spicata* 30% *Frankenia salina* <5% *Polypogon monspeliensis* 10% *Scirpus maritimus* 5% *Atriplex triangularis* 5%	12 traps placed
12	*Salicornia virginica* 40% *Lolium multiflorum* 10% *Distichlis spicata* 30% *Frankenia salina* <5% *Polypogon monspeliensis* 10% *Scirpus maritimus* 5% *Atriplex triangularis* 5%	13 traps placed
13	*Salicornia virginica* 65% *Distichlis spicata* 5% *Lolium multiflorum* 10% *Hordeum marinum* 10% *Polypogon monspeliensis* 10% *Scirpus maritimus* <5%	10 traps placed. Part of a a grid pattern w/ rows 14-17

Trapline No.	Species and Percent Cover	Comments
14	*Salicornia virginica* 65% *Distichlis spicata* 5% *Lolium multiflorum* 10% *Hordeum marinum* 10% *Polypogon monspeliensis* 10% *Scirpus maritimus* <5%	10 traps placed
15	*Salicornia virginica* 65% *Distichlis spicata* 5% *Lolium multiflorum* 10% *Hordeum marinum* 10% *Polypogon monspeliensis* 10% *Scirpus maritimus* <5%	10 traps placed
16	*Salicornia virginica* 65% *Distichlis spicata* 5% *Lolium multiflorum* 10% *Hordeum marinum* 10% *Polypogon monspeliensis* 10% *Scirpus maritimus* <5%	10 traps placed
17	*Salicornia virginica* 65% *Distichlis spicata* 5% *Lolium multiflorum* 10% *Hordeum marinum* 10% *Polypogon monspeliensis* 10% *Scirpus maritimus* <5%	10 traps placed
18	*Salicornia virginica* 35% *Lotus corniculatus* 35% *Hordeum marinum* 20% *Lolium multiflorum* 10%	13 traps placed
19	*Salicornia virginica* 55% *Lotus corniculatus* 10% *Polypogon monspeliensis* 5% *Lolium multiflorum* 30%	12 traps placed
20	*Salicornia virginica* 25% *Polypogon monspeliensis* 10% *Vulpia bromoides* 30% *Picris echioides* 5% *Hordeum marinum* 10%	25 traps placed

Trapline No.	Species and Percent Cover	Comments
	Bromus hordeaceus 20% *Medicago polymorpha* <5%	
21	*Salicornia virginica* 25% *Polypogon monspeliensis* 10% *Vulpia bromoides* 30% *Picris echioides* 5% *Hordeum marinum* 10% *Bromus hordeaceus* 20% *Medicago polymorpha* <5%	25 traps placed
22	*Salicornia virginica* 25% *Polypogon monspeliensis* 10% *Vulpia bromoides* 30% *Picris echioides* 5% *Hordeum marinum* 10% *Bromus hordeaceus* 20% *Medicago polymorpha* <5%	25 traps placed
23	*Salicornia virginica* 45% *Bromus hordeaceus* <5% *Polypogon monspeliensis* 22% *Hordeum marinum* 30% *Lolium multiflorum* <5%	25 traps placed
24	*Salicornia virginica* 35% *Hordeum marinum* <5% *Polypogon monspeliensis* 10% *Crypsis schoenoides* <5% *Atriplex triangularis* <5% *Xanthium strumarium* 5% *Typha angustifolia* <5% Bare ground 45%	25 traps placed
25	*Salicornia virginica* 35% *Hordeum marinum* <5% *Polypogon monspeliensis* 10% *Crypsis schoenoides* <5% *Atriplex triangularis* <5% *Xanthium strumarium* 5% *Typha angustifolia* <5% Bare ground 45%	25 traps placed

Trapline No.	Species and Percent Cover	Comments
26	*Salicornia virginica* 100% *Scirpus maritimus* <5%	75 traps placed
27	*Salicornia virginica* 20% *Distichlis spicata* 5% *Polypogon monspeliensis* 75% *Picris echioides* <5% *Avena* sp. present *Bromus hordeaceus* present *Medicago polymorpha* present	50 traps placed

Table 3. Number of Small Mammals Trapped Daily

	Sept. 27	Sept. 28	Sept. 29	Sept. 30	Oct. 5	Oct. 6	Oct. 7	Oct. 8	TOTAL:
Western harvest mouse (WHM)*	10	46	54	48	37	54	66	52	367
WHM recaptures	0	0**	12	16	18	31	34	46	157
New WHM captures each day	10	46	42	32	19	23	32	6	210
Percentage of WHM that are recaptures		0%	22	33	49	57	52	88	43%

House mouse*	44	111	117	108	92	95	94	100	761
California meadow vole	0	0	0	2	0	0	1	0	3
Norway rat	0	0	0	1	1	0	0	0	2

*This number includes recaptures

**harvest mice were not marked on the first trapping day so it is unknown if there were any recaptures on the second day.

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April 6, 2007
(*Via e-mail)*

Brian Peer
The Dutra Group
1000 Point San Pedro Road
San Rafael, CA 94901

Subject: Heron/Egret Rookery Impact Assessment and Recommendations, Haystack Landing Project, Petaluma, California

Dear Mr. Peer:

The following provides LSA Associates, Inc. (LSA) assessment of the potential effects of the Haystack Landing off-loading and processing facility to the heron and egret rookery located at the northwestern corner of the property. We have also provided our recommendations to minimize potential impacts and ensure project compliance with state and federal regulations that provide protection for the rookery.

Our assessment and recommendations are based on review of pertinent scientific literature, onsite observations of the active rookery, as well as our professional experience in dealing with similar issues at other rookeries. In particular, I was involved in the analysis, development, and implementation of protection measures of a heron and egret rookery on De Silva Island along Richardson Bay in Marin County. The DeSilva Island project was approved for construction of large condominium/townhomes and demolition/reconstruction of two single family homes. Our involvement in this project lasted for a period of five years, through site demolition/mass grading, construction, and ultimately occupation of the homes. As a result of the protection measures we developed and oversaw implementation of, this rookery maintained normal levels of productivity through the development and occupancy of the site. The experience and information we gained from observing this rookery, in combination with other literature, provides a sound basis for our recommendations.

PROJECT DESCRIPTION

The Dutra Group is proposing to relocate an asphalt production facility, recycling operation and associated stockpiles of rock and sand used to produce finished products at the approximately 37-acre Haystack Landing project site located at 3355 Petaluma Boulevard South near Petaluma, Sonoma County, California (Figure 1). In support of the asphalt plant, a barge off-loading facility will also be relocated and constructed on a small parcel located on the Petaluma River that will be used to import material from outside Sonoma County. The locations of the proposed asphalt plant and the off-loading facility are illustrated on Figure 2.

The proposed project will consist of a new asphalt plant, an asphalt recycling plant, and associated stockpiles of rock and sand used to produce finished products. These products include recycled asphalt products, an integral component for manufacturing new asphaltic concrete (AC).

The new asphalt plant, which will be located on the northern portion of Parcel A, will consist of a 6-product cold feed bin assembly, a 400 ton per hour counter flow drum mix assembly, twin oil storage tanks, two 200 ton storage silo assemblies, a heating oil plant, and a truck scale installation. An operator's compartment and electrical motor center will also be incorporated into the plant. This facility will be designed and constructed to address all seismic movements, as well as blue smoke and related emission requirements.

In support of the asphalt plant, a new barge off-loading facility will be constructed on Parcel B that will be used to import material from outside Sonoma County. This facility is required because, as with the present asphalt plant location approximately one-half mile to the north, all mining products will be imported by barge rather than by truck. A conveyor system will transport materials from the barge off-loading facility to stockpile locations in the southern portion of the property, near the asphalt plant.

The barge offloading equipment will include a conveyor with hopper, which will be lowered down onto a loaded barge. A front-end loader located on the barge will place material into the hopper for transport onto land. The conveyor with the hopper will be relatively short (about 40') and will drop material onto a longer conveyor (about 200') located perpendicular to the railroad tracks. This longer conveyor will rise from the river's edge up to a height of 24' going over the railroad tracks. This height is necessary to allow standard trains to pass underneath the conveyor. After crossing the railroad, another conveyor will take the material 700' in a southeast direction roughly parallel to the railroad. This conveyor will remain at a height of approximately 20' until it crosses over the current access road, which will remain in place. At the end of this conveyor, a telescoping radial stacking conveyor or similar conveyor system will stockpile the material. This will allow the most efficient storage of material on the site.

A small office complex, consisting of a reception and weighmaster area, an operations office, and a conference room area will also support the facility.

The Dutra Group is also proposing to restore and enhance wetlands on an approximately 19 acre area southeast of the asphalt plant site.

ROOKERY

The rookery is located in a grove of eucalyptus trees in the northwestern corner of the project site (Figure 2). About half the trees supporting nests are on the project site and the remaining trees are on the adjoining parcel. The rookery appears to correspond to what is termed the Shollenberger Park rookery, number 424, in Kelly et al. (2006). Data in Kelly et al. indicates the rookery was established (at least first recorded) in 2003 and is used by a combination of great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), and snowy egrets (*Egretta thula*). Use data indicates 1 to 2 great blue heron nests, 15 to 30 great egret nests, and 9 to 19 snowy egret nests, with a typical total nest for all species of 36 to 40 nests per year. Attachment A provides a copy the rookery summary data from Kelly et al. (2006).

The number of birds using the rookery through early April appears to be lower than the in previous years. As of early March this year, I observed only five adult great egrets constructing nests in the rookery area, although there are numerous old nests from previous years. As of April 4th, there were 12 active nests (incubating adults), although I did observe at least two great egrets bringing in nest materials for what appeared to be a new nest sites.

DISTURBANCE/BUFFER CONSIDERATIONS

Herons and egrets are typically considered to be sensitive to disturbance while they are nesting and can be prone to abandon rookeries when disturbance levels become too great. Disturbance at rookeries can also lead to increased predation by species such as ravens and crows, which can also lead to lowered reproductive success and nest/rookery abandonment. There are also numerous examples in the literature where heron and egret rookeries habituate to disturbance and remain nesting in areas of high levels of human activity, similar to those observed with the DeSilva Island rookery. The typical nesting period is from February through June, but occasionally can be longer, extending into August and even September.

Disturbance to wildlife from human activities has been widely studied. Probably the most studied aspects are in relation to human activities related to waterfowl, shorebirds, and raptors (hawks, eagles, and owls). The studies have shown varied wildlife responses to human activity and associated disturbances. Dahlgren and Korschgen (1992), for example, provide a detailed bibliography and review of 211 papers on the effects of human disturbance on waterfowl.

Most studies demonstrate that disturbance-related effects to wildlife are highly variable and controlled by a host of factors such as species, time of year, size of flock or group, type of disturbance, and tolerance or habituation of individual birds or groups to disturbance. Many wildlife exhibit some level of habituation to human activity and noise (Josselyn et al. 1989; Kramer 1986; Dahlgren and Korschgen 1992). Two principal considerations which emerge from many of these studies and which appears to play a role in the habituation process relate to a term called "flushing distance" (the distance at which birds may perceive activities as threatening actions) and the ability to physically separate disturbance and wildlife use areas. Where potential disturbances are located beyond the "flushing distance," most wildlife are unaffected by or reasonably tolerant of human activities. Most studies of waterfowl and shorebirds have generally found the disturbance-related zone to be between 75 to 175 feet in the absence of physical barriers or screening.

For herons and egrets, Erwin (1989 as cited in Kelly et al. 2006) recommended a 200-meter (660-foot) buffer based on typical flushing distance of 100 meters (330 feet) and an additional 100 meters for protection. Kelly (2002) in a San Francisco Bay Area study showed considerable more tolerance, but a high degree of variability among rookeries and at various stages of nesting. At the DeSilva Island rookery, the established development setback was 100 feet, with associated seasonal restrictions on use for a public access trail that wound through the rookery.

Factors that appear to be important with respect to herons and egrets are the timing of activities relative to the nesting cycle, structure of the nesting habitat, types of human activity, and the tolerance of individuals. Herons and egrets are most susceptible to disturbance during the courtship/pre-egg laying period (typically January-March). Site fidelity or tenacity increases as the birds progress through the incubation period (March-April). Once the eggs have hatched, the birds typically become highly attached to the nests and are less likely to abandon the rookery; however, disturbance during this period can lead to lowered reproductivity through increased predation or neglect/lack of food if the adults spend too much time away from the nests. Herons and egrets using taller trees, where the nests are higher from the ground, also appear to be more tolerant of human activity.

In order to more directly assess the tolerance of the herons and egrets using the Haystack rookery, we observed the rookery on March 4 and April 4, 2007. Existing disturbances include vehicle access to the residences/buildings along the waterfront using the current graveled road (approximately 320 feet from the closest nests), human activities at these buildings (130 to 300 feet from the rookery), and various human activities (vehicle parking, people walking, etc.) in the dirt area along Petaluma Boulevard. We also approached the rookery/nests on foot to assess heron and egret behavior to what could be considered more direct threatening behavior. These observations occurred during initial pair bonding, nest building, and early incubation when herons and egrets would typically be considered to be at greatest threat or susceptibility to disturbance impacts.

Based on our observations, the herons (one pair) and egrets (both great egrets and snowy egrets) do not appear to be concerned about vehicle or human activity outside of vehicles (including people walking dogs) along the existing site road (320 feet from the closest nests), along Petaluma Boulevard (generally 165 to 200 feet from the rookery, or in and around the buildings along the waterfront (130 to 320 feet). In these cases, the birds do not seem to pay any attention to activities in these areas (they remain on the nests, continue the same behaviors they were doing prior to the associated activity (e.g., preening, incubating, bring in nest materials).

On direct approach toward the rookery, the herons and egrets continued their ongoing behaviors until the observed reached approximately 110 feet from the closest nests. At this distance, incubating birds would turn their attention toward and watch the observer and one incubating bird stood up on the nest. At this observed behavior, we retreated toward the roadway and the birds resumed their previous behavior.

REGULATORY CONSIDERATIONS

Herons and egrets, including their "active" nests, eggs, and young are protected under various state and federal regulations.

The federal Migratory Bird Treaty Act provides that it is unlawful to: pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product unless permitted by regulations. Most bird species within California fall under the provisions of the Act. Excluded species include non-native species such as house sparrow, starling and ring-necked pheasant and native species such as quail.

Section 3503 of the State Fish and Game Code makes it unlawful to take, posses, or needlessly destroy the nests or eggs of any bird.

While these regulations do not specifically define "take," take is generally considered to include harassment or disturbance that could lead to abandonment of a nest or even lowered productivity. The time when a nest is considered to be a nest subject to these regulations is also not well defined. The California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife (FWS) typically consider a nest to be active once an egg is present continuing until the young leave the nest (fledging); however, this "rule of thumb" has been subject of some debate in the agencies.

While the California Environmental Quality Act (CEQA) does not provide direct protection to rookeries, impacts from projects that would cause substantial changes in population levels or distribution of plants or animals are considered significant under CEQA and, as such, mitigation measures are required to offset/minimize the impact. Because herons and egrets are colonial nesting species, loss or lowered reproduction from a colony/rookery can appreciably affect heron and egret populations and distribution over a large area. Such findings would be subject to CEQA review for determining a significant impact.

PROJECT IMPACTS

A number of activities associated with the development and operation of the asphalt plant project could adversely affect nesting heron and egrets. While most of the project site and features are more than 100 meters (330 feet) from the rookery, the primary concerns for disturbance to the rookery are:

1. Construction and operation of the conveyor system linking the barge off-loading facility and the plant site.
2. Activities associated with the barge off-loading, and associated night lighting, in particular.
3. Site access from Petaluma Boulevard and the immediate parking area adjacent to the proposed volunteer fire station.

The location of the rookery suggests that these herons and egrets are fairly tolerant of, and have habituated to, a fair degree of human associated disturbance in the vicinity. The rookery is only about two hundred feet from Petaluma Boulevard, and sits directly above and overlooks several occupied buildings/rural-type residences. There is also a fair amount of existing human activity along the Petaluma River shoreline in this area, and the adjacent parcel appears to be used at least periodically for equipment storage/parking. Access to the adjacent parcel also goes under the canopy of several of the active rookery trees. Our observations indicate the herons and egrets don't appear to become alarmed or concerned until the humans directly approach to within approximately 110 feet of the active nests.

There are two basic options for complying with the MBRT, Fish and Game Code 3503, and minimizing impacts under CEQA. The first option is to implement a series of operation and design standards that would minimize human activity/perceived threatening activities within the vicinity of the rookery. These measures would need to be coupled with ongoing monitoring to ensure that the measures are working and that take does not occur to active nests or nestlings. The second option would be to attempt to relocate the rookery to a more remote and secure location.

Operation and Design Standards

The apparent tolerance/habituation of the birds using the rookery suggests that, as long as human activity in the immediate area can be conducted in a manner that would minimize the herons and egrets viewing the activities as a threat, normal nesting activity rookery should continue at the site. However, implementation of such protection measures carries some level of risk. It is not possible to precisely predict how individual birds may respond, and their responses could change over time.

At the DeSilva Island rookery, prior approvals by the County established a 100-foot wide buffer between nest trees and most of the development. A public, shoreline access trail also meandered through the rookery trees. Protection measures for this rookery involved closure of the public trail during the early phases of the nesting cycle (February 1 through June). Work more than 100 feet from a nest tree was monitored to determine if the individual birds became alarmed by the activity. If the birds exhibited any level of concern, construction activities were ceased or modified depending on where the birds were in the nesting cycle. Generally, once young were present, the heron and egrets paid little attention to adjacent construction activity. In two instances, single family homes were modified/reconstructed directly underneath active nests. In both cases, construction began prior to the nesting season. In order to minimize disturbance to the nests, large parachutes were hung over the buildings, shielding direct views of the work men. The parachutes were maintained until the roofs/exterior work was finished. Nesting activity was regularly monitored through this construction.

The following recommendations are primarily intended to habituate the herons and egrets to the site operations during the period when the birds are typically most susceptible to disturbance. If the herons and egrets accept the operation activities during this early nest selection/pair bonding phase (typically mid February to mid March), they are most likely to remain at and use the rookery. If they abandon the site prior to egg-laying, it is likely the birds will simply relocate to another site somewhere in the general vicinity.

Conveyor Belt

1. The conveyor belt should be constructed during the non-nesting season (e.g., once the young have fledged and are capable of flight on their own - typically July through January).
2. The conveyor should be kept as low to the ground as possible in the immediate vicinity of the rookery.
3. A solid roof (metal, fiberglass, or opaque plastic) should be constructed over the conveyor system, and a walkway/maintenance access from the SMART railroad crossing to the entrance road (approximately 220 feet). The covering should extend down at least the upper half of the west wall facing the rookery.
4. The conveyor system should be run daily, even if empty, for a few hours once the herons and egrets arrive at the rookery and begin nest selection/pair bonding (typically mid February to mid March).
5. Human access should be restricted to the covered area along the conveyor during the nesting season.

The basic approach is to habituate the herons/egrets to the conveyor. They are most likely to stay and nest if they accept the presence of the facility during the early stages of nesting. If they don't like it, they will move on and the project will not have violated any state or federal regulations. Covering the conveyor removes/hides direct view of humans from the nesting birds - humans at close range are typically seen as a threat. Structures and most noise are not typically a problem.

Barge Off-loading

Because of the timing of high tides, unloading of barges will periodically occur at night. The following measures are recommended:

1. All work lights in the barge unloading area shall have sharp-cutoff angles and lights should be directed into the work area, not at the rookery.
2. Night lights should also be turned on several times for a couple of hours during the nest selection/pair bonding (typically mid February to mid March).

Entrance Parking Lot

1. The entrance parking lot should be relocated to the southeast such that it is a minimum of 110 feet from the closest rookery nest tree. The entrance road/access point can remain at the same location.

2. The row of eucalyptus trees in the proposed parking area should be retained. (these trees provide visual separation between the rookery and the entrance and Petaluma Boulevard.

Employee Education

1. Signs should be erected at the edge of an established buffer zone (minimum 100 feet or to the edge of a project feature (e.g., a parking lot) to alert workers and the public that foot-access to the rookery area is restricted during the nesting season.

Monitoring

Periodic monitoring should be conducted to assess heron and egret behavior in response to baseline/normal disturbance, during conveyor operation, and during night operations. Initial observations should be made more frequently during nest selection/pair bonding (typically mid February to mid March). If the birds habituate to the activities, then regular monitoring can be more spread out. Minimum observations should include:

1. Conveyor operation: a minimum of two periods when herons and egrets are present during nest selection/pair bonding (typically mid February to mid March).
2. Barge Operations/Night Lighting: a minimum of two periods when herons and egrets are present during nest selection/pair bonding (typically mid February to mid March).
3. Normal Operations: once a week during incubation and initial hatching, spacing to biweekly to monthly when the young are active, but remain in the nest.

Notes on heron and egret activity, and any changes in activity or signs of nervousness or flight should be recorded. The above monitoring schedules should also be modified based on site observations. For example, if the herons and egrets adversely react to tests, the frequency of the tests may be increased. The number or frequency of site visits should also be increased the closer the time comes to egg laying. Once any eggs are laid and the bids react adversely to onsite disturbance, site operations associated with the adverse reaction should be curtailed and alternative measures implemented and tested for effectiveness.

Rookery Relocation

The above measures are designed to habituate the herons and egrets to operations at the site during the period when the birds are most susceptible to disturbance. The underlying assumption is that if the birds accept the use/disturbance during this period, they are more likely to continue to nest.

Under current MBRT regulations and Fish and Game Code, the Dutra Group could remove the nesting trees in the rookery during the non-nesting season and not violate state or federal regulations. It is also questionable whether this would create a significant effect under CEQA since it most likely the birds would relocate to another site and breed that season (e.g, the breeding level or overall population in the area would not be lost or altered).

A compromise alternative is to attempt to relocate the rookery to another, more secure location on the site. While rookery relocation can be viewed as somewhat experimental, herons and egrets regularly utilize artificial structures for nesting and there have been a number of successful establishments of rookeries on artificial structures.

The 19.0-acre wetland mitigation and enhancement site provides a logical site to attempt the relocation. The site is nearby, secure, subject to a greater buffer zone and substantially less disturbance than the current rookery, and once implemented, will provide substantially enlarged and enhanced foraging habitat for the herons and egrets. Under this option, there would be a series of short and long-term measures.

Recommendations for Long-Term Establishment of the Relocated Rookery

The following species should be added to the planting program for the wetland edges and buffer area selected for the rookery:

- Plant fast growing native trees such as Fremont's cottonwood (*Populus fremontii*), red willow (*Salix laevigata*), and red alder (*Alnus rubra*) (White *et al.* 2005; pers. comm.. Mike Vasey; pers. comm. John Kelly).

- A few slower growing, sturdy trees such as California buckeye (*Aesculus californica*) could be also be planted. Herons and egrets are known to nest in buckeyes at the Marin Islands and other locations (Ornduff, and Vasey 1995; pers. comm. Mike Vasey).

<u>Recommendations for Short-Term Establishment of the Relocated Rookery</u>

Short term relocation would involve installation of artificial nesting platforms for egrets and herons. Construction materials and specifications for past successful nest platforms/artificial rookeries have included:

- Recycled, 30-foot tall wood transmission poles, each capable of holding 4 to 6 nesting platforms (ATC 2006) should be used for the main nest structure.
- Poles should be placed in 6-foot deep holes. The poles should extend at least 20 feet in the air. The holes should be lined with plastic (PVC) collars to present any collapsing in the wet soil (U.S. Navy 2003).
- Three (3) nest platforms, spaced 4 to 5 feet apart and staggered at 180 degree intervals should be constructed on each pole; 20 poles, spaced 10 to 15 feet apart could ideally support a colony of 60 pairs, which would accommodate the current population and allow for some expansion. Nailing tin or aluminum sheets below the bottom platforms can keep raccoons from climbing to the nests <u>(Erickson 2006).</u>
- Nest platforms should be constructed in a "X" formation made of 2, 2-inch by 4-inch by 4-feet redwood or pressure treated lumber. A plywood or siding 16-inch square shall be placd in the center of the "X" and can be supported with short pieces of 1-inch by 2-inch strips on each side to hold the nest sticks but drain rainwater. The 2 by 4 "X" gives the birds 4 places to stand beside the nest (SSM 2000). The platforms can also be extended out from the main pole by using, 4 to 6 foot long pressure treated landscape timbers or peeler cores. Each platform should be provided with sticks salvaged from the existing rookery.

- An optional design places a single nesting platform on top of a shorter "peeler cores" or landscaping poles. This latter design works in areas where there is dense low-growing (4 to 6-foot tall), shrubby vegetation.

A combination of both types of nest structures may be worth trying at the site. The dense coyotebrush along the river side of the wetland mitigation provides a good opportunity for the shorter pole, single nest platforms.

Use of the structures can be enhanced by attracting the herons and egrets. Egret and heron decoys can be placed at several of the platforms to attract birds. Audio recordings of herons and egrets at a rookery canals be played to attract birds. In one study, a tape-recording of a great blue heron distress call in the breeding season was played at the rookery relocation site every other day to attract great blue herons. Within the first 10 minutes, 17 herons few into the site (WDFW 2001).

We also recommend that if this approach is utilized, the trees in the existing rookery should be cut down at the end of the nesting season prior to desired use of the artificial site.

SUMMARY

Protection of the active rookery is required under the MBTA, Fish and Game Code, and CEQA to the extent that activities that could result in the loss of an active nest or reduced reproduction at a nest would be significant impact and would require mitigation. We offer two basic approaches for retaining the rookery on the property.

The first option involves a series of design measures, operational controls, and monitoring that are designed to minimize the visual influences of humans into the rookery and to attempt to habituate the herons and egrets a the site to increased noise, night lighting, and human activity. While similar measures have been employed successfully at the DeSilva Island rookery in Marin, there are potential risks of failure over time. Reliance on design and behavior control measures requires long-term monitoring and runs a risk of failure or increased likelihood of significant conflicts between heron and egret nest protection and operation of the project. The rookery is also subject to potentially significant disturbance from adjacent public and private properties that are not under the control of the Dutra Group. For example, 4 nest trees are located on the adjacent Fitch Brothers Drilling Company property. Equipment and one vehicle is parked under these trees.

The second option would be to eliminate the rookery trees during the non-nesting season and attempt to relocate the rookery to construct artificial nests in the onsite wetland restoration area. While rookery relocation may be viewed as experimental, it has been successfully implemented in past and can be completed in compliance with the MBTA and California Fish and Game Code. The primary risk with the relocation is monetary. If the herons and egrets do not use the artificial structures, they will nest at another location of their choosing. The loss would be the cost of the artificial structures and costs for the attempt to attract the birds to the artificial rookery. The adult herons and egrets will nest the next season at another site or sites of their choosing. Alternative sites could be more or less secure/subject to varying levels of disturbance. Relocation to the Dutra wetland mitigation area would provide a secure and protected site for the rookery.

I hope this assessment helps address your and the County's questions regarding options for preserving the rookery in relation to the proposed project. If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

LSA ASSOCIATES, INC.

Steve Foreman
Principal/Wildlife Biologist

cc Al Cornwell

REFERNCES AND LITERATURE CITED

American Transmission Company (ATC). 2006. *ACT help restore heron rookery.* ATC Environmental Department. Greenlines, Spring 2006. Available on the Internet at: http://www.atcaccelerate.com/documents/ExternalNewsletterApril2006.pdf.

Crozier, G. E. and Gawlik, D. E. 2003. *The use of decoys as a research tool for attracting wading birds*. Journal of Field Ornithology, vol 74, issue 1, January 2003, Pp. 53–58. Abstract available on the Internet at: http://www.bioone.org/perlserv/?request=get-document&doi=10.1648%2F0273-8570(2003)74%5B53%3ATUODAR%5D2.0.CO%3B2.

Erickson, L. 2006. *Great blue heron.* Birderblog.com website. Available on the Internet at: http://www.birderblog.com/bird/Conservation/PartIII/49B-GreatBlueHeron.html.

Erwin, R. M. 1989. Responses to human intruders by birds nesting in colonies: experimental results and management guidelines. Colonial Waterbirds 12: 104-8.

Goldberger, G. 2001. *A rookery rebounds*. Chicago Audubon Society. Compass, vol. 15, issue 1, January 2001. pp. 1-2. Available on the Internet at: http://www.chicagoaudubon.org/webPDFs/2001/Compass0101.pdf

Kelly, J. P. 2002. Disturbance patterns in heronries: a safe place to nest. Ardeid 2002: 1-3. Publication of Audubon Canyon Ranch, Stinson Beach, CA 94970.

Ornduff, R. and Vasey, M.C. 1995. *The Vegetation and Flora of the Marin Islands, California.* Madrono, vol. 42, no. 3. July – September 1995. Pp. 358-365.

Species Specific Management (SSM). 2000. *Great blue herons.* An email exchange between Robert W. McFarlane and Paul Jones, February 17, 2000. Lasting Forests website. Available on the Internet at: http://fwie.fw.vt.edu/rhgiles/SpeciesSSM/GBlueHeron.htm.

U.S. Fish and Wildlife Service (USFWS). 2004. *If you build it, they will come.* Chesapeake Bay Field Office. Fall 2004. Available on the Internet at: http://www.fws.gov/chesapeakebay/Fall04/egret.htm.

U.S. Geological Survey (USGS). 2006. *Great blue heron nest platform.* Northern Prairie Wildlife Research Center. Available on the Internet at: http://www.npwrc.usgs.gov/resource/wildlife/ndblinds/gbheron.htm.

U.S. Navy. 2003. *Raising a family: NAS Patuxent River provides herons with new homes.* Currents, Winter 2003. Available at the Internet at: http://www.enviro-navair.navy.mil/currents/winter2003/Win03_Raising_A_Family.pdf.

Washington Department of Fish and Wildlife (WDFW). 2001. *Heron rookery rescued!.* Crossing Paths with Wildlife in Washington Towns and Cities, Spring 2001. Available on the Internet at: http://wdfw.wa.gov/wlm/crospath/spring2001/cross-7.htm.

White, C.L., Frederick, P.C., Main, M.B., and Rodgers, J.A., Jr. 2005. *Nesting Island Creation for Wading Birds.* Circular 1473, Wildlife Ecology and Conservation Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. May 2005. Available on the Internet at http://edis.ifas.ufl.edu/UW223#FOOTNOTE_2#FOOTNOTE_2.

Personal Communications

Kelly, J. Research Director of Audubon Canyon Ranch, personal communication with Dan Sidle, LSA Associates, November 3, 2005, and personal communication via electronic mail, April 25 and 26, 2006.

Vasey, M. Interim Director of Environmental Studies Program, San Francisco State University, California, personal communication with Dan Sidle, LSA Associates, via electronic mail, November 4, 2005.

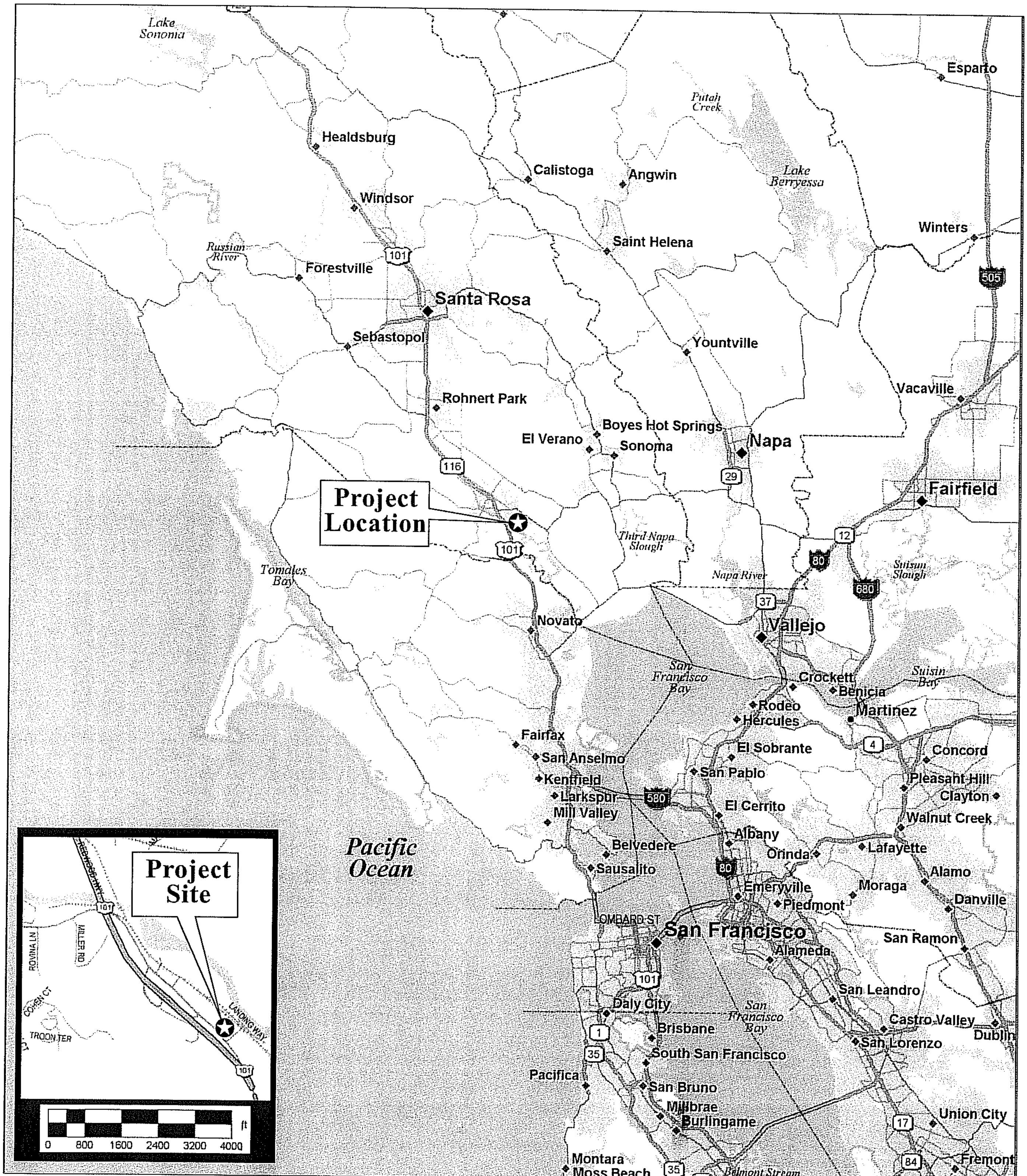

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FIGURE 1

Dutra Group
Proposed Haystack Asphalt Plant
Site Location

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SOURCE: ©2006 DeLORME. STREET ATLAS USA®2006.

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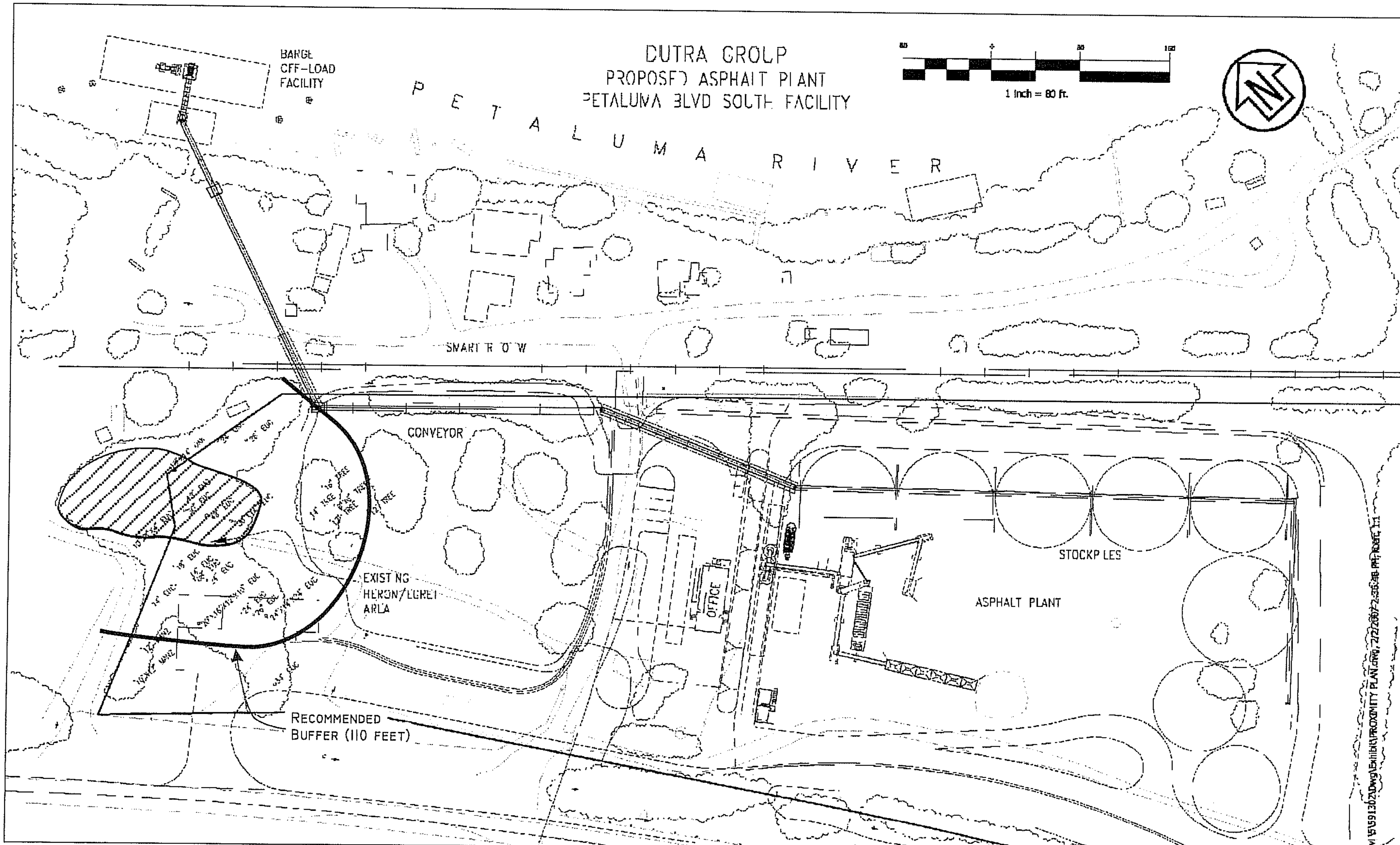

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FIGURE 2

Dutra Group
Proposed Haystack Asphalt Plant
Heron and Egret Rookery Location
and Recommended Minimum Buffer

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APPENDIX F

CULTURAL REPORT AND PEER REVIEW COMMENTS

PHASE I CULTURAL RESOURCES STUDY FOR HAYSTACK LANDING, PARCEL NUMBERS APN 019-320-001, -022, AND, -023 PETALUMA, SONOMA COUNTY, CALIFORNIA 94953

prepared for
Mr. David Ripple
Pagliaio Ventures, LLC
P.O. Box 751222
Petaluma, California 94975

for use by
Sonoma County Permit and Resource Management Department
and the
U.S. Army Corps of Engineers, San Francisco District

prepared by
Richard E. Thompson
Principal Archaeologist

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Archaeological Consultants
P.O. Box 3388
Fremont, California 94539

May 2004

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Introduction

In December 2003, *Archaeor*, Archaeological Consultants conducted a Phase I cultural resources study of the Haystack Landing project site, parcel numbers APN 019-320-001, -022, and, -023, consisting of approximately 38.0-acres located at the terminus of Petaluma Boulevard South, approximately 1.0 mile south of the City of Petaluma, Sonoma County, California (Map 1). This study was requested in order to provide cultural resources recommendations in preparation of submitting a use permit application to the Sonoma County Permit and Resource Management Department, and a Clean Water Act (CWA) Section 404 permit application to the U.S. Army Corps of Engineers, San Francisco District.

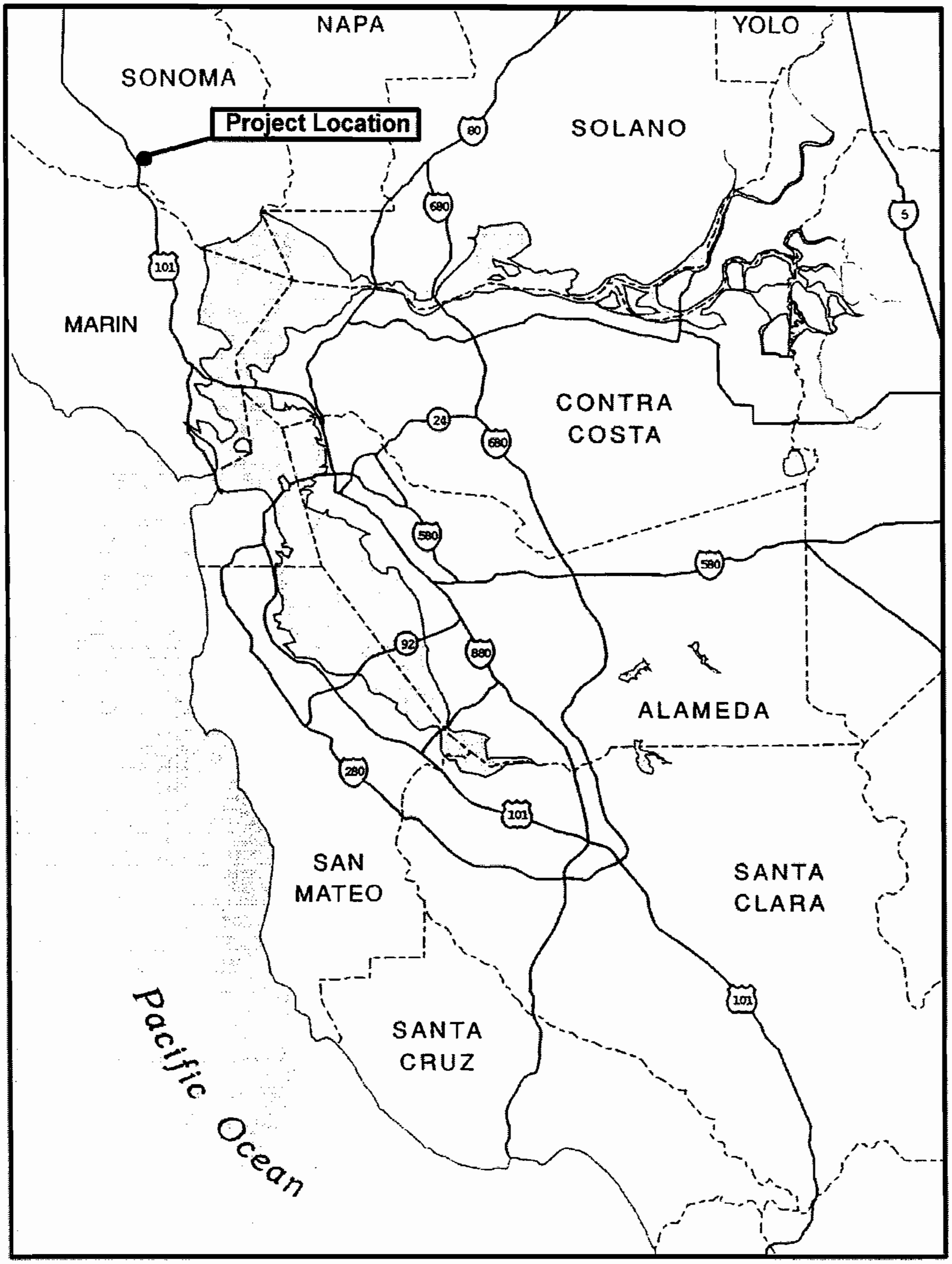
The purpose of this study is to determine if any possible historic or prehistoric cultural deposits are present at the location of this project area and to determine whether further sub-surface archaeological testing should be conducted in this area prior to any earth-moving activities. Further sub-surface testing could help to verify the presence of significant cultural resources.

This report outlines the results of a literature review conducted at the Northwest Information Center, Sonoma State University in Rohnert Park, California, a search of the Sacred Lands File maintained by the Native American Heritage Commission (NAHC), contact with Native American individuals/organizations which may have knowledge of unreported resources or areas of concern regarding the project area, and the results of an archaeological field survey conducted on the project area.

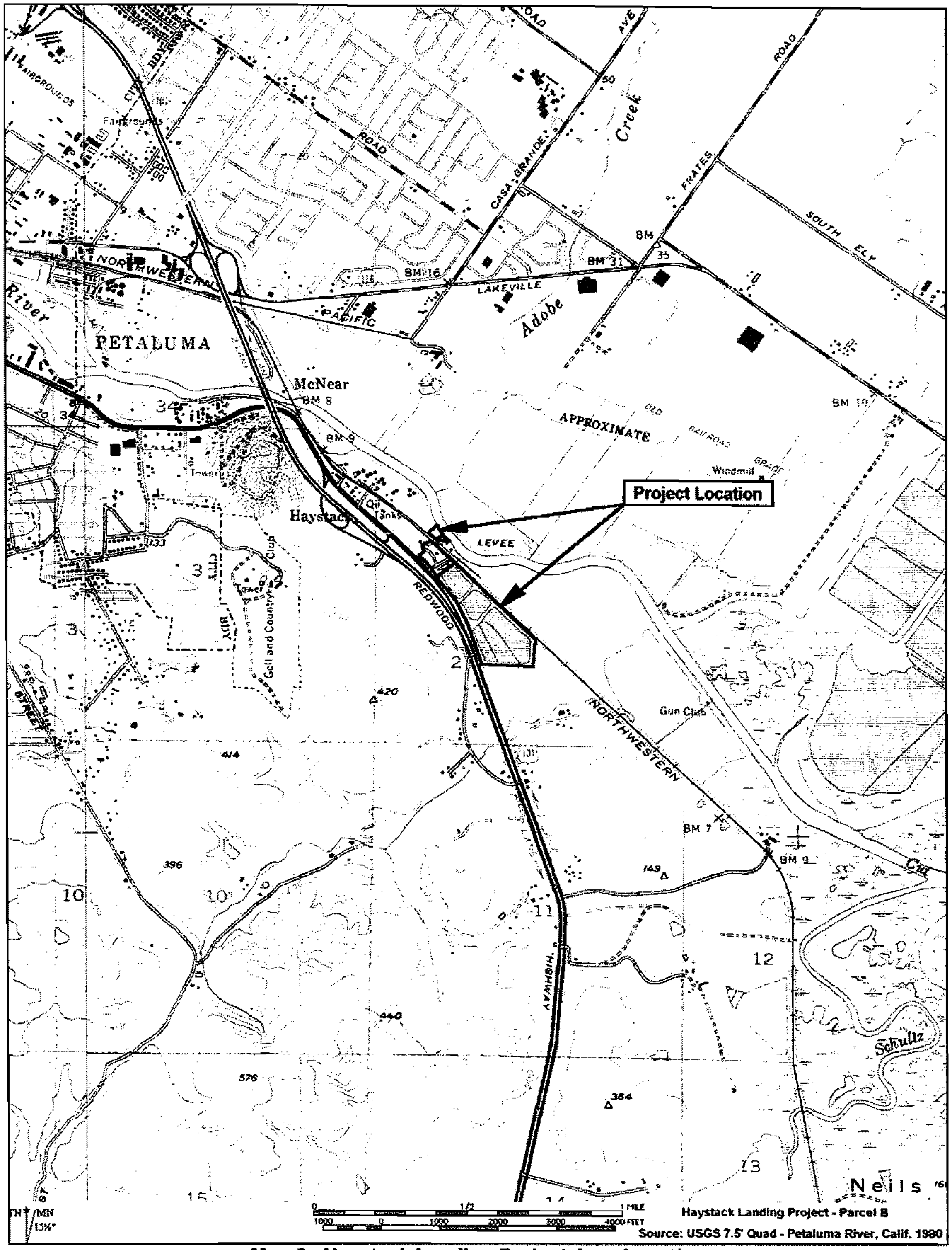
Based on the proposed project, potential impacts to cultural resources have been identified and appropriate measures to reduce impacts to a less-than-significant level have been recommended as defined in the guidelines specified in accordance with Section 15064.5(a)-(f) of the California Environmental Quality Act (CEQA), Section 5024.1 of the California Public Resources Code (CPRC), and, if applicable, Section 106, 36 C.F.R. Part 800 of the National Historic Preservation Act (NHPA). These recommendations are based on the results of the field survey and a review of pertinent literature and documents concerning known archaeological resources located on or in the vicinity of the project area.

Project Area Location and Description

The Haystack Landing project area consists of 3 parcels approximately 38.0-acres total, generally located on the southwest side of the Petaluma River, east of Highway 101, approximately 1.0 mile southeast of the intersection of the Petaluma River and U.S. Highway 101, at the south end of the City of Petaluma, Sonoma County, California (Map 2). The properties are bisected by Northwestern Pacific Railroad tracks, and bounded to the east by the Petaluma River; to the west by Highway 101; to the north by industrial land; and to the south by open space pasture land. The parcels are located primarily on flat and level land near the south bank of the Petaluma River, at an average elevation of 5 feet above mean sea level, except for parcel number APN 019-320-023, the northern third of which consists of a raised knoll (Figure 1).



Map 1. Haystack Landing Project Location



Map 2. Haystack Landing Project Area Location

Figure 1. Aerial View of the Haystack Landing Project Area

Cultural Background

Prehistoric

During prehistoric times, the area of the Haystack Landing project was known to have been inhabited by the Coast Miwok group of Native American Indians. The Coast Miwok Indians were a diverse group of peoples who occupied an area along the California Coast from Duncan's Point in Marin County, south to Point Bonita, and as far east as the Sonoma River in Sonoma County.

Anthropologists describe the prehistoric geographical territories of various Indian groups in California based primarily upon the similarities of the languages spoken within particular areas. Within the Coast Miwok territory, there were two distinct linguistic dialect groups; Western, or Bodega, and Southern, or Marin, with the Southern further divided into valley and coast (Barrett 1908:303-314).

Several well-known place-names in the area today derive from Coast Miwok: Cotati; Olema; Tamalpais; and, Tomales. Marin, Novato, and Nicasio are said to have been the names of local chiefs (Merriam 1916:118).

The Coast Miwok Indians utilized a typical "hunting and gathering" lifestyle. Hunter-gatherers are characterized as human societies that lived by hunting wild game, large and small, and by gathering wild vegetable foods, as well as by fishing. Hunting and gathering was the only human lifeway from the earliest prehistoric times up to the development of agriculture and animal domestication (Fagan 1988). Each group of Coast Miwok had one or more permanent villages, although archaeological evidence shows that most sites were inhabited seasonally. This was because most resources were geographically dispersed and only available for short periods of time (Milliken 1995).

The geographic area of the Coast Miwok Indians included many ecological regions. The Coast Miwok people had access to many miles of the Pacific coastline, which provided food resources such as sea lions, seals, sea otters, kelp, and abalone. Many freshwater creeks and larger rivers such as the Petaluma River flowed through the area providing year-round water sources and marshlands. Steelhead, salmon and other freshwater resources were harvested from these waterways. The marshlands and rivers were occupied by numerous species of migratory birds such as ducks and geese, an important food resource. Open grasslands covered many inland valleys, supporting a wide variety of large and small game animals such as elk, deer, antelope and rabbit. Oak forests covered many inland river valleys and hills providing acorns, an important food staple, along with animals such as black and grizzly bear, mountain lion, fox, and bobcat. Higher elevations and coastal mountains supported redwood forests, which afforded cooler temperatures in the summer and an abundance of plant and animal resources. The most obvious cultural contrasts within the area were probably determined by geographic and ecological factors, and were the result of the differences that exist between the coastal, interior valley, and riverside habitats (Milliken 1995).

The food resources available to the Coast Miwok living in a specific region had an effect on their diet and the general health of the population. The quality, quantity, and type of food sources available to prehistoric Coast Miwok Indians varied greatly from region to region, and the amount of animal protein in their diet depended on the season and local ecology. Most coastal groups lived on a high protein diet of fish, shellfish and sea mammal meat. In inland areas, sources of animal protein were scarcer and local groups depended more on vegetable food resources such as acorns, bulbs and hard seeds.

The annual cycle is clear. Some animal foods, such as deer and crab, were available all year. Winter and early spring were times of shortage, when stored acorns and seeds, plus kelp were the mainstay. Nevertheless, there were salmon runs; mudhens were available, and in late winter, geese. In spring, small fish stranded at low water in pools on the rocks were collected, and another [type of] kelp was eaten. Villages were adjacent to shore, lagoon, or slough; but come summer, attention shifted to the hills for hunting and for gathering of vegetable products (Kelly 1978).

The available resources and climate of a particular area had an effect on settlement patterns and population densities varied from one ecological zone to another (Milliken 1995). In western Central California, cool wet winters alternate with warm and dry summers. In the summer, temperatures in the inland valleys may be quite hot, while areas near the ocean may be covered with cool fog. During the winter, coastal regions usually escape the occasional nightly frost which can occur further inland. Permanent settlements tended to be located where two or more key resources of focal economies were most abundant. These locations were characterized by the presence of a year-round fresh water supply and ample food resources. Permanent Coast Miwok village sites have been found along the Petaluma River, and along the shores of the Tomales and San Francisco Bays, where these areas supported large populations of wild game and edible plant species.

Areas with harsher climates and less available resources tended to support seasonal occupation with less population densities. The low population densities on the coast were probably the result of the relatively small seed-plant habitat and mammal populations in the coniferous forests of the coastal mountains. Population density in the eastern Coast Ranges was limited by sparse plant and animal resources and a lack of water in the summer months (Milliken 1995). The seasonal availability of certain resources such as acorns, berries, bulbs, migratory birds and other migratory animals such as elk, deer and antelope influenced patterns of occupation. Many seasonally inhabited campsites were utilized specifically in order to take advantage of the resources that were available only at certain times of the year.

In 1811 and 1812, the well-known Russian colony was set up at nearby Fort Ross, to exploit sea-otter resources, and Bodega served as its port (Bancroft 1886-1890, 2:630). Several decades before the Russian penetration, the mission onslaught was launched with the founding, in 1776, of the mission at San Francisco. From this base and successively from missions at San Rafael (1817) and Solano-Sonoma (1823), forced evangelization took place, with attendant dislocation of population and disintegration of the [Coast Miwok] culture. The final blow was the Anglo appropriation of 1846. The early years of American exploitation focused on lumbering, dairying, and agriculture, at least some of the few surviving Coast Miwoks found work in the sawmills and in the fields (Kelly 1978).

Historic

Sonoma County is one of the original 27 California counties. "Sonoma" was the name of an Indian tribe whose village was taken over by Father Altamira in 1823 for Mission San Francisco Solano. The county seat was located at the town of Sonoma from 1850 to 1854; since 1854 it has been at Santa Rosa.

The Petaluma River, actually a slough, runs northward from San Pablo Bay to the present-day city of Petaluma. It is thought that the first historic ascent of the river was by a Spanish expedition under Ferdinand Quiros in 1776. In 1819, Father Mariano Payeras visited the Llano de los Petalumas ("the plain of the Petaluma Indians"). Mariano Vallejo began the construction of his impressive adobe nearby in 1834.

It was the river that determined the placement of the city of Petaluma. Hunters' camps and trading posts to supply the gold miners appeared on its banks in 1849. The valley became an important source of grain, exported to San Francisco. Waterborne commerce between Petaluma and San Francisco throve until August 1950, when the last steamer, the *Petaluma*, moored for the last time in McNear Canal. In addition to cereal and vegetable crops, Petaluma became known for its poultry. In 1879 L. C. Boyce won a gold medal at the California State Fair for his new incubator and soon thereafter began to make in Petaluma the brooders and incubators that made the mass production of poultry both possible and profitable. In 1918, Bert Kerrigan, secretary of the Petaluma chamber of commerce, dubbed the town "The Egg Basket of the World" (Hoover et al. 1990).

Results of Literature Review

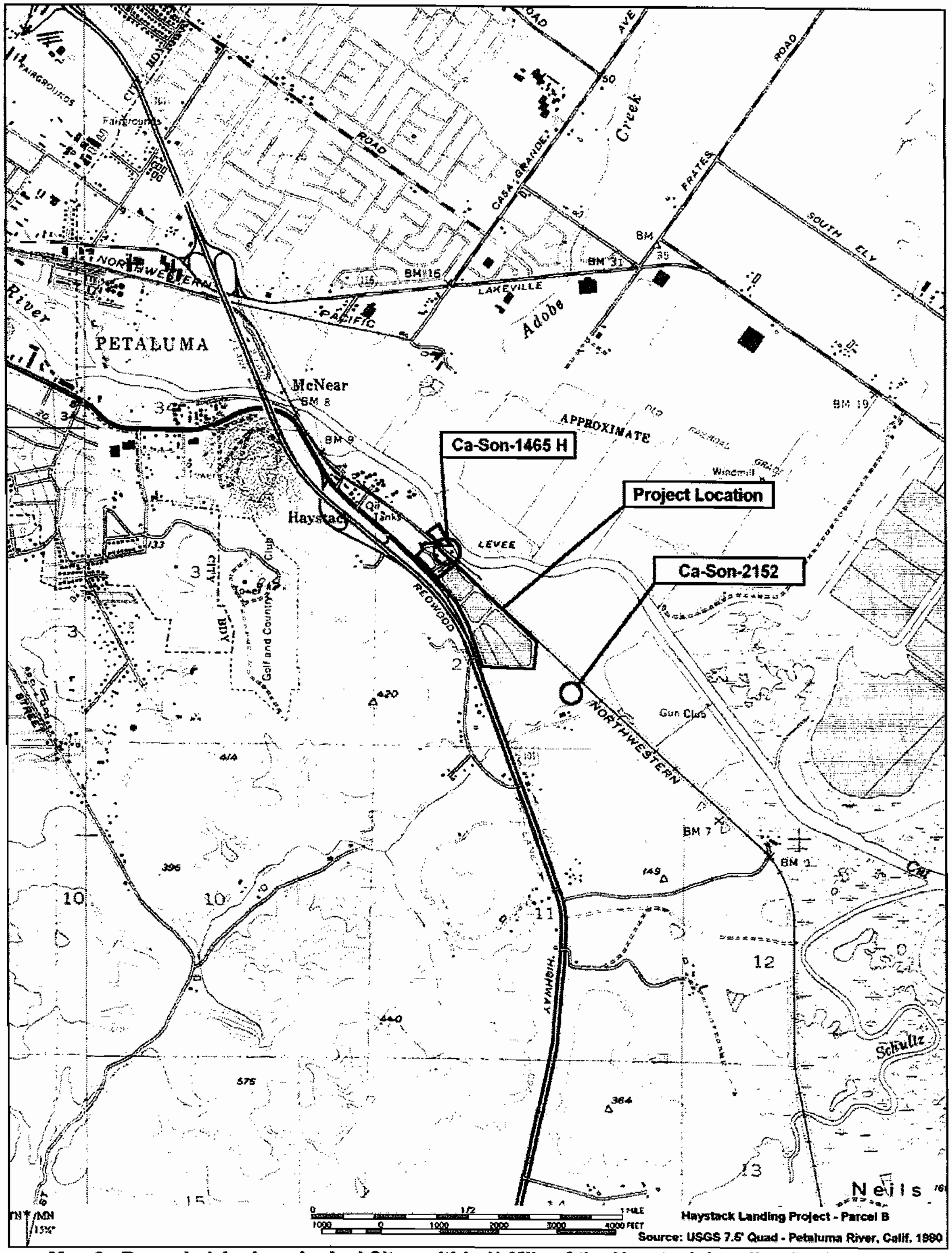
A records search of the Haystack Landing property was conducted on January 6, 2004 at the Northwest Information Center of the California Historical Resources Information System (CHRIS) at Sonoma State University in Rohnert Park, California. The records search consisted of consulting the CHRIS's records of previous studies and previously recorded cultural resource sites, as well as the National Register of Historic Places (as of March 6, 1998), the California Inventory of Historic Resources, and historic maps. These inventories indicated one prehistoric cultural resource; site Ca-Son-2152, located approximately ¼ mile south of the subject property and one historic site, Ca-Son-1465H (Haystack Landing) recorded on the Haystack Landing project area located within parcel APN 019-320-023 (Map 3). It has been determined that any ground-disturbing construction activities associated with the Haystack Landing project will not affect prehistoric site Ca-Son-2152. However, there is a potential for the Haystack Landing project to have a significant impact to historic site Ca-Son-1465H.

Previous Archaeology

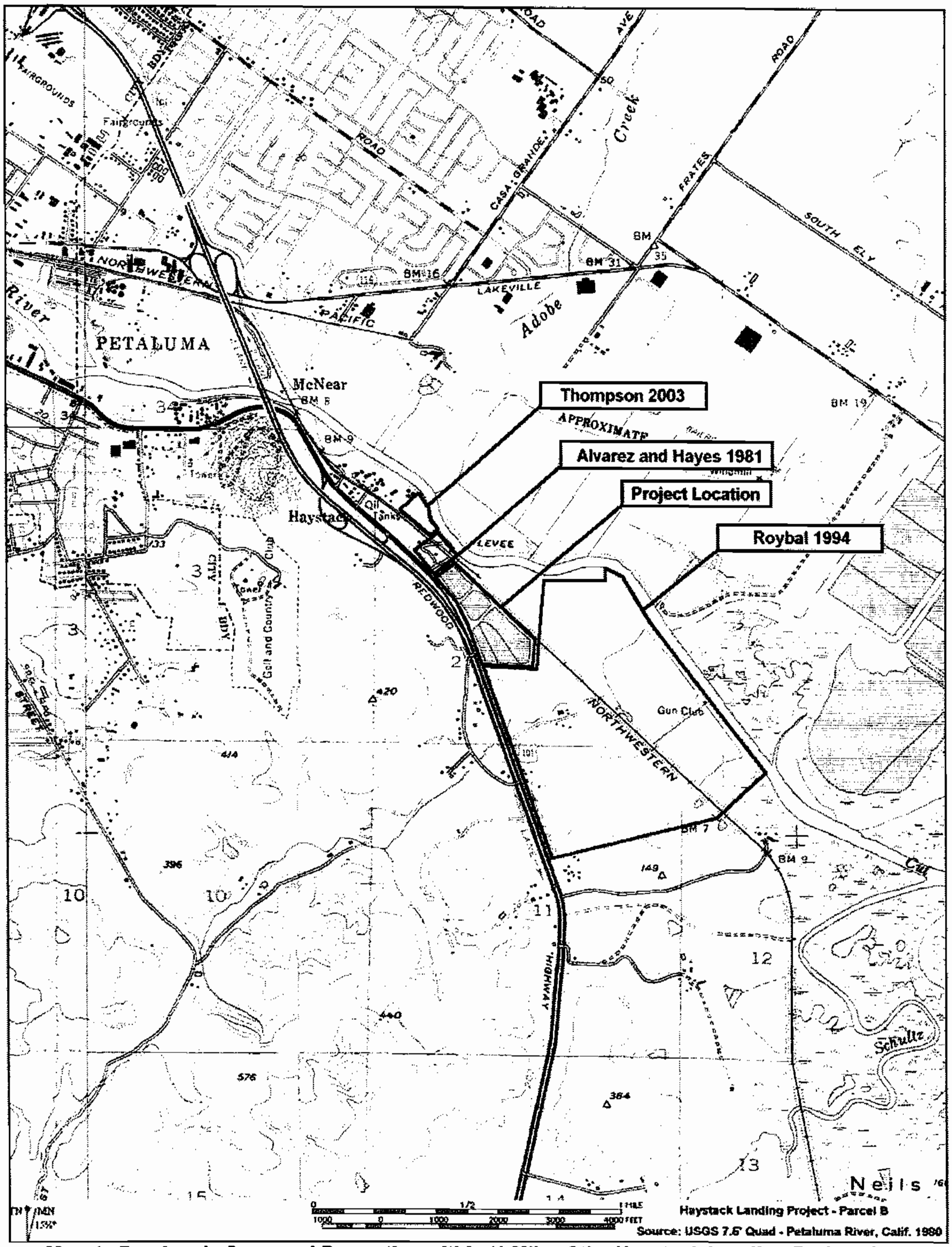
Three archaeological evaluations have previously been performed within ¼ mile of the Haystack Landing project area (Map 4). In April of 1985, Ms. Susan Alvarez and John Hayes of the Cultural Resources Facility at Sonoma State University performed an Archaeological Investigation of a 5-acre parcel located within the Haystack Landing project area at 3355 Petaluma Boulevard South, Petaluma, California. This investigation resulted in the identification and recordation of historic site Ca-Son-1465H (Haystack Landing) consisting of a nineteenth-century house (circa. 1864), two barns, and a board covered pit. It was recommended that if buried archaeological materials were discovered during ground-disturbing activities, work be halted in the area of the finds until a qualified archaeologist evaluated the situation (Alvarez and Hayes 1985).

In August of 2003, Mr. Richard Thompson of *Archaeor,* Archaeological Consultants conducted a Phase I Cultural Resources Study of a 6.0-acre parcel located approximately ¼ mile north of the Haystack Landing project area on Landing Way, Petaluma. This survey did not identify any archaeological resources within the 8.5-acre parcel and it was recommended that should any evidence of archaeological deposits be encountered at any time during earth moving operations associated with the project, all work should be halted in the vicinity of the find, and an archaeologist be contacted immediately (Thompson 2003).

In March 1994, a Reconnaissance Survey of the 264.5-acre Ford Ranch located immediately south of the Haystack Landing project area was performed by Mr. Gerald Roybal of Roybal & Associates. This reconnaissance resulted in the identification and recordation of prehistoric site Ca-Son-2152, located approximately ¼ mile south of the Haystack Landing project area. Ca-Son-2152 is described as high concentration of burnt rock fragments, obsidian flakes, shell fragments, and dark friable soil occupying an area of approximately 500x400 feet, located on a small knoll about 30 feet in elevation (Roybal 1994).



Map 3. Recorded Archaeological Sites within ¼ Mile of the Haystack Landing Project Area



Map 4. Previously Surveyed Properties within ¼ Mile of the Haystack Landing Project Area

Native American Consultation

On January 9, 2004, *Archaeor* contacted the State of California Native American Heritage Commission (NAHC), located in Sacramento. A search of the Sacred Lands files maintained by the NAHC for the project site was requested. The NAHC responded on January 14, 2004, stating that a search of the Sacred Lands File had produced negative results and provided a list of five Native American individuals/organizations that may have knowledge of unreported resources or areas of concern regarding the project area. The NAHC suggested that Archaeor contact the five individuals and/or organizations that it provided for the project site (see Appendix A).

On January 15, 2004, letters requesting information about any sites or areas of concern to Native American Indians within the project area were posted via U.S. Postal Service to the five individuals and/or organizations identified by the NAHC.

As of January 27, 2004, no responses had been received from any of the recipients of the January 15, 2004, mailing. On January 28, 2004, Andrew Galvan, Principal Historian for Archaeor placed follow-up telephone calls to all five individuals and/or organizations.

On Wednesday, January 28, 2004, Andrew Galvan telephoned to Grant Smith (Coast Miwok, Pomo) as no written or verbal response had been made to the letter dated January 15, 2004. Mr. Galvan reached Mr. Smith's daughter-in-law Connie via telephone. Connie stated that her father-in-law did not respond because "everything was okay". Connie said that this meant that he did not know of any traditional site specific to the project area.

On Wednesday, January 28, 2004, Andrew Galvan telephoned to Kathleen Smith (Pomo, Coast Miwok) as no written or verbal response had been made to the letter dated January 15, 2004. Ms. Smith stated that she had forwarded *Archaeor*'s letter to Mr. Tim Campbell, Cultural Resources Officer of The Federated Indians of Graton Rancheria. She stated that she felt it was appropriate for the office to respond.

On Wednesday, January 28, 2004, Andrew Galvan telephoned to Dawn S. Getchell (Coast Miwok, Pomo) as no written or verbal response had been made to the letter dated January 15, 2004. A gentleman answered the telephone and suggested that Mr. Galvan telephone back the next day as Ms. Getchell was not home.

On Wednesday, January 28, 2004, Andrew Galvan telephoned to Gene Buvelot (Coast Miwok, Southern Pomo) as no written or verbal response had been made to the letter dated January 15, 2004. Mr. Buvelot stated that Mr. Tim Campbell, Cultural Resources Officer of The Federated Indians of Graton Rancheria was the appropriate office to respond to our inquiry. Mr. Buvelot stated that he did not know of and traditional site specific to the project area. He also stated that if cultural materials were encountered during project construction, appropriate archaeological actions should be undertaken, and that the appropriate Indians be contacted as provided by law.

On Wednesday, January 28, 2004, Andrew Galvan telephoned to Tim Cambell (Coast Miwok, Southern Pomo), Cultural Resources Officer of The Federated Indians of Graton Rancheria, as no written or verbal response had been made to the letter dated January 15, 2004. Mr. Galvan attempted to reach Mr. Campbell several times on Wednesday, January 28, 2004, and Thursday, January 29, 2004, via telephone. Numerous voice messages were left. As of Thursday afternoon, January 29, 2004, no response from Mr. Campbell had been received.

Field Survey Methodology

On Tuesday January 6, and Wednesday January 7, 2004 Mr. Richard E. Thompson, Principal Archaeologist, accompanied by Mr. Andrew A. Galvan, Archaeological Field Technician, conducted a general archaeological field survey on parcel APN 019-320-022. On Tuesday, March 2, 2004, the remaining 2 parcels were surveyed by Mr. Richard Thompson, Principal Archaeologist.

An archaeological field survey is defined as:

> Inspection of all land surfaces that can reasonably be expected to contain visible archaeological resources. Every portion of the project area whose surface can be seen without major modification of vegetation, and where it is reasonably possible that human activities that would leave traces might be carried out, is inspected in a general surface reconnaissance. Every foot of ground is not necessarily covered. A general surface reconnaissance is the functional equivalent of a complete reconnaissance (investigation of every visible portion of the project area) in areas where soil, vegetation, or other conditions make it highly likely that some kinds of archaeological phenomena would be preserved, or where conditions obscure such phenomena to a point which they could not be observed without undertaking large scale brush clearing, grading, etc. (King, Morrato, and Leonard 1973; T. King 1978; Edwards 1979).

Typically, surface and/or sub-surface indicators of historic cultural deposits consist of one or more of the following: ruins and/or foundations of historic activities with or without associated ceramic, glass, metal, and/or wood artifacts; a scatter of historic artifacts and debris without structural remains; the remains of water control systems (e.g., dams, irrigation canals, aqueducts, standpipes, reservoirs); the remains of historic transportation systems (railroads, bridges, roads, trails); the remains of mining and industrial activities (mine shafts, kilns, ovens); and, historic "middens" (trash areas) or features (wells, cisterns, or privies).

Surface and or sub-surface indicators of prehistoric cultural deposits typically consist of one or more of the following: stone flakes made of chert. jaspar, quartzite, quartz, basalt, obsidian, and other rock types; shell, animal bone, and/or fish bone; groundstone tools used for grinding seeds and other plant foods such as manos, metates, or bedrock mortars; other artifacts, such as arrow or spear points or fragments of pottery vessels; darker soil resulting from the residue of garbage and cooking hearths called "midden"; and, circular depressions representing the ruins of houses or ceremonial structures.

10 meter zig-zag transects were used throughout the project area. All exposed soils in the surveyed area were examined for indicators of cultural resources and all rodent-hole backdirt piles encountered were carefully trowelled. Every portion of the surveyed area, whose surface could be seen without major modification of vegetation, and where it was reasonably possible that human activities would have left visible traces, was inspected. Ground surface visibility was poor throughout the surveyed area due to the dense covering of weeds and grasses on the surface of the parcels.

Field Survey Results

APN 019-320-001

This parcel is comprised of approximately 1.0-acres, located northeast of the Northwestern Pacific Railroad tracks along the southwest bank of the Petaluma River (see Figure 1, page 6). APN 019-320-001 is bisected by a small drainage channel running southwest to northeast. Existing structures on this parcel include modern, modular housing and associated outbuildings. Based upon an examination of the soil profile exhibited within the drainage channel, this parcel is comprised of imported fill material to a depth of at least four feet. No evidence of historic or prehistoric cultural indicators was observed during the archaeological field survey of this parcel.

APN 019-320-022

This approximately 32-acre parcel is located southwest of the Northwestern Pacific Railroad tracks, east of Highway 101. The property is currently vacant and consists of three large sedimentation ponds which occupy the southern half of the parcel. These ponds are bisected by various built-up levees. The remaining northern half of the property consists of imported fill material (see Figure 1, page 6). This parcel appears to have been subjected to extensive modifications within the past 100 years. No evidence of historic or prehistoric cultural indicators was observed during the archaeological field survey of this parcel.

APN 019-320-023

This parcel consists of approximately 5-acres and adjoins parcel APN 019-320-022 to the northwest (see Figure 1, page 6), and includes a portion historic site Ca-Son-1465H. The property is located at 3355 Petaluma Boulevard South, Petaluma, California. The parcel is dominated by a knoll in the eastern portion which rises from a generally level area on the west side of the property. The north side of the knoll slopes down the northern property boundary which is lined with eucalyptus trees. The south side of the knoll slopes gently downwards to an access road which runs east to west between Petaluma Boulevard South and the Northwestern Pacific Railroad tracks.

This parcel has been subjected to extensive modifications over the years including road cuts, grading, and historical and modern building construction. These modifications include the construction of a nineteenth-century house and barn, and several modern buildings located in the southern portion of the parcel. A mobile home is located at the eastern edge of the knoll, behind the nineteenth-century house. No evidence of prehistoric cultural indicators was observed during the archaeological field survey of this parcel. Historic features observed during the field survey include the nineteenth-century house and barn, and a scatter of mid- to late 1800s glass and ceramic shards located in a garden area approximately 30 feet northeast of the rear of the house (Figure 2). These features characterize the major physical elements of historic site Ca-Son-1465H, Haystack Landing.

Ca-Son-1465H, Haystack Landing

Historic site Ca-Son-1465H, Haystack Landing, was initially identified and recorded in April of 1985 by John Hayes and Susan Alvarez of the Cultural Resources Facility of the Anthropological Studies Center, Sonoma State University, Rohnert Park, California. At that time, Ca-Son-1465H was described as consisting of a nineteenth-century house located within the project area and at least one barn of probable mid- to late nineteenth-century construction located below the knoll on the south side of the project area. A board-covered pit was situated below the house on the northern down slope of the knoll (Alvarez and Hayes 1985). It was also noted that "the stone foundation of the house was altered on the south and west sides."

Currently, the house is raised off the ground and perched on large, horizontal wooden beams supported in places by upright beams placed on concrete blocks. Most of the stone foundation has been removed. A modern PVC sewer line and natural gas hookup were observed protruding from beneath the house along the south side. Construction materials (i.e. square cut nails) and construction style (i.e. imported stone foundation and Italianate architectural features) indicate that the house was built in the mid- to late 1800s.

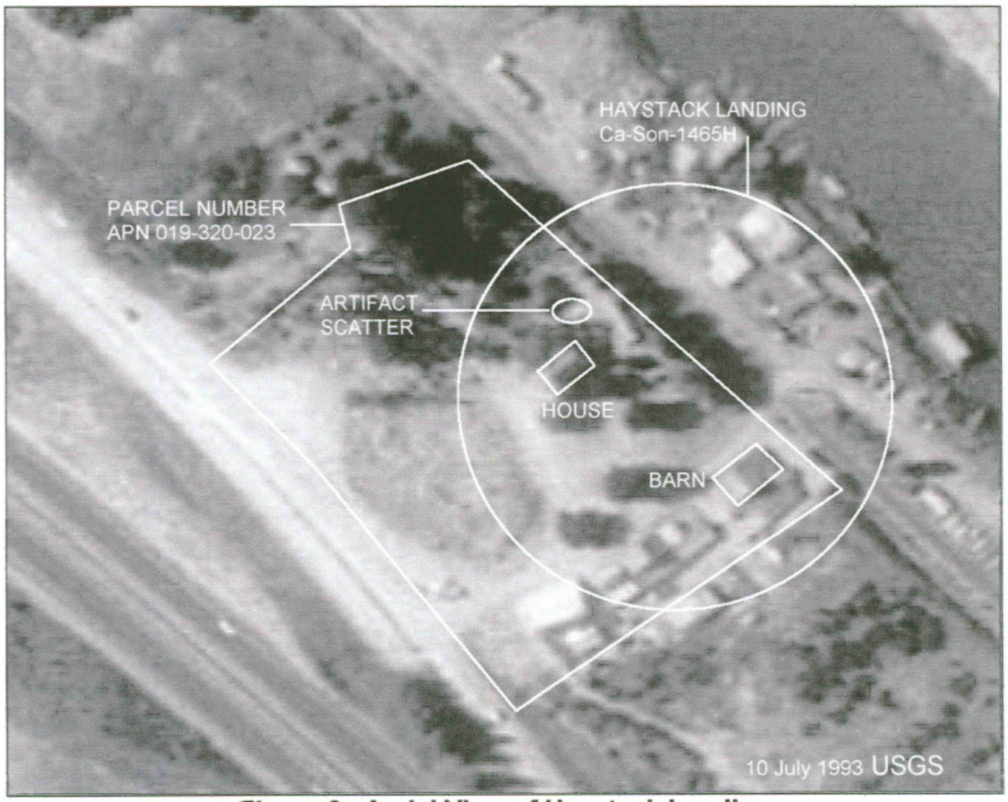


Figure 2. Aerial View of Haystack Landing

Figure 3. West Side of House

Figure 4. South Side of House

Figure 5. East Side of House

Figure 6. North Side of House

Italianate is a term used to denote an American architectural style, circa. 1850-1870, that came about as part of a larger Romantic movement in the arts. These buildings are commonly recognized by their tall, narrow windows and their low-pitched roofs with overhanging eaves.

Identifying features of Italianate architecture include:

- two-stories high;
- blocky and square in appearance;
- often includes square tower or projecting central section [frontispiece];
- low pitched hip roof;
- wide eaves with prominent decorative brackets;
- round-headed window and door openings as decorative accents; and,
- often features veranda and cupola which crowns main structure.

The existing house at Haystack Landing exhibits many of the identifying features for this type of Victorian architecture including: two-stories high; blocky and square in appearance; projecting central section (centered gable); low pitched roof; wide eaves with prominent, decorative double brackets; and, tall narrow windows with decorative accents.

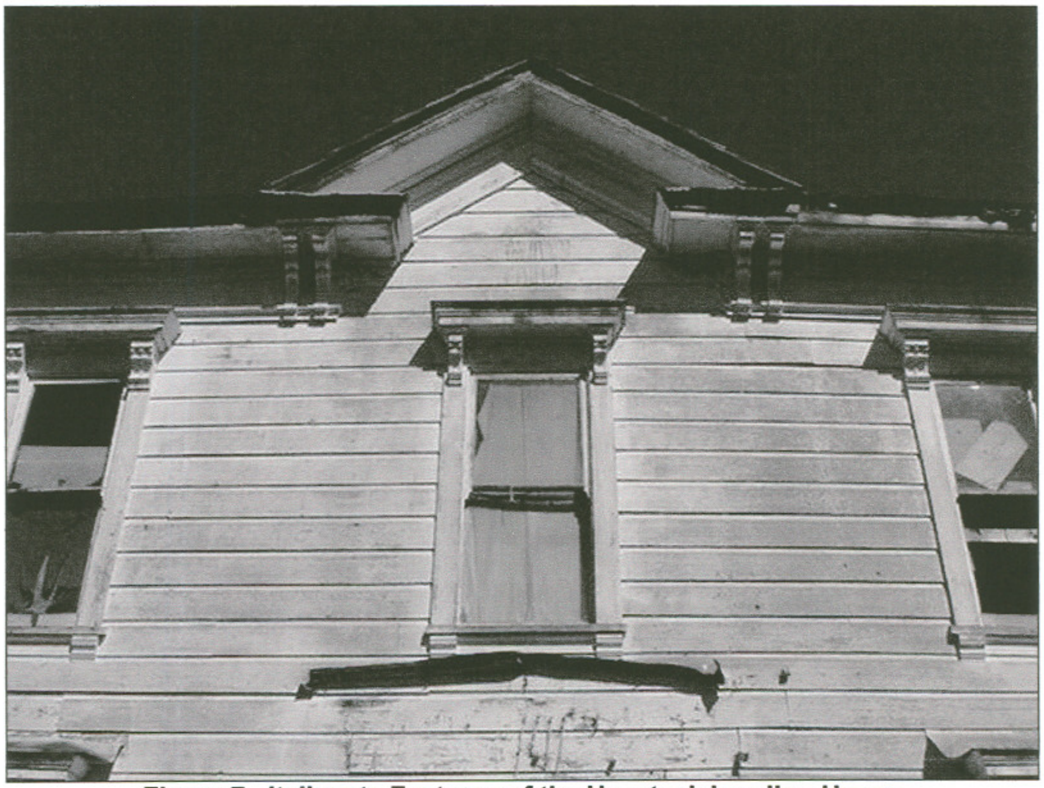
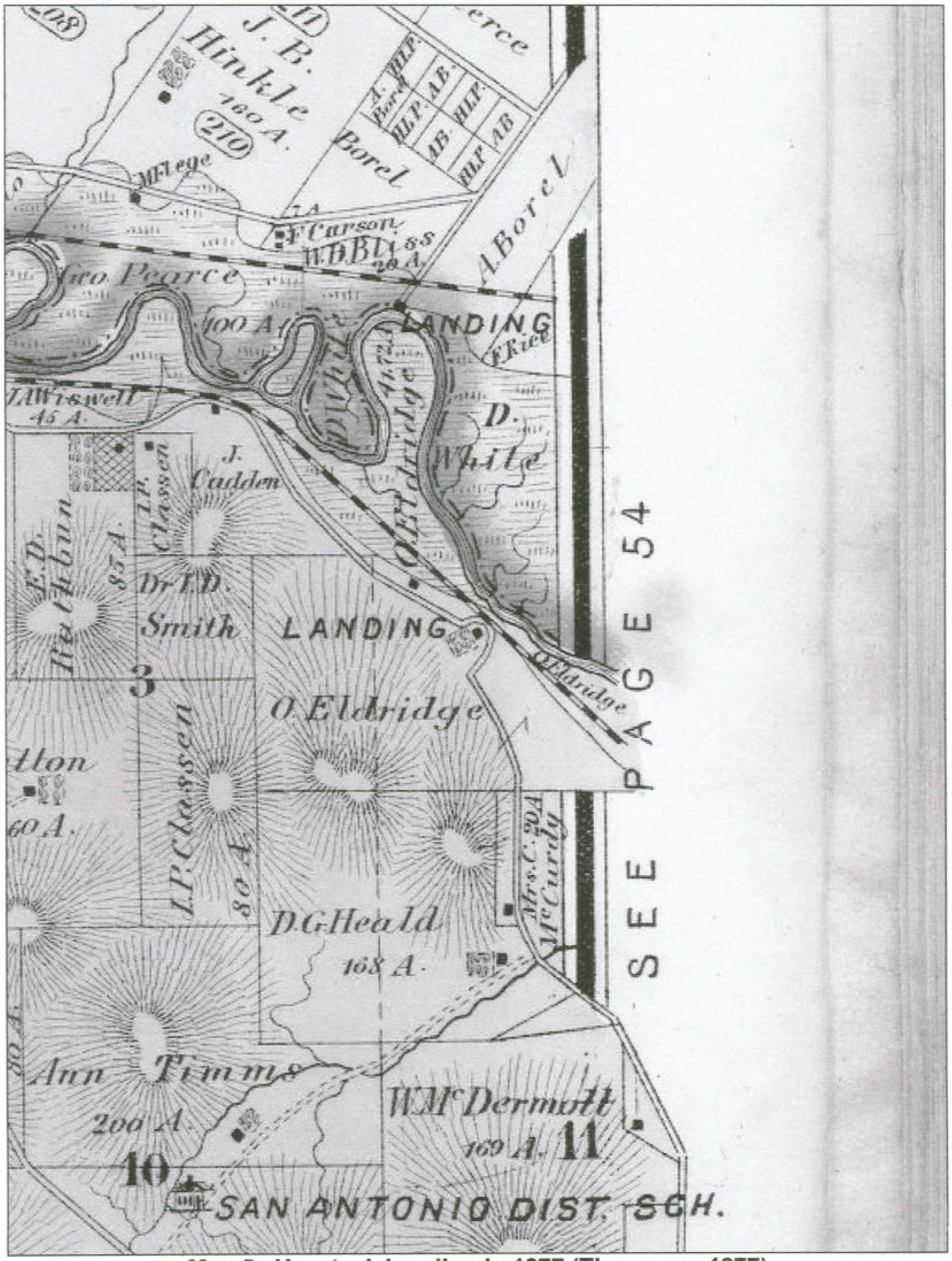
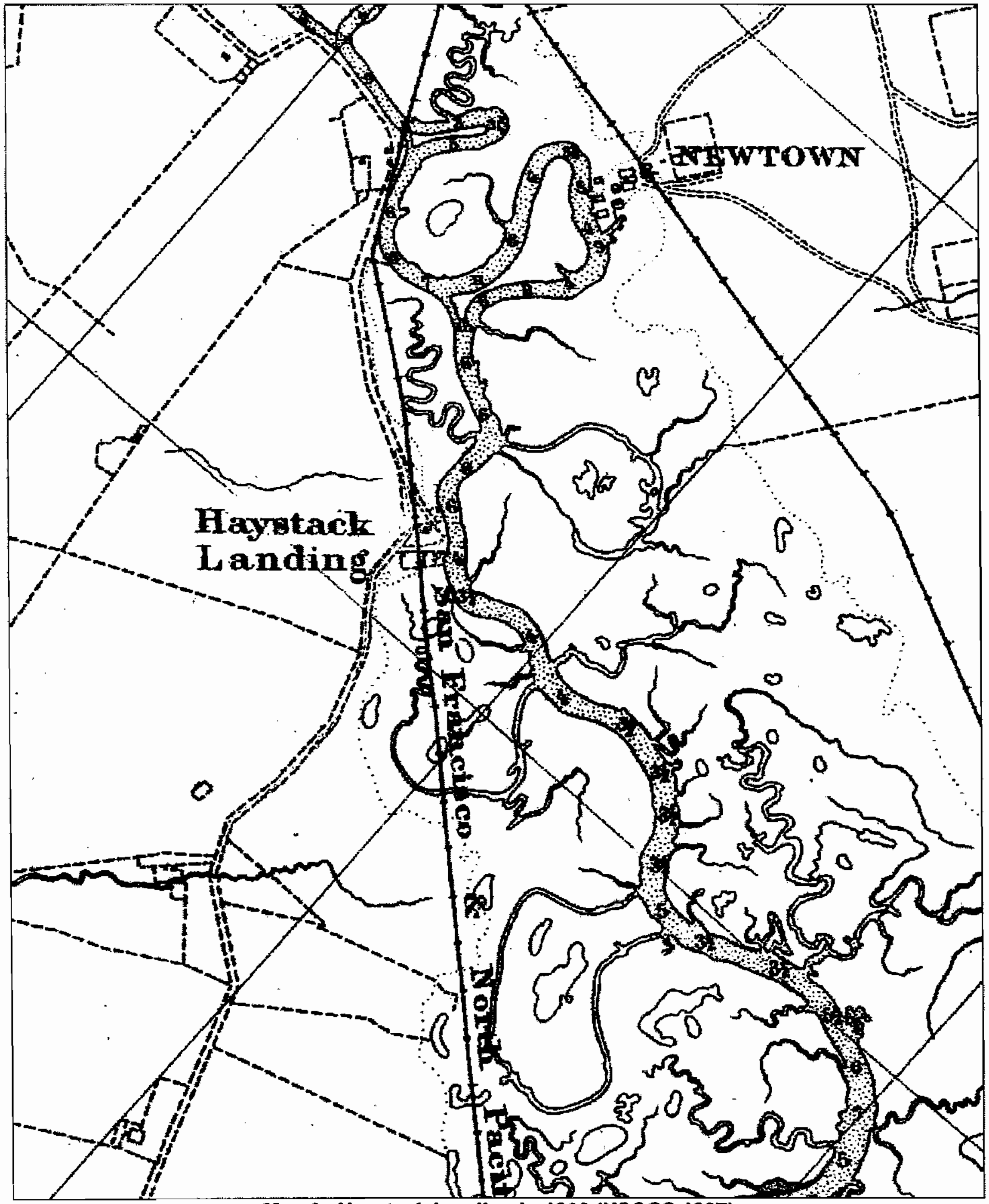


Figure 7. Italianate Features of the Haystack Landing House

A review of historical maps indicate that Haystack Landing was a portion of property owned by John A. Rudesill in the 1860s (GLO plat map 1864; Bowers 1867) and later by O. Eldridge (Thompson 1877). A residence and the landing are indicated on these maps, suggesting that the Haystack Landing house was built prior to 1864 (Map 5). Haystack Landing also appears on a map of the Petaluma and Napa Creeks surveyed in 1860, however, the residence is not shown (Map 6). It appears that the Haystack Landing house was built between 1860 and 1864.



Map 5. Haystack Landing in 1877 (Thompson 1877)



Map 6. Haystack Landing in 1860 (USCGS 1897)

The mid- to late nineteenth century barn is located across the access road which runs east to west between Petaluma Boulevard South and the Northwestern Pacific Railroad tracks, approximately 200 feet south of the Haystack Landing house. The barn is of typical construction for this time period and features a low, gabled roof. Square cut nails were observed throughout the exterior of the building and the stone foundation underlying a portion of the wooden plank floor is of the same type as that of the Haystack Landing house suggesting that these structures were built at approximately the same time.

Figure 8. Haystack Landing Barn Looking South

Historical Background of Haystack Landing

The Haystack Landing project area is labeled "Haystack" on the current USGS quadrangle map. This marks the location of Haystack Landing, also known as Rudesill's Landing for many years. The landing was a terminus for steamboats from San Francisco as well as for stage travel. Rudesill advertised his August 1857 establishment of staging facilities for mail delivery and passenger travel in the local newspaper *Sonoma Democrat* (Sonoma Democrat, October 22, 1857), and a magazine writer referred to "steamboat navigation of Petaluma Creek" to Haystack Landing in 1860 (Hutching's California Magazine, Vol. IV, No. 7, January 1860).

In response to demand for an end to the "bone jarring ride" from Haystack Landing to Petaluma, a proposal was made by Captain Thomas F. Baylis and his partners to construct a horse drawn railroad between the landing and downtown Petaluma. A public outcry over the potential monopoly ensued, and Charles Minturn ended up with a franchise from the city. Rather than a horse drawn railroad, Minturn acquired a steam engine and commenced service on August 1, 1864. The Petaluma and Haystack Railroad was the third railroad in California. In 1866 the boiler of the engine exploded when it was fired without containing adequate water. For the remaining years of its service, the Petaluma and Haystack Railroad was powered by a hitch of four mules (Heig 1982).

The following narrative is taken from *Redwood Railways* by Gilbert H. Kneiss (1956, Howell North, Berkeley):

> Charles Minturn was known around the San Francisco Bay in the early 1860's as "The Ferryboat King". His company, the Contra Costa Steam Navigation Company, had a monopoly on trans-bay traffic between San Francisco and what is today Oakland, and as he lost that monopoly he turned to the north bay to keep his business volumes up. His first venture on the north shore was via a steamboat that ran up Petaluma Creek to Lakeville, seven miles south of Petaluma. Minturn then started ferry service to San Rafael via Point San Quentin.
>
> Minturn focused back on Petaluma Creek and dredged a channel to Haystack Landing. In 1862, he chartered the Petaluma & Haystack to build a railroad between Black Point and Petaluma. According to the charter, no competing railroad could be built within 400 feet of the new line.
>
> The first portion of the railroad from Haystack Landing to Petaluma was built during the spring and summer of 1864, and the line opened on August 1 of that year. Minturn's application to use the City Plaza as a depot was rejected, and instead he established a depot on a small plot of land at the corner of First and B Streets. The Petaluma & Haystack was three miles long when completed. A steam locomotive that developed about twenty-six horsepower was built for the new line at the Atlas Foundry in San Francisco; the locomotive cost $5000 new. Hinkle's Night Coach connected with the trains in Petaluma to take travelers north to Santa Rosa and other points.
>
> In 1866, the railroad was extended southward to Rudesill's Landing, bypassing Haystack Landing and reducing the steamship mileage.
>
> On August 27, 1866, the single locomotive owned by the line blew up when the engineer (Joe Levitt, on loan from the San Francisco & San Jose Railroad while the P&H searched for a permanent replacement to fill the engineer position) let the boiler pressure rise to unsafe levels and also possibly let the water level in the boiler fall. The explosion destroyed the locomotive and killed four people, including Levitt. Most passengers were inside the cars at the time of the explosion and were unhurt; horse drawn coaches were substituted for the train to take the sixty or so uninjured down to a connection with the ferry.
>
> Minturn announced that he intended to procure a second steam locomotive, but instead the railroad used horses for the rest of its history.

The Petaluma & Haystack lasted until March 23, 1875, when it was purchased by the Sonoma & Marin Railway Company. The intent of the company was to extend the old P&H down to San Rafael. Grading of the line started. In 1876 the San Francisco & North Pacific took over the project, and the first train to run from San Rafael to Petaluma ran on August 31, 1878. The SF&NP at the time had a mainline that ran from Donahue Landing north through Petaluma to Cloverdale; adding the Sonoma & Marin gave the SF&NP a more direct route south towards San Francisco, but the line was limited in that it had to connect with the narrow gauge North Pacific Coast in San Rafael for those passengers wishing to access the ferry terminals at San Quentin or Sausalito, and since the SF&NP wanted to send as much business as possible via it's own steamship lines through Donahue there was not a great deal of cooperation between the two companies. The narrow gauge would eventually come under the same ownership as the standard gauge SF&NP, and the SF&NP also established its own ferry terminal at Tiburon.

A subsidiary of the SF&NP built a line from a connection with the Sonoma & Marin at Ignacio eastward to a connection with another SF&NP subsidiary that ran from Glen Ellen through Sonoma towards Black Point. This was later connected with a line of the Southern Pacific built west from Napa Junction; the two lines met at Schellville.

A change in ownership saw the SF&NP disappear into the California Northwestern. Through it all the line continued to be extended north, first to Ukiah, then to Willits, and then towards Sherwood. In 1904 ownership of the line passed to Edward Henry Harriman (owner of the Southern Pacific, amongst many other railroads). The Southern Pacific was battling with the Atchison, Topeka & Santa Fe at the time for dominance in a new line to be built between Eureka and San Francisco Bay, and Harriman purchased the C&NW as part of that battle. The two big roads eventually came to a compromise, and in 1907 the C&NW was one of many companies owned by the two roads that were welded together to form the Northwestern Pacific. The NWP completed the main line to Eureka in 1914.

That is the story of how the Petaluma & Haystack became part of today's Northwestern Pacific mainline.

Cultural Resources Significance Criteria (CEQA)

This cultural resources analysis uses criteria from the *State CEQA Guidelines*, Title 14, Chapter 3, Section 15064.5. According to these criteria, the project would have a significant impact to cultural resources if it:

- Caused a substantial adverse change in the significance of an historical resource;
- Caused a substantial adverse change in the significance of an archaeological resource; or,

- Disturbed any human remains, including those interred outside formal cemeteries.

The definitions of substantial adverse change, historical resource, and archaeological resource are defined below:

Substantial Adverse Change is defined as:

- Physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.

- Demolition or material alteration in an adverse manner of those physical characteristics of an historical resource which convey its historical significance and justify its inclusion in or eligibility for inclusion in the California Register of Historical Resources (CRHR), inclusion in a local register, or identification in a historical resources survey.

Historical Resource is defined as:

- A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources (mandatory significance).

- A resource included in a local register of historical resources or identified as significant in an historical resource survey unless the preponderance of evidence suggests it is not significant (presumptive significance).

- An historical resource still may be considered significant in the absence of a Federal, State, or local listing if substantial evidence demonstrates its significance (discretionary significance). This includes any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Generally, a resource shall be historically significant if it:

    - Is associated with events which made a significant contribution to the broad patterns of California's history and cultural heritage.

    - Is associated with the lives of people important in our past.

    - Embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of an important creative individual, or possesses high artistic values.

    - Has yielded or may be likely to yield information important in prehistory or history.

Archaeological Resource

The *State CEQA Guidelines* state that CEQA applies to effects on archaeological sites and direct that, when a project would impact an archaeological site, the lead agency should first determine whether the site is an historic resource as defined immediately above or whether it meets the definition of a "unique archaeological resource" contained in Section 21083.2 of the Public Resources Code. "Unique archaeological resource" refers to an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability it:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest or best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Discussion

Construction work for the Haystack Landing Project may include ground disturbing activities that could result in the loss of integrity of cultural deposits, the loss of information, and the alteration of site setting to cultural resources that are eligible for listing on the CRHR. Thus, degradation of the cultural resources would be a substantial adverse change, if the resources were considered eligible for the CRHR, or if the resources were unique archaeological resources. The literature review and field survey were conducted to provide the data needed to assess the significance of the cultural resources located within the project area and to determine whether they are historical or archaeological resources as defined in CEQA.

The literature review and subsequent field survey did not indicate any evidence that significant cultural resources are located within parcel numbers APN 019-320-001 and -022. Therefore, it is concluded that no significant impacts to historical resources will occur as a result of project construction on these two parcels.

Parcel number APN 019-320-023 was found to contain a portion of historic site Ca-Son-1465H, Haystack Landing. Historic features observed during the field survey include the nineteenth-century house and barn, and a scatter of mid- to late 1800s glass and ceramic shards located in a garden area approximately 30 feet northeast of the rear of the house. These features characterize the major physical elements of historic site Ca-Son-1465H, Haystack Landing.

According to Section 15064.5(a)(3) of CEQA, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852) as defined above under *Historical Resource.* The literature review and field survey for this parcel indicates that the Haystack Landing house, barn and artifact scatter described above should be considered "historically significant" by the lead agency according to the following criteria as specified in Section 15064.5(a)(3)(A)-(B) and (D) of CEQA:

Historic site Ca-Son-1465H, Haystack Landing, is "associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage". As has been indicated by historical maps, the house, and possibly the barn, has been situated within the study area at least as early as 1864, during which time Haystack Landing was a site of shipping and passenger travel activity. The landing was a terminus for steamboats from San Francisco as well as stage travel north as early as 1857. The first portion of the third railroad in California, from Haystack Landing to Petaluma, was built here by Charles Minturn during the spring and summer of 1864. Haystack Landing represents the expansion of travel, commerce, and transportation from the city of San Francisco into the North Bay Area during the 1850s and 1860s.

Haystack Landing is also "associated with the lives of persons important in our past". Charles Minturn was known around the San Francisco Bay in the early 1860's as "The Ferryboat King". His company, the Contra Costa Steam Navigation Company, had a monopoly on trans-bay traffic between San Francisco and what is today Oakland, and as he lost that monopoly he turned to the north bay to keep his business volumes up. His first venture on the north shore of San Francisco Bay was via a steamboat that ran up Petaluma Creek to Lakeville, seven miles south of Petaluma. Minturn then started a ferry service to San Rafael via Point San Quentin. Minturn then focused back on Petaluma Creek and dredged a channel to Haystack Landing. In 1862, he chartered the Petaluma & Haystack Railroad. Charles Minturn was largely responsible for the expansion of travel, commerce, and transportation from the city of San Francisco into the North Bay Area during the 1850s and 1860s.

Additionally, the mid- to late 1800s artifact scatter located behind the house (and the potential for other historic features such as trash dumps, privy-pits, etc. to be located within the site area) indicates that the site "has yielded, or may be likely to yield, information important in prehistory or history". Archaeological excavation, recording and/or documentation of these features and any associated artifactual materials could help interpret and reconstruct the historical aspects of Haystack Landing.

Recommendations

Parcel Numbers APN 019-320-001 and -022

No significant prehistoric or historic archaeological sites, features, or artifacts were found, nor were any significant historic buildings, structures, or objects identified within parcel numbers APN 019-320-001 and -022. Therefore, according to 36 CFR 800, Section 800.4(d)(1) of the NHPA, no historic properties will be affected by the proposed project within these three parcels. Additionally, no significant cultural resources were identified on these three parcels in accordance with Section 15064.5(a)(2)-(3) of CEQA guidelines, using the criteria described in Section 5024.1 of the California Public Resources Code.

No further archaeological work is recommended for these parcels. While the likelihood of finding subsurface archaeological features or artifacts is unlikely, if during the course of construction activities within the project area, previously unidentified archaeological materials are discovered, work should stop at that location and a qualified, professional archaeologist should be contacted to examine the discovery and determine its significance.

Parcel Number APN 019-320-023

This parcel consists of approximately 5-acres and adjoins parcel APN 019-320-022 to the northwest (see Figure 1, page 6), and includes a portion of historic site Ca-Son-1465H. The property is located at 3355 Petaluma Boulevard South, Petaluma, California. Parcel number APN 019-320-023 was found to contain a portion of historic site Ca-Son-1465H, Haystack Landing. Historic features observed during the field survey include the nineteenth-century house and barn, and a scatter of mid- to late 1800s glass and ceramic shards located in a garden area approximately 30 feet northeast of the rear of the house. These features characterize the major physical elements of historic site Ca-Son-1465H, Haystack Landing.

According to Section 15064.5(a)(3) of CEQA, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852). The literature review and field survey for this parcel indicates that the Haystack Landing house, barn and artifact scatter described above should be considered "historically significant" by the lead agency according to the criteria as specified in Section 15064.5(a)(3)(A)-(B) and (D) of CEQA, and are eligible for listing in the California Register of Historic Resources.

Recommendation 1:
An updated State of California Department of Parks and Recreation form 523 (DPR 523) should be prepared for site Ca-Son-1465H following the *Instructions for Recording Historical Resources*, Office of Historic Preservation, March 1995. The DPR 523 should reflect the eligibility of site Ca-Son-1465H for listing in the California Register of Historic Resources. Upon completion of an updated DPR 523, two copies should be submitted to the Northwest Information Center, Sonoma State University, Rohnert Park for inclusion into the California Historical Resources Information System.

Recommendation 2:
According to Section 15064.5 (b)(4) of CEQA, "A lead agency shall identify potentially feasible measures to mitigate significant adverse changes in the significance of an historical resource. The lead agency shall ensure that any adopted measures to mitigate or avoid significant adverse changes are fully enforceable through permit conditions, agreements, or other measures."

As prescribed in Section 15064.5 (b)(3), potentially feasible measures to mitigate significant adverse changes in the significance of the Haystack house may include on-site preservation of the house following the Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of Interior's Standards for Rehabilitation and Guidelines for Rehabilitating

Historic Buildings (1995), Weeks and Grimmer. According to this Section, this action would mitigate the impacts to the Haystack house to a "less than significant" level.

<u>Recommendation 3</u>
Prior to any material alteration or demolition of the Haystack barn, this resource should be documented by way of a historic narrative, photographs, and/or architectural drawings.

<u>Recommendation 4</u>
The mid- to late 1800s artifact scatter located behind the house (and the potential for other historic features such as trash dumps, privy-pits, etc. to be located within the site area) indicates that the site "has yielded, or may be likely to yield, information important in prehistory or history". Archaeological excavation, recording and/or documentation of these features and any associated artifactual materials could help interpret and reconstruct the historical aspects of Haystack Landing.

(A) A qualified, professional archaeologist should be present in order to monitor any ground disturbing activities including grading, scraping, excavation or grubbing operations undertaken at the location of the site Ca-Son-1465H, Haystack Landing as shown in Figure 2, page 16 of this report.

Following the conclusion of the archaeological monitoring, a Final Report of Findings should be prepared by the archaeologist which minimally describes the monitoring process, including the final disposition of impacts to archaeological site Ca-Son-1465H and descriptions and analysis of any formal or diagnostic artifacts recovered as a result of the project. This Final Report of Findings should be completed to the satisfaction of the lead agency abiding by the guidelines specified in *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format,* developed by the California Office of Historic Preservation (OHP), February 1990.

(B) If potentially significant cultural deposits are encountered during archaeological monitoring at any location, construction should be halted within 30 feet of the finds and the archeologist should conduct an independent review of the find, with authorization of and under direction of the lead agency. Prompt evaluations should be made regarding the significance and importance of the find under CEQA and a course of action acceptable to all concerned parties should be adopted.

If mitigation is required, preservation in place is the preferred manner of mitigating impacts to archaeological sites under CEQA. This may be accomplished by, but not limited to: 1) Planning construction to avoid archeological sites; 2) Incorporation of sites within parks, greenspace, or other open space; 3) Covering the archaeological sites with a layer of chemically stable soil; 4) Deeding the site into a permanent conservation easement.

When data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken.

(C) In the event of an accidental discovery or recognition of any human remains, the following steps should be taken as per *State CEQA Guidelines* 15064.5(e): There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until (1) the coroner of the county is contacted to determine that no investigation of the cause of death is required, and (2) the coroner determines whether the remains are Native American. If the remains are Native American the coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours. The NAHC shall identify the person or persons it believes to be the most likely descended from the deceased Native American. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of (with appropriate dignity) the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

If the event the NAHC is unable to identify a most likely descendent, or the most likely descendent failed to make a recommendation within 24 hours after being notified by the NAHC, or the landowner or his authorized representative rejects the recommendation of the descendent and the mediation by the NAHC fails to provide measures acceptable to the landowner, then the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.

Implementation of Recommendation 4 (A)-(C) would reduce potential impacts to site Ca-Son-1465H a less-than-significant level.

<u>Responsibility and Monitoring</u>

Implementation should be monitored by the consulting archaeologist retained to perform the recommended archaeological monitoring, evaluation of artifacts, determination of whether or not discovered resources meet CEQA significance criteria, and, if needed, identification of additional measures required to mitigate impacts on cultural resources. In the event that significant prehistoric archaeological resources are discovered, local Native American organizations should be consulted and involved in making resource management decisions. All applicable State and local requirements concerning the handling and disposition of archaeological finds should be strictly enforced.

References Cited

Alvarez, S. H., and J. Hayes

1985 An Archaeological Investigation of Anthony B. Kinnear's 5-acre Parcel at 3355 Petaluma Boulevard South, Petaluma, Sonoma County, California. MS on file, California Archaeological Site Inventory, Rohnert Park.

Bancroft, H. H.

1886-1890 The History of California. 7 vols. San Francisco: The History Company.

Barrett, S. A.

1908 The Ethnogeography of Pomo and Neighboring Indians. *University of California Publications in American Archaeology and Ethnology.* 6(1): 1-332. Berkeley.

Bowers, A. B.

1867 Map of Sonoma County. A. B. Bowers.

Edwards, R.

1979 Recommendations for Archaeological Impact Evaluations: Procedures and Guidelines for Archaeological Consultant Qualifications – Prepared for Santa Clara County. MS on file, California Archaeological Site Inventory, Rohnert Park.

Fagan, B.M.

1988 Archaeology: A Brief Introduction. 3rd ed. Scott, Foresman and Company, Glenview.

Government Land Office (GLO)

1864 Plat map of T4N/R7W.

Heig, A.

1982 History of Petaluma, A California River Town. Scotwall Associates. Petaluma.

Hoover, M. B., H. E. Rensch, E. G. Rensch, and W. B. Abeloe

1990 Historical Spots in California. Fourth Edition. Revised by D. E. Kyle. Stanford University Press. Stanford, CA.

Hutching's California Magazine.

1860 "A Trip to the California Geysers." pp. 259-268

Kelly, I.

1978 Coast Miwok. In *California*, edited by R.F. Heizer, Vol. 8. Handbook of North American Indians, W.G. Sturtevant, gen. ed., pp. 414-425, Smithsonian Institution, Washington D.C.

King, T.F.
1978 The Archaeological Survey: Methods and Uses. Heritage Conservation and Recreation Service, Washington D.C.

King, T.F., M.J. Moratto and N.N. Leonard III
1972 Recommended Procedures for Archaeological Impact Evaluation. Society for California Archaeology Publication.

Kneiss, G. H.
1956 Redwood Railways. Howell North. Berkeley.

Merriam, C. H.
1916 Indian Names in the Tamalpais Region. *California Out-of-Doors*, April: 118

Milliken, R.
1995 A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769 – 1810. Ballena Press, Menlo Park.

Roybal, G. J.
1994 A Reconnaissance Survey of Ford Ranch for Cloverdale Rancheria. MS on file, California Archaeological Site Inventory, Rohnert Park.

Sonoma Democrat
1857 Sonoma Democrat, Vol. I, No. 1. A.W. Russell, publisher. Santa Rosa.

Thompson, R. E.
2003 Phase I Cultural Resources Study for the Shamrock Materials, Inc. Landing Way Aggregate Distribution Facility, Petaluma, California 94953. MS on file, California Archaeological Site Inventory, Rohnert Park.

Thompson, T. H.
1877 Historical Atlas of Sonoma County, California. Oakland: T. H. Thompson.

United States Coast and Geodetic Survey (USCGS)
1897 Petaluma and Napa Creeks, California. Surveyed in 1854, '56, '57, '58, and '60. W. W. Duffield, Superintendent.

United States Department of Interior, Geologic Survey (USGS)
1993 Aerial View. Flown 10 July 1993. United States Geologic Survey, Menlo Park.

1978 Petaluma River, Calif. [Quadrangle]. Topographic, 7.5 minute series. United States Geologic Survey, Menlo Park.

APPENDIX A

Native American Heritage Commission Correspondence

STATE OF CALIFORNIA — Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov

January 14, 2004

Richard Thompson
Archaeor
P.O. Box 3388
Fremont, CA 94539

Sent by Fax: 510-687-9393
Number of Pages: 2

RE: Proposed Haystack Landing project, Sonoma County

Dear Mr. Thompson :

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Environmental Specialist III

NATIVE AMERICAN CONTACTS
Sonoma County
January 14, 2004

Grant Smith
4309 Chico Ave — Coast Miwok
Santa Rosa , CA 95401 — Pomo
(707) 528 -2584

The Federated Indians of Graton Rancheria
Tim Campbell, Cultural Resources Officer
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This list is current only as of the date of this document.

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

This list is only applicable for contacting local Native Americans with regards to cultural resources assessment for the proposed

APPENDIX B

Site Record for Ca-Son-1465H, Haystack Landing

Mic Hayes

HISTORIC ARCHAEOLOGICAL SITE RECORD

1. SITE No. CA-SON-1465H

LABORATORY CODES

2. FIELD No.

USGS topographic map inset

3. USGS Petaluma River, CA (484A) 1954

4. LANDGRANT

5. TWP 4 RNG 7 , ¼ OF ¼ OF ¼ OF NW ¼ OF SECTION No. 2

6. LONG LAT

7. UTMG ZONE 10 (534650) ME (4230240) MN

8. COORDINATES: MMS MME FROM THE NORTHWEST CORNER OF THE MAP

9. CONTOUR HIGHEST LOWEST X FEET

10. SITE LOCATION AND RELATIONSHIP TO TOPOGRAPHY Located west of Petaluma River between Petaluma Blvd South and Knoll on north side of site, surrounded by flat areas

11. SITE DESCRIPTION Consists of one (1) house on top of knoll in ~~northern portion of site and two(2) barns on flat area south of~~ knoll.

12. COMMON NAME Haystack Landing

13. HISTORIC NAME, IF KNOWN Haystack or Rudesill's Haystack Handig.

14. STREET OR RURAL ADDRESS 3355 Petaluma Blvd South

CITY Petaluma ZIP 94952 COUNTY Sonoma

15. PRESENT OWNER, Anthony B. Kinnear ADDRESS

CITY ZIP OWNERSHIP IS PUBLIC [ ] PRIVATE [X]

16. PRESENT USE Storage Unit Construct ORIGINAL USE Residence/~~Steamboat~~ Landing

17. APPARENT SIGNIFICANCE OF SITE Terminus for shipping, mail, staging since mid-1850's.

18. THEME- ARCHITECTURE [ ] ARTS & LEISURE [ ] ECONOMIC/INDUSTRIAL [X] EXPLORATION SETTLEMENT [ ] GOVERNMENT [ ] MILITARY [ ] RELIGION [ ] SOCIAL/EDUCATION [ ]

SITE No. CA-SON-1465H
FIELD No. ____________

19. DOMINANT VEGETATION BY DENSITIES (%) ____________

20. NEAREST WATER- DISTANCE 60-70 M DIRECTION East of site

NATURE OF WATER SOURCE Petaluma River

____________ ALTERNATE SOURCES, IF KNOWN ____________

21. EXPOSURE TO INSOLATION ____________

22. EXPOSURE TO PREVAILING WIND ____________

23. EROSION ____________

24. DISTURBANCE AND/OR MODIFICATIONS ~~N-S private access road near center~~ of property on edge of site. E-W private access road may be located on or near original road to wharf. Recent restoration attempts of house foundation. Concreted areas behind barns

25. DIMENSIONS OF ENTIRE SITE ____ M ____ - ____ X ____ M ____ - ____, ESTIMATED AREA OF THE ENTIRE SITE ________ SQ ____, DESCRIBE METHOD USED TO DETERMINE EXTENT OF SITE AND INDIVIDUAL FEATURES ____________

26. FEATURES AND/OR MAJOR ELEMENTS OF SITE (KEYED TO MAP)

A. DESCRIPTION House

____________ DIMENSIONS ____ M ____ X ____ M ____

B. DESCRIPTION East Barn

____________ DIMENSIONS ____ M ____ X ____ M ____

C. DESCRIPTION West Barn

____________ DIMENSIONS ____ M ____ X ____ M ____

D. DESCRIPTION Board covered pit

____________ DIMENSIONS ____ M ____ X ____ M ____

ADDITIONAL NOTES ON FEATURES- 2 glass/ceramic scatters

CA-SON-1465H

SITE No. ____________
FIELD No. ____________

27. ARTIFACTUAL REMAINS CERAMICS ____________________

GLASS ____________________

METAL ____________________

MISC. ____________________

BONE AND/OR SHELL ____________________

28. ESTIMATED DATES OF OCCUPATION REPRESENTED BY ARTIFACTS ____________

29. DATES BASED ON PUBLISHED SOURCES, RESPONDENTS, ETC. ____________

30. PRIMARY BUILDING MATERIAL - ADOBE [ ] WOOD [x] STONE [x] BRICK [ ]
STUCCO [ ] OTHER ____________

31. IS STRUCTURE ON ORIGINAL SITE [ ] MOVED [ ] UNKNOWN [ ] yes

32. YEAR OF INITIAL CONSTRUCTION ________ FACTUAL [ ] ESTIMATED [ ]

33. ELEMENTS OR FEATURES RELATED TO SITE BUT OUTSIDE SITE AS DELIMITED ____________

34. CURRENT LANDMARK STATUS - RECOMMENDED [ ] ____________
EXISTING [ ] ____________

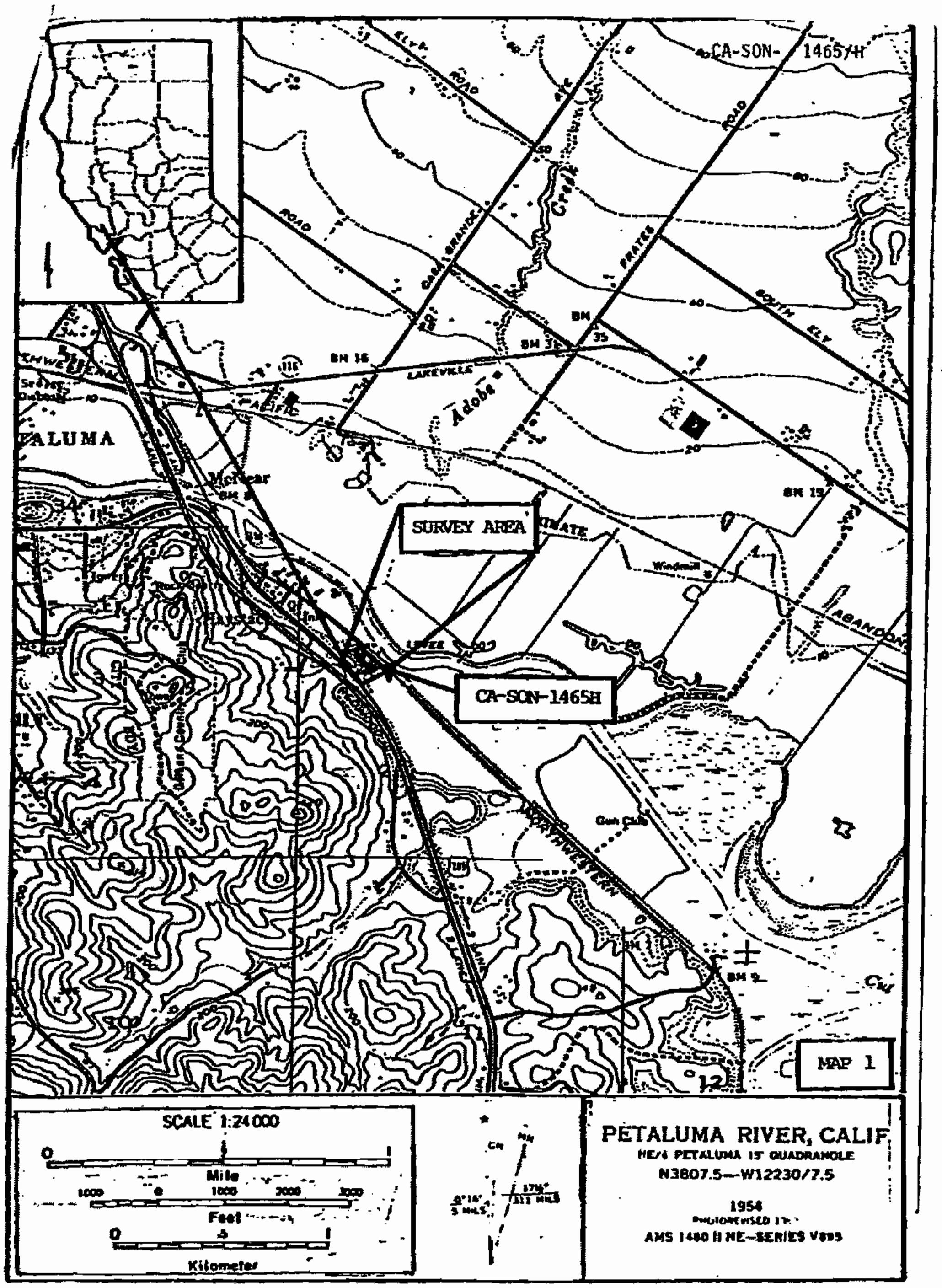
35. PREVIOUS SURVEY, EXCAVATION, OR REFERENCE ______ None

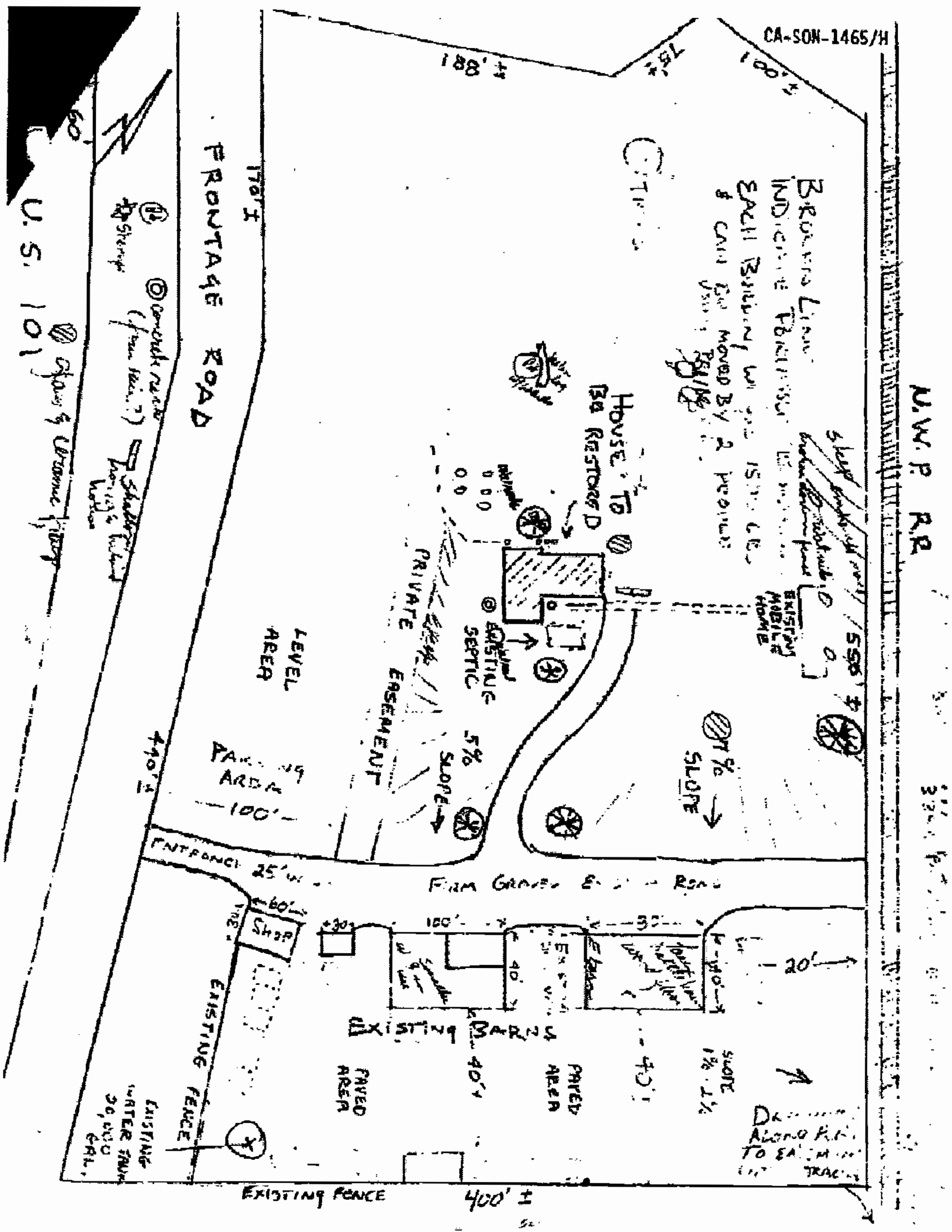
36. PHOTOGRAPHS NUMBER ___ B W ___ COLOR ___ SLIDES, BY ____________
ROLL ________ FRAMES ____________

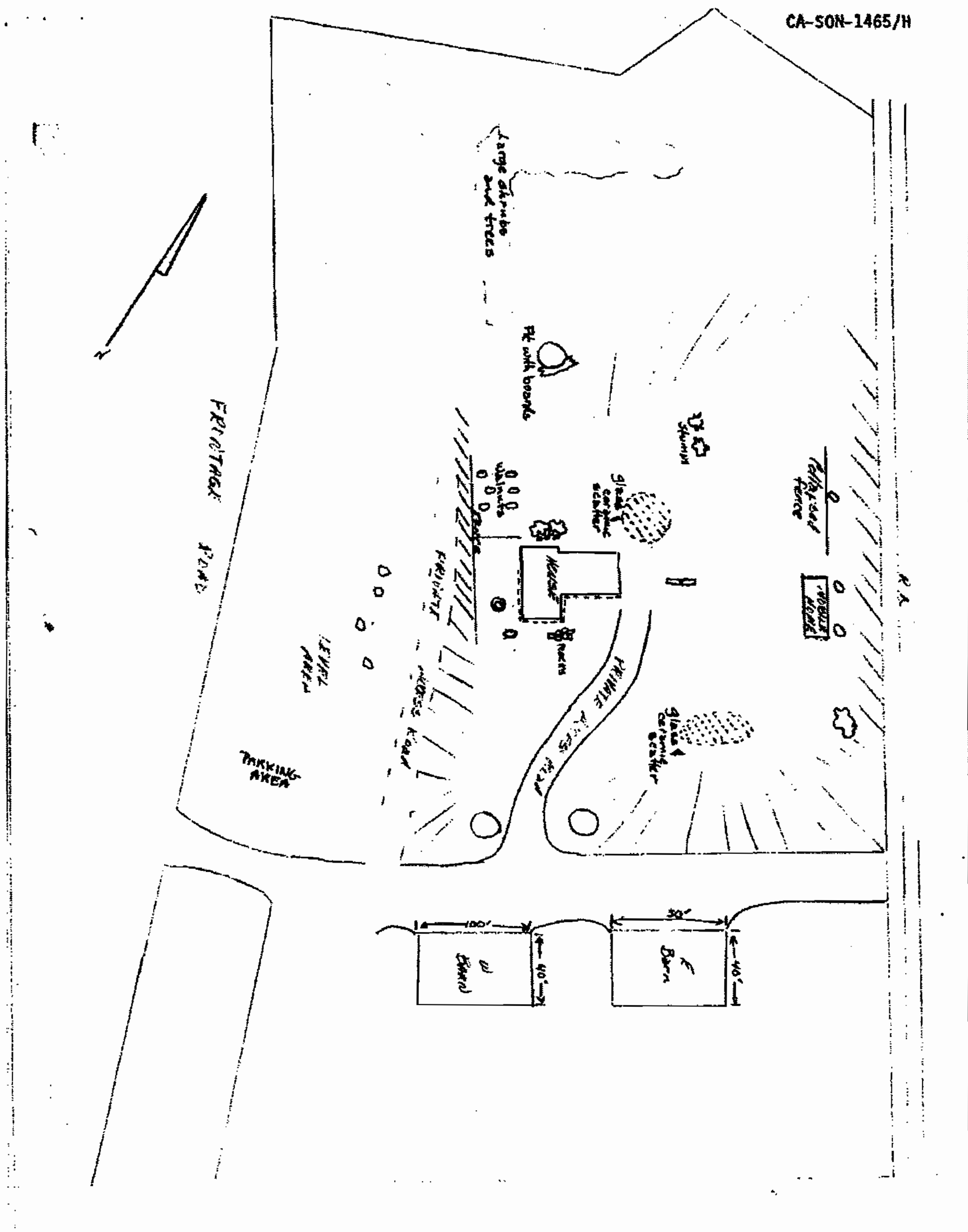
37. RECORDED BY ____________ DATE ____________

38. PROJECT ____________

39. COMMENTS ____________


CA-SON-1465/H
SURVEY AREA
CA-SON-1465H
MAP 1
SCALE 1:24 000
PETALUMA RIVER, CALIF.
N3807.5—W12230/7.5
1954
AMS 1480 II NE—SERIES V895


CA-SON-1465/H
N.W.P. R.R.
FRONTAGE ROAD
U.S. 101
HOUSE TO BE RESTORED
EXISTING SEPTIC
PRIVATE EASEMENT
LEVEL AREA
EXISTING MOBILE HOME
5% SLOPE
PARKING AREA
SHOP
EXISTING BARNS
PAVED AREA
EXISTING FENCE
EXISTING WATER TANK
400' ±
188' ±
100' ±
440' ±


FRONTAGE ROAD
PARKING AREA
LEVEL AREA
House
Barn
Large shrubs and trees
Pit with boards
Mobile Home
100'
40'
30'

Tom Origer & Associates
Archaeology / Historical Research

January 27, 2006

Geoff Reilly
Christopher A. Joseph & Associates
179 H Street
Petaluma, California 94952

Dear Mr. Reilly:

This letter documents work completed by Tom Origer & Associates for the Dutra Asphalt and Recycling Facility Project south of Petaluma. Work included a search of the files of the Northwest Information Center (NWIC) at Sonoma State University, review of the Phase I Cultural Resources Report prepared by Archaeor Archaeological Consultants in 2004, review of pertinent historical maps and other references, and a field check of areas where archaeological deposits and features were considered likely.

The NWIC has no additional information regarding the project area or the previously recorded site, CA-SON-1465H. Review of the Archaeor report found that the study methods met professional standards, and covered the same area now proposed for development. A potential error in the archival results was noted where Thompson (2004:20) reports that the residence at Haystack Landing does not show on the 1860 Petaluma and Napa creeks survey. Reinspection of the United States Coast and Geodetic Survey map published in 1897 (cited in Thompson 2004) and an 1860 US Coast Survey map shows several buildings at Rudesills/Haystack Landing, and one is likely a residence. That places the construction date of the house before 1860.

The site record for CA-SON-1465H shows an extant house and two barns, two areas with glass and ceramic specimens, and a board-covered pit in addition to a variety of trees and bushes (Alvarez and Hayes 1985). The Archaeor report indicates that the house and barns were still standing in 2004, and note is made of one of the artifact concentrations. It is assumed that the second concentration and the board-covered pit were not observed at that time. Thompson concludes that the site should be considered historically significant, citing its association with important events and people, and its potential for yielding important information (i.e. archaeological data) as reasons for its significance. Four specific recommendations were made Thompson 2004:28-30).

- Updating of site documentation
- On-site preservation of the house following the Secretary of the Interior's Standards and Guidelines.
- Documentation of the barn through historic narrative, photographs, and/or architectural drawings prior to alteration or demolition.
- Archaeological monitoring of ground disturbing activities undertaken at the site.

P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Subsequent to the Archaeor report, the old house burned down and the barns were demolished. Our site visit was made on January 24, 2006. There have been obvious impacts to the site due to fire suppression efforts, clean-up, and demolition of the barns. The two artifact concentrations identified by Alvarez and Hayes were observed, but the board-covered pit was not found.

Based on our archival review and field visit, we concur with Thompson's conclusion that the site is historically important, and are revising his recommendations based on current site conditions. Note, the lack of standing structures does not negate the site's importance.

Recommendations

1. Site documentation should be updated and brought to the level of current professional standards.
2. Because the house and barn are no longer extant, physical preservation, in the case of the house, and photo-documentation/ architectural drawings for the barn are no longer feasible recommendations. However, preservation through thorough historical documentation is possible and should be completed.
3. Historical documents show that this site was inhabited before 1860, and the probability of buried archaeological deposits and features is high. Archaeological deposits and other features associated with the house should be sought out in advance of any earth disturbing activities. This work could include using remote sensing techniques and/or searching for features with a backhoe equipped with a smooth-edged blade under the direction of a professional archeologist. Recommendations should be provided regarding any archaeological features found.

If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Vicki R. Beard
Senior Associate

References Cited

Thompson, R.
2004 Phase I Cultural Resources Study for the Haystack Landing, Parcel Numbers APN 019-320-001, -022, and -023, Petaluma, Sonoma County, California.

United States Coast Survey
1860 Map of a part of Petaluma Creek, California. Department of the Interior, Washington, D.C. Register No. 818. National Archives, Washington, D.C.

APPENDIX G
HYDROLOGY DATA

<u>REVISED TECHNICAL MEMORANDUM</u>

Evaluation of Potential Pollutant Loading – Petaluma River Proposed Dutra Asphalt Production Facility, Haystack Landing, Petaluma

Prepared by BASELINE Environmental Consulting

October 31, 2007

INTRODUCTION

Operation of the proposed Dutra Asphalt Plant would result in the emission of airborne pollutants, including metals, polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs). These airborne pollutants are the result of both the asphalt manufacturing processes and the loading and unloading of raw materials such as aggregate. To assist in the environmental assessment, estimates have been made on the possible amount of airborne pollutants that may reach the Petaluma River.

METHOD

The amount of airborne pollutants that may be emitted from the asphalt plant was obtained from the health-based risk assessment (RA) that was performed by the Bay Area Air Quality Management District (BAAQMD).[1] The emission used in the RA were estimated based on typical emission rates for Mixed Drum Asphalt plants from the US Environmental Protection Agency's (US EPA) guidance document, AP-42.[2] For asphalt plant emission, AP-42 provides emissions based on mass of asphalt produced. The RA evaluated risks to human health from emission estimates based on an annual production rate of 225,000 tons of asphalt per year. The daily output (assuming 250 work days per year) from the proposed plant will be 900 tons per day. Dividing the mass for each pollutant emitted in one year (pounds per year) used in the RA by 225,000 tons per year and then multiplying by 900 tons per day produced the mass in pounds of pollutants emitted on a daily basis (see Table 1).

To evaluate the potential "worst case" impact on the Petaluma River, the total mass of each pollutant emitted was added to one daily river flow volume. The volume used was obtained from the US Geological Survey's (USGS) Copland Pumping Station A, located upstream of the proposed project.[3] Daily streamflow data was available from 253 measurements taken between 29 November 1998 and 9 May 2005. To estimate a reasonable "worst case" condition, the lowest streamflow on record was used: 51 cubic feet per second.[4] This equates to a daily flow volume of 4,406,400 cubic feet per day.

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1 BAAQMD, Interoffice Memorandum, From Daphne Y. Chong to Thu Bui, dated 9 March 2005.

2 US EPA, AP 42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, January 1995.

3 Latitude 38°14'18", Longitude 122°38'12" NAD27. USGS Website reference: http://nwis.waterdata.usgs.gov/nwis/discharge/?site_no=11459150&agency_cd=USGS

4 It should be noted that the average flow volume from the data was 252 cubic feet per second.

Using the results of the daily emission estimate and the daily low river flow volume, the resultant concentration of specific pollutants in the Petaluma River was calculated. The values were compared against the National Oceanic and Atmospheric Administration's (NOAA) Screening Quick Reference Tables (SQuiRTs). The SQuiRTs were developed by the Coastal Protection and Restoration Division of the NOAA and provide fresh and marine surface water screening values that are intended to be protective of aquatic biota. The screening values consist of the criteria maximum concentration (CMC), which is the highest for a 1-hour average exposure not to be exceeded more than once every three years and the criteria continuous concentration (CCC) is the highest level for a 4-day average exposure not to be exceeded more than once every three years.

Table 1: Evaluation of Potential Contaminant Loading -Petaluma River
Dutra Materials Proposed Asphalt Plant

	Emission Factors			Daily Emissions					"Worst Case" [1]	Screening Values [2]	
ANALYTE	**S-8 (lbs/ton)**	**S-9 (lbs/ton)**	**S-10 (lbs/ton)**	**S-8 (lbs/day)**	**S-9 (lbs/day)**	**S-10 (lbs/day)**	**Total (lbs/day)**	**Total (gm/day)**	**Maximum Concentration (µg/L)**	**NOAA Squirts-Marine CMC-acute (µg/L)**	**NOAA Squirts-Marine CCC-chronic (µg/L)**
Benzene	3.90E-04			3.51E-01			0.35	159	1.28	5,100	700
Ethyl Benzene	2.40E-04			2.16E-01			0.216	98	0.78	430	NE
Formaldehyde	3.10E-03			2.79E+00			2.8	1,266	10.1	NE	NE
Hexane	9.20E-04			8.28E-01			0.83	376	3.0	NE	NE
Methyl Chloroform	4.80E-05			4.32E-02			0.043	19.6	0.157	31,200	NE
Toluene	1.50E-04			1.35E-01			0.135	61	0.49	63,000	5,000
Xylene	2.00E-04			1.80E-01			0.180	82	0.65	NE	NE
Benzo(a)anthracene	2.10E-07	1.31E-06	4.43E-07	1.89E-04	1.18E-03	3.99E-04	0.00176	0.80	0.0064	300	NE
Benzo(a)pyrene	9.80E-09		5.36E-08	8.82E-06		4.83E-05	0.000057	0.026	0.000208	300	NE
Benzo(b)fluoranthene	1.00E-07		1.77E-07	9.00E-05		1.60E-04	0.00025	0.113	0.00091	300	NE
Benzo(k)fluoranthene	4.10E-08		5.14E-08	3.69E-05		4.62E-05	0.000083	0.038	0.00030	300	NE
Chrysene	1.80E-07	4.90E-06	2.40E-06	1.62E-04	4.41E-03	2.16E-03	0.0067	3.1	0.024	300	NE
Indeno(1,2,3-c,d)pyrene	7.00E-09		1.10E-08	6.30E-06		9.87E-06	0.0000162	0.0073	0.000059	300	NE
Naphthalene	8.66E-05	4.25E-05	2.92E-05	7.79E-02	3.83E-02	2.63E-02	0.142	65	0.52	2,350	NE
Phenol			2.75E-05			2.48E-02	0.025	11.2	0.090	5,800	NE
Dioxins	6.90E-10			6.21E-07			0.00000062	0.00028	0.0000023	NE	NE
Arsenic	1.80E-07			1.62E-04			0.000162	0.073	0.00059	69	36
Cadmium	4.10E-07			3.69E-04			0.00037	0.167	0.00134	42	9.3
Chromium Hexavalent	4.50E-07			4.05E-04			0.00041	0.184	0.00147	1,100	50
Copper	3.10E-06			2.79E-03			0.0028	1.27	0.0101	4.8	3.1
Lead	6.20E-07			5.58E-04			0.00056	0.25	0.00203	210	8.1
Manganese	7.70E-06			6.93E-03			0.0069	3.1	0.025	NE	NE
Mercury	2.40E-07			2.16E-04			0.000216	0.098	0.00078	1.8	0.940
Nickel	6.30E-05			5.67E-02			0.057	26	0.206	74	8.2
Phosphorous	2.80E-05			2.52E-02			0.025	11.4	0.091	NE	0.1
Selenium	3.50E-07			3.15E-04			0.00032	0.143	0.00115	290	71
Zinc	6.10E-05			5.49E-02			0.055	25	0.200	90	81

Notes:

S-8 = dryer/mixer
S-9 = three silos
S-10 = load-out

Asphalt Plant daily production rate: 900 tons (maximum 225,000 production for plant divided by 250 working days)

Petaluma River low flow velocity 51 cubic feet per second (USGS Copland Pumping Station A Petaluma Ca, http://nwis.waterdata.usgs.gov)

Petaluma River low flow velocity 4,406,400 cubic feet per day

CMC = Criteria maximum concentration is the highest for a 1-hour average exposure not to be exceeded more than once every three years.

CCC = Criteria continuous concentration is the highest level for a 4-day average exposure not to be exceeded more than once every three years.

Exceedances indicated by bold text

[1] Assumes all the pollutants emitted daily settle into the river.

[2] National Oceanic and Atmospheric Administration Screening Quick Reference Tables (SQuiRTs), updated September 1999.

INTEROFFICE MEMORANDUM
MARCH 9, 2005

TO: Thu Bui Via: Scott B. Lutz

FROM: Daphne Y. Chong

SUBJECT: **Results of Health Risk Screening Analysis for Dutra Materials (Petaluma, CA), Mix Drum Asphalt Plant, Plant #16483, Application #10901**

Per your request, we have completed a health risk screening analysis for the above referenced permit application. The analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from operation of a mix drum asphalt plant at this facility located in Petaluma. The estimated incremental increase in emissions of TACs provided in your memo dated February 3, 2005 was used in the health risk screening analysis. The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. The model was run with Petaluma meteorological data. Stack parameters for the analysis were based on information provided by the applicant. Estimates of residential risk assume continuous 70-year exposure to annual average TAC concentrations. Additional details of the analysis are included in the attached materials.

Results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 6.6 in a million. In accordance with the District's Risk Management Policy, this risk level is considered acceptable if the sources are determined to meet current TBACT requirements. However, if you determine that the sources do not meet current TBACT requirements, the estimated maximum incremental increased cancer risk for this application is not considered acceptable because it is greater than 1 in a million. In that case, the applicant should consider installing an abatement device that meets current TBACT requirements.

Please let me know if you have any questions or would like to discuss.

Health Risk Screening Analysis Summary for Mix Drum Asphalt Plant
Facility = Dutra Materials (Petaluma, CA)
- **Plant #16483, Application #10901**
- **ISCST3 Air Dispersion Model Used**
- **Petaluma Meteorological Data Used**
- **Rural Land Use**

	Inhalation Unit Risk Factor (ug/m3)^-1	Inhalation REL (ug/m^3)	S-8 (Dryer/Mixer) (lb/yr)	S-9 (3-Silos) (lb/yr)	S-10 (Load-Out) (lb/yr)	S-8 & S-9 (lb/yr)	Input Factors for ISCST3 Model: Cancer Risk		Input Factors for ISCST3 Model: Non-Cancer Risk	
							S-8 & S-9	S-10	S-8 & S-9	S-10
Benzene	2.9E-05	6.0E+01	3.43E+02			3.43E+02	1.0E-02		5.7E+00	
Ethyl Benzene	NC	2.0E+03	2.11E+02			2.11E+02	NC		1.1E-01	
Formaldehyde	6.0E-06	3.0E+00	2.73E+03			2.73E+03	1.6E-02		9.1E+02	
Hexane	NC	7.0E+03	8.10E+02			8.10E+02	NC		1.2E-01	
Methyl Chloroform	NC	1.0E+03	4.22E+01			4.22E+01	NC		4.2E-02	
Toluene	NC	3.0E+02	1.32E+02			1.32E+02	NC		4.4E-01	
Xylene	NC	7.0E+02	1.76E+02			1.76E+02	NC		2.5E-01	
Benzo(a)anthracene*	1.7E-03	NA	1.85E-01	1.15E+00	3.90E-01	1.33E+00	2.3E-03	6.6E-04	NA	NA
Benzo(a)pyrene*	1.7E-02	NA	8.62E-03		4.72E-02	8.62E-03	1.5E-04	8.0E-04	NA	NA
Benzo(b)fluoranthene*	1.7E-03	NA	8.80E-02		1.56E-01	8.80E-02	1.5E-04	2.7E-04	NA	NA
Benzo(k)fluoranthene*	1.7E-03	NA	3.61E-02		4.52E-02	3.61E-02	6.1E-05	7.7E-05	NA	NA
Chrysene*	1.7E-04	NA	1.58E-01	4.31E+00	2.11E+00	4.47E+00	7.6E-04	3.6E-04	NA	NA
Indeno(1,2,3-c,d)pyrene*	1.7E-03	NA	6.16E-03		9.65E-03	6.16E-03	1.0E-05	1.6E-05	NA	NA
Naphthalene	3.4E-05	NA	7.92E+01	3.74E+01	2.57E+01	1.17E+02	4.0E-03	8.7E-04	NA	NA
Phenol	NC	2.0E+02			2.42E+01		NC	NC		1.21E-01
Dioxins*	3.4E+02	3.8E-06	6.07E-04			6.07E-04	2.0E-01		1.6E+02	
Arsenic*	1.6E-02	1.6E-02	1.58E-01			1.58E-01	2.5E-03		9.9E+00	
Cadmium*	4.3E-03	1.8E-02	3.61E-01			3.61E-01	1.6E-03		2.0E+01	
Chromium Hexavalent*	1.5E-01	2.0E-01	3.96E-01			3.96E-01	5.9E-02		2.0E+00	
Copper	NC	2.4E+00	2.73E+00			2.73E+00	NC		1.1E+00	
Lead*	3.6E-05	NA	5.46E-01			5.46E-01	2.0E-05		NA	
Manganese	NC	2.0E-01	6.78E+00			6.78E+00	NC		3.4E+01	
Mercury*	NC	1.5E-02	2.11E-01			2.11E-01	NC		1.4E+01	
Nickel*	2.6E-04	5.0E-02	5.54E+01			5.54E+01	1.4E-02		1.1E+03	
Phosphorous	NC	7.0E-02	2.46E+01			2.46E+01	NC		3.5E+02	
Selenium	NC	2.0E+01	3.08E-01			3.08E-01	NC		1.5E-02	
Zinc	NC	3.5E+01	5.37E+01			5.37E+01	NC		1.5E+00	
							3.2E-01	3.1E-03	2.6E+03	1.2E-01
						Input Factors =	***4.5E+00***	***4.4E-02***	***3.8E-02***	***1.7E-06***

* Inhalation URFs and RELs have been adjusted to included a impacts from non-inhalatin exposure pathway (multi-pathway evaluation)

Receptor	ISCST3 Output	Cancer Risk Exposure Adjustment Factor	Cancer Risk (in a million)	Hazard Index
Resident	6.6	1.0	6.6	0.05

```
#
# U.S. Geological Survey
# National Water Information System
# Retrieved: 2006-05-08 18:25:15 EDT
#
# This file contains published daily mean streamflow data.
#
# Further Descriptions of the dv_cd column can be found at:
# http://waterdata.usgs.gov/nwis/help?codes_help#dv_cd
#
#
# This information includes the following fields:
#
#  agency_cd   Agency Code
#  site_no     USGS station number
#  dv_dt       date of daily mean streamflow
#  dv_va       daily mean streamflow value, in cubic-feet per-second
#  dv_cd       daily mean streamflow value qualification code
#
# Sites in this file include:
#  USGS 11459150 PETALUMA R A COPLAND PUMPING STATION A PETALUMA CA
#
#
agency_cd	site_no	dv_dt	dv_va	dv_cd
5s	15s	10d	12n	3s
USGS	11459150	1998-11-29	200	e
USGS	11459150	1998-12-01	160	e
USGS	11459150	1998-12-03	170	e
USGS	11459150	1998-12-04	70	e
USGS	11459150	1998-12-05	80	e
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HYDROLOGY REPORT
FOR
DUTRA-HAYSTACK LANDING ASPHALT AND RECYCLING FACILITY

PETALUMA, SONOMA COUNTY, CALIFORNIA

Prepared:
April 5, 2006

Prepared for:
DUTRA MATERIALS
1000 Pt. San Pedro Road
San Rafael, CA 94901
(415) 459-7740

Prepared by:
CSW/STUBER-STROEH ENGINEERING GROUP, INC.
790 DeLong Avenue
Novato, CA 94945
(415) 892-4763

File No.: 5.913.02

HYDROLOGY REPORT
FOR
DUTRA-HAYSTACK LANDING
ASPHALT AND RECYCLING FACILITY
Petaluma, Sonoma County, California

TABLE OF CONTENTS

Date: April 5, 2006
File: 5.913.02

HAYSTACK HYDROLOGY REPORT
EXECUTIVE SUMMARY

A. PROJECT DESCRIPTION

The proposed project consists of building an asphalt plant and recycled aggregate facility at 3355 Petaluma Boulevard South in Petaluma, California. The details of the project are described in numerous documents available at the County of Sonoma Permit and Resource Management District (PRMD) and elsewhere.

B. PURPOSE OF THE SUMMARY

The purpose of this report is to describe the storm water management for both the pre and post project conditions. The analysis will determine what impacts, if any, occur in downstream facilities which convey storm water runoff to the Petaluma River. Two issues are of prime concern. First, to determine whether or not the existing culvert under the Northwestern Pacific Tracks, now under the jurisdiction of the Sonoma Marin Area Rail Transit Authority, otherwise known as SMART is impacted by the proposed facility.

Second, to demonstrate that the project, which includes rerouting the storm water runoff of the existing site through the mitigation area and the enhanced vegetated ditch, will not adversely affect the floodplain in the vicinity of the site.

C. EXISTING CONDITIONS

The existing conditions are shown on the attached plates Map No. 1, H1 and H1-V. The total watershed that drains to the culvert under the SMART tracks is about 143 acres. This includes all of the project site with the exception of two areas.

The first area is the very north end of the site between the railroad and Petaluma Boulevard South. This includes approximately one acre which drains to the watershed directly north of the project site. No development is anticipated for this area, therefore no new impacts to the drainage course will result.

The second area is that area known as the Barton/Shields Parcel which is directly on the Petaluma River, east of the railroad. This parcel will be used for the new barge unloading facility. The property will not significantly change from its existing condition of a level graded pad. A new off load facility will be installed on a floating barge anchored to a pile supported dock. The transport barges will be unloaded by mechanical equipment and the aggregate placed on a conveyor for transport over the SMART tracks to the new asphalt plant facility. The runoff from this area will continue to flow directly to the Petaluma River or to a side slough of the Petaluma River. There should be no significant impacts to the existing slough and river bank.

The main watershed can be divided into three main systems which all drain to the existing culvert under the railroad shown as POC 1 (point of concentration) after being collected in a series of interconnected ditches and ponds shown as the railroad pond. The culvert under the railroad has been variously reported as a wood box culvert (Balance Hydrologics), 24" CMP (Petaluma River Watershed Master Drainage Plan maps) or a concrete box (R.W. Davis and Associates) between 24" square to 30" square. It is partially clogged with various plant or animal growth. For the purposes of this report we will assume its opening acts like a box 18" wide by 24" tall.

The first system collects runoff from 53-acres west of Highway 101 and conveys the water through a 30" culvert (POC 4) to the ditch/pond along the western portion of the project site. Here it is joined by 13.83 acres from the hillside site of the former farmhouse and the area around the barns (now demolished). The ditch/pond discharges through a 15" culvert (POC3) under the old farm roads into the railroad pond.

The second system collects runoff from 20.2 acres on the west side of Highway 101 and delivers the storm water through a 30" culvert (POC 5) to the south end of the project site and into the area that was used as settling ponds by the recent quarry activities on the west side of Highway 101. This runoff is joined by 13.96 acres of watershed in the settling pond area and flows through a break in the old levee which contained the settling ponds to the southern ditch/pond which is also along the western edge of the property. This ditch/pond collects runoff from the highway and bank below the highway before being discharged through an 18" culvert (POC2) into the railroad pond.

The third system collects runoff from approximately 19.9 acres south of the project site and east of Highway 101. This undeveloped pasture land drains north toward the project site and collects in a ditch which leads to a pond of about 3.0 acres which is directly connected to and a part of the railroad pond.

The three systems collect in the railroad pond and discharge through the railroad culvert (POC1). The railroad culvert is subject to tidal influence. According to Balance Hydrologics, the tide elevations vary from 4.16 MHHW to -1.86 MLW.

The immediate watershed on the east side of the highway (with the exception of the hill area) has little elevation change and the ditch/ponds conveying storm water are flat or, in some cases, inverted. All flow and discharge through the system is driven by differential head and ultimately dependent upon the tidal cycle to discharge the storm flows which collect and are "detained" in the railroad pond during periods of high tide.

Existing 100-year peak flows through POC 1 are estimated to be 6.36 CFS with a maximum water surface of 4.43 NGVD.

D. PROPOSED CONDITIONS

The proposed project will slightly modify the existing watershed and provide opportunities to mitigate the impact of the developed facility system on the storm water runoff peaks and water quality. It does this by rerouting the ditch/pond areas and providing more storage upstream of the railroad pond.

The proposed system maintains the existing railroad culvert and railroad pond concept. The railroad pond is enlarged slightly as a part of the wetland mitigations to improve the opportunities for species desiring tidal habitat. The northerly and southerly ditch/pond areas along the westerly boundary are connected via a weir that allows runoff from the asphalt plant area to be further treated by filtering through a wetland ditch/pond and allowing additional contact time with vegetation. In addition, the low-lying area of the south ditch/pond is further excavated to provide open water year around. The southerly 30" culvert that drains the area west of Highway 101 is re-directed east towards a newly created emergent marsh area that drains directly into the railroad ditch. See Plate H2.

Two areas of impact from the proposed project warrant further explanation. First, the area of the asphalt plant will be paved. However all drainage from the immediate vicinity of the asphalt plant will be directed to a catch basin that will allow it to be filtered and treated before it is discharged into the treatment train of the north ditch/pond. Second, the flow from the aggregate storage areas as well as that from the recycled aggregate processing area and the other improved areas will be directed into the ditch/pond system and allowed significant contact time with vegetation to promote treatment and settling of sediment prior to reaching the railroad pond.

Proposed 100-year peak flows through POC 1 are estimated to be 1.38 CFS with a maximum water surface of 4.16 NGVD.

E. CRITERIA AND METHOD OF ANALYSIS

Flooding the F2 Issue

This project is located in the County of Sonoma F2 zoning overlay. This means that the volume of flood storage cannot be reduced. If the volume of flood storage (overflow from the Petaluma River) is reduced, a project must provide calculations to show that the development of the project will not raise the water surface during the flooding event. For the purposes of the flood elevation the County uses the FEMA flood defined 100-year overflow of elevation 7.0 MSL. As shown in the Table 1, the existing storage below elevation 7.0 is 28.57 acre-feet.

TABLE 1

Condition	Comparison of Storage Below Elevation 7.0 NGVD
Existing	28.57 acre-feet
Proposed	32.53 acre-feet

The project proposes to grade the site, raising some areas to allow for areas to drain properly, and re-contour the existing remnants of the settling ponds providing the mitigations areas shown on the Lucy Macmillan report. The result of this grading will be to provide volume below elevation 7.0 to offset the filled areas within the existing drainage system. These results are also shown in Table 1. It is apparent that the project will not impact the overflow flooding of the Petaluma River as outlined in the zoning code defining the F-2 overlay zoning.

Peak Flows and Water Surface Elevations

As shown above, the 100-year flow in the post project condition is less than the existing condition (6.36 CFS vs. 1.38 CFS). The water surface in the railroad pond is slightly lowered also reducing the impact on the railroad.

F. CONCLUSIONS

The proposed project does not present any significant impacts to the existing hydrology as shown above. Peak flows into the railroad box culvert are reduced and the water surface in the ditch/pond along the railroad is slightly lower than the existing condition.

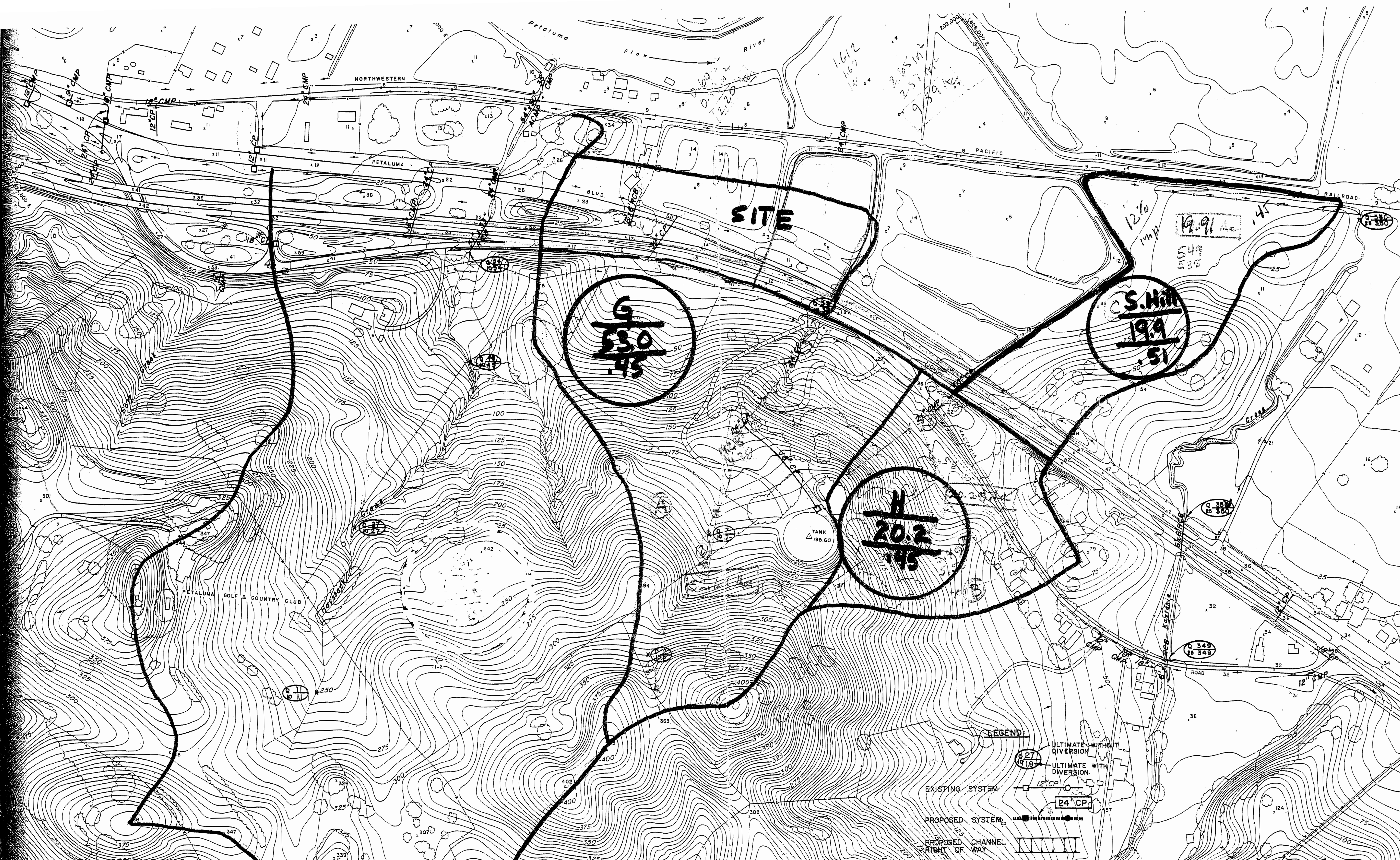
The volume of available storage on the property after construction is greater than that available today.

Based on the above, it is our opinion, that the project as proposed does not present any significant environmental impact to the site, the railroad, or the railroad culvert.

APPENDIX I

MAPS

~~Map No. 1: Petaluma River Watershed Master Drainage Plan~~
Map H1: Preliminary Hydrology Plan - Existing Conditions
Map H2: Preliminary Hydrology Plan - Post Development
Map H1-V: Pre Development Ditch / Pond
Map H2-V: Post Development Ditch / Pond



BASE MAPPING BY
Towill, inc.
JOB NO. 6599

NOTE:
HORIZONTAL DATUM: CALIFORNIA COORDINATE SYSTEM ZONE 2
VERTICAL DATUM: U.S.N.G.S. MEAN SEA LEVEL OF 1929
DATE OF PHOTOGRAPHY: JAN. 31, 1983
VERTICAL ACCURACY: SPOT ELEVATIONS WITHIN ± 2.5' OF TRUE ELEVATION ; CONTOURS WITHIN ONE CONTOUR OF TRUE ELEVATION.

GRAPHIC SCALE 200 0 200 400 600 FEET

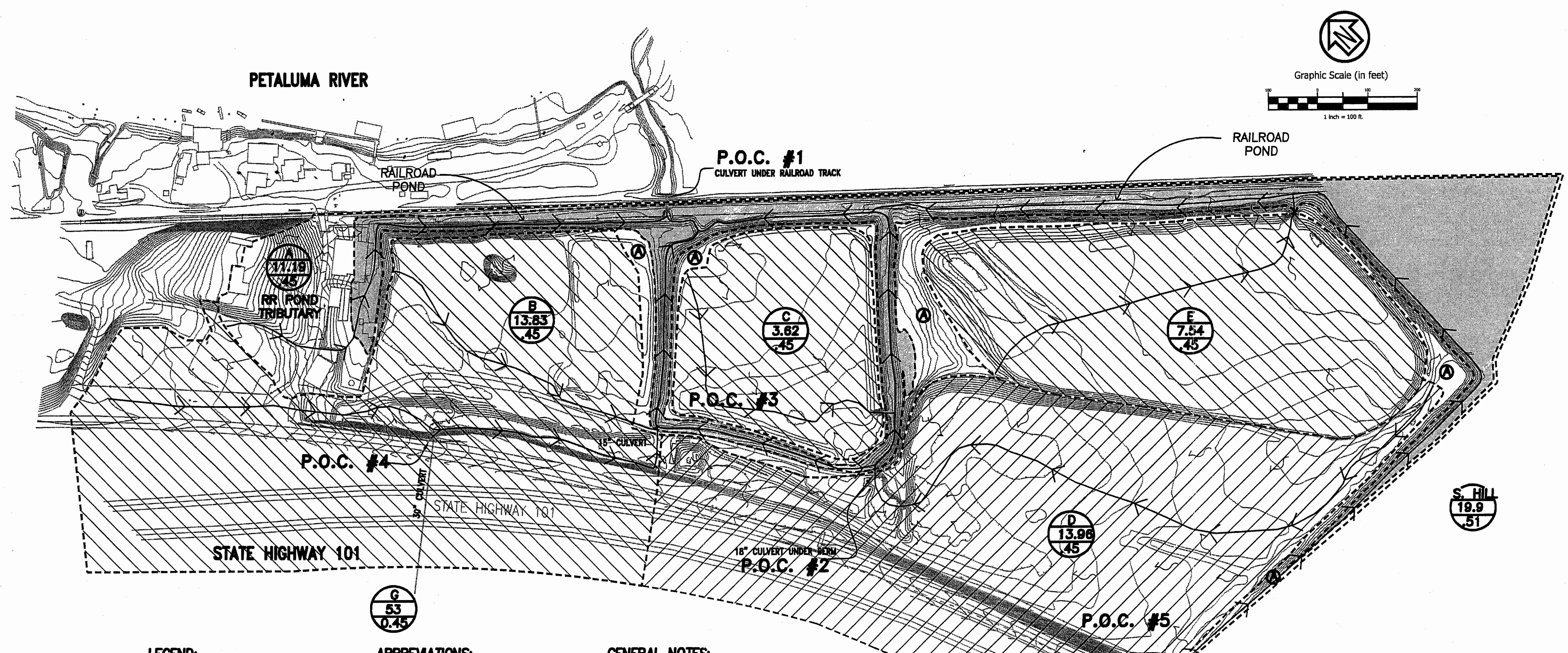
CONTOUR INTERVAL: 5FEET

PETALUMA RIVER WATERSHED MASTER DRAINAGE PLAN

KASTANIA, GOLF, AND HAYSTACK CREEKS

PREPARED BY: SONOMA COUNTY WATER AGENCY

MAP NO. 1



LEGEND:

21.34	EXISTING GROUND ELEVATION
	CONTOUR LINE-INDEX-5' INTERVAL
	DEPRESSION CONTOUR LINE - 1' INTERVAL
	CONTOUR LINE- 1' INTERVAL
	CHAIN LINK FENCE w/3 STRANDS B/W (5' HIGH UNLESS OTHER WISE NOTED)
	VEGETATION LINE
	RAILROAD TRACKS
	GRAPHIC PROPERTY LINE/CORNER (SEE NOTES)
	PRIMARY DRAINAGE FLOW PATH
	TRIBUTARY AREA BOUNDARY
	FLOW DIRECTION

ABBREVIATIONS:

T	TANK
C	CONCRETE
FH	FIRE HYDRANT
DI	DROP INLET
DMH	DRAIN MANHOLE
PD	POWER DROP
UP	UTILITY POLE
O/H	OVER-HEAD
CLF	CHAIN LINK FENCE
HT.	HEIGHT
B/W	BARBED WIRE
EM	ELECTRIC METER
GM	GAS METER
w/	WITH
EOP	EDGE OF PAVEMENT
TYP.	TYPICAL

C / 9.82 / .45 — TRIBUTARY AREA DESIGNATION — AREA (ACRES) — RUNOFF COEFFICIENT -"C" FACTOR

GENERAL NOTES:

1. AERIAL MAPPING PROVIDED BY CARTWRIGHT AERIAL SURVEYS, FLOWN 11-26-03
2. FIELD SURVEY FOR BOUNDARY & AERIAL CONTROL PERFORMED BETWEEN NOVEMBER 2003 - FEBRUARY 2004
3. BENCHMARK IS SONOMA COUNTY WATER AGENCY BENCHMARK 99-637, FOUND 2" BRASS DISK, ELEVATION 25.67, NGVD29
4. DATUM USED IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)

Rev	Date	Description	Designed	Drawn	Checked

CSW [St]²
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790 DeLong Ave., Novato, CA. 94945-3246
TEL (415) 892-4763 FAX (415) 892-4502

City: Petaluma
County: Sonoma
State: California

DUTRA-HAYSTACK LANDING
ASPHALT & RECYCLING FACILITY
PRELIMINARY HYDROLOGY PLAN-EXISTING CONDITIONS
DUTRA GROUP INC/CORTOMENO SAND & GRAVEL, LLC

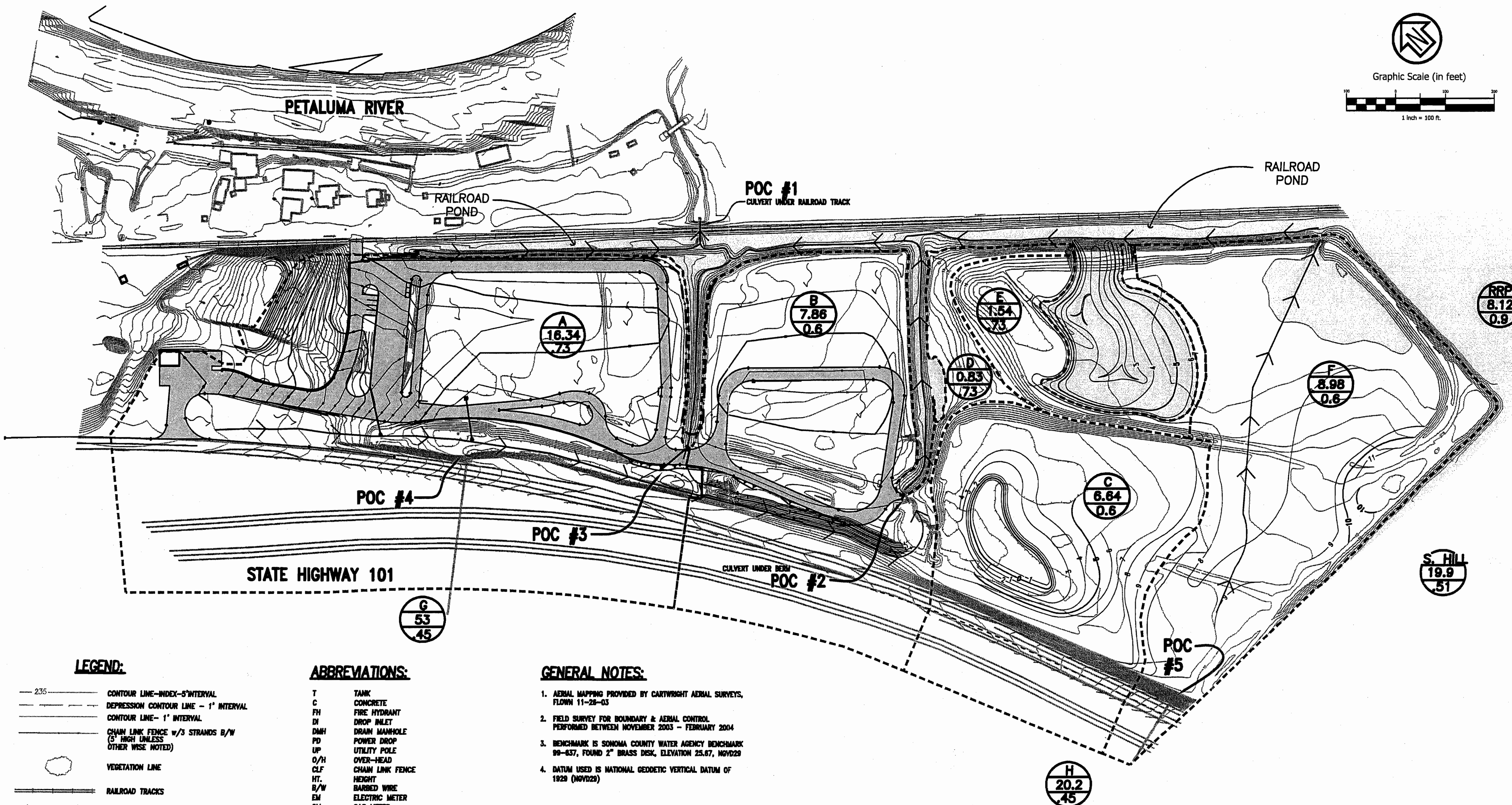
Prepared Under the Direction of:

Date

Sheet H1

Scale Hor: 1"=100' Date: 12-02-04
File: 5913.02
Plan File: D-4397

\\0ds1\Data\Civil\5\591302\Dwg\H1.dwg, 4/5/2006 9:26:56 AM, kuerc, 1:2.28571



LEGEND:

- 235 — CONTOUR LINE–INDEX–5' INTERVAL
- DEPRESSION CONTOUR LINE – 1' INTERVAL
- CONTOUR LINE – 1' INTERVAL
- CHAIN LINK FENCE w/3 STRANDS B/W (5' HIGH UNLESS OTHER WISE NOTED)
- VEGETATION LINE
- RAILROAD TRACKS
- PRIMARY DRAINAGE FLOW PATH
- TRIBUTARY AREA BOUNDARY
- FLOW DIRECTION

D / 13.94 / .46 — TRIBUTARY AREA DESIGNATION — AREA (ACRES) — RUNOFF COEFFICIENT –"C" FACTOR

ABBREVIATIONS:

T	TANK
C	CONCRETE
FH	FIRE HYDRANT
DI	DROP INLET
DMH	DRAIN MANHOLE
PD	POWER DROP
UP	UTILITY POLE
O/H	OVER-HEAD
CLF	CHAIN LINK FENCE
HT.	HEIGHT
B/W	BARBED WIRE
EM	ELECTRIC METER
GM	GAS METER
w/	WITH
EOP	EDGE OF PAVEMENT
TYP.	TYPICAL

GENERAL NOTES:

1. AERIAL MAPPING PROVIDED BY CARTWRIGHT AERIAL SURVEYS, FLOWN 11-28-03
2. FIELD SURVEY FOR BOUNDARY & AERIAL CONTROL PERFORMED BETWEEN NOVEMBER 2003 – FEBRUARY 2004
3. BENCHMARK IS SONOMA COUNTY WATER AGENCY BENCHMARK 99-637, FOUND 2" BRASS DISK, ELEVATION 25.67, NGVD29
4. DATUM USED IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)

Rev	Date	Description	Designed	Drawn	Checked

CSW [St]² — CSW/STUBER-STROEH ENGINEERING GROUP, INC. ENGINEERS & PLANNERS
790 DeLong Ave., Novato, CA 94945-3246
TEL (415) 892-4763 FAX (415) 892-4502

City: Petaluma
County: Sonoma
State: California

DUTRA-HAYSTACK LANDING
ASPHALT & RECYCLING FACILITY
PRELIMINARY HYDROLOGY PLAN-POST DEVELOPMENT
DUTRA GROUP INC/CORTOMENO SAND & GRAVEL, LLC

Prepared Under the Direction of:

Date

Sheet H2 © 2004
Scale: Hor: 1"=100' Date: 12-02-04
File: 591302
Plan File: D-4397

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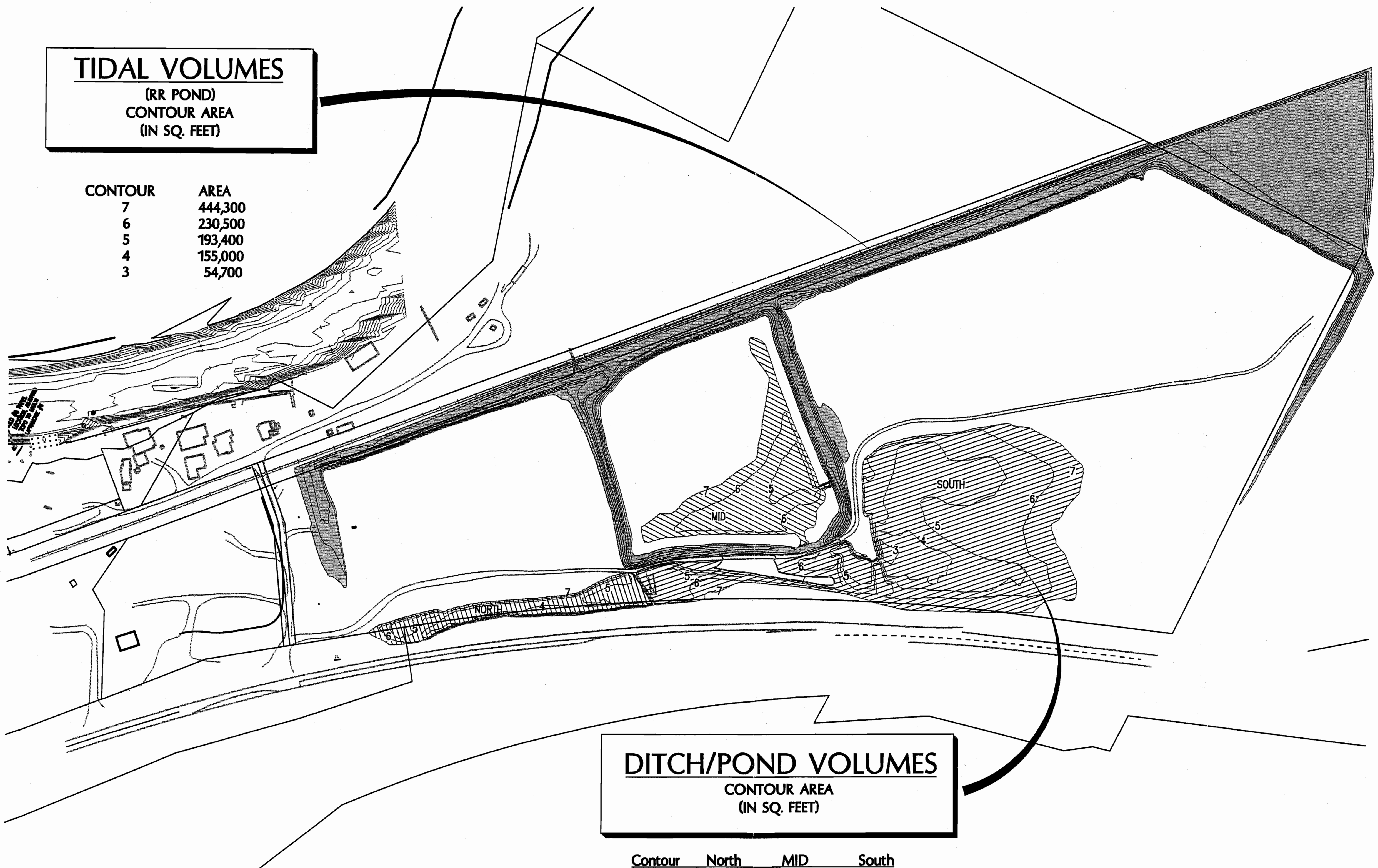

TIDAL VOLUMES

(RR POND)
CONTOUR AREA
(IN SQ. FEET)

CONTOUR	AREA
7	444,300
6	230,500
5	193,400
4	155,000
3	54,700

DITCH/POND VOLUMES

CONTOUR AREA
(IN SQ. FEET)

Contour	North	MID	South
7	27,700	54,400	182,700
6	23,700	29,700	131,900
5	14,200	6,400	61,700
4	3,300	0	14,250
3	0	0	1,000

Rev	Date	Description	Designed	Drawn	Checked

CSW [St]²
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City: Petaluma
County: Sonoma
State: California

DUTRA-HAYSTACK LANDING
ASPHALT & RECYCLING FACILITY
PRE DEVELOPMENT DITCH/POND
DUTRA GROUP INC/CORTOMENO SAND & GRAVEL, LLC

Prepared Under the Direction of:
Date

Sheet H1-V
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Scale Hor. AS SHOWN
Vert.
File 5.913.02
Plan File

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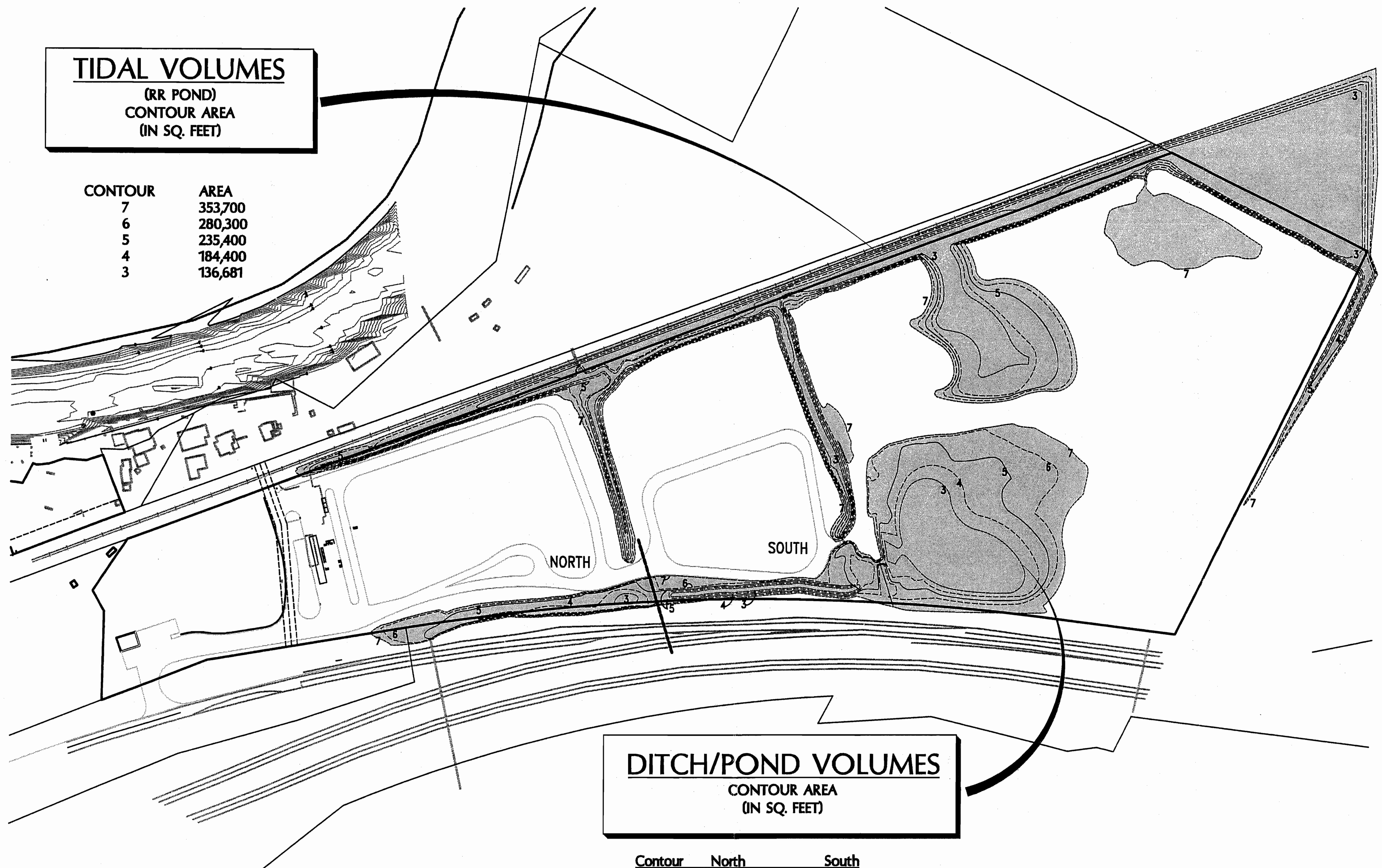

TIDAL VOLUMES
(RR POND)
CONTOUR AREA
(IN SQ. FEET)

CONTOUR	AREA
7	353,700
6	280,300
5	235,400
4	184,400
3	136,681

DITCH/POND VOLUMES
CONTOUR AREA
(IN SQ. FEET)

Contour	North	South
7	26,500	175,400
6	22,800	138.100
5	15,000	97,200
4	5,500	64,300
3	850	41,200

Rev	Date	Description	Designed	Drawn	Checked

CSW [St]²
CSW/STUBER-STROEH ENGINEERING GROUP, INC. ENGINEERS & PLANNERS
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State: California

DUTRA-HAYSTACK LANDING
ASPHALT & RECYCLING FACILITY
POST DEVELOPMENT DITCH/POND
DUTRA GROUP INC/CORTOMENO SAND & GRAVEL, LLC

Prepared Under the Direction of:

Date

Sheet H2-V
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Scale Hor: AS SHOWN Vert:
File: 591302
Plan File:

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APPENDIX II

METHOD OF ANALYSIS AND ORDER OF HYDROGRAPHS IN THE HYDROFLOW MODEL

METHOD OF ANALYSIS AND ORDER OF HYDROGRAPHS IN THE HYDROFLOW MODEL

We used two methods to model drainage of the site through the detention basin:

We first used the Rational Method to model the volume of runoff produced by a 100-year storm event for the drainage areas identified on Sheets H1 and H2. We estimated the rates of flow for pre-development conditions and for post-development conditions.

The Rational Method calculates peak runoff (Q) in cfs described by the equation Q=CIA. The terms are defined as follows:

Q - Flow of runoff measured in cubic feet per second (cfs)
C - Runoff coefficient
I - Intensity of the storm (in/hr)
A - Area contributing to the flow at a given point of concentration (acres)

We next used a hydrograph analysis to model drainage of the site. Using the peak flow from the Rational Method we were able to generate hydrographs to model the progression through the various ponds and determine the ability of the site to detain runoff.

A computer program, Hydraflow Hydrographs, developed by Intelisolve, was used to model the volume of runoff coming from the site. The hydrograph program allows the user to define parameters to model a watershed and create a hydrograph. Parameters defined for the Hydrograph program included the drainage area, runoff coefficient, time of concentration, return period and intensities used for the Rational Method.

The order of the Hydrographs in the Hydraflow model are as follows:

EXISTING CONDITIONS:

Hydrograph	Description
1	Hydrograph developed for Area G
2	Hydrograph developed for Area H
3	Hydrograph developed for South Hill Area
4	Hydrograph developed for Area A
5	Hydrograph developed for Area B
6	Hydrograph developed for Area C
7	Hydrograph developed for Area D
8	Hydrograph developed for Area E
9	Hydrograph developed for G added to B
10	Hydrograph developed for H added to D
11	G + B routed through North Pond

Hydrograph	Description
12	Area C routed through Middle Pond
13	H + D routed through South Pond
14	Outflow for North Pond added to outflow for Middle Pond
15	Combo North / Middle added to South Pond outflow
16	Area E hydrograph & South Hill hydrograph combined
17	Hydrographs 15 and 16 combined (3 ponds + Area E + South Hill)
18	Hydrograph 17 added to hydrograph for Area A (Hydrograph 4)
19	Hydrograph 18 routed through RR Pond

PROPOSED CONDITIONS:

Hydrograph	Description
1	Hydrograph developed for Area G
2	Hydrograph developed for Area H
3	Hydrograph developed for South Hill Area
4	Hydrograph developed for Area A
5	Hydrograph developed for Area B and C combined
6	Hydrograph developed for Area F
7	Hydrograph for Area A added to G (1 + 4)
8	Hydrograph developed for Area A and G routed through the North Pond
9	Hydrograph for North Pond culvert outfall
10	Hydrograph for North Pond weir outfall
11	North Pond weir hydrograph (No. 10) added to Hydrograph No. 5 (Areas B + C)
12	Hydrograph No. 11 routed through South Pond
13	Hydrograph No. 2 added to Hydrograph No. 6 (H + F)
14	Hydrograph No. 13 routed through broad swale
15	Hydrograph developed for Areas RRP + E + D
16	North Pond Culvert hydrograph added to outflow of South Pond (Hydrographs 9 + 12)
17	Broad swale hydrograph added to South Hill hydrograph (14 + 3)
18	North and South Ponds, broad swale & South Hill hydrograph added (16 + 17)
19	Above hydrograph added to RR Pond area hydrograph (18 + 15)
20	All areas routed through RR Pond

APPENDIX III

DATUM EXPLANATION

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1310 Redwood Way, Suite 200, Petaluma, CA 94954 Tel: (707) 795-4764 Fax: (707) 795-0516

SHEET NO. 1/1

JOB NO. 591302 JOB Dutra-Haystack Landing BY KNP DATE 3/29/06

CLIENT ______ SUBJECT "Hydrology" Datum versus "Topo" Datum CHK'D ______ DATE ______

In order to compensate for the limitations of the Hydraflow-Hydrographs program, elevations found in the plans which are based upon NGVD were increased by a set amount represented by the equation:

HYDROLOGY DATUM = TOPO DATUM + 2.32

The Hydraflow-Hydrographs program allows only positive elevations. The invert for the outfall of the Railroad Pond is at elevation -2.32 and is the lowest elevation considered in the analysis. Therefore -2.32 in the topography is considered elevation zero for the hydrologic analysis.

APPENDIX IV

POND PARAMETERS

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SHEET NO. 1/23

JOB NO. 591302 JOB Dutra-Haystack Landing BY KNP DATE 4/4/06

CLIENT ______ SUBJECT Existing Conditions CHK'D ______ DATE ______

North Pond

Contour Elev. (ft) "Topo Datum" (T.D.)	Contour Elev. (ft) "Hydrology Datum" (H.D.)	Contour Area (s.f.)
3	5.32	10
3.9	6.22	10
4	6.32	3300
5	7.32	14 200
6	8.32	23700
7	9.32	27700

Outfall Structure:

Culvert: 15" diameter
n = 0.024 (assume CMP)
80 LF
invert elevation: 5.82 (H.D.) / 3.5 (T.D)
slope = 0.3% (assume)
discharges to Railroad Pond.

Weir: Length = 10'
elevation = 8.07 (H.D.) / 5.75 (T.D.)

Reservoir Report

2/23

English

Reservoir No. 1 - North Pond

(Existing conditions MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	5.32	10	0	0
0.90	6.22	10	9	9
1.00	6.32	3,300	166	175
2.00	7.32	14,200	8,750	8,925
3.00	8.32	23,700	18,950	27,875
4.00	9.32	27,700	25,700	53,575

Culvert / Orifice Structures

		[A]	[B]	[C]	[D]
Rise in	=	15.0	0.0	0.0	0.0
Span in	=	15.0	0.0	0.0	0.0
No. Barrels	=	1	0	0	0
Invert El. ft	=	5.82	0.00	0.00	0.00
Length ft	=	80.0	0.0	0.0	0.0
Slope %	=	0.30	0.00	0.00	0.00
N-Value	=	.024	.000	.000	.000
Orif. Coeff.	=	0.60	0.00	0.00	0.00
Multi-Stage	=	-----	No	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len ft	=	10.0	0.0	0.0	0.0
Crest El. ft	=	8.07	0.00	0.00	0.00
Weir Coeff.	=	3.00	0.00	0.00	0.00
Eqn. Exp.	=	1.50	0.00	0.00	0.00
Multi-Stage	=	No	No	No	No

Tailwater Elevation = 6.75 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	5.32	0.00	---	---	---	0.00	---	---	---	0.00
0.09	1	5.41	0.00	---	---	---	0.00	---	---	---	0.00
0.18	2	5.50	0.00	---	---	---	0.00	---	---	---	0.00
0.27	3	5.59	0.00	---	---	---	0.00	---	---	---	0.00
0.36	4	5.68	0.00	---	---	---	0.00	---	---	---	0.00
0.45	5	5.77	0.00	---	---	---	0.00	---	---	---	0.00
0.54	5	5.86	0.00	---	---	---	0.00	---	---	---	0.00
0.63	6	5.95	0.00	---	---	---	0.00	---	---	---	0.00
0.72	7	6.04	0.00	---	---	---	0.00	---	---	---	0.00
0.81	8	6.13	0.00	---	---	---	0.00	---	---	---	0.00
0.90	9	6.22	0.00	---	---	---	0.00	---	---	---	0.00

Continues on next page...

3/23

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.91	26	6.23	0.00	---	---	---	0.00	---	---	---	0.00
0.92	42	6.24	0.00	---	---	---	0.00	---	---	---	0.00
0.93	59	6.25	0.00	---	---	---	0.00	---	---	---	0.00
0.94	75	6.26	0.00	---	---	---	0.00	---	---	---	0.00
0.95	92	6.27	0.00	---	---	---	0.00	---	---	---	0.00
0.96	108	6.28	0.00	---	---	---	0.00	---	---	---	0.00
0.97	125	6.29	0.00	---	---	---	0.00	---	---	---	0.00
0.98	141	6.30	0.00	---	---	---	0.00	---	---	---	0.00
0.99	158	6.31	0.00	---	---	---	0.00	---	---	---	0.00
1.00	175	6.32	0.00	---	---	---	0.00	---	---	---	0.00
1.10	1,050	6.42	0.00	---	---	---	0.00	---	---	---	0.00
1.20	1,925	6.52	0.00	---	---	---	0.00	---	---	---	0.00
1.30	2,800	6.62	0.00	---	---	---	0.00	---	---	---	0.00
1.40	3,675	6.72	0.00	---	---	---	0.00	---	---	---	0.00
1.50	4,550	6.82	0.90	---	---	---	0.00	---	---	---	0.90
1.60	5,425	6.92	1.50	---	---	---	0.00	---	---	---	1.50
1.70	6,300	7.02	1.82	---	---	---	0.00	---	---	---	1.82
1.80	7,175	7.12	1.90	---	---	---	0.00	---	---	---	1.90
1.90	8,050	7.22	2.21	---	---	---	0.00	---	---	---	2.21
2.00	8,925	7.32	2.47	---	---	---	0.00	---	---	---	2.47
2.10	10,820	7.42	2.71	---	---	---	0.00	---	---	---	2.71
2.20	12,715	7.52	2.93	---	---	---	0.00	---	---	---	2.93
2.30	14,610	7.62	3.14	---	---	---	0.00	---	---	---	3.14
2.40	16,505	7.72	3.33	---	---	---	0.00	---	---	---	3.33
2.50	18,400	7.82	3.51	---	---	---	0.00	---	---	---	3.51
2.60	20,295	7.92	3.69	---	---	---	0.00	---	---	---	3.69
2.70	22,190	8.02	3.85	---	---	---	0.00	---	---	---	3.85
2.80	24,085	8.12	4.01	---	---	---	0.34	---	---	---	4.35
2.90	25,980	8.22	4.16	---	---	---	1.74	---	---	---	5.91
3.00	27,875	8.32	4.31	---	---	---	3.75	---	---	---	8.06
3.10	30,445	8.42	4.45	---	---	---	6.21	---	---	---	10.67
3.20	33,015	8.52	4.59	---	---	---	9.06	---	---	---	13.65
3.30	35,585	8.62	4.73	---	---	---	12.24	---	---	---	16.96
3.40	38,155	8.72	4.86	---	---	---	15.72	---	---	---	20.58
3.50	40,725	8.82	4.98	---	---	---	19.49	---	---	---	24.47
3.60	43,295	8.92	5.11	---	---	---	23.51	---	---	---	28.62
3.70	45,865	9.02	5.23	---	---	---	27.78	---	---	---	33.00
3.80	48,435	9.12	5.34	---	---	---	32.28	---	---	---	37.62
3.90	51,005	9.22	5.46	---	---	---	37.00	---	---	---	42.46
4.00	53,575	9.32	5.57	---	---	---	41.93	---	---	---	47.50

...End

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SHEET NO. 4/23

JOB NO. 591302 JOB Dutra - Haystack Landing BY KNP DATE 4/4/06

CLIENT ______ SUBJECT Existing Conditions CHK'D ______ DATE ______

South Pond

Contour Elev. (ft) "Topo Datum" (T.D.)	Contour Elev (ft) "Hydrology Datum" (H.D.)	Contour Area (s.f.)
3	5.32	1000
4	6.32	14250
5	7.32	61700
6	8.32	131900
7	9.32	182700

Outfall Structure:

Culvert: 18" diameter
n = 0.024 (assume CMP)
20 LF
invert elevation: 6.22 (H.D.) / 3.90 (T.D.)
slope = 3%
discharges to Railroad Pond.

Reservoir Report

5/23

English

Reservoir No. 2 - South Pond

(Existing Conditions MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	5.32	1,000	0	0
1.00	6.32	14,250	7,625	7,625
2.00	7.32	61,700	37,975	45,600
3.00	8.32	131,900	96,800	142,400
4.00	9.32	182,700	157,300	299,700

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	0.0	0.0	0.0
Span in	= 18.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 6.22	0.00	0.00	0.00
Length ft	= 20.0	0.0	0.0	0.0
Slope %	= 3.00	0.00	0.00	0.00
N-Value	= .024	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.0	0.0	0.0	0.0
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Eqn. Exp.	= 0.00	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 6.75 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	5.32	0.00	---	---	---	---	---	---	---	0.00
0.10	763	5.42	0.00	---	---	---	---	---	---	---	0.00
0.20	1,525	5.52	0.00	---	---	---	---	---	---	---	0.00
0.30	2,288	5.62	0.00	---	---	---	---	---	---	---	0.00
0.40	3,050	5.72	0.00	---	---	---	---	---	---	---	0.00
0.50	3,813	5.82	0.00	---	---	---	---	---	---	---	0.00
0.60	4,575	5.92	0.00	---	---	---	---	---	---	---	0.00
0.70	5,338	6.02	0.00	---	---	---	---	---	---	---	0.00
0.80	6,100	6.12	0.00	---	---	---	---	---	---	---	0.00
0.90	6,863	6.22	0.00	---	---	---	---	---	---	---	0.00
1.00	7,625	6.32	0.00	---	---	---	---	---	---	---	0.00

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6/23

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.10	11,423	6.42	0.00	---	---	---	---	---	---	---	0.00
1.20	15,220	6.52	0.00	---	---	---	---	---	---	---	0.00
1.30	19,018	6.62	0.00	---	---	---	---	---	---	---	0.00
1.40	22,815	6.72	0.00	---	---	---	---	---	---	---	0.00
1.50	26,613	6.82	0.82	---	---	---	---	---	---	---	0.82
1.60	30,410	6.92	1.67	---	---	---	---	---	---	---	1.67
1.70	34,208	7.02	2.43	---	---	---	---	---	---	---	2.43
1.80	38,005	7.12	3.35	---	---	---	---	---	---	---	3.35
1.90	41,803	7.22	4.18	---	---	---	---	---	---	---	4.18
2.00	45,600	7.32	5.04	---	---	---	---	---	---	---	5.04
2.10	55,280	7.42	5.72	---	---	---	---	---	---	---	5.72
2.20	64,960	7.52	6.32	---	---	---	---	---	---	---	6.32
2.30	74,640	7.62	6.75	---	---	---	---	---	---	---	6.75
2.40	84,320	7.72	6.65	---	---	---	---	---	---	---	6.65
2.50	94,000	7.82	7.18	---	---	---	---	---	---	---	7.18
2.60	103,680	7.92	7.67	---	---	---	---	---	---	---	7.67
2.70	113,360	8.02	8.14	---	---	---	---	---	---	---	8.14
2.80	123,040	8.12	8.58	---	---	---	---	---	---	---	8.58
2.90	132,720	8.22	9.00	---	---	---	---	---	---	---	9.00
3.00	142,400	8.32	9.40	---	---	---	---	---	---	---	9.40
3.10	158,130	8.42	9.78	---	---	---	---	---	---	---	9.78
3.20	173,860	8.52	10.15	---	---	---	---	---	---	---	10.15
~~3.30~~	~~189,590~~	~~8.62~~	~~10.51~~	~~---~~	~~---~~	~~---~~	~~---~~	~~---~~	~~---~~	~~---~~	~~10.51~~
3.40	205,320	8.72	10.85	---	---	---	---	---	---	---	10.85
~~3.50~~	~~221,050~~	~~8.82~~	~~11.19~~	~~---~~	~~---~~	~~---~~	~~---~~	~~---~~	~~---~~	~~---~~	~~11.19~~
3.60	236,780	8.92	11.51	---	---	---	---	---	---	---	11.51
3.70	252,510	9.02	11.83	---	---	---	---	---	---	---	11.83
3.80	268,240	9.12	12.13	---	---	---	---	---	---	---	12.13
3.90	283,970	9.22	12.43	---	---	---	---	---	---	---	12.43
4.00	299,700	9.32	12.73	---	---	---	---	---	---	---	12.73

...End

CSW [St]²

CSW/Stuber-Stroeh Engineering Group, Inc.
790 De Long Avenue, Novato, CA 94945 Tel: (415) 892-4763 Fax: (415) 892-4502
1310 Redwood Way, Suite 200, Petaluma, CA 94954 Tel: (707) 795-4764 Fax: (707) 795-0516

SHEET NO. 7/23

JOB NO. 591302 JOB Dutra-Haystack Landing BY KNP DATE 4/4/06

CLIENT ________ SUBJECT Existing Conditions CHK'D ________ DATE ________

Middle Pond

Contour Elev. (ft) "Topo Datum" (T.D.)	Contour Elev. (ft) "Hydrology Datum" (H.D.)	Contour Area (s.f.)
5	7.32	6400
6	8.32	29700
7	9.32	54400

Outfall Structure :

Weir : length = 5'
top elevation : 7.32 (H.D.) / 5 (T.D.)
discharges to Railroad Pond!

8/23

Reservoir Report

English

Reservoir No. 3 - Middle Pond

(Existing Conditions
MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	7.32	6,400	0	0
1.00	8.32	29,700	18,050	18,050
2.00	9.32	54,400	42,050	60,100

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 5.0	0.0	0.0	0.0
Crest El. ft	= 7.32	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 6.75 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	7.32	---	---	---	---	0.00	---	---	---	0.00
0.10	1,805	7.42	---	---	---	---	0.47	---	---	---	0.47
0.20	3,610	7.52	---	---	---	---	1.34	---	---	---	1.34
0.30	5,415	7.62	---	---	---	---	2.46	---	---	---	2.46
0.40	7,220	7.72	---	---	---	---	3.79	---	---	---	3.79
0.50	9,025	7.82	---	---	---	---	5.30	---	---	---	5.30
0.60	10,830	7.92	---	---	---	---	6.97	---	---	---	6.97
0.70	12,635	8.02	---	---	---	---	8.78	---	---	---	8.78
0.80	14,440	8.12	---	---	---	---	10.73	---	---	---	10.73
0.90	16,245	8.22	---	---	---	---	12.81	---	---	---	12.81
1.00	18,050	8.32	---	---	---	---	15.00	---	---	---	15.00

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Stage / Storage / Discharge Table

9/23

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.10	22,255	8.42	---	---	---	---	17.31	---	---	---	17.31
1.20	26,460	8.52	---	---	---	---	19.72	---	---	---	19.72
1.30	30,665	8.62	---	---	---	---	22.23	---	---	---	22.23
1.40	34,870	8.72	---	---	---	---	24.85	---	---	---	24.85
1.50	39,075	8.82	---	---	---	---	27.56	---	---	---	27.56
1.60	43,280	8.92	---	---	---	---	30.36	---	---	---	30.36
1.70	47,485	9.02	---	---	---	---	33.25	---	---	---	33.25
1.80	51,690	9.12	---	---	---	---	36.22	---	---	---	36.22
1.90	55,895	9.22	---	---	---	---	39.28	---	---	---	39.28
2.00	60,100	9.32	---	---	---	---	42.43	---	---	---	42.43

...End

CSW [St]²

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SHEET NO. 10/23

JOB NO. 591302 JOB Dutra- Haystack Landing BY KWP DATE 4/4/06

CLIENT ______ SUBJECT Existing Conditions CHK'D ______ DATE ______

Railroad Pond

Contour Elev. (ft) "Topo Datum" (T.D.)	Contour Elev (ft) "Hydrology Datum" (H.D.)	Contour Area s.f.
-2.32	0	10
2.9	5.22	20
3	5.32	54700
4	6.32	155000
5	7.32	193400
6	8.32	230500
7	9.32	444300

Outfall Structure:

Culvert: 1.5' wide x 2' high
n=0.024 (concrete roughened by barnacles)
length = 45 LF
Invert elevation : 0 (H.D.) / -2.32 (T.D.)
slope = 0.82%
discharges to slough below train tracks

Tailwater Elevations: MHHW 4.16 (T.D.) 6.48 (H.D.)

MLW -1.86 (T.D.) 0.46 (H.D.)

Reservoir Report

11/23

English

Reservoir No. 4 - Railroad Pond

(Existing Conditions
MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	0.00	10	0	0
5.22	5.22	20	78	78
5.32	5.32	54,700	2,736	2,814
6.32	6.32	155,000	104,850	107,664
7.32	7.32	193,400	174,200	281,864
8.32	8.32	230,500	211,950	493,814
9.32	9.32	444,300	337,400	831,214

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 24.0	0.0	0.0	0.0
Span in	= 18.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 45.0	0.0	0.0	0.0
Slope %	= 0.82	0.00	0.00	0.00
N-Value	= .024	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.0	0.0	0.0	0.0
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Eqn. Exp.	= 0.00	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 6.48 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	0.00	0.00	---	---	---	---	---	---	---	0.00
0.52	8	0.52	0.00	---	---	---	---	---	---	---	0.00
1.04	16	1.04	0.00	---	---	---	---	---	---	---	0.00
1.57	23	1.57	0.00	---	---	---	---	---	---	---	0.00
2.09	31	2.09	0.00	---	---	---	---	---	---	---	0.00
2.61	39	2.61	0.00	---	---	---	---	---	---	---	0.00
3.13	47	3.13	0.00	---	---	---	---	---	---	---	0.00
3.65	55	3.65	0.00	---	---	---	---	---	---	---	0.00
4.18	63	4.18	0.00	---	---	---	---	---	---	---	0.00
4.70	70	4.70	0.00	---	---	---	---	---	---	---	0.00
5.22	78	5.22	0.00	---	---	---	---	---	---	---	0.00

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12/23

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
5.23	352	5.23	0.00	---	---	---	---	---	---	---	0.00
5.24	626	5.24	0.00	---	---	---	---	---	---	---	0.00
5.25	899	5.25	0.00	---	---	---	---	---	---	---	0.00
5.26	1,173	5.26	0.00	---	---	---	---	---	---	---	0.00
5.27	1,446	5.27	0.00	---	---	---	---	---	---	---	0.00
5.28	1,720	5.28	0.00	---	---	---	---	---	---	---	0.00
5.29	1,994	5.29	0.00	---	---	---	---	---	---	---	0.00
5.30	2,267	5.30	0.00	---	---	---	---	---	---	---	0.00
5.31	2,541	5.31	0.00	---	---	---	---	---	---	---	0.00
5.32	2,814	5.32	0.00	---	---	---	---	---	---	---	0.00
5.42	13,299	5.42	0.00	---	---	---	---	---	---	---	0.00
5.52	23,784	5.52	0.00	---	---	---	---	---	---	---	0.00
5.62	34,269	5.62	0.00	---	---	---	---	---	---	---	0.00
5.72	44,754	5.72	0.00	---	---	---	---	---	---	---	0.00
5.82	55,239	5.82	0.00	---	---	---	---	---	---	---	0.00
5.92	65,724	5.92	0.00	---	---	---	---	---	---	---	0.00
6.02	76,209	6.02	0.00	---	---	---	---	---	---	---	0.00
6.12	86,694	6.12	0.00	---	---	---	---	---	---	---	0.00
6.22	97,179	6.22	0.00	---	---	---	---	---	---	---	0.00
6.32	107,664	6.32	0.00	---	---	---	---	---	---	---	0.00
6.42	125,084	6.42	0.00	---	---	---	---	---	---	---	0.00
6.52	142,504	6.52	2.46	---	---	---	---	---	---	---	2.46
~~6.62~~	~~159,924~~	~~6.62~~	~~4.61~~	---	---	---	---	---	---	---	~~4.61~~
6.72	177,344	6.72	6.03	---	---	---	---	---	---	---	6.03
~~6.82~~	~~194,764~~	~~6.82~~	~~7.18~~	---	---	---	---	---	---	---	~~7.18~~
6.92	212,184	6.92	8.17	---	---	---	---	---	---	---	8.17
7.02	229,604	7.02	9.05	---	---	---	---	---	---	---	9.05
7.12	247,024	7.12	9.85	---	---	---	---	---	---	---	9.85
7.22	264,444	7.22	10.60	---	---	---	---	---	---	---	10.60
7.32	281,864	7.32	11.29	---	---	---	---	---	---	---	11.29
7.42	303,059	7.42	11.94	---	---	---	---	---	---	---	11.94
7.52	324,254	7.52	12.56	---	---	---	---	---	---	---	12.56
7.62	345,449	7.62	13.15	---	---	---	---	---	---	---	13.15
7.72	366,644	7.72	13.72	---	---	---	---	---	---	---	13.72
7.82	387,839	7.82	14.26	---	---	---	---	---	---	---	14.26
7.92	409,034	7.92	14.78	---	---	---	---	---	---	---	14.78
8.02	430,229	8.02	15.29	---	---	---	---	---	---	---	15.29
8.12	451,424	8.12	15.77	---	---	---	---	---	---	---	15.77
8.22	472,619	8.22	16.25	---	---	---	---	---	---	---	16.25
8.32	493,814	8.32	16.71	---	---	---	---	---	---	---	16.71
8.42	527,554	8.42	17.16	---	---	---	---	---	---	---	17.16
8.52	561,294	8.52	17.59	---	---	---	---	---	---	---	17.59
8.62	595,034	8.62	18.02	---	---	---	---	---	---	---	18.02
8.72	628,774	8.72	18.44	---	---	---	---	---	---	---	18.44
8.82	662,514	8.82	18.84	---	---	---	---	---	---	---	18.84
8.92	696,254	8.92	19.24	---	---	---	---	---	---	---	19.24
9.02	729,994	9.02	19.63	---	---	---	---	---	---	---	19.63
9.12	763,734	9.12	20.01	---	---	---	---	---	---	---	20.01
9.22	797,474	9.22	20.39	---	---	---	---	---	---	---	20.39
9.32	831,214	9.32	20.76	---	---	---	---	---	---	---	20.76

...End

CSW [St]²

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JOB NO. 591302 JOB Dutra-Haystack Landing BY KNP DATE 3/24/06

CLIENT ______ SUBJECT Proposed Conditions CHK'D ______ DATE ______

North Pond

Contour Elev. (ft) "Topo Datum" (T.D.)	Contour Elev. (ft) "Hydrology Datum" (H.D.)	Contour Area (s.f.)
3	5.32	850
4	6.32	5500
5	7.32	15 000
6	8.32	22800
7	9.32	26500

Outfall Structures :

Culvert : 15" diameter
n=0.024 (assume CMP)
80 LF
invert elevation : 5.82 (H.D.) / 3.5 (T.D.)
slope = 0.3% (assume)
discharges to Railroad Pond

Weir : length = 15'
top elevation : 6.52 (H.D.) / 4.2 (T.D.)
discharges to South Pond.

Reservoir Report

14/23

English

Reservoir No. 1 - North Pond

(Proposed Conditions
MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	5.32	850	0	0
1.00	6.32	5,500	3,175	3,175
2.00	7.32	15,000	10,250	13,425
3.00	8.32	22,800	18,900	32,325
4.00	9.32	26,500	24,650	56,975

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 15.0	0.0	0.0	0.0
Span in	= 15.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 5.82	0.00	0.00	0.00
Length ft	= 80.0	0.0	0.0	0.0
Slope %	= 0.30	0.00	0.00	0.00
N-Value	= .024	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.0	0.0	0.0	0.0
Crest El. ft	= 6.52	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 6.48 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	5.32	0.00	---	---	---	0.00	---	---	---	0.00
0.10	318	5.42	0.00	---	---	---	0.00	---	---	---	0.00
0.20	635	5.52	0.00	---	---	---	0.00	---	---	---	0.00
0.30	953	5.62	0.00	---	---	---	0.00	---	---	---	0.00
0.40	1,270	5.72	0.00	---	---	---	0.00	---	---	---	0.00
0.50	1,588	5.82	0.00	---	---	---	0.00	---	---	---	0.00
0.60	1,905	5.92	0.00	---	---	---	0.00	---	---	---	0.00
0.70	2,223	6.02	0.00	---	---	---	0.00	---	---	---	0.00
0.80	2,540	6.12	0.00	---	---	---	0.00	---	---	---	0.00
0.90	2,858	6.22	0.00	---	---	---	0.00	---	---	---	0.00
1.00	3,175	6.32	0.00	---	---	---	0.00	---	---	---	0.00

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15/23

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.10	4,200	6.42	0.00	---	---	---	0.00	---	---	---	0.00
1.20	5,225	6.52	0.44	---	---	---	0.00	---	---	---	0.44
1.30	6,250	6.62	0.99	---	---	---	1.42	---	---	---	2.41
1.40	7,275	6.72	1.48	---	---	---	4.02	---	---	---	5.51
1.50	8,300	6.82	1.66	---	---	---	7.39	---	---	---	9.06
1.60	9,325	6.92	1.78	---	---	---	11.38	---	---	---	13.16
1.70	10,350	7.02	1.82	---	---	---	15.91	---	---	---	17.73
1.80	11,375	7.12	1.90	---	---	---	20.91	---	---	---	22.82
1.90	12,400	7.22	2.21	---	---	---	26.35	---	---	---	28.56
2.00	13,425	7.32	2.47	---	---	---	32.20	---	---	---	34.67
2.10	15,315	7.42	2.71	---	---	---	38.42	---	---	---	41.13
2.20	17,205	7.52	2.93	---	---	---	45.00	---	---	---	47.93
2.30	19,095	7.62	3.14	---	---	---	51.92	---	---	---	55.06
2.40	20,985	7.72	3.33	---	---	---	59.15	---	---	---	62.49
2.50	22,875	7.82	3.51	---	---	---	66.70	---	---	---	70.21
2.60	24,765	7.92	3.69	---	---	---	74.54	---	---	---	78.23
2.70	26,655	8.02	3.85	---	---	---	82.67	---	---	---	86.52
2.80	28,545	8.12	4.01	---	---	---	91.07	---	---	---	95.08
2.90	30,435	8.22	4.16	---	---	---	99.74	---	---	---	103.91
3.00	32,325	8.32	4.31	---	---	---	108.67	---	---	---	112.98
3.10	34,790	8.42	4.45	---	---	---	117.85	---	---	---	122.31
3.20	37,255	8.52	4.59	---	---	---	127.28	---	---	---	131.87
~~3.30~~	~~39,720~~	~~8.62~~	~~4.73~~	~~---~~	~~---~~	~~---~~	~~136.94~~	~~---~~	~~---~~	~~---~~	~~141.67~~
3.40	42,185	8.72	4.86	---	---	---	146.84	---	---	---	151.70
~~3.50~~	~~44,650~~	~~8.82~~	~~4.98~~	~~---~~	~~---~~	~~---~~	~~156.97~~	~~---~~	~~---~~	~~---~~	~~161.95~~
3.60	47,115	8.92	5.11	---	---	---	167.31	---	---	---	172.42
3.70	49,580	9.02	5.23	---	---	---	177.88	---	---	---	183.10
3.80	52,045	9.12	5.34	---	---	---	188.66	---	---	---	194.00
3.90	54,510	9.22	5.46	---	---	---	199.65	---	---	---	205.11
4.00	56,975	9.32	5.57	---	---	---	210.84	---	---	---	216.41

...End

CSW [St]²
CSW/Stuber-Stroeh Engineering Group, Inc.
790 De Long Avenue, Novato, CA 94945 Tel: (415) 892-4763 Fax: (415) 892-4502
1310 Redwood Way, Suite 200, Petaluma, CA 94954 Tel: (707) 795-4764 Fax: (707) 795-0516

SHEET NO. 16/23

JOB NO. 591302 JOB Dutra - Haystack Landing BY KNP DATE 3/29/06

CLIENT ______ SUBJECT Proposed Conditions CHK'D ______ DATE ______

South Pond

Contour Elev (ft) "Topo Datum" (T.D.)	Contour Elev (ft) "Hydrology Datum" (H.D.)	Contour Area (s.f.)
3	5.32	41,200
4	6.32	64,300
5	7.32	97,200
6	8.32	138,100
7	9.32	175,400

Outfall Structure :

Culvert : 18" diameter
n = 0.024 (assume CMP)
20 LF
invert elevation : 6.22 (H.D.) / 3.90 (T.D.)
slope = 3%
discharges to Railroad Pond.

Reservoir Report

17/23

English

Reservoir No. 2 - South Pond (Proposed Conditions MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	5.32	41,200	0	0
1.00	6.32	64,300	52,750	52,750
2.00	7.32	97,200	80,750	133,500
3.00	8.32	138,100	117,650	251,150
4.00	9.32	175,400	156,750	407,900

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	0.0	0.0	0.0
Span in	= 18.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 6.22	0.00	0.00	0.00
Length ft	= 20.0	0.0	0.0	0.0
Slope %	= 3.00	0.00	0.00	0.00
N-Value	= .024	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.0	0.0	0.0	0.0
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 6.48 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	5.32	0.00	---	---	---	---	---	---	---	0.00
0.10	5,275	5.42	0.00	---	---	---	---	---	---	---	0.00
0.20	10,550	5.52	0.00	---	---	---	---	---	---	---	0.00
0.30	15,825	5.62	0.00	---	---	---	---	---	---	---	0.00
0.40	21,100	5.72	0.00	---	---	---	---	---	---	---	0.00
0.50	26,375	5.82	0.00	---	---	---	---	---	---	---	0.00
0.60	31,650	5.92	0.00	---	---	---	---	---	---	---	0.00
0.70	36,925	6.02	0.00	---	---	---	---	---	---	---	0.00
0.80	42,200	6.12	0.00	---	---	---	---	---	---	---	0.00
0.90	47,475	6.22	0.00	---	---	---	---	---	---	---	0.00
1.00	52,750	6.32	0.00	---	---	---	---	---	---	---	0.00

Continues on next page...

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.10	60,825	6.42	0.00	---	---	---	---	---	---	---	0.00
1.20	68,900	6.52	0.20	---	---	---	---	---	---	---	0.20
1.30	76,975	6.62	0.60	---	---	---	---	---	---	---	0.60
1.40	85,050	6.72	1.18	---	---	---	---	---	---	---	1.18
1.50	93,125	6.82	1.76	---	---	---	---	---	---	---	1.76
1.60	101,200	6.92	2.39	---	---	---	---	---	---	---	2.39
1.70	109,275	7.02	2.96	---	---	---	---	---	---	---	2.96
1.80	117,350	7.12	3.69	---	---	---	---	---	---	---	3.69
1.90	125,425	7.22	4.31	---	---	---	---	---	---	---	4.31
2.00	133,500	7.32	5.04	---	---	---	---	---	---	---	5.04
2.10	145,265	7.42	5.72	---	---	---	---	---	---	---	5.72
2.20	157,030	7.52	6.32	---	---	---	---	---	---	---	6.32
2.30	168,795	7.62	6.75	---	---	---	---	---	---	---	6.75
2.40	180,560	7.72	6.65	---	---	---	---	---	---	---	6.65
2.50	192,325	7.82	7.18	---	---	---	---	---	---	---	7.18
2.60	204,090	7.92	7.67	---	---	---	---	---	---	---	7.67
2.70	215,855	8.02	8.14	---	---	---	---	---	---	---	8.14
2.80	227,620	8.12	8.58	---	---	---	---	---	---	---	8.58
2.90	239,385	8.22	9.00	---	---	---	---	---	---	---	9.00
3.00	251,150	8.32	9.40	---	---	---	---	---	---	---	9.40
3.10	266,825	8.42	9.78	---	---	---	---	---	---	---	9.78
3.20	282,500	8.52	10.15	---	---	---	---	---	---	---	10.15
3.30	298,175	8.62	10.51	---	---	---	---	---	---	---	10.51
3.40	313,850	8.72	10.85	---	---	---	---	---	---	---	10.85
3.50	329,525	8.82	11.19	---	---	---	---	---	---	---	11.19
3.60	345,200	8.92	11.51	---	---	---	---	---	---	---	11.51
3.70	360,875	9.02	11.83	---	---	---	---	---	---	---	11.83
3.80	376,550	9.12	12.13	---	---	---	---	---	---	---	12.13
3.90	392,225	9.22	12.43	---	---	---	---	---	---	---	12.43
4.00	407,900	9.32	12.73	---	---	---	---	---	---	---	12.73

...End

CSW [St]²

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SHEET NO. 19/23

JOB NO. 591302 JOB Dutra-Haystack Landing BY KNP DATE

CLIENT SUBJECT Proposed Conditions CHK'D DATE

Railroad Pond

Contour Elev (ft) "Topo Datum" (T.D.)	Contour Elev (ft) "Hydrology Datum (H.D.)	Contour Area (s.f.)
-2.32	0	10
2.9	5.22	20
3	5.32	136681
4	6.32	184400
5	7.32	235400
6	8.32	280300
7	9.32	353700

Outfall Structure:

Culvert: 1.5' wide x 2' high
n = 0.024 (concrete roughened by barnacles)
length = 45 LF
invert elevation: 0 (H.D.) / -2.32 (T.D.)
slope = 0.82%
discharges to slough below train tracks

Tailwater Elevations:	MHHW	4.16 (T.D.)	6.48 (H.D.)
	MLW	-1.86 (T.D.)	0.46 (H.D)

Reservoir Report

20/23

English

Reservoir No. 3 - Railroad Pond (Proposed Conditions MHHW)

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	0.00	10	0	0
5.22	5.22	20	78	78
5.32	5.32	136,681	6,835	6,913
6.32	6.32	184,400	160,541	167,454
7.32	7.32	235,400	209,900	377,354
8.32	8.32	280,300	257,850	635,204
9.32	9.32	353,700	317,000	952,204

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 24.0	0.0	0.0	0.0
Span in	= 18.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 45.0	0.0	0.0	0.0
Slope %	= 0.82	0.00	0.00	0.00
N-Value	= .024	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.0	0.0	0.0	0.0
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Eqn. Exp.	= 0.00	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 6.48 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

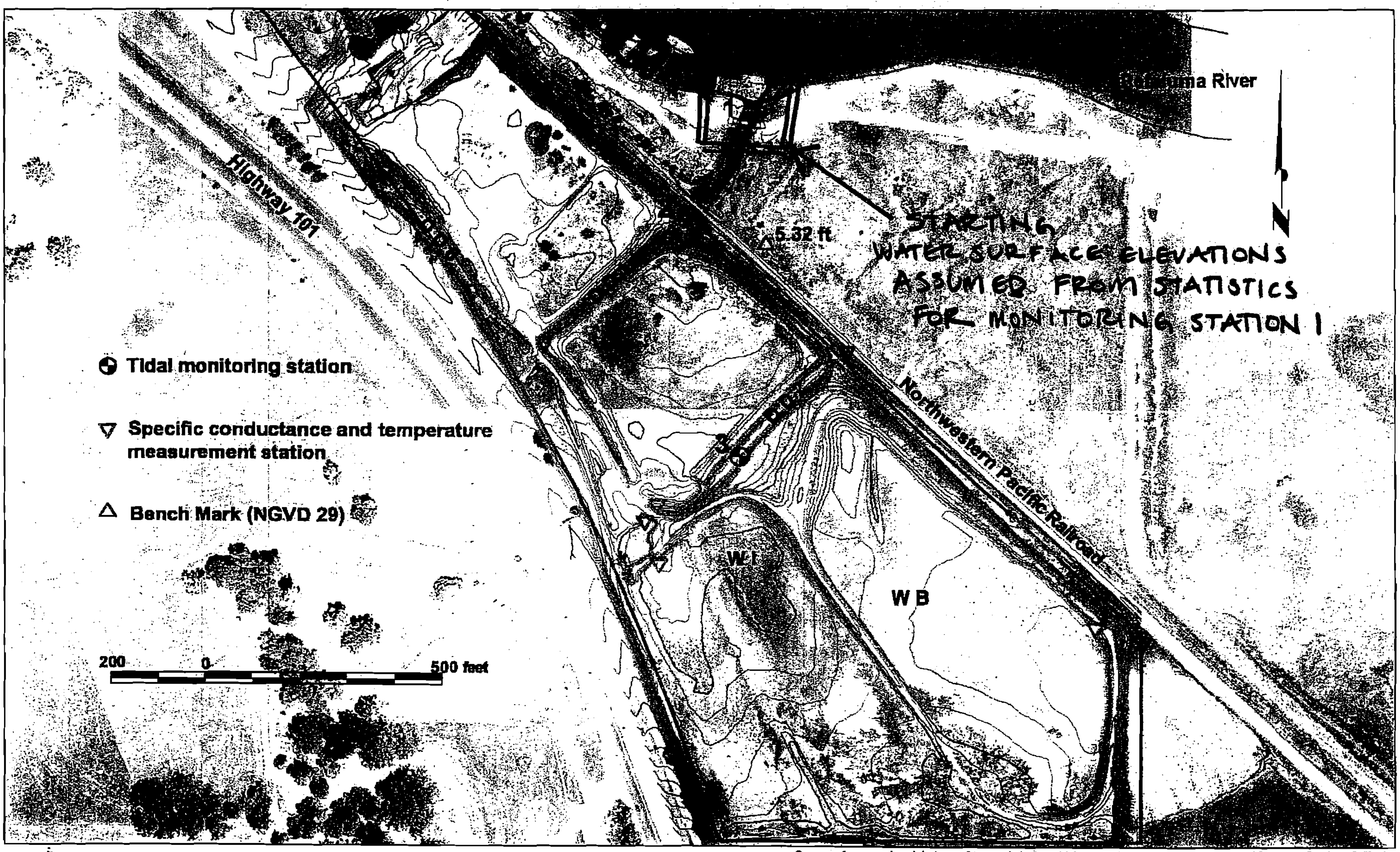
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	0.00	0.00	---	---	---	---	---	---	---	0.00
0.52	8	0.52	0.00	---	---	---	---	---	---	---	0.00
1.04	16	1.04	0.00	---	---	---	---	---	---	---	0.00
1.57	23	1.57	0.00	---	---	---	---	---	---	---	0.00
2.09	31	2.09	0.00	---	---	---	---	---	---	---	0.00
2.61	39	2.61	0.00	---	---	---	---	---	---	---	0.00
3.13	47	3.13	0.00	---	---	---	---	---	---	---	0.00
3.65	55	3.65	0.00	---	---	---	---	---	---	---	0.00
4.18	63	4.18	0.00	---	---	---	---	---	---	---	0.00
4.70	70	4.70	0.00	---	---	---	---	---	---	---	0.00
5.22	78	5.22	0.00	---	---	---	---	---	---	---	0.00

Continues on next page...

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
5.23	762	5.23	0.00	---	---	---	---	---	---	---	0.00
5.24	1,445	5.24	0.00	---	---	---	---	---	---	---	0.00
5.25	2,129	5.25	0.00	---	---	---	---	---	---	---	0.00
5.26	2,812	5.26	0.00	---	---	---	---	---	---	---	0.00
5.27	3,496	5.27	0.00	---	---	---	---	---	---	---	0.00
5.28	4,179	5.28	0.00	---	---	---	---	---	---	---	0.00
5.29	4,863	5.29	0.00	---	---	---	---	---	---	---	0.00
5.30	5,546	5.30	0.00	---	---	---	---	---	---	---	0.00
5.31	6,230	5.31	0.00	---	---	---	---	---	---	---	0.00
5.32	6,913	5.32	0.00	---	---	---	---	---	---	---	0.00
5.42	22,967	5.42	0.00	---	---	---	---	---	---	---	0.00
5.52	39,021	5.52	0.00	---	---	---	---	---	---	---	0.00
5.62	55,076	5.62	0.00	---	---	---	---	---	---	---	0.00
5.72	71,130	5.72	0.00	---	---	---	---	---	---	---	0.00
5.82	87,184	5.82	0.00	---	---	---	---	---	---	---	0.00
5.92	103,238	5.92	0.00	---	---	---	---	---	---	---	0.00
6.02	119,292	6.02	0.00	---	---	---	---	---	---	---	0.00
6.12	135,346	6.12	0.00	---	---	---	---	---	---	---	0.00
6.22	151,400	6.22	0.00	---	---	---	---	---	---	---	0.00
6.32	167,454	6.32	0.00	---	---	---	---	---	---	---	0.00
6.42	188,444	6.42	0.00	---	---	---	---	---	---	---	0.00
6.52	209,434	6.52	2.46	---	---	---	---	---	---	---	2.46
6.62	230,424	6.62	4.61	---	---	---	---	---	---	---	4.61
6.72	251,414	6.72	6.03	---	---	---	---	---	---	---	6.03
6.82	272,404	6.82	7.18	---	---	---	---	---	---	---	7.18
6.92	293,394	6.92	8.17	---	---	---	---	---	---	---	8.17
7.02	314,384	7.02	9.05	---	---	---	---	---	---	---	9.05
7.12	335,374	7.12	9.85	---	---	---	---	---	---	---	9.85
7.22	356,364	7.22	10.60	---	---	---	---	---	---	---	10.60
7.32	377,354	7.32	11.29	---	---	---	---	---	---	---	11.29
7.42	403,139	7.42	11.94	---	---	---	---	---	---	---	11.94
7.52	428,924	7.52	12.56	---	---	---	---	---	---	---	12.56
7.62	454,709	7.62	13.15	---	---	---	---	---	---	---	13.15
7.72	480,494	7.72	13.72	---	---	---	---	---	---	---	13.72
7.82	506,279	7.82	14.26	---	---	---	---	---	---	---	14.26
7.92	532,064	7.92	14.78	---	---	---	---	---	---	---	14.78
8.02	557,849	8.02	15.29	---	---	---	---	---	---	---	15.29
8.12	583,634	8.12	15.77	---	---	---	---	---	---	---	15.77
8.22	609,419	8.22	16.25	---	---	---	---	---	---	---	16.25
8.32	635,204	8.32	16.71	---	---	---	---	---	---	---	16.71
8.42	666,904	8.42	17.16	---	---	---	---	---	---	---	17.16
8.52	698,604	8.52	17.59	---	---	---	---	---	---	---	17.59
8.62	730,304	8.62	18.02	---	---	---	---	---	---	---	18.02
8.72	762,004	8.72	18.44	---	---	---	---	---	---	---	18.44
8.82	793,704	8.82	18.84	---	---	---	---	---	---	---	18.84
8.92	825,404	8.92	19.24	---	---	---	---	---	---	---	19.24
9.02	857,104	9.02	19.63	---	---	---	---	---	---	---	19.63
9.12	888,804	9.12	20.01	---	---	---	---	---	---	---	20.01
9.22	920,504	9.22	20.39	---	---	---	---	---	---	---	20.39
9.32	952,204	9.32	20.76	---	---	---	---	---	---	---	20.76

...End



Source of map and aerial photo: Steven J. Lafranchi & Associates, Inc. Civil Engineers-Land Surveyors, Petaluma California

Balance Hydrologics, Inc.

Figure 2. Existing site plan and locations of monitoring stations, Haystack Landing, Petaluma, California.

FROM: PRELIMINARY HYDROLOGIC EVALUATION OF WETLAND RESTORATION FEASIBILITY AT HAYSTACK LANDING, PETALUMA, CA DATED OCTOBER 2004

204012 Loc Map.dwg

22/23

Table 1. Tidal elevation statistics at Haystack Landing wetland restoration site and Petaluma River, Petaluma, CA

	Petaluma River at D Street Bridge [1] (feet, NGVD)	Haystack Station #1: Mouth of slough at bridge (feet, NGVD)	Haystack Station #2: Slough above train tracks (feet, NGVD)	Haystack Station #3: Jurisdictional area DD2 (feet, NGVD)
Mean Higher High Water (MHHW)	5.11	4.16	3.47	3.41
Mean High Water (MHW)	4.44	3.49	3.06	---
Mean Low Water (MLW)	---	-1.86	-1.16	---
Mean Lower Low Water (MLLW)	---	---	---	---

Notes:

1. California Department of Water Resources Petaluma River At D Street Bridge (PTB) station is operated by the City of Petaluma. The data are reported in feet above the 1929 National Geodetic Vertical Datum (NGVD) and recorded at variable intervals. Some high water levels conceivably may have occurred between long time-interval readings.
2. Haystack Landing statistics were based on a continuous water-level monitoring record from June 10 through July 7, 2004.
3. Tidal statistics were not calculated where channel elevations were above tide levels. For example, the elevation of the lower low water (LLW) trough for each day was not recorded at the monitoring stations because the channel elevations were higher than the LLW elevations which truncated the record.

FROM: PRELIMINARY HYDROLOGIC EVALUATION
OF WETLAND RESTORATION FEASIBILITY AT
HAYSTACK LANDING, PETALUMA, CA
DATED OCTOBER 2004

APPENDIX V

EXISTING CONDITIONS HYDROGRAPHS

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Return period (yrs)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	57.44	1	15	103,396	100	----	------	------	Area G - 53 acre o
2	Rational	21.68	1	15	39,017	100	----	------	------	Area H - 20 acre o
3	Rational	24.44	1	15	43,998	100	----	------	------	So. Hill - 19.9 ac
4	Rational	21.54	1	5	12,926	100	----	------	------	Area A (Trib to RR
5	Rational	18.54	1	10	22,254	100	----	------	------	Area B (Trib to Ex
6	Rational	5.46	1	8	5,237	100	----	------	------	Area C (Trib to no
7	Rational	18.72	1	10	22,463	100	----	------	------	Area D (Trib to Ex
8	Rational	11.36	1	8	10,909	100	----	------	------	Area E (Trib to no
9	Combine	72.90	1	15	125,649	100	1 + 5	------	------	Area G + Area B
10	Combine	37.28	1	15	61,480	100	2 + 7	------	------	Area H + Area D
11	Reservoir	46.67	1	29	121,975	100	9	9.30	53,151	North Pond Outfall
12	Reservoir	1.46	1	26	5,237	100	6	7.53	3,794	Middle Pond Outfal
13	Reservoir	5.45	1	49	38,665	100	10	7.38	51,459	South Pond Outfall
14	Combine	48.08	1	29	127,212	100	11 + 12	------	------	North + Middle Pon
15	Combine	52.67	1	30	165,877	100	13 + 14	------	------	North + Middle + S
16	Combine	32.49	1	15	54,907	100	3 + 8	------	------	Area E + South Hil
17	Combine	72.18	1	26	220,784	100	15 + 16	------	------	Ponds/Area E/South
18	Combine	72.18	1	26	233,710	100	17 + 4	------	------	All Area into RR P
19	Reservoir	6.36	1	115	108,625	100	18	6.75	182,277	Railroad Pond Outf

Proj. file: pondmodel-excond.GPW	IDF file: pondmodel-idf.IDF	Run date: 04-05-2006

Existing Conditions

1/20

Hydrograph Report

English

Hyd. No. 1

Area G - 53 acre offsite

Hydrograph type	= Rational	Peak discharge	= 57.44 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 53.0 ac	Runoff coeff.	= 0.45
Intensity	= 2.41 in	Time of conc. (Tc)	= 15 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 103,396 cuft

Hydrograph Discharge Table

Time -- Outflow (min	cfs)
1	3.83
6	22.98
11	42.12
16	56.17
21	49.78
26	43.40
31	37.02
36	30.64
41	24.25
46	17.87
51	11.49
56	5.11

...End

Ex. Cond. 2/30

Hydrograph Report

English

Hyd. No. 2

Area H - 20 acre offsite

Hydrograph type	= Rational	Peak discharge	= 21.68 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 20.0 ac	Runoff coeff.	= 0.45
Intensity	= 2.41 in	Time of conc. (Tc)	= 15 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 39,017 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.45
6	8.67
11	15.90
16	21.19
21	18.79
26	16.38
31	13.97
36	11.56
41	9.15
46	6.74
51	4.34
56	1.93

...End

Ex. Cond. 3/30

Hydrograph Report

English

Hyd. No. 3

So. Hill - 19.9 acre offsite

Hydrograph type	= Rational	Peak discharge	= 24.44 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 19.9 ac	Runoff coeff.	= 0.51
Intensity	= 2.41 in	Time of conc. (Tc)	= 15 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 43,998 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.63
6	9.78
11	17.93
16	23.90
21	21.18
26	18.47
31	15.75
36	13.04
41	10.32
46	7.60
51	4.89
56	2.17

...End

Ex. Cond. 4/30

Hydrograph Report

English

Hyd. No. 4

Area A (Trib to RR Pond)

Hydrograph type	= Rational	Peak discharge	= 21.54 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 11.2 ac	Runoff coeff.	= 0.45
Intensity	= 4.28 in	Time of conc. (Tc)	= 5 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 12,926 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	4.31
6	20.11
11	12.93
16	5.74

...End

Ex. Cond. 5/30

Hydrograph Report

English

Hyd. No. 5

Area B (Trib to Ex. 15in Culvert)

Hydrograph type	= Rational	Peak discharge	= 18.54 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 13.8 ac	Runoff coeff.	= 0.45
Intensity	= 2.98 in	Time of conc. (Tc)	= 10 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 22,254 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.85
6	11.13
11	17.93
16	14.84
21	11.75
26	8.65
31	5.56
36	2.47

...End

Ex. Cond. 6/30

Hydrograph Report

English

Hyd. No. 6

Area C (Trib to notch in weir)

Hydrograph type	= Rational	Peak discharge	= 5.46 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 3.6 ac	Runoff coeff.	= 0.45
Intensity	= 3.35 in	Time of conc. (Tc)	= 8 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 5,237 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	0.68
6	4.09
11	4.77
16	3.64
21	2.50
26	1.36
31	0.23

...End

Ex. Cond. 7/30

Hydrograph Report

English

Hyd. No. 7

Area D (Trib to Ex. 18in Culvert)

Hydrograph type	= Rational	Peak discharge	= 18.72 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 14.0 ac	Runoff coeff.	= 0.45
Intensity	= 2.98 in	Time of conc. (Tc)	= 10 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 22,463 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.87
6	11.23
11	18.10
16	14.98
21	11.86
26	8.74
31	5.62
36	2.50

...End

Ex. Cond. 8/30

Hydrograph Report

English

Hyd. No. 8

Area E (Trib to notch in weir)

Hydrograph type	= Rational	Peak discharge	= 11.36 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 7.5 ac	Runoff coeff.	= 0.45
Intensity	= 3.35 in	Time of conc. (Tc)	= 8 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 10,909 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.42
6	8.52
11	9.94
16	7.58
21	5.21
26	2.84
31	0.47

...End

Ex. Cond. 9/30

Hydrograph Report

English

Hyd. No. 9

Area G + Area B

Hydrograph type	= Combine	Peak discharge	= 72.90 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
1st inflow hyd. No.	= 1	2nd inflow hyd. No.	= 5

Total Volume = 125,649 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	19.15		9.27		28.42
10	38.29		18.54 <<		56.84
15	57.44 <<		15.45		72.90 <<
20	51.06		12.36		63.42
25	44.68		9.27		53.95
30	38.29		6.18		44.48
35	31.91		3.09		35.00
40	25.53		0.00		25.53
45	19.15		0.00		19.15
50	12.76		0.00		12.76
55	6.38		0.00		6.38

...End

Ex. Cond. 10/30

Hydrograph Report

English

Hyd. No. 10

Area H + Area D

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 2

Peak discharge = 37.28 cfs
Time interval = 1 min
2nd inflow hyd. No.= 7

Total Volume = 61,480 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	7.23		9.36		16.59
10	14.45		18.72 <<		33.17
15	21.68 <<		15.60		37.28 <<
20	19.27		12.48		31.75
25	16.86		9.36		26.22
30	14.45		6.24		20.69
35	12.04		3.12		15.16
40	9.63		0.00		9.63
45	7.23		0.00		7.23
50	4.82		0.00		4.82
55	2.41		0.00		2.41

...End

Ex Cond. 11/30

Hydrograph Report

English

Hyd. No. 11

North Pond Outfall

Hydrograph type	= Reservoir	Peak discharge	= 46.67 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 9	Reservoir name	= North Pond
Max. Elevation	= 9.30 ft	Max. Storage	= 53,151 cuft

Storage Indication method used.

Total Volume = 121,975 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
5	28.42	6.79	0.59	-----	-----	-----	-----	-----	-----	-----	0.59
10	56.84	7.71	3.31	-----	-----	-----	-----	-----	-----	-----	3.31
15	72.90 <<	8.55	4.63	-----	-----	-----	9.99	-----	-----	-----	14.62
20	63.42	9.05	5.26	-----	-----	-----	29.21	-----	-----	-----	34.47
25	53.95	9.27	5.51	-----	-----	-----	39.22	-----	-----	-----	44.73
30	44.48	9.30	5.55	-----	-----	-----	40.98	-----	-----	-----	46.53
35	35.00	9.24	5.48	-----	-----	-----	37.83	-----	-----	-----	43.31
40	25.53	9.12	5.34	-----	-----	-----	32.14	-----	-----	-----	37.48
45	19.15	8.98	5.18	-----	-----	-----	25.97	-----	-----	-----	31.14
50	12.76	8.84	5.00	-----	-----	-----	20.12	-----	-----	-----	25.12
55	6.38	8.69	4.81	-----	-----	-----	14.60	-----	-----	-----	19.41
60	0.00	8.53	4.61	-----	-----	-----	9.39	-----	-----	-----	13.99
65	0.00	8.39	4.41	-----	-----	-----	5.54	-----	-----	-----	9.95
70	0.00	8.28	4.26	-----	-----	-----	3.00	-----	-----	-----	7.26
75	0.00	8.18	4.11	-----	-----	-----	1.25	-----	-----	-----	5.36
80	0.00	8.11	3.99	-----	-----	-----	0.30	-----	-----	-----	4.29
85	0.00	8.04	3.89	-----	-----	-----	0.08	-----	-----	-----	3.97
90	0.00	7.98	3.79	-----	-----	-----	-----	-----	-----	-----	3.79
95	0.00	7.92	3.69	-----	-----	-----	-----	-----	-----	-----	3.69
100	0.00	7.87	3.59	-----	-----	-----	-----	-----	-----	-----	3.59
105	0.00	7.81	3.50	-----	-----	-----	-----	-----	-----	-----	3.50
110	0.00	7.76	3.40	-----	-----	-----	-----	-----	-----	-----	3.40
115	0.00	7.70	3.30	-----	-----	-----	-----	-----	-----	-----	3.30
120	0.00	7.65	3.20	-----	-----	-----	-----	-----	-----	-----	3.20
125	0.00	7.60	3.10	-----	-----	-----	-----	-----	-----	-----	3.10
130	0.00	7.55	3.00	-----	-----	-----	-----	-----	-----	-----	3.00
135	0.00	7.51	2.90	-----	-----	-----	-----	-----	-----	-----	2.90
140	0.00	7.46	2.80	-----	-----	-----	-----	-----	-----	-----	2.80
145	0.00	7.42	2.71	-----	-----	-----	-----	-----	-----	-----	2.71
150	0.00	7.38	2.61	-----	-----	-----	-----	-----	-----	-----	2.61
155	0.00	7.33	2.51	-----	-----	-----	-----	-----	-----	-----	2.51
160	0.00	7.27	2.33	-----	-----	-----	-----	-----	-----	-----	2.33
165	0.00	7.19	2.12	-----	-----	-----	-----	-----	-----	-----	2.12
170	0.00	7.12	1.91	-----	-----	-----	-----	-----	-----	-----	1.91
175	0.00	7.06	1.85	-----	-----	-----	-----	-----	-----	-----	1.85
180	0.00	7.00	1.74	-----	-----	-----	-----	-----	-----	-----	1.74

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Ex. Cond. 12/30

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
185	0.00	6.94	1.56	-----	-----	-----	-----	-----	-----	-----	1.56
190	0.00	6.89	1.32	-----	-----	-----	-----	-----	-----	-----	1.32
195	0.00	6.85	1.07	-----	-----	-----	-----	-----	-----	-----	1.07
200	0.00	6.82	0.86	-----	-----	-----	-----	-----	-----	-----	0.86
205	0.00	6.79	0.63	-----	-----	-----	-----	-----	-----	-----	0.63

...End

Ex. Cond. 13/30

Hydrograph Report

English

Hyd. No. 12

Middle Pond Outfall

Hydrograph type	= Reservoir	Peak discharge	= 1.46 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Middle Pond
Max. Elevation	= 7.53 ft	Max. Storage	= 3,794 cuft

Storage Indication method used.

Total Volume = 5,237 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
5	3.41	7.35	-----	-----	-----	-----	0.13	-----	-----	-----	0.13
10	5.00	7.42	-----	-----	-----	-----	0.49	-----	-----	-----	0.49
15	3.86	7.48	-----	-----	-----	-----	1.02	-----	-----	-----	1.02
20	2.73	7.52	-----	-----	-----	-----	1.32	-----	-----	-----	1.32
25	1.59	7.53	-----	-----	-----	-----	1.46	-----	-----	-----	1.46
30	0.45	7.52	-----	-----	-----	-----	1.38	-----	-----	-----	1.38
35	0.00	7.50	-----	-----	-----	-----	1.20	-----	-----	-----	1.20
40	0.00	7.48	-----	-----	-----	-----	1.04	-----	-----	-----	1.04
45	0.00	7.47	-----	-----	-----	-----	0.90	-----	-----	-----	0.90
50	0.00	7.45	-----	-----	-----	-----	0.78	-----	-----	-----	0.78
55	0.00	7.44	-----	-----	-----	-----	0.67	-----	-----	-----	0.67
60	0.00	7.43	-----	-----	-----	-----	0.58	-----	-----	-----	0.58
65	0.00	7.42	-----	-----	-----	-----	0.50	-----	-----	-----	0.50
70	0.00	7.42	-----	-----	-----	-----	0.45	-----	-----	-----	0.45
75	0.00	7.41	-----	-----	-----	-----	0.42	-----	-----	-----	0.42
80	0.00	7.40	-----	-----	-----	-----	0.39	-----	-----	-----	0.39
85	0.00	7.40	-----	-----	-----	-----	0.36	-----	-----	-----	0.36
90	0.00	7.39	-----	-----	-----	-----	0.33	-----	-----	-----	0.33
95	0.00	7.38	-----	-----	-----	-----	0.31	-----	-----	-----	0.31
100	0.00	7.38	-----	-----	-----	-----	0.28	-----	-----	-----	0.28
105	0.00	7.38	-----	-----	-----	-----	0.26	-----	-----	-----	0.26
110	0.00	7.37	-----	-----	-----	-----	0.24	-----	-----	-----	0.24
115	0.00	7.37	-----	-----	-----	-----	0.22	-----	-----	-----	0.22
120	0.00	7.36	-----	-----	-----	-----	0.21	-----	-----	-----	0.21
125	0.00	7.36	-----	-----	-----	-----	0.19	-----	-----	-----	0.19
130	0.00	7.36	-----	-----	-----	-----	0.18	-----	-----	-----	0.18
135	0.00	7.35	-----	-----	-----	-----	0.16	-----	-----	-----	0.16
140	0.00	7.35	-----	-----	-----	-----	0.15	-----	-----	-----	0.15
145	0.00	7.35	-----	-----	-----	-----	0.14	-----	-----	-----	0.14
150	0.00	7.35	-----	-----	-----	-----	0.13	-----	-----	-----	0.13
155	0.00	7.35	-----	-----	-----	-----	0.12	-----	-----	-----	0.12
160	0.00	7.34	-----	-----	-----	-----	0.11	-----	-----	-----	0.11
165	0.00	7.34	-----	-----	-----	-----	0.10	-----	-----	-----	0.10
170	0.00	7.34	-----	-----	-----	-----	0.09	-----	-----	-----	0.09
175	0.00	7.34	-----	-----	-----	-----	0.09	-----	-----	-----	0.09
180	0.00	7.34	-----	-----	-----	-----	0.08	-----	-----	-----	0.08

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Ex. Cond. 14/30

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
185	0.00	7.34	-----	-----	-----	-----	0.07	-----	-----	-----	0.07
190	0.00	7.33	-----	-----	-----	-----	0.07	-----	-----	-----	0.07
195	0.00	7.33	-----	-----	-----	-----	0.06	-----	-----	-----	0.06
200	0.00	7.33	-----	-----	-----	-----	0.06	-----	-----	-----	0.06
205	0.00	7.33	-----	-----	-----	-----	0.05	-----	-----	-----	0.05
210	0.00	7.33	-----	-----	-----	-----	0.05	-----	-----	-----	0.05
215	0.00	7.33	-----	-----	-----	-----	0.05	-----	-----	-----	0.05
220	0.00	7.33	-----	-----	-----	-----	0.04	-----	-----	-----	0.04
225	0.00	7.33	-----	-----	-----	-----	0.04	-----	-----	-----	0.04
230	0.00	7.33	-----	-----	-----	-----	0.04	-----	-----	-----	0.04
235	0.00	7.33	-----	-----	-----	-----	0.03	-----	-----	-----	0.03
240	0.00	7.33	-----	-----	-----	-----	0.03	-----	-----	-----	0.03
245	0.00	7.33	-----	-----	-----	-----	0.03	-----	-----	-----	0.03
250	0.00	7.33	-----	-----	-----	-----	0.03	-----	-----	-----	0.03
255	0.00	7.33	-----	-----	-----	-----	0.02	-----	-----	-----	0.02
260	0.00	7.32	-----	-----	-----	-----	0.02	-----	-----	-----	0.02
265	0.00	7.32	-----	-----	-----	-----	0.02	-----	-----	-----	0.02
270	0.00	7.32	-----	-----	-----	-----	0.02	-----	-----	-----	0.02
275	0.00	7.32	-----	-----	-----	-----	0.02	-----	-----	-----	0.02
280	0.00	7.32	-----	-----	-----	-----	0.02	-----	-----	-----	0.02
285	0.00	7.32	-----	-----	-----	-----	0.02	-----	-----	-----	0.02

...End

Ex. Cond. 15/30

Hydrograph Report

English

Hyd. No. 13

South Pond Outfall

Hydrograph type	= Reservoir	Peak discharge	= 5.45 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 10	Reservoir name	= South Pond
Max. Elevation	= 7.38 ft	Max. Storage	= 51,459 cuft

Storage Indication method used.

Total Volume = 38,665 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
20	31.75	6.93	1.72	-----	-----	-----	-----	-----	-----	-----	1.72
25	26.22	7.14	3.47	-----	-----	-----	-----	-----	-----	-----	3.47
30	20.69	7.29	4.76	-----	-----	-----	-----	-----	-----	-----	4.76
35	15.16	7.35	5.22	-----	-----	-----	-----	-----	-----	-----	5.22
40	9.63	7.37	5.37	-----	-----	-----	-----	-----	-----	-----	5.37
45	7.23	7.38	5.43	-----	-----	-----	-----	-----	-----	-----	5.43
50	4.82	7.38	5.45	-----	-----	-----	-----	-----	-----	-----	5.45
55	2.41	7.37	5.41	-----	-----	-----	-----	-----	-----	-----	5.41
60	0.00	7.36	5.32	-----	-----	-----	-----	-----	-----	-----	5.32
65	0.00	7.35	5.21	-----	-----	-----	-----	-----	-----	-----	5.21
70	0.00	7.33	5.10	-----	-----	-----	-----	-----	-----	-----	5.10
75	0.00	7.30	4.90	-----	-----	-----	-----	-----	-----	-----	4.90
80	0.00	7.27	4.58	-----	-----	-----	-----	-----	-----	-----	4.58
85	0.00	7.23	4.28	-----	-----	-----	-----	-----	-----	-----	4.28
90	0.00	7.20	4.00	-----	-----	-----	-----	-----	-----	-----	4.00
95	0.00	7.17	3.75	-----	-----	-----	-----	-----	-----	-----	3.75
100	0.00	7.14	3.51	-----	-----	-----	-----	-----	-----	-----	3.51
105	0.00	7.11	3.29	-----	-----	-----	-----	-----	-----	-----	3.29
110	0.00	7.09	3.06	-----	-----	-----	-----	-----	-----	-----	3.06
115	0.00	7.06	2.84	-----	-----	-----	-----	-----	-----	-----	2.84
120	0.00	7.04	2.64	-----	-----	-----	-----	-----	-----	-----	2.64
125	0.00	7.02	2.46	-----	-----	-----	-----	-----	-----	-----	2.46
130	0.00	7.00	2.31	-----	-----	-----	-----	-----	-----	-----	2.31
135	0.00	6.99	2.17	-----	-----	-----	-----	-----	-----	-----	2.17
140	0.00	6.97	2.05	-----	-----	-----	-----	-----	-----	-----	2.05
145	0.00	6.95	1.93	-----	-----	-----	-----	-----	-----	-----	1.93
150	0.00	6.94	1.81	-----	-----	-----	-----	-----	-----	-----	1.81
155	0.00	6.93	1.71	-----	-----	-----	-----	-----	-----	-----	1.71
160	0.00	6.91	1.60	-----	-----	-----	-----	-----	-----	-----	1.60
165	0.00	6.90	1.50	-----	-----	-----	-----	-----	-----	-----	1.50
170	0.00	6.89	1.40	-----	-----	-----	-----	-----	-----	-----	1.40
175	0.00	6.88	1.31	-----	-----	-----	-----	-----	-----	-----	1.31
180	0.00	6.87	1.22	-----	-----	-----	-----	-----	-----	-----	1.22
185	0.00	6.86	1.14	-----	-----	-----	-----	-----	-----	-----	1.14
190	0.00	6.85	1.07	-----	-----	-----	-----	-----	-----	-----	1.07
195	0.00	6.84	1.00	-----	-----	-----	-----	-----	-----	-----	1.00

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Ex. Cond. 16/30

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
200	0.00	6.83	0.93	-----	-----	-----	-----	-----	-----	-----	0.93
205	0.00	6.83	0.87	-----	-----	-----	-----	-----	-----	-----	0.87
210	0.00	6.82	0.82	-----	-----	-----	-----	-----	-----	-----	0.82
215	0.00	6.81	0.77	-----	-----	-----	-----	-----	-----	-----	0.77
220	0.00	6.81	0.72	-----	-----	-----	-----	-----	-----	-----	0.72
225	0.00	6.80	0.67	-----	-----	-----	-----	-----	-----	-----	0.67
230	0.00	6.80	0.63	-----	-----	-----	-----	-----	-----	-----	0.63
235	0.00	6.79	0.59	-----	-----	-----	-----	-----	-----	-----	0.59
240	0.00	6.79	0.56	-----	-----	-----	-----	-----	-----	-----	0.56
245	0.00	6.78	0.52	-----	-----	-----	-----	-----	-----	-----	0.52
250	0.00	6.78	0.49	-----	-----	-----	-----	-----	-----	-----	0.49
255	0.00	6.78	0.46	-----	-----	-----	-----	-----	-----	-----	0.46
260	0.00	6.77	0.43	-----	-----	-----	-----	-----	-----	-----	0.43
265	0.00	6.77	0.40	-----	-----	-----	-----	-----	-----	-----	0.40
270	0.00	6.77	0.38	-----	-----	-----	-----	-----	-----	-----	0.38
275	0.00	6.76	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
280	0.00	6.76	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
285	0.00	6.76	0.31	-----	-----	-----	-----	-----	-----	-----	0.31
290	0.00	6.76	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
295	0.00	6.75	0.27	-----	-----	-----	-----	-----	-----	-----	0.27
300	0.00	6.75	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
305	0.00	6.75	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
310	0.00	6.75	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
315	0.00	6.75	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
320	0.00	6.74	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
325	0.00	6.74	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
330	0.00	6.74	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
335	0.00	6.74	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
340	0.00	6.74	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
345	0.00	6.74	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
350	0.00	6.74	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
355	0.00	6.74	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
360	0.00	6.73	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
365	0.00	6.73	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
370	0.00	6.73	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
375	0.00	6.73	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
380	0.00	6.73	0.09	-----	-----	-----	-----	-----	-----	-----	0.09
385	0.00	6.73	0.09	-----	-----	-----	-----	-----	-----	-----	0.09
390	0.00	6.73	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
395	0.00	6.73	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
400	0.00	6.73	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
405	0.00	6.73	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
410	0.00	6.73	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
415	0.00	6.73	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
420	0.00	6.73	0.05	-----	-----	-----	-----	-----	-----	-----	0.05

...End

Ex. Cond. 17/30

Hydrograph Report

English

Hyd. No. 14

North + Middle Pond

Hydrograph type	= Combine	Peak discharge	= 48.08 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
1st inflow hyd. No.	= 11	2nd inflow hyd. No.	= 12

Total Volume = 127,212 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	0.59		0.13		0.72
10	3.31		0.49		3.80
15	14.62		1.02		15.64
20	34.47		1.32		35.79
25	44.73		1.46		46.19
30	46.53		1.38		47.91
35	43.31		1.20		44.51
40	37.48		1.04		38.52
45	31.14		0.90		32.04
50	25.12		0.78		25.90
55	19.41		0.67		20.09
60	13.99		0.58		14.58
65	9.95		0.50		10.46
70	7.26		0.45		7.71
75	5.36		0.42		5.78
80	4.29		0.39		4.68
85	3.97		0.36		4.33
90	3.79		0.33		4.12
95	3.69		0.31		4.00
100	3.59		0.28		3.88
105	3.50		0.26		3.76
110	3.40		0.24		3.64
115	3.30		0.22		3.52
120	3.20		0.21		3.40
125	3.10		0.19		3.29
130	3.00		0.18		3.18
135	2.90		0.16		3.07
140	2.80		0.15		2.95
145	2.71		0.14		2.85
150	2.61		0.13		2.73
155	2.51		0.12		2.63
160	2.33		0.11		2.44
165	2.12		0.10		2.22
170	1.91		0.09		2.00
175	1.85		0.09		1.94
180	1.74		0.08		1.82

Continues on next page...

Ex. Cond. 18/30

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	1.56		0.07		1.63
190	1.32		0.07		1.38
195	1.07		0.06		1.14
200	0.86		0.06		0.92
205	0.63		0.05		0.69
210	0.47		0.05		0.52

...End

Ex. Cond. 19/30

Hydrograph Report

English

Hyd. No. 15

North + Middle + South Ponds

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 13

Peak discharge = 52.67 cfs
Time interval = 1 min
2nd inflow hyd. No.= 14

Total Volume = 165,877 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	0.00		0.72		0.72
10	0.00		3.80		3.80
15	0.00		15.64		15.64
20	1.72		35.79		37.51
25	3.47		46.19		49.66
30	4.76		47.91		52.67 <<
35	5.22		44.51		49.73
40	5.37		38.52		43.89
45	5.43		32.04		37.47
50	5.45		25.90		31.34
55	5.41		20.09		25.50
60	5.32		14.58		19.90
65	5.21		10.46		15.67
70	5.10		7.71		12.81
75	4.90		5.78		10.68
80	4.58		4.68		9.26
85	4.28		4.33		8.61
90	4.00		4.12		8.13
95	3.75		4.00		7.75
100	3.51		3.88		7.39
105	3.29		3.76		7.04
110	3.06		3.64		6.69
115	2.84		3.52		6.36
120	2.64		3.40		6.05
125	2.46		3.29		5.75
130	2.31		3.18		5.49
135	2.17		3.07		5.24
140	2.05		2.95		5.00
145	1.93		2.85		4.77
150	1.81		2.73		4.55
155	1.71		2.63		4.33
160	1.60		2.44		4.05
165	1.50		2.22		3.72
170	1.40		2.00		3.40
175	1.31		1.94		3.25
180	1.22		1.82		3.05

Continues on next page...

Ex. Cond. 20/30

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	1.14		1.63		2.78
190	1.07		1.38		2.45
195	1.00		1.14		2.14
200	0.93		0.92		1.86
205	0.87		0.69		1.56
210	0.82		0.52		1.33
215	0.77		0.39		1.15
220	0.72		0.29		1.01
225	0.67		0.22		0.90
230	0.63		0.17		0.80
235	0.59		0.13		0.73
240	0.56		0.10		0.66
245	0.52		0.08		0.60
250	0.49		0.07		0.55

...End

Ex. Cond. 21/30

Hydrograph Report

English

Hyd. No. 16

Area E + South Hill

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 3

Peak discharge = 32.49 cfs
Time interval = 1 min
2nd inflow hyd. No.= 8

Total Volume = 54,907 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	8.15		7.10		15.25
10	16.30		10.42		26.71
15	24.44 <<		8.05		32.49 <<
20	21.73		5.68		27.41
25	19.01		3.31		22.33
30	16.30		0.95		17.24
35	13.58		0.00		13.58
40	10.86		0.00		10.86
45	8.15		0.00		8.15
50	5.43		0.00		5.43
55	2.72		0.00		2.72

...End

Ex. Cond. 22/30

Hydrograph Report

English

Hyd. No. 17

Ponds/Area E/South Hill

Hydrograph type	= Combine	Peak discharge	= 72.18 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
1st inflow hyd. No.	= 15	2nd inflow hyd. No.	= 16

Total Volume = 220,784 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	0.72		15.25		15.97
10	3.80		26.71		30.52
15	15.64		32.49 <<		48.13
20	37.51		27.41		64.92
25	49.66		22.33		71.99
30	52.67 <<		17.24		69.91
35	49.73		13.58		63.31
40	43.89		10.86		54.75
45	37.47		8.15		45.62
50	31.34		5.43		36.78
55	25.50		2.72		28.21
60	19.90		0.00		19.90
65	15.67		0.00		15.67
70	12.81		0.00		12.81
75	10.68		0.00		10.68
80	9.26		0.00		9.26
85	8.61		0.00		8.61
90	8.13		0.00		8.13
95	7.75		0.00		7.75
100	7.39		0.00		7.39
105	7.04		0.00		7.04
110	6.69		0.00		6.69
115	6.36		0.00		6.36
120	6.05		0.00		6.05
125	5.75		0.00		5.75
130	5.49		0.00		5.49
135	5.24		0.00		5.24
140	5.00		0.00		5.00
145	4.77		0.00		4.77
150	4.55		0.00		4.55
155	4.33		0.00		4.33
160	4.05		0.00		4.05
165	3.72		0.00		3.72
170	3.40		0.00		3.40
175	3.25		0.00		3.25
180	3.05		0.00		3.05

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Ex. Cond. 23/30

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	2.78		0.00		2.78
190	2.45		0.00		2.45
195	2.14		0.00		2.14
200	1.86		0.00		1.86
205	1.56		0.00		1.56
210	1.33		0.00		1.33
215	1.15		0.00		1.15
220	1.01		0.00		1.01
225	0.90		0.00		0.90
230	0.80		0.00		0.80
235	0.73		0.00		0.73

...End

Ex. Cond. 24/30

Hydrograph Report

English

Hyd. No. 18

All Area into RR Pond

Hydrograph type	= Combine	Peak discharge	= 72.18 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
1st inflow hyd. No.	= 17	2nd inflow hyd. No.	= 4

Total Volume = 233,710 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	15.97		21.54 <<		37.51
10	30.52		14.36		44.88
15	48.13		7.18		55.31
20	64.92		0.00		64.92
25	71.99		0.00		71.99
30	69.91		0.00		69.91
35	63.31		0.00		63.31
40	54.75		0.00		54.75
45	45.62		0.00		45.62
50	36.78		0.00		36.78
55	28.21		0.00		28.21
60	19.90		0.00		19.90
65	15.67		0.00		15.67
70	12.81		0.00		12.81
75	10.68		0.00		10.68
80	9.26		0.00		9.26
85	8.61		0.00		8.61
90	8.13		0.00		8.13
95	7.75		0.00		7.75
100	7.39		0.00		7.39
105	7.04		0.00		7.04
110	6.69		0.00		6.69
115	6.36		0.00		6.36
120	6.05		0.00		6.05
125	5.75		0.00		5.75
130	5.49		0.00		5.49
135	5.24		0.00		5.24
140	5.00		0.00		5.00
145	4.77		0.00		4.77
150	4.55		0.00		4.55
155	4.33		0.00		4.33
160	4.05		0.00		4.05
165	3.72		0.00		3.72
170	3.40		0.00		3.40
175	3.25		0.00		3.25
180	3.05		0.00		3.05

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Ex Cond. 25/30

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	2.78		0.00		2.78
190	2.45		0.00		2.45
195	2.14		0.00		2.14
200	1.86		0.00		1.86
205	1.56		0.00		1.56
210	1.33		0.00		1.33
215	1.15		0.00		1.15
220	1.01		0.00		1.01
225	0.90		0.00		0.90
230	0.80		0.00		0.80
235	0.73		0.00		0.73

...End

Ex. Cond. 26/30

Hydrograph Report

English

Hyd. No. 19

Railroad Pond Outfall

Hydrograph type	= Reservoir	Peak discharge	= 6.36 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 18	Reservoir name	= Railroad Pond
Max. Elevation	= 6.75 ft	Max. Storage	= 182,277 cuft

Storage Indication method used.

Total Volume = 108,625 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
40	54.75	6.45	0.82	-----	-----	-----	-----	-----	-----	-----	0.82
45	45.62	6.54	2.81	-----	-----	-----	-----	-----	-----	-----	2.81
50	36.78	6.60	4.20	-----	-----	-----	-----	-----	-----	-----	4.20
55	28.21	6.65	5.02	-----	-----	-----	-----	-----	-----	-----	5.02
60	19.90	6.68	5.48	-----	-----	-----	-----	-----	-----	-----	5.48
65	15.67	6.70	5.78	-----	-----	-----	-----	-----	-----	-----	5.78
70	12.81	6.72	5.98	-----	-----	-----	-----	-----	-----	-----	5.98
75	10.68	6.73	6.10	-----	-----	-----	-----	-----	-----	-----	6.10
80	9.26	6.73	6.18	-----	-----	-----	-----	-----	-----	-----	6.18
85	8.61	6.74	6.23	-----	-----	-----	-----	-----	-----	-----	6.23
90	8.13	6.74	6.27	-----	-----	-----	-----	-----	-----	-----	6.27
95	7.75	6.74	6.30	-----	-----	-----	-----	-----	-----	-----	6.30
100	7.39	6.75	6.33	-----	-----	-----	-----	-----	-----	-----	6.33
105	7.04	6.75	6.35	-----	-----	-----	-----	-----	-----	-----	6.35
110	6.69	6.75	6.36	-----	-----	-----	-----	-----	-----	-----	6.36
115	6.36	6.75 <<	6.36	-----	-----	-----	-----	-----	-----	-----	6.36 <<
120	6.05	6.75	6.36	-----	-----	-----	-----	-----	-----	-----	6.36
125	5.75	6.75	6.35	-----	-----	-----	-----	-----	-----	-----	6.35
130	5.49	6.75	6.33	-----	-----	-----	-----	-----	-----	-----	6.33
135	5.24	6.74	6.31	-----	-----	-----	-----	-----	-----	-----	6.31
140	5.00	6.74	6.29	-----	-----	-----	-----	-----	-----	-----	6.29
145	4.77	6.74	6.26	-----	-----	-----	-----	-----	-----	-----	6.26
150	4.55	6.74	6.23	-----	-----	-----	-----	-----	-----	-----	6.23
155	4.33	6.73	6.20	-----	-----	-----	-----	-----	-----	-----	6.20
160	4.05	6.73	6.16	-----	-----	-----	-----	-----	-----	-----	6.16
165	3.72	6.73	6.11	-----	-----	-----	-----	-----	-----	-----	6.11
170	3.40	6.72	6.06	-----	-----	-----	-----	-----	-----	-----	6.06
175	3.25	6.72	6.00	-----	-----	-----	-----	-----	-----	-----	6.00
180	3.05	6.71	5.93	-----	-----	-----	-----	-----	-----	-----	5.93
185	2.78	6.71	5.86	-----	-----	-----	-----	-----	-----	-----	5.86
190	2.45	6.70	5.78	-----	-----	-----	-----	-----	-----	-----	5.78
195	2.14	6.70	5.70	-----	-----	-----	-----	-----	-----	-----	5.70
200	1.86	6.69	5.61	-----	-----	-----	-----	-----	-----	-----	5.61
205	1.56	6.68	5.51	-----	-----	-----	-----	-----	-----	-----	5.51
210	1.33	6.68	5.42	-----	-----	-----	-----	-----	-----	-----	5.42
215	1.15	6.67	5.31	-----	-----	-----	-----	-----	-----	-----	5.31

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Ex. Cond. 27/20

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
220	1.01	6.66	5.21	-----	-----	-----	-----	-----	-----	-----	5.21
225	0.90	6.65	5.11	-----	-----	-----	-----	-----	-----	-----	5.11
230	0.80	6.65	5.00	-----	-----	-----	-----	-----	-----	-----	5.00
235	0.73	6.64	4.90	-----	-----	-----	-----	-----	-----	-----	4.90
240	0.66	6.63	4.80	-----	-----	-----	-----	-----	-----	-----	4.80
245	0.60	6.63	4.70	-----	-----	-----	-----	-----	-----	-----	4.70
250	0.55	6.62	4.59	-----	-----	-----	-----	-----	-----	-----	4.59
255	0.51	6.61	4.45	-----	-----	-----	-----	-----	-----	-----	4.45
260	0.47	6.61	4.30	-----	-----	-----	-----	-----	-----	-----	4.30
265	0.44	6.60	4.16	-----	-----	-----	-----	-----	-----	-----	4.16
270	0.41	6.59	4.03	-----	-----	-----	-----	-----	-----	-----	4.03
275	0.38	6.59	3.90	-----	-----	-----	-----	-----	-----	-----	3.90
280	0.35	6.58	3.77	-----	-----	-----	-----	-----	-----	-----	3.77
285	0.33	6.57	3.64	-----	-----	-----	-----	-----	-----	-----	3.64
290	0.31	6.57	3.52	-----	-----	-----	-----	-----	-----	-----	3.52
295	0.29	6.56	3.41	-----	-----	-----	-----	-----	-----	-----	3.41
300	0.27	6.56	3.29	-----	-----	-----	-----	-----	-----	-----	3.29
305	0.25	6.55	3.18	-----	-----	-----	-----	-----	-----	-----	3.18
310	0.24	6.55	3.08	-----	-----	-----	-----	-----	-----	-----	3.08
315	0.22	6.54	2.97	-----	-----	-----	-----	-----	-----	-----	2.97
320	0.21	6.54	2.87	-----	-----	-----	-----	-----	-----	-----	2.87
325	0.19	6.53	2.78	-----	-----	-----	-----	-----	-----	-----	2.78
330	0.18	6.53	2.68	-----	-----	-----	-----	-----	-----	-----	2.68
335	0.17	6.53	2.59	-----	-----	-----	-----	-----	-----	-----	2.59
340	0.16	6.52	2.50	-----	-----	-----	-----	-----	-----	-----	2.50
345	0.15	6.52	2.41	-----	-----	-----	-----	-----	-----	-----	2.41
350	0.14	6.51	2.32	-----	-----	-----	-----	-----	-----	-----	2.32
355	0.13	6.51	2.23	-----	-----	-----	-----	-----	-----	-----	2.23
360	0.12	6.51	2.14	-----	-----	-----	-----	-----	-----	-----	2.14
365	0.12	6.50	2.06	-----	-----	-----	-----	-----	-----	-----	2.06
370	0.11	6.50	1.97	-----	-----	-----	-----	-----	-----	-----	1.97
375	0.10	6.50	1.90	-----	-----	-----	-----	-----	-----	-----	1.90
380	0.09	6.49	1.82	-----	-----	-----	-----	-----	-----	-----	1.82
385	0.09	6.49	1.75	-----	-----	-----	-----	-----	-----	-----	1.75
390	0.08	6.49	1.68	-----	-----	-----	-----	-----	-----	-----	1.68
395	0.08	6.49	1.61	-----	-----	-----	-----	-----	-----	-----	1.61
400	0.07	6.48	1.55	-----	-----	-----	-----	-----	-----	-----	1.55
405	0.07	6.48	1.49	-----	-----	-----	-----	-----	-----	-----	1.49
410	0.06	6.48	1.43	-----	-----	-----	-----	-----	-----	-----	1.43
415	0.06	6.48	1.37	-----	-----	-----	-----	-----	-----	-----	1.37
420	0.06	6.47	1.32	-----	-----	-----	-----	-----	-----	-----	1.32
425	0.05	6.47	1.27	-----	-----	-----	-----	-----	-----	-----	1.27
430	0.05	6.47	1.22	-----	-----	-----	-----	-----	-----	-----	1.22
435	0.05	6.47	1.17	-----	-----	-----	-----	-----	-----	-----	1.17
440	0.04	6.47	1.12	-----	-----	-----	-----	-----	-----	-----	1.12
445	0.04	6.46	1.08	-----	-----	-----	-----	-----	-----	-----	1.08
450	0.04	6.46	1.03	-----	-----	-----	-----	-----	-----	-----	1.03
455	0.04	6.46	0.99	-----	-----	-----	-----	-----	-----	-----	0.99
460	0.03	6.46	0.95	-----	-----	-----	-----	-----	-----	-----	0.95

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Ex. Cond. 28/30

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
465	0.03	6.46	0.91	-----	-----	-----	-----	-----	-----	-----	0.91
470	0.03	6.46	0.88	-----	-----	-----	-----	-----	-----	-----	0.88
475	0.03	6.45	0.84	-----	-----	-----	-----	-----	-----	-----	0.84
480	0.03	6.45	0.81	-----	-----	-----	-----	-----	-----	-----	0.81
485	0.02	6.45	0.78	-----	-----	-----	-----	-----	-----	-----	0.78
490	0.02	6.45	0.74	-----	-----	-----	-----	-----	-----	-----	0.74
495	0.02	6.45	0.71	-----	-----	-----	-----	-----	-----	-----	0.71
500	0.02	6.45	0.69	-----	-----	-----	-----	-----	-----	-----	0.69
505	0.02	6.45	0.66	-----	-----	-----	-----	-----	-----	-----	0.66
510	0.02	6.45	0.63	-----	-----	-----	-----	-----	-----	-----	0.63
515	0.02	6.44	0.61	-----	-----	-----	-----	-----	-----	-----	0.61
520	0.02	6.44	0.58	-----	-----	-----	-----	-----	-----	-----	0.58
525	0.01	6.44	0.56	-----	-----	-----	-----	-----	-----	-----	0.56
530	0.01	6.44	0.53	-----	-----	-----	-----	-----	-----	-----	0.53
535	0.01	6.44	0.51	-----	-----	-----	-----	-----	-----	-----	0.51
540	0.01	6.44	0.49	-----	-----	-----	-----	-----	-----	-----	0.49
545	0.01	6.44	0.47	-----	-----	-----	-----	-----	-----	-----	0.47
550	0.01	6.44	0.45	-----	-----	-----	-----	-----	-----	-----	0.45
555	0.01	6.44	0.43	-----	-----	-----	-----	-----	-----	-----	0.43
560	0.01	6.44	0.42	-----	-----	-----	-----	-----	-----	-----	0.42
565	0.01	6.44	0.40	-----	-----	-----	-----	-----	-----	-----	0.40
570	0.01	6.44	0.38	-----	-----	-----	-----	-----	-----	-----	0.38
575	0.01	6.43	0.37	-----	-----	-----	-----	-----	-----	-----	0.37
580	0.01	6.43	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
585	0.01	6.43	0.34	-----	-----	-----	-----	-----	-----	-----	0.34
590	0.01	6.43	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
595	0.01	6.43	0.31	-----	-----	-----	-----	-----	-----	-----	0.31
600	0.01	6.43	0.30	-----	-----	-----	-----	-----	-----	-----	0.30
605	0.01	6.43	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
610	0.00	6.43	0.28	-----	-----	-----	-----	-----	-----	-----	0.28
615	0.00	6.43	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
620	0.00	6.43	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
625	0.00	6.43	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
630	0.00	6.43	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
635	0.00	6.43	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
640	0.00	6.43	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
645	0.00	6.43	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
650	0.00	6.43	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
655	0.00	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
660	0.00	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
665	0.00	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
670	0.00	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
675	0.00	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
680	0.00	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
685	0.00	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
690	0.00	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
695	0.00	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
700	0.00	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
705	0.00	6.43	0.12	-----	-----	-----	-----	-----	-----	-----	0.12

Continues on next page...

Ex. Cond. 29/30

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
710	0.00	6.42	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
715	0.00	6.42	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
720	0.00	6.42	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
725	0.00	6.42	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
730	0.00	6.42	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
735	0.00	6.42	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
740	0.00	6.42	0.09	-----	-----	-----	-----	-----	-----	-----	0.09
745	0.00	6.42	0.09	-----	-----	-----	-----	-----	-----	-----	0.09
750	0.00	6.42	0.09	-----	-----	-----	-----	-----	-----	-----	0.09
755	0.00	6.42	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
760	0.00	6.42	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
765	0.00	6.42	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
770	0.00	6.42	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
775	0.00	6.42	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
780	0.00	6.42	0.07	-----	-----	-----	-----	-----	-----	-----	0.07

...End

Ex. Cond. 30/30

APPENDIX VI

PROPOSED CONDITIONS HYDROGRAPHS

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Return period (yrs)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	57.44	1	15	103,396	100	----	------	------	POC 4 - 53 acre of
2	Rational	21.68	1	15	39,017	100	----	------	------	POC 5 - 20 acre of
3	Rational	24.44	1	15	43,998	100	----	------	------	So. Hill - 19.9 ac
4	Rational	35.54	1	10	42,653	100	----	------	------	16.34 acre area on
5	Rational	25.92	1	10	31,109	100	----	------	------	14.5 acre area ons
6	Rational	18.04	1	8	17,323	100	----	------	------	8.98 acre onsite
7	Combine	87.06	1	15	146,048	100	1 + 4	------	------	53 acre + 16.76 ac
8	Reservoir	77.14	1	19	141,848	100	7	7.91	24,509	Outflow North Pond
9	Diversion1	3.66	1	19	10,674	100	8	------	------	POC 3 - North Pond
10	Diversion2	73.48	1	19	131,175	100	8	------	------	North Pond Weir Ou
11	Combine	92.12	1	18	162,284	100	5 + 10	------	------	N.Pond Weir + 14.5
12	Reservoir	6.00	1	58	97,478	100	11	7.47	150,721	POC 2 - Outflw So.
13	Combine	34.46	1	15	56,340	100	2 + 6	------	------	20 acre + 8.98 acr
14	Reach	30.52	1	19	57,508	100	13	------	------	broad swale thru 8
15	Rational	40.39	1	5	24,235	100	----	------	------	Railroad Pond + D
16	Combine	7.84	1	41	108,152	100	9 + 12	------	------	N.&S.Pond into RR
17	Combine	53.47	1	17	101,506	100	3 + 14	------	------	broad swale+South
18	Combine	57.10	1	17	209,658	100	16 + 17	------	------	Ponds,Swale&S.Hill
19	Combine	69.60	1	15	233,893	100	15 + 18	------	------	All Area into RR P
20	Reservoir	1.38	1	390	44,386	100	19	6.48	200,215	POC 1 - Outflow RR

Proposed Conditions

Hydrograph Report

English

Hyd. No. 1

POC 4 - 53 acre offsite

Hydrograph type	= Rational	Peak discharge	= 57.44 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 53.0 ac	Runoff coeff.	= 0.45
Intensity	= 2.41 in	Time of conc. (Tc)	= 15 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 103,396 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	3.83
6	22.98
11	42.12
16	56.17
21	49.78
26	43.40
31	37.02
36	30.64
41	24.25
46	17.87
51	11.49
56	5.11

...End

Proposed Conditions

Hydrograph Report

English

Hyd. No. 2

POC 5 - 20 acre offsite

Hydrograph type	= Rational	Peak discharge	= 21.68 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 20.0 ac	Runoff coeff.	= 0.45
Intensity	= 2.41 in	Time of conc. (Tc)	= 15 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 39,017 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.45
6	8.67
11	15.90
16	21.19
21	18.79
26	16.38
31	13.97
36	11.56
41	9.15
46	6.74
51	4.34
56	1.93

...End

Pro Cond. 3/42

Hydrograph Report

English

Hyd. No. 3

So. Hill - 19.9 acre offsite

Hydrograph type	= Rational	Peak discharge	= 24.44 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 19.9 ac	Runoff coeff.	= 0.51
Intensity	= 2.41 in	Time of conc. (Tc)	= 15 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 43,998 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	1.63
6	9.78
11	17.93
16	23.90
21	21.18
26	18.47
31	15.75
36	13.04
41	10.32
46	7.60
51	4.89
56	2.17

...End

Pro. Cond. 4/42

Hyd. No. 4

16.34 acre area onsite

Hydrograph type	= Rational	Peak discharge	= 35.54 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 16.3 ac	Runoff coeff.	= 0.73
Intensity	= 2.98 in	Time of conc. (Tc)	= 10 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 42,653 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	3.55
6	21.33
11	34.36
16	28.44
21	22.51
26	16.59
31	10.66
36	4.74

...End

Hydrograph Report

English

Hyd. No. 5

14.5 acre area onsite

Hydrograph type	= Rational	Peak discharge	= 25.92 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 14.5 ac	Runoff coeff.	= 0.6
Intensity	= 2.98 in	Time of conc. (Tc)	= 10 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 31,109 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	2.59
6	15.55
11	25.06
16	20.74
21	16.42
26	12.10
31	7.78
36	3.46

...End

Pro Cond. 6/42

Hydrograph Report

English

Hyd. No. 6

8.98 acre onsite

Hydrograph type	= Rational	Peak discharge	= 18.04 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 9.0 ac	Runoff coeff.	= 0.6
Intensity	= 3.35 in	Time of conc. (Tc)	= 8 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 17,323 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	2.26
6	13.53
11	15.79
16	12.03
21	8.27
26	4.51
31	0.75

...End

ProCond. 7/42

Hydrograph Report

English

Hyd. No. 7

53 acre + 16.76 acre

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 1

Peak discharge = 87.06 cfs
Time interval = 1 min
2nd inflow hyd. No.= 4

Total Volume = 146,048 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	19.15		17.77		36.92
10	38.29		35.54 <<		73.84
15	57.44 <<		29.62		87.06 <<
20	51.06		23.70		74.76
25	44.68		17.77		62.45
30	38.29		11.85		50.14
35	31.91		5.92		37.84
40	25.53		0.00		25.53
45	19.15		0.00		19.15
50	12.76		0.00		12.76
55	6.38		0.00		6.38

...End

Pro Cond. 8/42

Hydrograph Report

English

Hyd. No. 8

Outflow North Pond

Hydrograph type	= Reservoir	Peak discharge	= 77.14 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 7	Reservoir name	= North Pond
Max. Elevation	= 7.91 ft	Max. Storage	= 24,509 cuft

Storage Indication method used. Total Volume = 141,848 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
5	36.92	6.55	0.59	-----	-----	-----	0.39	-----	-----	-----	0.99
10	73.84	7.44	2.76	-----	-----	-----	39.80	-----	-----	-----	42.56
15	87.06 <<	7.81	3.50	-----	-----	-----	66.14	-----	-----	-----	69.64
20	74.76	7.90	3.66	-----	-----	-----	73.22	-----	-----	-----	76.88
25	62.45	7.82	3.51	-----	-----	-----	66.52	-----	-----	-----	70.03
30	50.14	7.68	3.26	-----	-----	-----	56.30	-----	-----	-----	59.56
35	37.84	7.52	2.94	-----	-----	-----	45.23	-----	-----	-----	48.17
40	25.53	7.35	2.55	-----	-----	-----	34.20	-----	-----	-----	36.75
45	19.15	7.15	1.99	-----	-----	-----	22.48	-----	-----	-----	24.47
50	12.76	7.01	1.82	-----	-----	-----	15.46	-----	-----	-----	17.28
55	6.38	6.87	1.72	-----	-----	-----	9.54	-----	-----	-----	11.26
60	0.00	6.72	1.48	-----	-----	-----	4.08	-----	-----	-----	5.57
65	0.00	6.61	0.96	-----	-----	-----	1.34	-----	-----	-----	2.30
70	0.00	6.56	0.68	-----	-----	-----	0.61	-----	-----	-----	1.29

...End

ProCond. 9/42

Hydrograph Report

English

Hyd. No. 9

POC 3 - North Pond Culvert Outfall

Hydrograph type	= Diversion1	Peak discharge	= 3.66 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hydrograph	= 8	2nd diverted hyd.	= 10
Diversion method	= Pond - North Pond	Pond structure	= Culv/Orf A

Total Volume = 10,674 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	2nd Diverted cfs	Outflow cfs
5	0.99	0.39	0.59
10	42.56	39.80	2.76
15	69.64	66.14	3.50
20	76.88	73.22	3.66
25	70.03	66.52	3.51
30	59.56	56.30	3.26
35	48.17	45.23	2.94
40	36.75	34.20	2.55
45	24.47	22.48	1.99
50	17.28	15.46	1.82
55	11.26	9.54	1.72
60	5.57	4.08	1.48
65	2.30	1.34	0.96
70	1.29	0.61	0.68
75	0.73	0.20	0.52
80	0.43	0.00	0.43
85	0.38	0.00	0.38
90	0.34	0.00	0.34
95	0.29	0.00	0.29
100	0.26	0.00	0.26
105	0.23	0.00	0.23
110	0.20	0.00	0.20
115	0.18	0.00	0.18
120	0.15	0.00	0.15
125	0.14	0.00	0.14
130	0.12	0.00	0.12
135	0.10	0.00	0.10
140	0.09	0.00	0.09
145	0.08	0.00	0.08
150	0.07	0.00	0.07
155	0.06	0.00	0.06
160	0.05	0.00	0.05
165	0.05	0.00	0.05
170	0.04	0.00	0.04
175	0.04	0.00	0.04

...End

Pro Cond. 10/42

Hydrograph Report

English

Hyd. No. 10

North Pond Weir Outfall (into S.Pond)

Hydrograph type	= Diversion2	Peak discharge	= 73.48 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hydrograph	= 8	2nd diverted hyd.	= 9
Diversion method	= Pond - North Pond	Pond structure	= Culv/Orf A

Total Volume = 131,175 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	2nd Diverted cfs	Outflow cfs
10	42.56	2.76	39.80
15	69.64	3.50	66.14
20	76.88	3.66	73.22
25	70.03	3.51	66.52
30	59.56	3.26	56.30
35	48.17	2.94	45.23
40	36.75	2.55	34.20
45	24.47	1.99	22.48
50	17.28	1.82	15.46
55	11.26	1.72	9.54
60	5.57	1.48	4.08
65	2.30	0.96	1.34

...End

Pro Cond. 11/42

Hydrograph Report

English

Hyd. No. 11

N.Pond Weir + 14.5ac

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 5

Peak discharge = 92.12 cfs
Time interval = 1 min
2nd inflow hyd. No.= 10

Total Volume = 162,284 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	12.96		0.39		13.36
10	25.92 <<		39.80		65.73
15	21.60		66.14		87.74
20	17.28		73.22		90.51
25	12.96		66.52		79.48
30	8.64		56.30		64.94
35	4.32		45.23		49.55
40	0.00		34.20		34.20
45	0.00		22.48		22.48
50	0.00		15.46		15.46
55	0.00		9.54		9.54
60	0.00		4.08		4.08
65	0.00		1.34		1.34

...End

Pro Cond. 12/42

Hydrograph Report

English

Hyd. No. 12

POC 2 - Outflw So. Pnd

Hydrograph type	= Reservoir	Peak discharge	= 6.00 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 11	Reservoir name	= South Pond
Max. Elevation	= 7.47 ft	Max. Storage	= 150,721 cuft

Storage Indication method used.

Total Volume = 97,478 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
20	90.51	6.46	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
25	79.48	6.78	1.51	-----	-----	-----	-----	-----	-----	-----	1.51
30	64.94	7.04	3.09	-----	-----	-----	-----	-----	-----	-----	3.09
35	49.55	7.24	4.42	-----	-----	-----	-----	-----	-----	-----	4.42
40	34.20	7.36	5.28	-----	-----	-----	-----	-----	-----	-----	5.28
45	22.48	7.41	5.67	-----	-----	-----	-----	-----	-----	-----	5.67
50	15.46	7.45	5.88	-----	-----	-----	-----	-----	-----	-----	5.88
55	9.54	7.46	5.98	-----	-----	-----	-----	-----	-----	-----	5.98
60	4.08	7.47	5.99	-----	-----	-----	-----	-----	-----	-----	5.99
65	1.34	7.46	5.94	-----	-----	-----	-----	-----	-----	-----	5.94
70	0.61	7.44	5.86	-----	-----	-----	-----	-----	-----	-----	5.86
75	0.20	7.43	5.78	-----	-----	-----	-----	-----	-----	-----	5.78
80	0.00	7.42	5.69	-----	-----	-----	-----	-----	-----	-----	5.69
85	0.00	7.40	5.59	-----	-----	-----	-----	-----	-----	-----	5.59
90	0.00	7.39	5.49	-----	-----	-----	-----	-----	-----	-----	5.49
95	0.00	7.37	5.40	-----	-----	-----	-----	-----	-----	-----	5.40
100	0.00	7.36	5.31	-----	-----	-----	-----	-----	-----	-----	5.31
105	0.00	7.35	5.22	-----	-----	-----	-----	-----	-----	-----	5.22
110	0.00	7.33	5.13	-----	-----	-----	-----	-----	-----	-----	5.13
115	0.00	7.32	5.04	-----	-----	-----	-----	-----	-----	-----	5.04
120	0.00	7.30	4.90	-----	-----	-----	-----	-----	-----	-----	4.90
125	0.00	7.28	4.77	-----	-----	-----	-----	-----	-----	-----	4.77
130	0.00	7.27	4.64	-----	-----	-----	-----	-----	-----	-----	4.64
135	0.00	7.25	4.52	-----	-----	-----	-----	-----	-----	-----	4.52
140	0.00	7.23	4.40	-----	-----	-----	-----	-----	-----	-----	4.40
145	0.00	7.22	4.29	-----	-----	-----	-----	-----	-----	-----	4.29
150	0.00	7.20	4.19	-----	-----	-----	-----	-----	-----	-----	4.19
155	0.00	7.19	4.10	-----	-----	-----	-----	-----	-----	-----	4.10
160	0.00	7.17	4.00	-----	-----	-----	-----	-----	-----	-----	4.00
165	0.00	7.16	3.91	-----	-----	-----	-----	-----	-----	-----	3.91
170	0.00	7.14	3.82	-----	-----	-----	-----	-----	-----	-----	3.82
175	0.00	7.13	3.74	-----	-----	-----	-----	-----	-----	-----	3.74
180	0.00	7.11	3.65	-----	-----	-----	-----	-----	-----	-----	3.65
185	0.00	7.10	3.55	-----	-----	-----	-----	-----	-----	-----	3.55
190	0.00	7.09	3.45	-----	-----	-----	-----	-----	-----	-----	3.45
195	0.00	7.07	3.36	-----	-----	-----	-----	-----	-----	-----	3.36

Continues on next page...

Pro Cond. 13/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
200	0.00	7.06	3.27	-----	-----	-----	-----	-----	-----	-----	3.27
205	0.00	7.05	3.18	-----	-----	-----	-----	-----	-----	-----	3.18
210	0.00	7.04	3.10	-----	-----	-----	-----	-----	-----	-----	3.10
215	0.00	7.03	3.01	-----	-----	-----	-----	-----	-----	-----	3.01
220	0.00	7.02	2.94	-----	-----	-----	-----	-----	-----	-----	2.94
225	0.00	7.01	2.88	-----	-----	-----	-----	-----	-----	-----	2.88
230	0.00	6.99	2.82	-----	-----	-----	-----	-----	-----	-----	2.82
235	0.00	6.98	2.76	-----	-----	-----	-----	-----	-----	-----	2.76
240	0.00	6.97	2.70	-----	-----	-----	-----	-----	-----	-----	2.70
245	0.00	6.96	2.64	-----	-----	-----	-----	-----	-----	-----	2.64
250	0.00	6.95	2.59	-----	-----	-----	-----	-----	-----	-----	2.59
255	0.00	6.95	2.53	-----	-----	-----	-----	-----	-----	-----	2.53
260	0.00	6.94	2.48	-----	-----	-----	-----	-----	-----	-----	2.48
265	0.00	6.93	2.43	-----	-----	-----	-----	-----	-----	-----	2.43
270	0.00	6.92	2.38	-----	-----	-----	-----	-----	-----	-----	2.38
275	0.00	6.91	2.32	-----	-----	-----	-----	-----	-----	-----	2.32
280	0.00	6.90	2.27	-----	-----	-----	-----	-----	-----	-----	2.27
285	0.00	6.89	2.21	-----	-----	-----	-----	-----	-----	-----	2.21
290	0.00	6.88	2.16	-----	-----	-----	-----	-----	-----	-----	2.16
295	0.00	6.88	2.11	-----	-----	-----	-----	-----	-----	-----	2.11
300	0.00	6.87	2.06	-----	-----	-----	-----	-----	-----	-----	2.06
305	0.00	6.86	2.01	-----	-----	-----	-----	-----	-----	-----	2.01
310	0.00	6.85	1.97	-----	-----	-----	-----	-----	-----	-----	1.97
315	0.00	6.85	1.92	-----	-----	-----	-----	-----	-----	-----	1.92
320	0.00	6.84	1.88	-----	-----	-----	-----	-----	-----	-----	1.88
325	0.00	6.83	1.83	-----	-----	-----	-----	-----	-----	-----	1.83
330	0.00	6.83	1.79	-----	-----	-----	-----	-----	-----	-----	1.79
335	0.00	6.82	1.75	-----	-----	-----	-----	-----	-----	-----	1.75
340	0.00	6.81	1.71	-----	-----	-----	-----	-----	-----	-----	1.71
345	0.00	6.81	1.68	-----	-----	-----	-----	-----	-----	-----	1.68
350	0.00	6.80	1.64	-----	-----	-----	-----	-----	-----	-----	1.64
355	0.00	6.79	1.61	-----	-----	-----	-----	-----	-----	-----	1.61
360	0.00	6.79	1.57	-----	-----	-----	-----	-----	-----	-----	1.57
365	0.00	6.78	1.54	-----	-----	-----	-----	-----	-----	-----	1.54
370	0.00	6.78	1.51	-----	-----	-----	-----	-----	-----	-----	1.51
375	0.00	6.77	1.47	-----	-----	-----	-----	-----	-----	-----	1.47
380	0.00	6.77	1.44	-----	-----	-----	-----	-----	-----	-----	1.44
385	0.00	6.76	1.41	-----	-----	-----	-----	-----	-----	-----	1.41
390	0.00	6.76	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
395	0.00	6.75	1.35	-----	-----	-----	-----	-----	-----	-----	1.35
400	0.00	6.75	1.32	-----	-----	-----	-----	-----	-----	-----	1.32
405	0.00	6.74	1.30	-----	-----	-----	-----	-----	-----	-----	1.30
410	0.00	6.74	1.27	-----	-----	-----	-----	-----	-----	-----	1.27
415	0.00	6.73	1.24	-----	-----	-----	-----	-----	-----	-----	1.24
420	0.00	6.73	1.22	-----	-----	-----	-----	-----	-----	-----	1.22
425	0.00	6.72	1.19	-----	-----	-----	-----	-----	-----	-----	1.19
430	0.00	6.72	1.17	-----	-----	-----	-----	-----	-----	-----	1.17
435	0.00	6.71	1.14	-----	-----	-----	-----	-----	-----	-----	1.14
440	0.00	6.71	1.12	-----	-----	-----	-----	-----	-----	-----	1.12

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Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
445	0.00	6.70	1.09	-----	-----	-----	-----	-----	-----	-----	1.09
450	0.00	6.70	1.07	-----	-----	-----	-----	-----	-----	-----	1.07
455	0.00	6.70	1.05	-----	-----	-----	-----	-----	-----	-----	1.05
460	0.00	6.69	1.03	-----	-----	-----	-----	-----	-----	-----	1.03
465	0.00	6.69	1.00	-----	-----	-----	-----	-----	-----	-----	1.00
470	0.00	6.69	0.98	-----	-----	-----	-----	-----	-----	-----	0.98
475	0.00	6.68	0.96	-----	-----	-----	-----	-----	-----	-----	0.96
480	0.00	6.68	0.94	-----	-----	-----	-----	-----	-----	-----	0.94
485	0.00	6.68	0.92	-----	-----	-----	-----	-----	-----	-----	0.92
490	0.00	6.67	0.90	-----	-----	-----	-----	-----	-----	-----	0.90
495	0.00	6.67	0.88	-----	-----	-----	-----	-----	-----	-----	0.88
500	0.00	6.67	0.86	-----	-----	-----	-----	-----	-----	-----	0.86
505	0.00	6.66	0.85	-----	-----	-----	-----	-----	-----	-----	0.85
510	0.00	6.66	0.83	-----	-----	-----	-----	-----	-----	-----	0.83
515	0.00	6.66	0.81	-----	-----	-----	-----	-----	-----	-----	0.81
520	0.00	6.65	0.79	-----	-----	-----	-----	-----	-----	-----	0.79
525	0.00	6.65	0.78	-----	-----	-----	-----	-----	-----	-----	0.78
530	0.00	6.65	0.76	-----	-----	-----	-----	-----	-----	-----	0.76
535	0.00	6.64	0.74	-----	-----	-----	-----	-----	-----	-----	0.74
540	0.00	6.64	0.73	-----	-----	-----	-----	-----	-----	-----	0.73
545	0.00	6.64	0.71	-----	-----	-----	-----	-----	-----	-----	0.71
550	0.00	6.64	0.70	-----	-----	-----	-----	-----	-----	-----	0.70
555	0.00	6.63	0.68	-----	-----	-----	-----	-----	-----	-----	0.68
560	0.00	6.63	0.67	-----	-----	-----	-----	-----	-----	-----	0.67
565	0.00	6.63	0.65	-----	-----	-----	-----	-----	-----	-----	0.65
570	0.00	6.63	0.64	-----	-----	-----	-----	-----	-----	-----	0.64
575	0.00	6.62	0.63	-----	-----	-----	-----	-----	-----	-----	0.63
580	0.00	6.62	0.61	-----	-----	-----	-----	-----	-----	-----	0.61
585	0.00	6.62	0.60	-----	-----	-----	-----	-----	-----	-----	0.60
590	0.00	6.62	0.59	-----	-----	-----	-----	-----	-----	-----	0.59
595	0.00	6.61	0.58	-----	-----	-----	-----	-----	-----	-----	0.58
600	0.00	6.61	0.58	-----	-----	-----	-----	-----	-----	-----	0.58
605	0.00	6.61	0.57	-----	-----	-----	-----	-----	-----	-----	0.57
610	0.00	6.61	0.56	-----	-----	-----	-----	-----	-----	-----	0.56
615	0.00	6.61	0.55	-----	-----	-----	-----	-----	-----	-----	0.55
620	0.00	6.60	0.54	-----	-----	-----	-----	-----	-----	-----	0.54
625	0.00	6.60	0.53	-----	-----	-----	-----	-----	-----	-----	0.53
630	0.00	6.60	0.53	-----	-----	-----	-----	-----	-----	-----	0.53
635	0.00	6.60	0.52	-----	-----	-----	-----	-----	-----	-----	0.52
640	0.00	6.60	0.51	-----	-----	-----	-----	-----	-----	-----	0.51
645	0.00	6.59	0.50	-----	-----	-----	-----	-----	-----	-----	0.50
650	0.00	6.59	0.49	-----	-----	-----	-----	-----	-----	-----	0.49
655	0.00	6.59	0.49	-----	-----	-----	-----	-----	-----	-----	0.49
660	0.00	6.59	0.48	-----	-----	-----	-----	-----	-----	-----	0.48
665	0.00	6.59	0.47	-----	-----	-----	-----	-----	-----	-----	0.47
670	0.00	6.59	0.46	-----	-----	-----	-----	-----	-----	-----	0.46
675	0.00	6.58	0.46	-----	-----	-----	-----	-----	-----	-----	0.46
680	0.00	6.58	0.45	-----	-----	-----	-----	-----	-----	-----	0.45
685	0.00	6.58	0.44	-----	-----	-----	-----	-----	-----	-----	0.44

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Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
690	0.00	6.58	0.44	-----	-----	-----	-----	-----	-----	-----	0.44
695	0.00	6.58	0.43	-----	-----	-----	-----	-----	-----	-----	0.43
700	0.00	6.58	0.42	-----	-----	-----	-----	-----	-----	-----	0.42
705	0.00	6.57	0.42	-----	-----	-----	-----	-----	-----	-----	0.42
710	0.00	6.57	0.41	-----	-----	-----	-----	-----	-----	-----	0.41
715	0.00	6.57	0.41	-----	-----	-----	-----	-----	-----	-----	0.41
720	0.00	6.57	0.40	-----	-----	-----	-----	-----	-----	-----	0.40
725	0.00	6.57	0.39	-----	-----	-----	-----	-----	-----	-----	0.39
730	0.00	6.57	0.39	-----	-----	-----	-----	-----	-----	-----	0.39
735	0.00	6.57	0.38	-----	-----	-----	-----	-----	-----	-----	0.38
740	0.00	6.56	0.38	-----	-----	-----	-----	-----	-----	-----	0.38
745	0.00	6.56	0.37	-----	-----	-----	-----	-----	-----	-----	0.37
750	0.00	6.56	0.36	-----	-----	-----	-----	-----	-----	-----	0.36
755	0.00	6.56	0.36	-----	-----	-----	-----	-----	-----	-----	0.36
760	0.00	6.56	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
765	0.00	6.56	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
770	0.00	6.56	0.34	-----	-----	-----	-----	-----	-----	-----	0.34
775	0.00	6.55	0.34	-----	-----	-----	-----	-----	-----	-----	0.34
780	0.00	6.55	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
785	0.00	6.55	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
790	0.00	6.55	0.32	-----	-----	-----	-----	-----	-----	-----	0.32
795	0.00	6.55	0.32	-----	-----	-----	-----	-----	-----	-----	0.32
800	0.00	6.55	0.31	-----	-----	-----	-----	-----	-----	-----	0.31
805	0.00	6.55	0.31	-----	-----	-----	-----	-----	-----	-----	0.31
810	0.00	6.55	0.30	-----	-----	-----	-----	-----	-----	-----	0.30
815	0.00	6.55	0.30	-----	-----	-----	-----	-----	-----	-----	0.30
820	0.00	6.54	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
825	0.00	6.54	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
830	0.00	6.54	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
835	0.00	6.54	0.28	-----	-----	-----	-----	-----	-----	-----	0.28
840	0.00	6.54	0.28	-----	-----	-----	-----	-----	-----	-----	0.28
845	0.00	6.54	0.27	-----	-----	-----	-----	-----	-----	-----	0.27
850	0.00	6.54	0.27	-----	-----	-----	-----	-----	-----	-----	0.27
855	0.00	6.54	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
860	0.00	6.54	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
865	0.00	6.53	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
870	0.00	6.53	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
875	0.00	6.53	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
880	0.00	6.53	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
885	0.00	6.53	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
890	0.00	6.53	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
895	0.00	6.53	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
900	0.00	6.53	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
905	0.00	6.53	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
910	0.00	6.53	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
915	0.00	6.53	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
920	0.00	6.53	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
925	0.00	6.52	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
930	0.00	6.52	0.21	-----	-----	-----	-----	-----	-----	-----	0.21

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Procond. 16/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
935	0.00	6.52	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
940	0.00	6.52	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
945	0.00	6.52	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
950	0.00	6.52	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
955	0.00	6.52	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
960	0.00	6.52	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
965	0.00	6.52	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
970	0.00	6.52	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
975	0.00	6.52	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
980	0.00	6.52	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
985	0.00	6.52	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
990	0.00	6.51	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
995	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1000	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1005	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1010	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1015	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1020	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1025	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1030	0.00	6.51	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1035	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1040	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1045	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1050	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1055	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1060	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1065	0.00	6.51	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1070	0.00	6.50	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1075	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1080	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1085	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1090	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1095	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1100	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1105	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1110	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1115	0.00	6.50	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1120	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1125	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1130	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1135	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1140	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1145	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1150	0.00	6.50	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1155	0.00	6.49	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1160	0.00	6.49	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1165	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1170	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1175	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14

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Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
1180	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1185	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1190	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1195	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1200	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1205	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1210	0.00	6.49	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1215	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1220	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1225	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1230	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1235	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1240	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1245	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1250	0.00	6.49	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1255	0.00	6.48	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1260	0.00	6.48	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1265	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1270	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1275	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1280	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1285	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1290	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1295	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1300	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1305	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1310	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1315	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1320	0.00	6.48	0.12	-----	-----	-----	-----	-----	-----	-----	0.12
1325	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1330	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1335	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1340	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1345	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1350	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1355	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1360	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1365	0.00	6.48	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1370	0.00	6.47	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1375	0.00	6.47	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1380	0.00	6.47	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
1385	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1390	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1395	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1400	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1405	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1410	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1415	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1420	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10

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Pro Cond. 18/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
1425	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1430	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1435	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
1440	0.00	6.47	0.10	-----	-----	-----	-----	-----	-----	-----	0.10

...End

Pro Cond. 19/42

Hydrograph Report

English

Hyd. No. 13

20 acre + 8.98 acre

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 2

Peak discharge = 34.46 cfs
Time interval = 1 min
2nd inflow hyd. No.= 6

Total Volume = 56,340 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	7.23		11.28		18.50
10	14.45		16.54		30.99
15	21.68 <<		12.78		34.46 <<
20	19.27		9.02		28.29
25	16.86		5.26		22.12
30	14.45		1.50		15.95
35	12.04		0.00		12.04
40	9.63		0.00		9.63
45	7.23		0.00		7.23
50	4.82		0.00		4.82
55	2.41		0.00		2.41

...End

Pro Cond. 20/42

Hydrograph Report

English

Hyd. No. 14

broad swale thru 8.98ac

Hydrograph type	= Reach	Peak discharge	= 30.52 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 13	Section type	= Triangular
Reach length	= 1000.0 ft	Channel slope	= 0.3 %
Manning's n	= 0.035	Bottom width	= 0.0 ft
Side slope	= 10.0:1	Max. depth	= 0.0 ft
Rating curve x	= 0.683	Rating curve m	= 1.333
Ave. velocity	= 2.62 ft/s	Routing coeff.	= 0.1897

Modified Att-Kin routing method used.

Total Volume = 57,508 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Outflow cfs
5	18.50	7.41
10	30.99	19.87
15	34.46 <<	28.19
20	28.29	30.33
25	22.12	27.07
30	15.95	21.91
35	12.04	16.50
40	9.63	12.84
45	7.23	10.00
50	4.82	7.44
55	2.41	4.98
60	0.00	2.55
65	0.00	0.89
70	0.00	0.31

...End

Pro Cond. 21/42

Hydrograph Report

English

Hyd. No. 15

Railroad Pond + D + E

Hydrograph type	= Rational	Peak discharge	= 40.39 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 10.5 ac	Runoff coeff.	= 0.9
Intensity	= 4.28 in	Time of conc. (Tc)	= 5 min
I-D-F Curve	= pondmodel-idf.IDF	Reced. limb factor	= 3

Total Volume = 24,235 cuft

Hydrograph Discharge Table

Time -- (min	Outflow cfs)
1	8.08
6	37.70
11	24.23
16	10.77

...End

Pro Cond. 22/42

Hydrograph Report

English

Hyd. No. 16

N.&S.Pond into RR Pond

Hydrograph type = Combine
Storm frequency = 100 yrs
1st inflow hyd. No. = 9

Peak discharge = 7.84 cfs
Time interval = 1 min
2nd inflow hyd. No.= 12

Total Volume = 108,152 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	0.59		0.00		0.59
10	2.76		0.00		2.76
15	3.50		0.00		3.50
20	3.66		0.08		3.74
25	3.51		1.51		5.02
30	3.26		3.09		6.34
35	2.94		4.42		7.36
40	2.55		5.28		7.83
45	1.99		5.67		7.66
50	1.82		5.88		7.70
55	1.72		5.98		7.70
60	1.48		5.99		7.47
65	0.96		5.94		6.89
70	0.68		5.86		6.54
75	0.52		5.78		6.30
80	0.43		5.69		6.12
85	0.38		5.59		5.97
90	0.34		5.49		5.83
95	0.29		5.40		5.69
100	0.26		5.31		5.57
105	0.23		5.22		5.44
110	0.20		5.13		5.33
115	0.18		5.04		5.21
120	0.15		4.90		5.06
125	0.14		4.77		4.91
130	0.12		4.64		4.76
135	0.10		4.52		4.62
140	0.09		4.40		4.49
145	0.08		4.29		4.37
150	0.07		4.19		4.26
155	0.06		4.10		4.16
160	0.05		4.00		4.06
165	0.05		3.91		3.96
170	0.04		3.82		3.87
175	0.04		3.74		3.78
180	0.03		3.65		3.68

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Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	0.03		3.55		3.58
190	0.03		3.45		3.48
195	0.02		3.36		3.38
200	0.02		3.27		3.29
205	0.02		3.18		3.20
210	0.01		3.10		3.11
215	0.01		3.01		3.03
220	0.01		2.94		2.95
225	0.01		2.88		2.89
230	0.01		2.82		2.82
235	0.01		2.76		2.77
240	0.01		2.70		2.71
245	0.01		2.64		2.65
250	0.01		2.59		2.59
255	0.00		2.53		2.54
260	0.00		2.48		2.49
265	0.00		2.43		2.43
270	0.00		2.38		2.38
275	0.00		2.32		2.32
280	0.00		2.27		2.27
285	0.00		2.21		2.22
290	0.00		2.16		2.16
295	0.00		2.11		2.11
300	0.00		2.06		2.06
305	0.00		2.01		2.02
310	0.00		1.97		1.97
315	0.00		1.92		1.92
320	0.00		1.88		1.88
325	0.00		1.83		1.83
330	0.00		1.79		1.79
335	0.00		1.75		1.75
340	0.00		1.71		1.71
345	0.00		1.68		1.68
350	0.00		1.64		1.64
355	0.00		1.61		1.61
360	0.00		1.57		1.57
365	0.00		1.54		1.54
370	0.00		1.51		1.51
375	0.00		1.47		1.47
380	0.00		1.44		1.44
385	0.00		1.41		1.41
390	0.00		1.38		1.38
395	0.00		1.35		1.35
400	0.00		1.32		1.32
405	0.00		1.30		1.30
410	0.00		1.27		1.27
415	0.00		1.24		1.24
420	0.00		1.22		1.22
425	0.00		1.19		1.19

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Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
430	0.00		1.17		1.17
435	0.00		1.14		1.14
440	0.00		1.12		1.12
445	0.00		1.09		1.09
450	0.00		1.07		1.07
455	0.00		1.05		1.05
460	0.00		1.03		1.03
465	0.00		1.00		1.00
470	0.00		0.98		0.98
475	0.00		0.96		0.96
480	0.00		0.94		0.94
485	0.00		0.92		0.92
490	0.00		0.90		0.90
495	0.00		0.88		0.88
500	0.00		0.86		0.86
505	0.00		0.85		0.85
510	0.00		0.83		0.83
515	0.00		0.81		0.81
520	0.00		0.79		0.79
525	0.00		0.78		0.78
530	0.00		0.76		0.76
535	0.00		0.74		0.74
540	0.00		0.73		0.73
545	0.00		0.71		0.71
550	0.00		0.70		0.70
555	0.00		0.68		0.68
560	0.00		0.67		0.67
565	0.00		0.65		0.65
570	0.00		0.64		0.64
575	0.00		0.63		0.63
580	0.00		0.61		0.61
585	0.00		0.60		0.60
590	0.00		0.59		0.59
595	0.00		0.58		0.58
600	0.00		0.58		0.58
605	0.00		0.57		0.57
610	0.00		0.56		0.56
615	0.00		0.55		0.55
620	0.00		0.54		0.54
625	0.00		0.53		0.53
630	0.00		0.53		0.53
635	0.00		0.52		0.52
640	0.00		0.51		0.51
645	0.00		0.50		0.50
650	0.00		0.49		0.49
655	0.00		0.49		0.49
660	0.00		0.48		0.48
665	0.00		0.47		0.47
670	0.00		0.46		0.46

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Pro Cond. 25/42

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
675	0.00		0.46		0.46
680	0.00		0.45		0.45
685	0.00		0.44		0.44
690	0.00		0.44		0.44
695	0.00		0.43		0.43
700	0.00		0.42		0.42
705	0.00		0.42		0.42
710	0.00		0.41		0.41
715	0.00		0.41		0.41
720	0.00		0.40		0.40
725	0.00		0.39		0.39
730	0.00		0.39		0.39
735	0.00		0.38		0.38
740	0.00		0.38		0.38
745	0.00		0.37		0.37
750	0.00		0.36		0.36
755	0.00		0.36		0.36
760	0.00		0.35		0.35
765	0.00		0.35		0.35
770	0.00		0.34		0.34
775	0.00		0.34		0.34
780	0.00		0.33		0.33
785	0.00		0.33		0.33
790	0.00		0.32		0.32
795	0.00		0.32		0.32
800	0.00		0.31		0.31
805	0.00		0.31		0.31
810	0.00		0.30		0.30
815	0.00		0.30		0.30
820	0.00		0.29		0.29
825	0.00		0.29		0.29
830	0.00		0.29		0.29
835	0.00		0.28		0.28
840	0.00		0.28		0.28
845	0.00		0.27		0.27
850	0.00		0.27		0.27
855	0.00		0.26		0.26
860	0.00		0.26		0.26
865	0.00		0.26		0.26
870	0.00		0.25		0.25
875	0.00		0.25		0.25
880	0.00		0.25		0.25
885	0.00		0.24		0.24
890	0.00		0.24		0.24
895	0.00		0.23		0.23
900	0.00		0.23		0.23
905	0.00		0.23		0.23
910	0.00		0.22		0.22
915	0.00		0.22		0.22

Continues on next page...

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
920	0.00		0.22		0.22
925	0.00		0.21		0.21
930	0.00		0.21		0.21
935	0.00		0.21		0.21
940	0.00		0.20		0.20
945	0.00		0.20		0.20
950	0.00		0.20		0.20
955	0.00		0.20		0.20
960	0.00		0.19		0.19
965	0.00		0.19		0.19
970	0.00		0.19		0.19
975	0.00		0.19		0.19
980	0.00		0.19		0.19
985	0.00		0.19		0.19
990	0.00		0.19		0.19
995	0.00		0.18		0.18
1000	0.00		0.18		0.18
1005	0.00		0.18		0.18
1010	0.00		0.18		0.18
1015	0.00		0.18		0.18
1020	0.00		0.18		0.18
1025	0.00		0.18		0.18
1030	0.00		0.18		0.18
1035	0.00		0.17		0.17
1040	0.00		0.17		0.17
1045	0.00		0.17		0.17
1050	0.00		0.17		0.17
1055	0.00		0.17		0.17
1060	0.00		0.17		0.17
1065	0.00		0.17		0.17
1070	0.00		0.17		0.17
1075	0.00		0.16		0.16
1080	0.00		0.16		0.16
1085	0.00		0.16		0.16
1090	0.00		0.16		0.16
1095	0.00		0.16		0.16
1100	0.00		0.16		0.16
1105	0.00		0.16		0.16
1110	0.00		0.16		0.16
1115	0.00		0.16		0.16
1120	0.00		0.15		0.15
1125	0.00		0.15		0.15
1130	0.00		0.15		0.15
1135	0.00		0.15		0.15
1140	0.00		0.15		0.15
1145	0.00		0.15		0.15
1150	0.00		0.15		0.15
1155	0.00		0.15		0.15
1160	0.00		0.15		0.15

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Pro Cond. 27/42

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
1165	0.00		0.14		0.14
1170	0.00		0.14		0.14
1175	0.00		0.14		0.14
1180	0.00		0.14		0.14
1185	0.00		0.14		0.14
1190	0.00		0.14		0.14
1195	0.00		0.14		0.14
1200	0.00		0.14		0.14
1205	0.00		0.14		0.14
1210	0.00		0.14		0.14
1215	0.00		0.13		0.13
1220	0.00		0.13		0.13
1225	0.00		0.13		0.13
1230	0.00		0.13		0.13
1235	0.00		0.13		0.13
1240	0.00		0.13		0.13
1245	0.00		0.13		0.13
1250	0.00		0.13		0.13
1255	0.00		0.13		0.13
1260	0.00		0.13		0.13
1265	0.00		0.12		0.12
1270	0.00		0.12		0.12
1275	0.00		0.12		0.12
1280	0.00		0.12		0.12
1285	0.00		0.12		0.12
1290	0.00		0.12		0.12
1295	0.00		0.12		0.12
1300	0.00		0.12		0.12
1305	0.00		0.12		0.12
1310	0.00		0.12		0.12
1315	0.00		0.12		0.12
1320	0.00		0.12		0.12
1325	0.00		0.11		0.11
1330	0.00		0.11		0.11
1335	0.00		0.11		0.11
1340	0.00		0.11		0.11
1345	0.00		0.11		0.11
1350	0.00		0.11		0.11
1355	0.00		0.11		0.11
1360	0.00		0.11		0.11
1365	0.00		0.11		0.11
1370	0.00		0.11		0.11
1375	0.00		0.11		0.11
1380	0.00		0.11		0.11
1385	0.00		0.10		0.10
1390	0.00		0.10		0.10
1395	0.00		0.10		0.10
1400	0.00		0.10		0.10
1405	0.00		0.10		0.10

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Pro. Cond. 28/42

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
1410	0.00		0.10		0.10
1415	0.00		0.10		0.10
1420	0.00		0.10		0.10
1425	0.00		0.10		0.10
1430	0.00		0.10		0.10
1435	0.00		0.10		0.10
1440	0.00		0.10		0.10

...End

Pro Cond. 29/42

Hydrograph Report

English

Hyd. No. 17

broad swale+South Hill Area

Hydrograph type = Combine	Peak discharge = 53.47 cfs
Storm frequency = 100 yrs	Time interval = 1 min
1st inflow hyd. No. = 3	2nd inflow hyd. No.= 14

Total Volume = 101,506 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	8.15		7.41		15.55
10	16.30		19.87		36.16
15	24.44 <<		28.19		52.64
20	21.73		30.33		52.06
25	19.01		27.07		46.08
30	16.30		21.91		38.21
35	13.58		16.50		30.08
40	10.86		12.84		23.71
45	8.15		10.00		18.15
50	5.43		7.44		12.87
55	2.72		4.98		7.69
60	0.00		2.55		2.55
65	0.00		0.89		0.89

...End

Pro Cond. 30/42

Hydrograph Report

English

Hyd. No. 18

Ponds,Swale&S.Hill into RR Pond

Hydrograph type	= Combine	Peak discharge	= 57.10 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
1st inflow hyd. No.	= 16	2nd inflow hyd. No.	= 17

Total Volume = 209,658 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	0.59		15.55		16.15
10	2.76		36.16		38.92
15	3.50		52.64		56.14
20	3.74		52.06		55.80
25	5.02		46.08		51.10
30	6.34		38.21		44.55
35	7.36		30.08		37.44
40	7.83		23.71		31.54
45	7.66		18.15		25.81
50	7.70		12.87		20.57
55	7.70		7.69		15.39
60	7.47		2.55		10.02
65	6.89		0.89		7.79
70	6.54		0.31		6.85
75	6.30		0.11		6.41
80	6.12		0.04		6.16
85	5.97		0.01		5.98
90	5.83		0.00		5.83
95	5.69		0.00		5.69
100	5.57		0.00		5.57
105	5.44		0.00		5.44
110	5.33		0.00		5.33
115	5.21		0.00		5.21
120	5.06		0.00		5.06
125	4.91		0.00		4.91
130	4.76		0.00		4.76
135	4.62		0.00		4.62
140	4.49		0.00		4.49
145	4.37		0.00		4.37
150	4.26		0.00		4.26
155	4.16		0.00		4.16
160	4.06		0.00		4.06
165	3.96		0.00		3.96
170	3.87		0.00		3.87
175	3.78		0.00		3.78
180	3.68		0.00		3.68

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Pro Cond. 31/42

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	3.58		0.00		3.58
190	3.48		0.00		3.48
195	3.38		0.00		3.38
200	3.29		0.00		3.29
205	3.20		0.00		3.20
210	3.11		0.00		3.11
215	3.03		0.00		3.03
220	2.95		0.00		2.95
225	2.89		0.00		2.89
230	2.82		0.00		2.82
235	2.77		0.00		2.77
240	2.71		0.00		2.71
245	2.65		0.00		2.65
250	2.59		0.00		2.59
255	2.54		0.00		2.54
260	2.49		0.00		2.49
265	2.43		0.00		2.43
270	2.38		0.00		2.38
275	2.32		0.00		2.32
280	2.27		0.00		2.27
285	2.22		0.00		2.22
290	2.16		0.00		2.16
295	2.11		0.00		2.11
300	2.06		0.00		2.06
305	2.02		0.00		2.02
310	1.97		0.00		1.97
315	1.92		0.00		1.92
320	1.88		0.00		1.88
325	1.83		0.00		1.83
330	1.79		0.00		1.79
335	1.75		0.00		1.75
340	1.71		0.00		1.71
345	1.68		0.00		1.68
350	1.64		0.00		1.64
355	1.61		0.00		1.61
360	1.57		0.00		1.57
365	1.54		0.00		1.54
370	1.51		0.00		1.51
375	1.47		0.00		1.47
380	1.44		0.00		1.44
385	1.41		0.00		1.41
390	1.38		0.00		1.38
395	1.35		0.00		1.35
400	1.32		0.00		1.32
405	1.30		0.00		1.30
410	1.27		0.00		1.27
415	1.24		0.00		1.24
420	1.22		0.00		1.22
425	1.19		0.00		1.19

Continues on next page...

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
430	1.17		0.00		1.17
435	1.14		0.00		1.14
440	1.12		0.00		1.12
445	1.09		0.00		1.09
450	1.07		0.00		1.07
455	1.05		0.00		1.05
460	1.03		0.00		1.03
465	1.00		0.00		1.00
470	0.98		0.00		0.98
475	0.96		0.00		0.96
480	0.94		0.00		0.94
485	0.92		0.00		0.92
490	0.90		0.00		0.90
495	0.88		0.00		0.88
500	0.86		0.00		0.86
505	0.85		0.00		0.85
510	0.83		0.00		0.83
515	0.81		0.00		0.81
520	0.79		0.00		0.79
525	0.78		0.00		0.78
530	0.76		0.00		0.76
535	0.74		0.00		0.74
540	0.73		0.00		0.73
545	0.71		0.00		0.71
550	0.70		0.00		0.70
555	0.68		0.00		0.68
560	0.67		0.00		0.67
565	0.65		0.00		0.65
570	0.64		0.00		0.64
575	0.63		0.00		0.63
580	0.61		0.00		0.61
585	0.60		0.00		0.60
590	0.59		0.00		0.59
595	0.58		0.00		0.58
600	0.58		0.00		0.58

...End

Hydrograph Report

English

Hyd. No. 19

All Area into RR Pond

Hydrograph type	= Combine	Peak discharge	= 69.60 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
1st inflow hyd. No.	= 15	2nd inflow hyd. No.	= 18

Total Volume = 233,893 cuft

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
5	40.39 <<		16.15		56.54
10	26.93		38.92		65.85
15	13.46		56.14		69.60 <<
20	0.00		55.80		55.80
25	0.00		51.10		51.10
30	0.00		44.55		44.55
35	0.00		37.44		37.44
40	0.00		31.54		31.54
45	0.00		25.81		25.81
50	0.00		20.57		20.57
55	0.00		15.39		15.39
60	0.00		10.02		10.02
65	0.00		7.79		7.79
70	0.00		6.85		6.85
75	0.00		6.41		6.41
80	0.00		6.16		6.16
85	0.00		5.98		5.98
90	0.00		5.83		5.83
95	0.00		5.69		5.69
100	0.00		5.57		5.57
105	0.00		5.44		5.44
110	0.00		5.33		5.33
115	0.00		5.21		5.21
120	0.00		5.06		5.06
125	0.00		4.91		4.91
130	0.00		4.76		4.76
135	0.00		4.62		4.62
140	0.00		4.49		4.49
145	0.00		4.37		4.37
150	0.00		4.26		4.26
155	0.00		4.16		4.16
160	0.00		4.06		4.06
165	0.00		3.96		3.96
170	0.00		3.87		3.87
175	0.00		3.78		3.78
180	0.00		3.68		3.68

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Pro Cond. 34/42

Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
185	0.00		3.58		3.58
190	0.00		3.48		3.48
195	0.00		3.38		3.38
200	0.00		3.29		3.29
205	0.00		3.20		3.20
210	0.00		3.11		3.11
215	0.00		3.03		3.03
220	0.00		2.95		2.95
225	0.00		2.89		2.89
230	0.00		2.82		2.82
235	0.00		2.77		2.77
240	0.00		2.71		2.71
245	0.00		2.65		2.65
250	0.00		2.59		2.59
255	0.00		2.54		2.54
260	0.00		2.49		2.49
265	0.00		2.43		2.43
270	0.00		2.38		2.38
275	0.00		2.32		2.32
280	0.00		2.27		2.27
285	0.00		2.22		2.22
290	0.00		2.16		2.16
295	0.00		2.11		2.11
300	0.00		2.06		2.06
305	0.00		2.02		2.02
310	0.00		1.97		1.97
315	0.00		1.92		1.92
320	0.00		1.88		1.88
325	0.00		1.83		1.83
330	0.00		1.79		1.79
335	0.00		1.75		1.75
340	0.00		1.71		1.71
345	0.00		1.68		1.68
350	0.00		1.64		1.64
355	0.00		1.61		1.61
360	0.00		1.57		1.57
365	0.00		1.54		1.54
370	0.00		1.51		1.51
375	0.00		1.47		1.47
380	0.00		1.44		1.44
385	0.00		1.41		1.41
390	0.00		1.38		1.38
395	0.00		1.35		1.35
400	0.00		1.32		1.32
405	0.00		1.30		1.30
410	0.00		1.27		1.27
415	0.00		1.24		1.24
420	0.00		1.22		1.22
425	0.00		1.19		1.19

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Hydrograph Discharge Table

Time (min)	1st Inflow cfs	+	2nd Inflow cfs	=	Outflow cfs
430	0.00		1.17		1.17
435	0.00		1.14		1.14
440	0.00		1.12		1.12
445	0.00		1.09		1.09
450	0.00		1.07		1.07
455	0.00		1.05		1.05
460	0.00		1.03		1.03
465	0.00		1.00		1.00
470	0.00		0.98		0.98
475	0.00		0.96		0.96
480	0.00		0.94		0.94
485	0.00		0.92		0.92
490	0.00		0.90		0.90
495	0.00		0.88		0.88
500	0.00		0.86		0.86
505	0.00		0.85		0.85
510	0.00		0.83		0.83
515	0.00		0.81		0.81
520	0.00		0.79		0.79
525	0.00		0.78		0.78
530	0.00		0.76		0.76
535	0.00		0.74		0.74
540	0.00		0.73		0.73
545	0.00		0.71		0.71
550	0.00		0.70		0.70

...End

Hydrograph Report

English

Hyd. No. 20

POC 1 - Outflow RR Pnd

Hydrograph type	= Reservoir	Peak discharge	= 1.38 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 19	Reservoir name	= Railroad Pond
Max. Elevation	= 6.48 ft	Max. Storage	= 200,215 cuft

Storage Indication method used.

Total Volume = 44,386 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
215	3.03	6.42	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
220	2.95	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
225	2.89	6.43	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
230	2.82	6.43	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
235	2.77	6.44	0.42	-----	-----	-----	-----	-----	-----	-----	0.42
240	2.71	6.44	0.50	-----	-----	-----	-----	-----	-----	-----	0.50
245	2.65	6.44	0.57	-----	-----	-----	-----	-----	-----	-----	0.57
250	2.59	6.45	0.64	-----	-----	-----	-----	-----	-----	-----	0.64
255	2.54	6.45	0.71	-----	-----	-----	-----	-----	-----	-----	0.71
260	2.49	6.45	0.77	-----	-----	-----	-----	-----	-----	-----	0.77
265	2.43	6.45	0.83	-----	-----	-----	-----	-----	-----	-----	0.83
270	2.38	6.46	0.88	-----	-----	-----	-----	-----	-----	-----	0.88
275	2.32	6.46	0.94	-----	-----	-----	-----	-----	-----	-----	0.94
280	2.27	6.46	0.98	-----	-----	-----	-----	-----	-----	-----	0.98
285	2.22	6.46	1.03	-----	-----	-----	-----	-----	-----	-----	1.03
290	2.16	6.46	1.07	-----	-----	-----	-----	-----	-----	-----	1.07
295	2.11	6.46	1.10	-----	-----	-----	-----	-----	-----	-----	1.10
300	2.06	6.47	1.14	-----	-----	-----	-----	-----	-----	-----	1.14
305	2.02	6.47	1.17	-----	-----	-----	-----	-----	-----	-----	1.17
310	1.97	6.47	1.20	-----	-----	-----	-----	-----	-----	-----	1.20
315	1.92	6.47	1.22	-----	-----	-----	-----	-----	-----	-----	1.22
320	1.88	6.47	1.25	-----	-----	-----	-----	-----	-----	-----	1.25
325	1.83	6.47	1.27	-----	-----	-----	-----	-----	-----	-----	1.27
330	1.79	6.47	1.29	-----	-----	-----	-----	-----	-----	-----	1.29
335	1.75	6.47	1.30	-----	-----	-----	-----	-----	-----	-----	1.30
340	1.71	6.47	1.32	-----	-----	-----	-----	-----	-----	-----	1.32
345	1.68	6.47	1.33	-----	-----	-----	-----	-----	-----	-----	1.33
350	1.64	6.47	1.34	-----	-----	-----	-----	-----	-----	-----	1.34
355	1.61	6.47	1.35	-----	-----	-----	-----	-----	-----	-----	1.35
360	1.57	6.48	1.36	-----	-----	-----	-----	-----	-----	-----	1.36
365	1.54	6.48	1.37	-----	-----	-----	-----	-----	-----	-----	1.37
370	1.51	6.48	1.37	-----	-----	-----	-----	-----	-----	-----	1.37
375	1.47	6.48	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
380	1.44	6.48	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
385	1.41	6.48	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
390	1.38	6.48 <<	1.38	-----	-----	-----	-----	-----	-----	-----	1.38 <<

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Pro Cond. 37/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
395	1.35	6.48	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
400	1.32	6.48	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
405	1.30	6.48	1.38	-----	-----	-----	-----	-----	-----	-----	1.38
410	1.27	6.48	1.37	-----	-----	-----	-----	-----	-----	-----	1.37
415	1.24	6.48	1.37	-----	-----	-----	-----	-----	-----	-----	1.37
420	1.22	6.48	1.37	-----	-----	-----	-----	-----	-----	-----	1.37
425	1.19	6.48	1.36	-----	-----	-----	-----	-----	-----	-----	1.36
430	1.17	6.47	1.35	-----	-----	-----	-----	-----	-----	-----	1.35
435	1.14	6.47	1.35	-----	-----	-----	-----	-----	-----	-----	1.35
440	1.12	6.47	1.34	-----	-----	-----	-----	-----	-----	-----	1.34
445	1.09	6.47	1.33	-----	-----	-----	-----	-----	-----	-----	1.33
450	1.07	6.47	1.32	-----	-----	-----	-----	-----	-----	-----	1.32
455	1.05	6.47	1.31	-----	-----	-----	-----	-----	-----	-----	1.31
460	1.03	6.47	1.30	-----	-----	-----	-----	-----	-----	-----	1.30
465	1.00	6.47	1.29	-----	-----	-----	-----	-----	-----	-----	1.29
470	0.98	6.47	1.28	-----	-----	-----	-----	-----	-----	-----	1.28
475	0.96	6.47	1.27	-----	-----	-----	-----	-----	-----	-----	1.27
480	0.94	6.47	1.26	-----	-----	-----	-----	-----	-----	-----	1.26
485	0.92	6.47	1.25	-----	-----	-----	-----	-----	-----	-----	1.25
490	0.90	6.47	1.24	-----	-----	-----	-----	-----	-----	-----	1.24
495	0.88	6.47	1.23	-----	-----	-----	-----	-----	-----	-----	1.23
500	0.86	6.47	1.21	-----	-----	-----	-----	-----	-----	-----	1.21
505	0.85	6.47	1.20	-----	-----	-----	-----	-----	-----	-----	1.20
510	0.83	6.47	1.19	-----	-----	-----	-----	-----	-----	-----	1.19
515	0.81	6.47	1.18	-----	-----	-----	-----	-----	-----	-----	1.18
520	0.79	6.47	1.16	-----	-----	-----	-----	-----	-----	-----	1.16
525	0.78	6.47	1.15	-----	-----	-----	-----	-----	-----	-----	1.15
530	0.76	6.47	1.14	-----	-----	-----	-----	-----	-----	-----	1.14
535	0.74	6.47	1.12	-----	-----	-----	-----	-----	-----	-----	1.12
540	0.73	6.47	1.11	-----	-----	-----	-----	-----	-----	-----	1.11
545	0.71	6.46	1.10	-----	-----	-----	-----	-----	-----	-----	1.10
550	0.70	6.46	1.08	-----	-----	-----	-----	-----	-----	-----	1.08
555	0.68	6.46	1.07	-----	-----	-----	-----	-----	-----	-----	1.07
560	0.67	6.46	1.06	-----	-----	-----	-----	-----	-----	-----	1.06
565	0.65	6.46	1.04	-----	-----	-----	-----	-----	-----	-----	1.04
570	0.64	6.46	1.03	-----	-----	-----	-----	-----	-----	-----	1.03
575	0.63	6.46	1.01	-----	-----	-----	-----	-----	-----	-----	1.01
580	0.61	6.46	1.00	-----	-----	-----	-----	-----	-----	-----	1.00
585	0.60	6.46	0.99	-----	-----	-----	-----	-----	-----	-----	0.99
590	0.59	6.46	0.97	-----	-----	-----	-----	-----	-----	-----	0.97
595	0.58	6.46	0.96	-----	-----	-----	-----	-----	-----	-----	0.96
600	0.58	6.46	0.95	-----	-----	-----	-----	-----	-----	-----	0.95
605	0.57	6.46	0.93	-----	-----	-----	-----	-----	-----	-----	0.93
610	0.56	6.46	0.92	-----	-----	-----	-----	-----	-----	-----	0.92
615	0.55	6.46	0.91	-----	-----	-----	-----	-----	-----	-----	0.91
620	0.54	6.46	0.90	-----	-----	-----	-----	-----	-----	-----	0.90
625	0.53	6.46	0.88	-----	-----	-----	-----	-----	-----	-----	0.88
630	0.53	6.46	0.87	-----	-----	-----	-----	-----	-----	-----	0.87
635	0.52	6.45	0.86	-----	-----	-----	-----	-----	-----	-----	0.86

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Pro Cond. 38/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
640	0.51	6.45	0.85	-----	-----	-----	-----	-----	-----	-----	0.85
645	0.50	6.45	0.84	-----	-----	-----	-----	-----	-----	-----	0.84
650	0.49	6.45	0.82	-----	-----	-----	-----	-----	-----	-----	0.82
655	0.49	6.45	0.81	-----	-----	-----	-----	-----	-----	-----	0.81
660	0.48	6.45	0.80	-----	-----	-----	-----	-----	-----	-----	0.80
665	0.47	6.45	0.79	-----	-----	-----	-----	-----	-----	-----	0.79
670	0.46	6.45	0.78	-----	-----	-----	-----	-----	-----	-----	0.78
675	0.46	6.45	0.77	-----	-----	-----	-----	-----	-----	-----	0.77
680	0.45	6.45	0.76	-----	-----	-----	-----	-----	-----	-----	0.76
685	0.44	6.45	0.75	-----	-----	-----	-----	-----	-----	-----	0.75
690	0.44	6.45	0.74	-----	-----	-----	-----	-----	-----	-----	0.74
695	0.43	6.45	0.73	-----	-----	-----	-----	-----	-----	-----	0.73
700	0.42	6.45	0.71	-----	-----	-----	-----	-----	-----	-----	0.71
705	0.42	6.45	0.70	-----	-----	-----	-----	-----	-----	-----	0.70
710	0.41	6.45	0.69	-----	-----	-----	-----	-----	-----	-----	0.69
715	0.41	6.45	0.68	-----	-----	-----	-----	-----	-----	-----	0.68
720	0.40	6.45	0.68	-----	-----	-----	-----	-----	-----	-----	0.68
725	0.39	6.45	0.67	-----	-----	-----	-----	-----	-----	-----	0.67
730	0.39	6.45	0.66	-----	-----	-----	-----	-----	-----	-----	0.66
735	0.38	6.45	0.65	-----	-----	-----	-----	-----	-----	-----	0.65
740	0.38	6.45	0.64	-----	-----	-----	-----	-----	-----	-----	0.64
745	0.37	6.45	0.63	-----	-----	-----	-----	-----	-----	-----	0.63
750	0.36	6.45	0.62	-----	-----	-----	-----	-----	-----	-----	0.62
755	0.36	6.44	0.61	-----	-----	-----	-----	-----	-----	-----	0.61
760	0.35	6.44	0.60	-----	-----	-----	-----	-----	-----	-----	0.60
765	0.35	6.44	0.59	-----	-----	-----	-----	-----	-----	-----	0.59
770	0.34	6.44	0.58	-----	-----	-----	-----	-----	-----	-----	0.58
775	0.34	6.44	0.58	-----	-----	-----	-----	-----	-----	-----	0.58
780	0.33	6.44	0.57	-----	-----	-----	-----	-----	-----	-----	0.57
785	0.33	6.44	0.56	-----	-----	-----	-----	-----	-----	-----	0.56
790	0.32	6.44	0.55	-----	-----	-----	-----	-----	-----	-----	0.55
795	0.32	6.44	0.54	-----	-----	-----	-----	-----	-----	-----	0.54
800	0.31	6.44	0.54	-----	-----	-----	-----	-----	-----	-----	0.54
805	0.31	6.44	0.53	-----	-----	-----	-----	-----	-----	-----	0.53
810	0.30	6.44	0.52	-----	-----	-----	-----	-----	-----	-----	0.52
815	0.30	6.44	0.51	-----	-----	-----	-----	-----	-----	-----	0.51
820	0.29	6.44	0.50	-----	-----	-----	-----	-----	-----	-----	0.50
825	0.29	6.44	0.50	-----	-----	-----	-----	-----	-----	-----	0.50
830	0.29	6.44	0.49	-----	-----	-----	-----	-----	-----	-----	0.49
835	0.28	6.44	0.48	-----	-----	-----	-----	-----	-----	-----	0.48
840	0.28	6.44	0.48	-----	-----	-----	-----	-----	-----	-----	0.48
845	0.27	6.44	0.47	-----	-----	-----	-----	-----	-----	-----	0.47
850	0.27	6.44	0.46	-----	-----	-----	-----	-----	-----	-----	0.46
855	0.26	6.44	0.46	-----	-----	-----	-----	-----	-----	-----	0.46
860	0.26	6.44	0.45	-----	-----	-----	-----	-----	-----	-----	0.45
865	0.26	6.44	0.44	-----	-----	-----	-----	-----	-----	-----	0.44
870	0.25	6.44	0.44	-----	-----	-----	-----	-----	-----	-----	0.44
875	0.25	6.44	0.43	-----	-----	-----	-----	-----	-----	-----	0.43
880	0.25	6.44	0.42	-----	-----	-----	-----	-----	-----	-----	0.42

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Pro Cond. 39/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
885	0.24	6.44	0.42	-----	-----	-----	-----	-----	-----	-----	0.42
890	0.24	6.44	0.41	-----	-----	-----	-----	-----	-----	-----	0.41
895	0.23	6.44	0.40	-----	-----	-----	-----	-----	-----	-----	0.40
900	0.23	6.44	0.40	-----	-----	-----	-----	-----	-----	-----	0.40
905	0.23	6.44	0.39	-----	-----	-----	-----	-----	-----	-----	0.39
910	0.22	6.44	0.39	-----	-----	-----	-----	-----	-----	-----	0.39
915	0.22	6.44	0.38	-----	-----	-----	-----	-----	-----	-----	0.38
920	0.22	6.44	0.38	-----	-----	-----	-----	-----	-----	-----	0.38
925	0.21	6.44	0.37	-----	-----	-----	-----	-----	-----	-----	0.37
930	0.21	6.43	0.36	-----	-----	-----	-----	-----	-----	-----	0.36
935	0.21	6.43	0.36	-----	-----	-----	-----	-----	-----	-----	0.36
940	0.20	6.43	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
945	0.20	6.43	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
950	0.20	6.43	0.34	-----	-----	-----	-----	-----	-----	-----	0.34
955	0.20	6.43	0.34	-----	-----	-----	-----	-----	-----	-----	0.34
960	0.19	6.43	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
965	0.19	6.43	0.33	-----	-----	-----	-----	-----	-----	-----	0.33
970	0.19	6.43	0.32	-----	-----	-----	-----	-----	-----	-----	0.32
975	0.19	6.43	0.32	-----	-----	-----	-----	-----	-----	-----	0.32
980	0.19	6.43	0.32	-----	-----	-----	-----	-----	-----	-----	0.32
985	0.19	6.43	0.31	-----	-----	-----	-----	-----	-----	-----	0.31
990	0.19	6.43	0.31	-----	-----	-----	-----	-----	-----	-----	0.31
995	0.18	6.43	0.30	-----	-----	-----	-----	-----	-----	-----	0.30
1000	0.18	6.43	0.30	-----	-----	-----	-----	-----	-----	-----	0.30
1005	0.18	6.43	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
1010	0.18	6.43	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
1015	0.18	6.43	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
1020	0.18	6.43	0.28	-----	-----	-----	-----	-----	-----	-----	0.28
1025	0.18	6.43	0.28	-----	-----	-----	-----	-----	-----	-----	0.28
1030	0.18	6.43	0.28	-----	-----	-----	-----	-----	-----	-----	0.28
1035	0.17	6.43	0.27	-----	-----	-----	-----	-----	-----	-----	0.27
1040	0.17	6.43	0.27	-----	-----	-----	-----	-----	-----	-----	0.27
1045	0.17	6.43	0.27	-----	-----	-----	-----	-----	-----	-----	0.27
1050	0.17	6.43	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
1055	0.17	6.43	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
1060	0.17	6.43	0.26	-----	-----	-----	-----	-----	-----	-----	0.26
1065	0.17	6.43	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
1070	0.17	6.43	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
1075	0.16	6.43	0.25	-----	-----	-----	-----	-----	-----	-----	0.25
1080	0.16	6.43	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
1085	0.16	6.43	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
1090	0.16	6.43	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
1095	0.16	6.43	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
1100	0.16	6.43	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
1105	0.16	6.43	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
1110	0.16	6.43	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
1115	0.16	6.43	0.23	-----	-----	-----	-----	-----	-----	-----	0.23
1120	0.15	6.43	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
1125	0.15	6.43	0.22	-----	-----	-----	-----	-----	-----	-----	0.22

Continues on next page...

Pro Cond. 40/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
1130	0.15	6.43	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
1135	0.15	6.43	0.22	-----	-----	-----	-----	-----	-----	-----	0.22
1140	0.15	6.43	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
1145	0.15	6.43	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
1150	0.15	6.43	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
1155	0.15	6.43	0.21	-----	-----	-----	-----	-----	-----	-----	0.21
1160	0.15	6.43	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
1165	0.14	6.43	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
1170	0.14	6.43	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
1175	0.14	6.43	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
1180	0.14	6.43	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
1185	0.14	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
1190	0.14	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
1195	0.14	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
1200	0.14	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
1205	0.14	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
1210	0.14	6.43	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
1215	0.13	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1220	0.13	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1225	0.13	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1230	0.13	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1235	0.13	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1240	0.13	6.43	0.18	-----	-----	-----	-----	-----	-----	-----	0.18
1245	0.13	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1250	0.13	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1255	0.13	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1260	0.13	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1265	0.12	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1270	0.12	6.43	0.17	-----	-----	-----	-----	-----	-----	-----	0.17
1275	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1280	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1285	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1290	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1295	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1300	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1305	0.12	6.43	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
1310	0.12	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1315	0.12	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1320	0.12	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1325	0.11	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1330	0.11	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1335	0.11	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1340	0.11	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1345	0.11	6.43	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
1350	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1355	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1360	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1365	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1370	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14

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Pro Cond. 4/42

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
1375	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1380	0.11	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1385	0.10	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1390	0.10	6.43	0.14	-----	-----	-----	-----	-----	-----	-----	0.14
1395	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1400	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1405	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1410	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1415	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1420	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1425	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1430	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1435	0.10	6.43	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
1440	0.10	6.43	0.12	-----	-----	-----	-----	-----	-----	-----	0.12

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Pro Cond. 42/42

APPENDIX H
NOISE DATA

ROSEN
GOLDBERG
& DER Consultants in Acoustics

Noise Attenuation and Mitigation Plan

for the

Dutra Haystack Landing Facility

Sonoma County, CA

RGD Project # 05-004-2

SUBMITTED TO:

Dutra Group
1000 Point San Pedro Road
San Rafael, CA 94901

PREPARED BY:

Harold Goldberg, P.E.

DATE:

12 May 2006

A. Introduction

This report describes the noise attenuation measures that will be employed with the operation of the proposed asphalt plant, concrete recycling and barge unloading facilities. This report supplements the Environmental Noise Analysis for the project prepared by Bollard and Brennan Inc., September 2004 by providing detailed information on the specific noise attenuation measures and the resulting sound levels at the nearest residential land uses. This report also presents additional information for the County's CEQA analysis including:

- Results of noise measurements of the new Shamrock barge unloading facility located to the north. This is intended to quantify the change in ambient since the Bollard report was prepared.

- An assessment of day/night average sound level (L_{dn}) and the potential for sleep interference.

- An assessment of project generated groundborne vibration.

In summary, the noise attenuation measures adopted in this report will allow the proposed industrial facility to meet the noise level performance standards of the County's General Plan, except at the immediately adjacent residences along the Petaluma River and at the Park across the river. The noise from the new Shamrock facility does not affect the findings of the previous environmental noise analysis. The expected groundborne vibration generated by the proposed facility is not expected to be noticeable at the nearest residential uses.

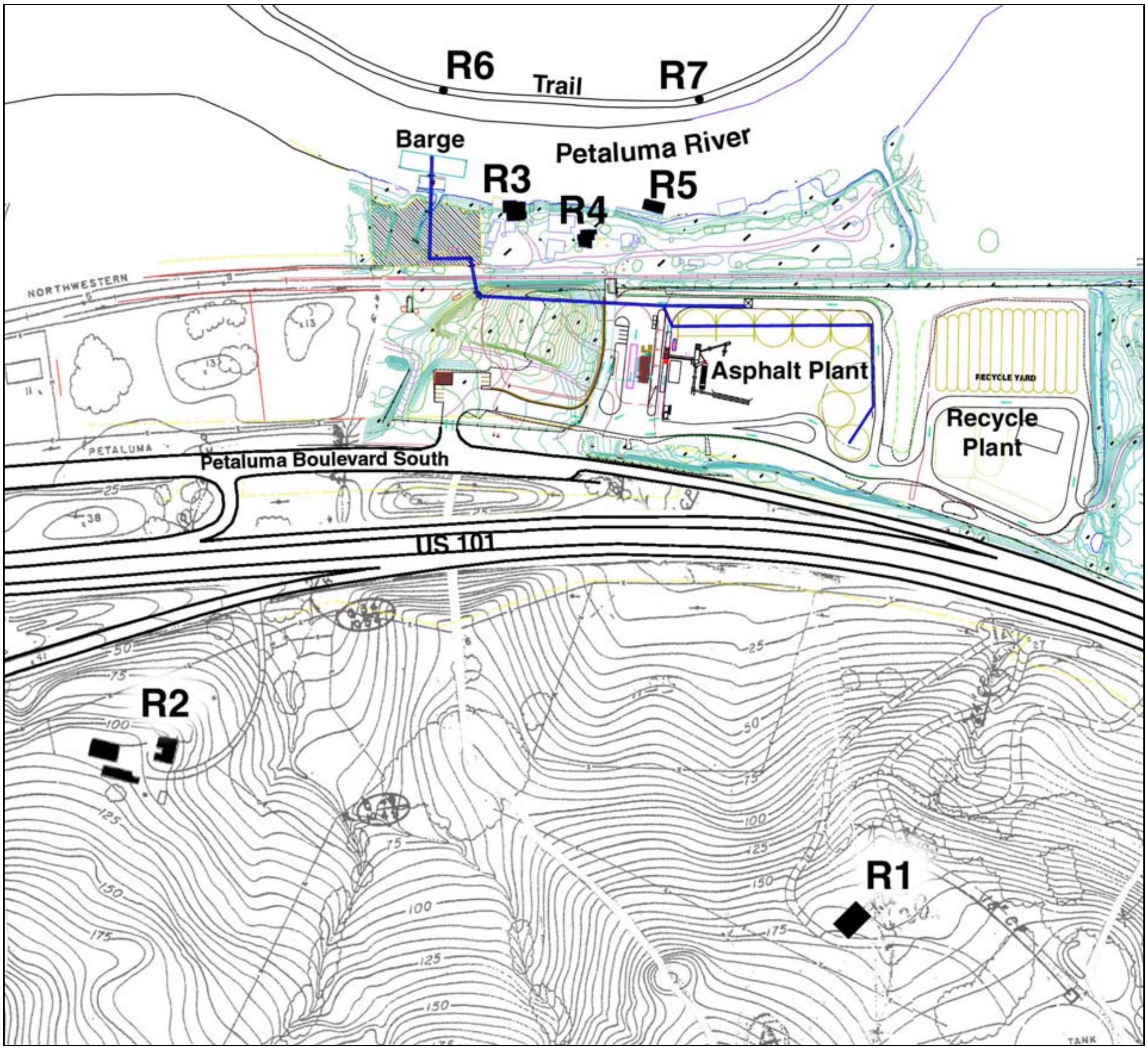
B. Previous Noise Study

Bollard & Brennan, Inc., consultants in acoustics and noise control engineering evaluated the compatibility of the proposed Haystack operations with Sonoma County and California Environmental Quality Act (CEQA) noise standards and prepared a report dated September 15, 2004. The Bollard report assessed the noise generated by the proposed asphalt plant, concrete recycling and barge unloading facilities at two residential locations on the hillside to the west and two residences along the Petaluma River to the east. The assessment included ambient noise measurements and project noise predictions. It concluded that noise generated at the Dutra Haystack facility project would exceed the County's standard unless substantial noise mitigation measures are incorporated within the project design.

While the Bollard report provides an extensive list of noise mitigation options and recommendations it does not provide an analysis of the resulting noise levels with the mitigation. This current Noise Attenuation and Mitigation Plan assesses the mitigated noise levels based on the latest equipment/operational information. The noise levels are predicted for the residences addressed in the Bollard report along with an additional, third residence along the Petaluma River and the trail at Schollenberger

Park across the river. Figure 1 shows the project site and noise sensitive receiver locations.

Figure 1: Project Site and Noise Sensitive Receiver Locations



C. Environmental Noise Fundamentals

Noise can be defined as unwanted sound and is commonly measured with an instrument called a sound level meter. The sound level meter "captures" sound with a microphone and converts it into a number called a sound level. Sound levels are expressed in units of decibels (dB).

To correlate the microphone signal to a level that corresponds to the way humans perceive noise, the A-weighting filter is used. A-weighting de-emphasizes low-frequency and very high-frequency sound in a manner similar to human hearing. The use of A-weighting is required by most local agencies as well as other federal and state noise regulations (e.g. Caltrans, EPA, OSHA and HUD). The abbreviation dBA is often used when the A-weighted sound level is reported.

Because of the time-varying nature of environmental sound, there are many descriptors that are used to quantify the sound level. Although one individual descriptor alone does not fully describe a particular noise environment, taken together, they can more accurately represent the noise environment. There are four descriptors that are commonly used in environmental studies; the L_{max}, L_{eq}, L_{90} and L_{dn} (or CNEL).

The maximum instantaneous noise level (L_{max}) is often used to identify the loudness of a single event such as a car pass-by or airplane flyover. To express the average noise level, the L_{eq} (equivalent noise level) is used. The L_{eq} can be measured over any length of time but is typically reported for periods of 15 minutes to 1 hour. The background noise level (or residual noise level) is the sound level during the quietest moments. It is usually generated by steady sources such as distant freeway traffic. It can be quantified with a descriptor called the L_{90} which is the sound level exceeded 90 percent of the time.

To quantify the noise level over a 24-hour period, the Day/Night Average Sound Level (L_{dn} or DNL) or Community Noise Equivalent Level (CNEL) is used. These descriptors are averages like the L_{eq} except they include a 10 dBA penalty for noises that occur during nighttime hours (and a 5 dBA penalty during evening hours in the CNEL) to account for peoples' increased sensitivity during these hours.

In environmental noise, a change in the noise level of 3 dBA is considered a just noticeable difference. A 5 dBA change is clearly noticeable, but not dramatic. A 10 dBA change is perceived as a halving or doubling in loudness.

D. ACOUSTICAL CRITERIA

The Noise Element of the Sonoma County General Plan policy that is applicable to the project is:

> *NE-1c: Control non transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table NE-2 as measured at the exterior property line of any affected residential land use. Limit exceptions to the following:*
>
> > *1) If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level.*
> >
> > *2) Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.*

3) Reduce the applicable standards in Table NE-2 by 5 decibels if they exceed the ambient level by 10 or more decibels.

Table 1: Noise Level Performance Standards (Sonoma County General Plan Table NE-2)

Category	Maximum Exterior Noise Level Standards, dBA		
	Cumulative Duration of Noise Event in any one-hour period	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
1	30-60 minutes	50	45
2	15-30 minutes	55	50
3	5-15 minutes	60	55
4	1-5 minutes	65	60
5	0-1 minute	70	65

Table NE-2 indicates that the County's noise standards vary with the amount of time that a specific noise level would be exceeded. To meet the Category 1 limit a noise level of 50 dBA cannot be exceeded for more than 30 minutes in an hour. This level is the L_{50}, the noise level exceeded 50 percent of the time. The L_{50} is also called the median noise level. To meet the Category 5 limit, the noise level cannot exceed 70 dBA between 0 and 1 minute. This is the L_{max} or maximum noise level.

Since the noise sources at the proposed project generate continuous, steady noise, the most restrictive standard is Category 1, or an L_{50} of 50 dBA during the day and 45 dBA at night. According to the General Plan, the daytime and nighttime standards are to be adjusted upward or downward, depending on the existing ambient noise levels. Based on the ambient noise measurements in the Bollard report, the standards are adjusted upward since the ambient noise level is greater than standard.

For the purposes of this analysis, the County standard is applied to the project-generated noise only. This means that the total noise level (project plus ambient) could be up to 3 dBA greater than the existing ambient. An increase in noise of 3 dBA is normally considered a just noticeable difference.

E. <u>Changes Ambient Noise Level</u>

Ambient noise levels are quantified in the Bollard report based on long-term noise measurements conducted in March 2004. The major noise source was traffic on US 101. Based on a historical review of US 101 traffic volume counts published by Caltrans the daily highway volume increases about 5% per year. This traffic volume increase corresponds to a noise increase of less than 1 dBA between the years 2004 and 2006.

Another potential source of increased ambient noise levels is Shamrock's new barge unloading facility located along the Petaluma River just north of the project's proposed barge unloading facility. The dominant noise source is a crane that moves the material from the barge to stockpiles at the site.

To quantify this source noise measurements were conducted at two locations during a barge unloading on 20 April 2006 (see Table 2). Location 1 was adjacent to the residence just south of the northernmost residential use along the Petaluma River, about 850 feet south of the Shamrock crane. This is the same as the Location B used for ambient noise monitoring in the Bollard Report. The L_{50} at this location was dominated by freeway noise and a nearby gas valve. The constant sound of the crane cooling fans was faintly audible. Intermittent noises from a front end loader and gravel being dumped into trucks was occasionally distinguishable. The measured L_{max} of 64 dBA was generated by the front end loader dumping gravel into a truck at the Shamrock site.

Because of the influence of freeway noise at the residential location, a second, simultaneous measurement was conducted closer to the Shamrock site to minimize the effect of the freeway and gas valve. Location 2 was 154 feet from the barge unloading crane and the L_{50} from was 65 dBA. The crane noise level is reduced with distance at a rate of 6 dBA per doubling of distance and a small (1 dBA) factor for sound absorption in air. The calculated noise level of the crane noise at Location 1 is 49 dBA. The crane noise contribution to the ambient is 1 dBA. That is, the measured L_{50} was 54 dBA and without the crane, the ambient L_{50} would be 53 dBA.

The small changes in ambient noise levels due to increased traffic and barge unloading activities at the Shamrock facility do not necessitate a reevaluation of the ambient noise levels used in the Bollard Report for assessing the impacts of project-generated noise with respect to the County's standards.

Table 2: Noise Measurements during Shamrock Barge Unloading
20 April 2006, 9:00 – 10:00 A.M.

Location	A-weighted Noise Level, dBA					
	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
1. Property line of northernmost residential use (same as Location B in Bollard Report)	55	64	58	57	55	54
2. On Shamrock site, 154 feet from Crane	66	76	69	68	67	65

F. Project Generated Noise Levels

There are three main components associated with the operation of the project: an asphalt plant, a concrete recycling plant and barge unloading. The asphalt plant and barge unloading would operate during the day and sometimes at night. The recycling plant would only operate during daytime hours (7 A. M. to 10 P.M.). Table 3 summarizes the noise level of each activity as well as the combined noise level for those times when more than one component is operating. Those scenarios that result in a noise level that exceeds the County's daytime and/or nighttime standard are identified with a "D" and/or "N". For additional information on project operations see the Bollard Report.

Table 3: Project Generated Noise Levels (L_{50}, dBA) without Mitigation

Reciever	Asphalt Plant	Concrete Recycling Plant (Daytime Only)	Barge Unloading	Asphalt plus Recycling (Daytime Only)	Asphalt plus Barge	Asphalt plus Recycling plus Barge (Daytime Only)	Existing Ambient (County Standard)	
							Day	Night
R1 Hillside South	52 N	63 D	41	63 D	53 N	63 D	59	51
R2 Hillside North	53 N	56 D	44	58 D	54 N	58 D	55	50
R3 River North	53 N	51	65 D, N	55 D	65 D, N	65 D	53	50
R4 River Middle	68 D, N	63 D	47	69 D	68 D, N	69 D	53	50
R5 River South	67 D, N	64 D	55 D, N	69 D	68 D, N	69 D	53	50
R6 Park North	59 D	59 D	65 D	62 D	66 D	67 D	53	N/A
R7 Park South	63 D	63 D	53	66 D	63 D	66 D	53	N/A

Notes: D – noise level exceeds the County's daytime standard
N – noise level exceeds the County's nighttime standard

G. NOISE ATTENUATION MEASURES

This section presents the recommended noise attenuation measures for the various elements of the project. Specific information such as noise reduction, height, location and materials are provided as appropriate. Figures 3 and 4 show the Asphalt Plant and recycling plant noise control measures, respectively.

1. Asphalt Plant

a. <u>Baghouse fan stack silencer</u>
Install a silencer between the baghouse fan and the exhaust stack. The silencer should be designed to reduce the A-weighted sound level of the fan exhaust by 20 dBA when the fan is operating in the range of 70-100% of maximum airflow.

b. <u>Baghouse fan casing barrier or enclosure</u>
Install a barrier along the west side of the baghouse fan casing. The barrier should be made of sound absorptive steel panels or mass-loaded quilted vinyl (1.5 pounds per square foot). The barrier should be 12 feet tall and located within 3 feet of the fan casing. It should return along the south and north sides of the baghouse fan casing. Alternatively, a ventilated enclosure can be used that is constructed of sound absorptive metal panels and designed to achieve an A-weighted noise reduction of 15 dBA.

c. <u>Fiberbed fan stack silencer</u>
Install a silencer between the fiberbed fan and the exhaust stack. The silencer should be designed to reduce the A-weighted sound level of the fan exhaust by 15 dBA when the fan is operating at 100% of maximum airflow.

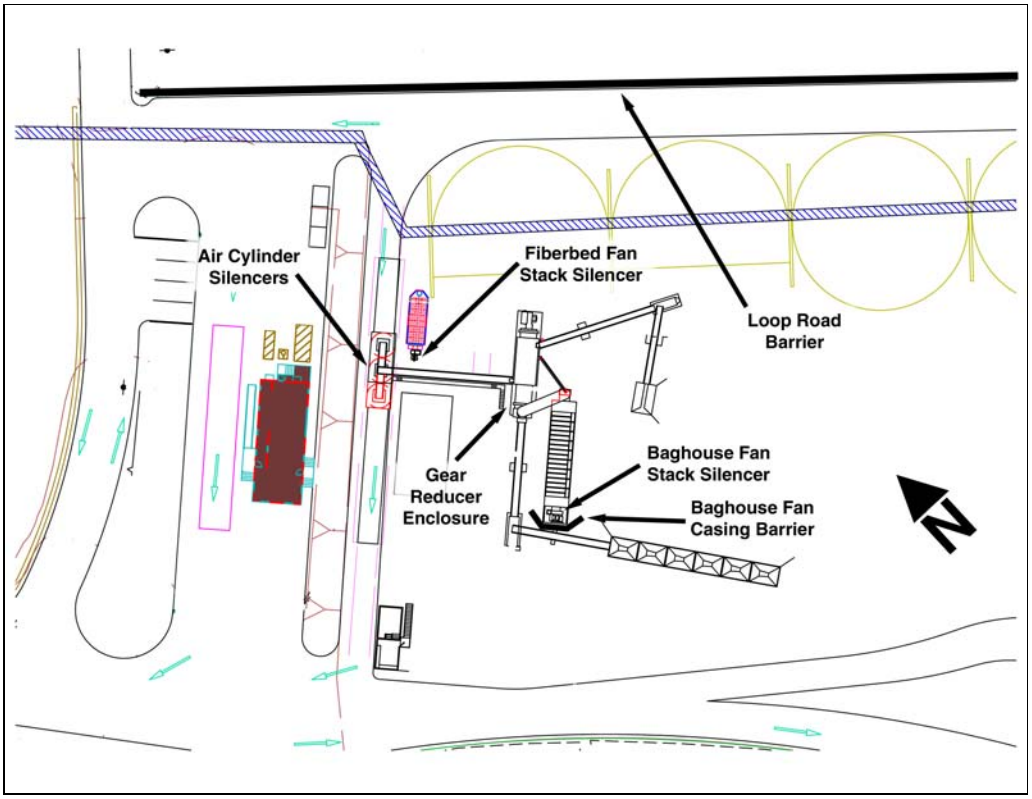
d. <u>Gear reducer enclosure</u>
Install an enclosure around the gear reducer for the asphalt burner drum to reduce its noise level by 15 dBA.

e. <u>Air compressor enclosure</u>
Install an enclosure around the air compressor to reduce its noise level by 20 dBA.

f. <u>Air cylinder silencers</u>
Install air cylinder silencers at the batcher and discharge gates designed to reduce the air release noise by a minimum of 20 dBA.

g. <u>Soundwall along loop road</u>
Install a 12-foot-tall noise barrier along the east side of the asphalt plant site. The barrier could be a masonry or wood wall located along the loop road that the customer trucks use to access the asphalt silos.

Figure 3: Asphalt Plant Noise Control Measures



2. Concrete Recycling Plant

a. Non-metallic aggregate sorting screens
Use non-metallic screening panels. Non-metallic materials such as neoprene, rubber or high density polyethylene (HDPE) can significantly reduce the noise generated by the crushed concrete bouncing on the screens.

b. Hopper and chute liners
Line all unenclosed hoppers and chutes at which aggregate materials fall onto a metal surface with a sound deadening material such as heavy neoprene, rubber or HDPE.

c. Use PG&E Power Instead of an Engine-Generator Set
Operate the recycling plant without the engine-generator commonly used to power portable concrete recycling plants.

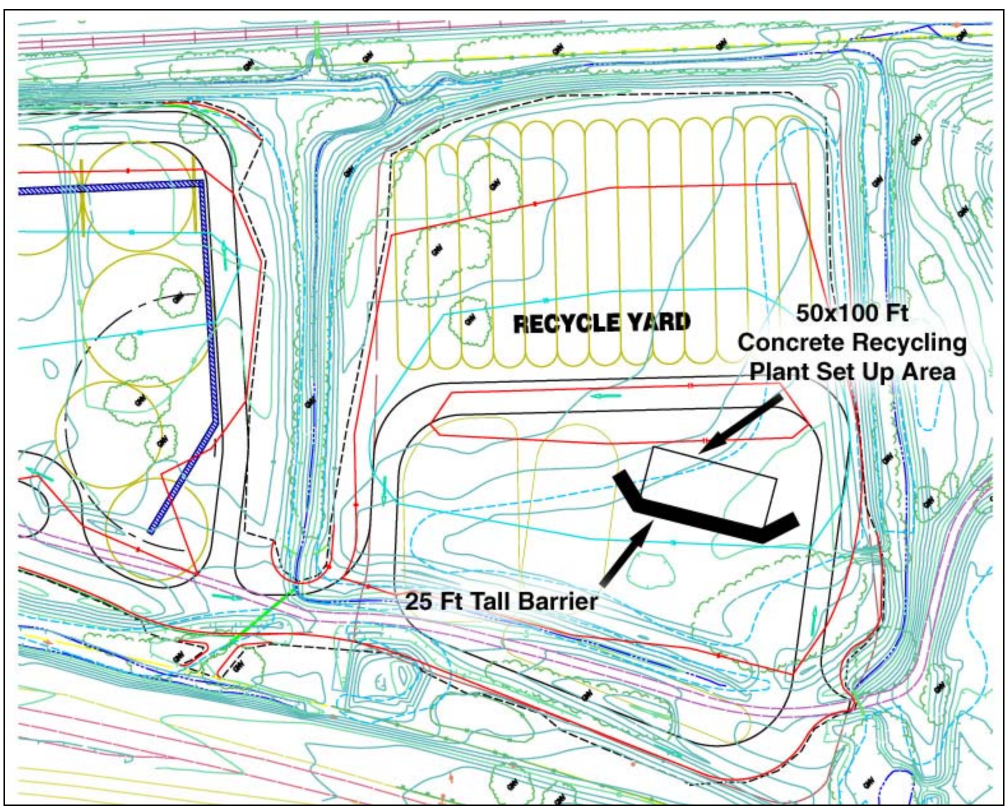
d. Barrier along West Side of Plant
Install a noise barrier along the west side of the concrete recycling plant. Possible barrier materials include sound absorptive steel panels or mass-loaded quilted vinyl (minimum 1.5 pounds per square foot). The barrier

should be on the west side of the plant area and return along the north and south sides of the plant area as shown in Figure 4. The barrier should be designed to achieve approximately 10 dBA of noise reduction. Based on preliminary information, the barrier would need to be 25 feet tall and within 12 feet of the screen and crushers assuming the equipment is 16 feet tall.

The final design of the noise barrier (height, length and location) should be based on the actual specification of the recycling plant. For example, the noise barrier height could be reduced below 25 feet if the elevation at the top of the recycling plant is lower than the current assumption. Also, if the plant is more compact, the length of the barrier could be reduced.

e. Stockpiles to the North and East
Stockpiles of processed and unprocessed materials should be located to the north and east sites of the recycling plant. These stockpiles will help reduce noise at the homes along the river and the park across the river. Since the presence of the stockpiles is dependent on the amount of material at the site, their noise reduction is not relied upon in the calculations of mitigated noise levels at the residential receivers. The noise predictions at the Schollenberger Park include the effect of piles of material located in the recycle yard because there is enough space in the recycle yard to always maintain some piles to a height of approximately 15 feet.

Figure 4: Concrete Recycling Plant Noise Control Barrier



3. Barge Unloading Facility

a. <u>Enclosed Transfer Points</u>
Enclosed the points along the conveyor system where material transfer from one belt to another by means of a hopper. The enclosure material should have a minimum surface density of 1.5 pounds per square foot.

4. Backup Beepers

a. <u>Use Strobe Lights Instead of Back-up Beepers at Night</u>
Install an OSHA approved strobe light back-up notification system on front end loaders that are used at the asphalt plant and the barge unloading.[2] Use the strobes exclusively instead of the beepers during nighttime hours (10 P.M. to 7 A.M. or daylight.) This measure is intended to reduce annoyance during nighttime hours but is not relied upon to achieve the mitigated noise levels in this report.

b. <u>One-way Truck Traffic</u>
Design the on-site truck circulation to allow for one-way operation. This will minimize the need for trucks to operate in reverse and sound their backup beepers.

5. Noise Attenuation Measures Considered but Not Included

a. <u>Use of Setbacks</u>
Setbacks can be used to reduce noise by increasing the distance between the noise source and the sensitive receiver. However, the locations of the various project components are constrained by the size of the site, the requirements for vehicular circulation, and the setback required along the US 101 scenic corridor.

b. <u>Use of Barriers at Barge Unloading</u>
Barriers were considered as a measure to reduce the noise of the front end loader operating on the barge during the unloading process. However, a barrier would need to be located in the river to block the line-of-sight between the barge and the river residences R3 and R5, and it is not practical to block the river with a permanent barrier. While it is theoretically possible to use temporary barriers either on piers or on the sides of the barge, it would not be practical to enforce this measure on an on-going basis.

c. <u>Eliminating the Use of Front End Loaders for the Asphalt Plant at Night</u>
It is anticipated that the front end loader would be needed to fill the hoppers to keep up with demand for asphalt during night shifts. Therefore,

[2] Rosen Goldberg & Der, Inc. is not responsible the acceptability of this measure from a safety standpoint.

continuous operation of the front end loader is assumed in the noise predictions. However, it may be possible to minimize the use of the front end loader by filling the plant silos and feed hoppers before the nighttime hours. Therefore, nighttime noise levels by be less than shown in this report.

d. Use of Vegetation
Trees and vegetation are not normally relied upon for noise reduction. A stand of evergreen trees must be about 100 feet deep before a noticeable noise reduction is reliably achieved, and site constraints make this measure impractical.

e. Building Façade Improvements at Nearest Residences
Substantial reductions in indoor noise can be achieved by improving the sound insulating properties of a typical residential structure. This measure, however, requires the cooperation of the residence owner and is therefore, not included in this report's noise predictions. Implementing this measure would required a detailed analysis of the structure's existing sound insulation and detailed specifications for treatments such as sound rated windows, doors and walls construction. The noise reduction improvements would only be realized when the windows are in the closed position. Since the County's performance standards for non-transportation sources apply only to outdoor sound levels, this measure would not affect compliance with County standards.

f. Procurement of Affected Homes
The river residences are located on non-residentially zoned properties. If the use of the properties changes from residential to something that is not noise sensitive, then the County's performance standards would not apply. We understand that The Dutra Group has offered to purchase the residence that is closest to the barge unloading facility, but an agreement was not achieved.

H. Mitigated Sound Levels and Conclusion

1. County's Performance Standard for Non-Transportation Noise Sources

Table 4 summarizes the project generated noise levels (L_{50}) with the proposed mitigation measures. Various operational scenarios are presented, some with each component operating individually and some with components operation simultaneously. Those scenarios that result in a noise level that exceeds the County's standard are identified with a "D" (exceeds the daytime standard), an "N" (exceeds nighttime standard) or both.

a. Hillside Residences (R1 and R2)
All combinations of the asphalt plant, concrete recycling plant and barge unloading will meet the County's daytime and nighttime standards at the hillside homes to the west.

b. River Residences (R3, R4 and R5)
Noise from the asphalt plant will meet the daytime standard at all three river residences, but exceed the nighttime standard at the two closer river residences, R3 and R4. Noise from the recycling plant will meet the daytime standard at the three river residences. Noise from the barge unloading will exceed the daytime and nighttime standards and the northern and southern river residences, R3 and R5. The middle residence is shielded from the barge unloading noise by the intervening buildings.

At R4 and R5 the concrete recycling plant and the asphalt plant each generate an L_{50} close to the daytime standard. When these sources operate together, the total noise exceeds the daytime standard.

c. Schollenberger Park (R6 and R7)
Since the park is used only during the daytime and not for sleeping, only the County's daytime standard is applied. The barge unloading would occur directly across the Petaluma River from the park. At the closest point along the shoreline trail the predicted noise level exceeds the County's standard by 12 dBA. The other components of the project would not generate noise levels in excess of the standard.

Table 4: Project Generated Noise Levels (L_{50}, dBA) with Mitigation

Reciever	Asphalt Plant	Concrete Recycling Plant (Daytime Only)	Barge Unloading	Asphalt plus Recycling (Daytime Only)	Asphalt plus Barge	Asphalt plus Recycling plus Barge (Daytime Only)	Existing Ambient (County Standard)	
							Day	Night
R1 Hillside South	47	47	41	50	48	51	59	51
R2 Hillside North	46	41	44	47	48	49	55	50
R3 River North	45	46	65 D, N	48	65 D, N	65 D	53	50
R4 River Middle	52 N	51	47	55 D	53 N	55 D	53	50
R5 River South	52 N	52	55 D, N	55 D	57 D, N	58 D	53	50
R6 Park North	44	46	65 D	48	65 D	65 D	53	N/A
R7 Park South	48	50	53	52	54 D	56 D	53	N/A

2. Average Daily Noise Levels

Another noise descriptor that is useful for assessing noise impacts is the Day/Night Average Sound Level (L_{dn}). This descriptor is used to assess the overall change in a noise environment due to this type of project because it takes into account how many hours per day a facility operates. Since the project's operations will vary from day to day, this report uses an average annual L_{dn} to quantify the noise from the project. Table 5 presents the calculated L_{dn} from each of the project's components and the combined total for each noise sensitive receiver. The table also includes the existing ambient L_{dn} as presented in the Bollard Report.

Table 5: Project Generated Noise Levels (L_{dn}, dBA) with Mitigation

Reciever	Asphalt Plant	Recycling Plant	Barge Unloading	Total	Existing Ambient
R1 Hillside South	48	40	35	49	63
R2 Hillside North	47	33	39	48	60
R3 River North	46	38	59	59	59
R4 River Middle	53	43	41	54	59
R5 River South	53	44	49	55	59
R6 Park North	45	39	59	59	59
R7 Park South	49	42	47	52	59

The L_{dn} from the project would be greatest at the northernmost river residence, R3, and the park, R6. At these locations the L_{dn} of 59 dBA would be dominated by the barge unloading activities. Since the existing, ambient L_{dn} at these locations is also 59 dBA, the increase in L_{dn} would be 3 dBA. At the other locations, the project generated L_{dn} is 4 to 14 dBA less than the existing conditions and would result in an increase of 1 dBA or less.

The L_{dn} can also be compared to a threshold of 60 dBA which is used by the County in their General Plan to identify noise impacted areas. The contribution from the project is less than 60 dBA at all noise sensitive receivers.

3. Sleep Disturbance

The World Health Organization (WHO) has reviewed the available studies on the effects of noise on sleep and concluded the following[3];

[3] *Community Noise*, Berglund & Lindvall, Published by World Health Organization, 1995.

In order to avoid negative effects on REM-sleep, the equivalent continuous sound pressure level during the sleeping period should not exceed 30-35 dBA L_{eq} for continuous noise indoors. In the case of fluctuating noise, the maximum level is best correlated to sleep disturbances. For isolated exposures as low as 45 dBA L_{max}, awakenings, changes of sleep depth, etc., have been shown. An increasing number of exposures results in greater risk of adverse effects on sleep.

To assess the potential for sleep interference at the nearest residences, Table 6 shows the calculated interior noise level (in terms of L_{eq}) when both the asphalt plant is operating and a barge is being unloaded. The project generated noise at the two hillside residences is within the WHO recommendation for sleep disturbance of 35 dBA L_{eq}. The indoor noise exceeds the WHO recommendation at each of the three river residences with the windows open. With the windows closed, only the northernmost residence (R3) would be exposed to noise levels expected to interfere with sleep. It should be noted that the nighttime noise level at R3 is generated by the barge unloading activities which will occur infrequently, about 1 or 2 nights per month.

Table 6: Project Generated Noise Levels (L_{eq}, dBA)
During the Nighttime with Mitigation

Receiver	Outdoors	Indoors	
		Windows Open	Windows Closed
R1 Hillside South	50	35	25
R2 Hillside North	50	35	25
R3 River North	67	52	42
R4 River Middle	54	39	29
R5 River South	58	43	33

I. Groundborne Vibration

Sources of groundborne vibration associated with the project include stationary material processing/handling equipment and mobile diesel equipment. The mobile diesel equipment used at the facility (primarily trucks and front end loaders) will be rubber wheeled equipment. This type of equipment typically generates less groundborne vibration than similar equipment that use rolling metal tracks instead of rubber wheels.

To quantify the expected groundborne vibration levels measurements were conducted at the Dutra facility in Richmond, California. Ground vibration was measured with an accelerometer and spectrum analyzer at 200 feet from an operating concrete recycling plant that included a screen, crusher, front end loader and conveyors. This equipment represents the greatest potential for ground vibration since the screen is essentially a large tray that shakes to sort material.

The measured vibration levels were at least 18 decibels below the vibration perception threshold of 72 VdB[4] reported by the American National Standards Institute (ANSI)[5]. This threshold is also used by the Federal Transit Administration (FTA)[6] as a vibration impact criterion for new transit systems.

Groundborne vibration from the project is not expected to be perceptible at the nearest residential uses based on the type of equipment that will be used, the distances to the existing residences and the measured vibration levels at a similar facility.

[4] VdB – an abbreviation for vibration velocity expressed in decibels re one micro-inch per second.
[5] *Guide to the Evaluation of Human Exposure to Vibration in Buildings*, ANSI S3.29-1983
[6] *Transit Noise and Vibration Impact Assessment*, Federal Transit Administration, 1995

Environmental Noise Analysis

Dutra Materials Haystack Project

Sonoma County, California

Bollard & Brennan, Inc. Job # 2004-034

Prepared For:

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September 15, 2004

INTRODUCTION

Dutra Materials is proposing to operate an asphalt concrete production and recycling facility at its Haystack Site in Sonoma County. The project site is located on the east side if Highway 101, just south of the City of Petaluma, at the location identified by Figure 1.

Dutra Materials has retained Bollard & Brennan, Inc., consultants in acoustics and noise control engineering, to evaluate the compatibility of their proposed Haystack operations with Sonoma County and California Environmental Quality Act (CEQA) noise standards. With the exception of an evaluation of project alternatives (there are none), this report is based on a level of analysis commensurate with that normally prepared for an Environmental Impact Report (EIR) noise section.

BACKGROUND ON NOISE AND ACOUSTICAL TERMINOLOGY

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness. Figure 2 illustrates common noise levels associated with various sources.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels.

Figure 1
Richmond Haystack
Project Area

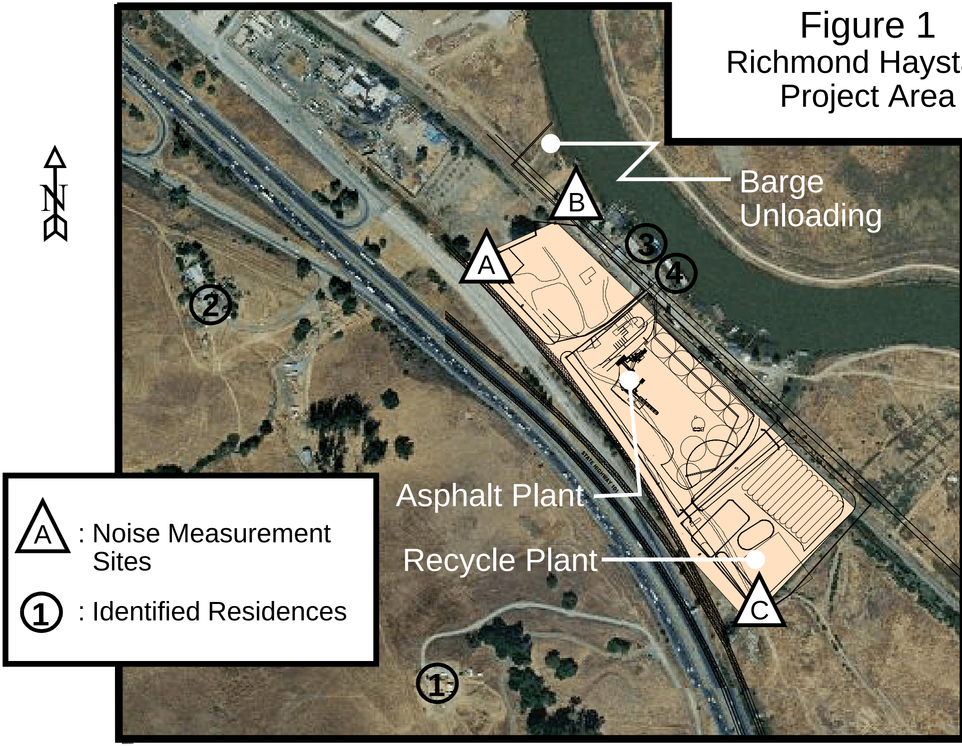
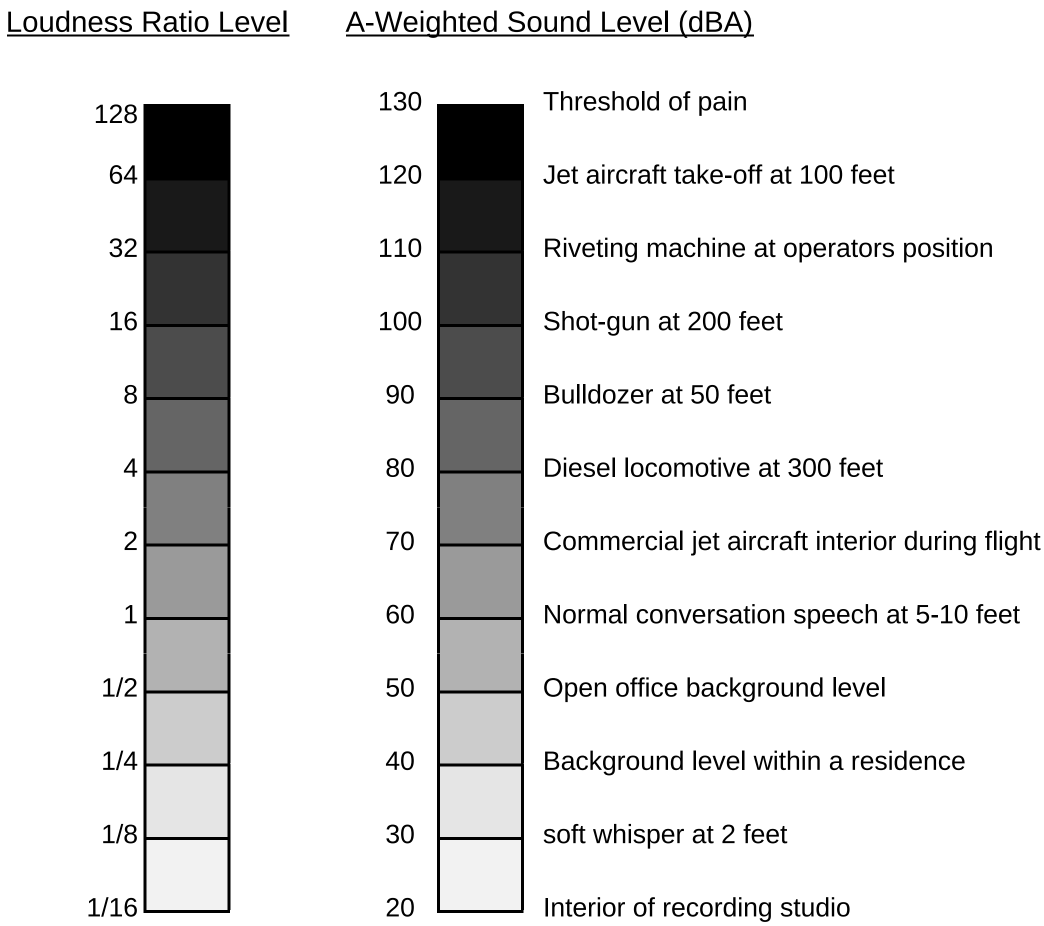


Figure 2
Typical A-Weighted Sound Levels of Common Noise Sources



PROJECT DESCRIPTION

The proposed project will consist of a facility for the production of asphalt concrete, a facility for the processing of recycled aggregate materials, aggregate stockpiles, and a barge unloading facility. Due to the increasing demand for asphalt concrete for nighttime paving jobs, the project application requests no limitations on hours of operation for the asphalt plant. In addition, due to varying tides, the applicant reports that periodic nighttime barge unloading activities would be necessary. Because the recycle facility need not operate during nighttime hours (10 pm to 7 am), its use will be limited to daytime hours.

According to the project applicant, peak truck traffic generated by the project would be 25-30 trucks inbound & outbound, for a total of approximately 60 total per hour. This would be the maximum peak during the day, which would occur at around 7:00 AM. The total trucks per day would be about 340 on the busiest days, over a 24 hour period.

EXISTING LAND USES IN PROJECT VICINITY

With the exception of an uninhabitable house on the northern portion of the project site, the site is essentially vacant. It is bordered to the east by an industrial area beyond which is a slew and open space. There are 2 existing residences located within the industrial property to the immediate east, and a recreation trail is located within the open space further to the east.

The site is bordered to the south by open space, and to the north by industrial uses.

The project site is bordered to the west by Highway 101, beyond which two residences were identified on the hillside overlooking the highway and project site.

The nearest identified noise residences to the project site are shown on Figure 1.

EXISTING NOISE ENVIRONMENT IN THE PROJECT VICINITY

The existing noise environment in the immediate project area is dominated by Highway 101 traffic noise.

To quantify ambient noise levels in the project vicinity, Bollard & Brennan, Inc. conducted a continuous noise level measurement survey at three locations from March 17-19, 2004, for a consecutive period of 54 hours at each site. The noise measurement locations are identified on Figure 1.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before and after use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4).

The ambient noise measurement results are summarized in Table 1 and are displayed graphically for March 17-18 on Figures 3 through 5. The complete ambient noise level results are provided in Appendix B.

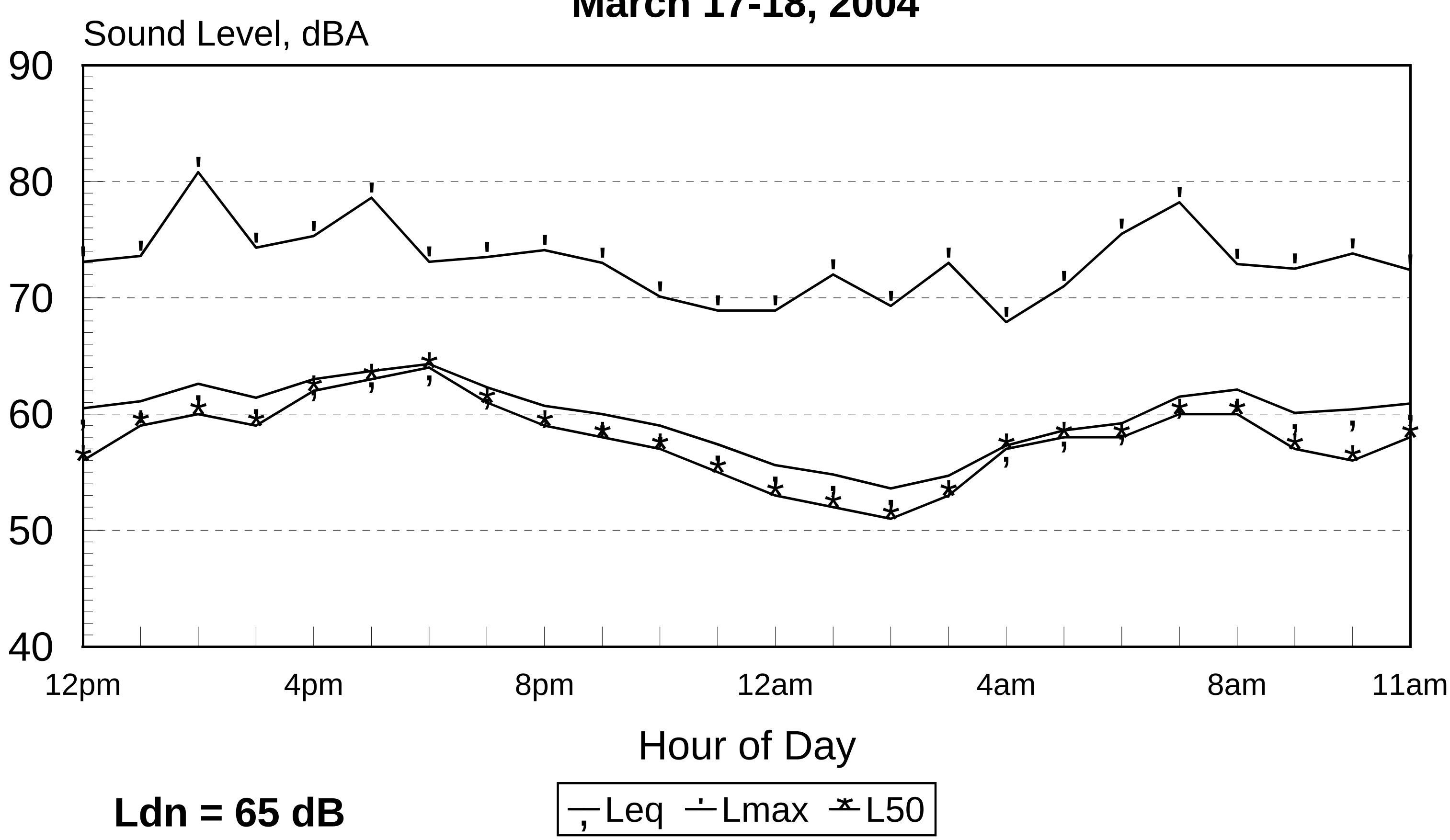
Table 1
Statistical Summary of Ambient Noise Measurement Results
Dutra Haystack Project Site
March 17-18, 2004

			Median (L50, dB)		Maximum (Lmax, dB)	
Site	Date	Ldn, dB	Day	Night	Day	Night
A	March 17-18	65	59	55	72-81	68-76
	March 18-19	65	61	55	72-89	67-74
B	March 17-18	59	52	50	62-76	58-68
	March 18-19	59	54	50	62-82	58-66
C	March 17-18	72	68	60	75-91	78-83
	March 18-19	72	68	61	78-92	77-83

Notes:
1. The locations of noise measurement sites are shown on Figure 1.
Source: Bollard & Brennan, Inc.

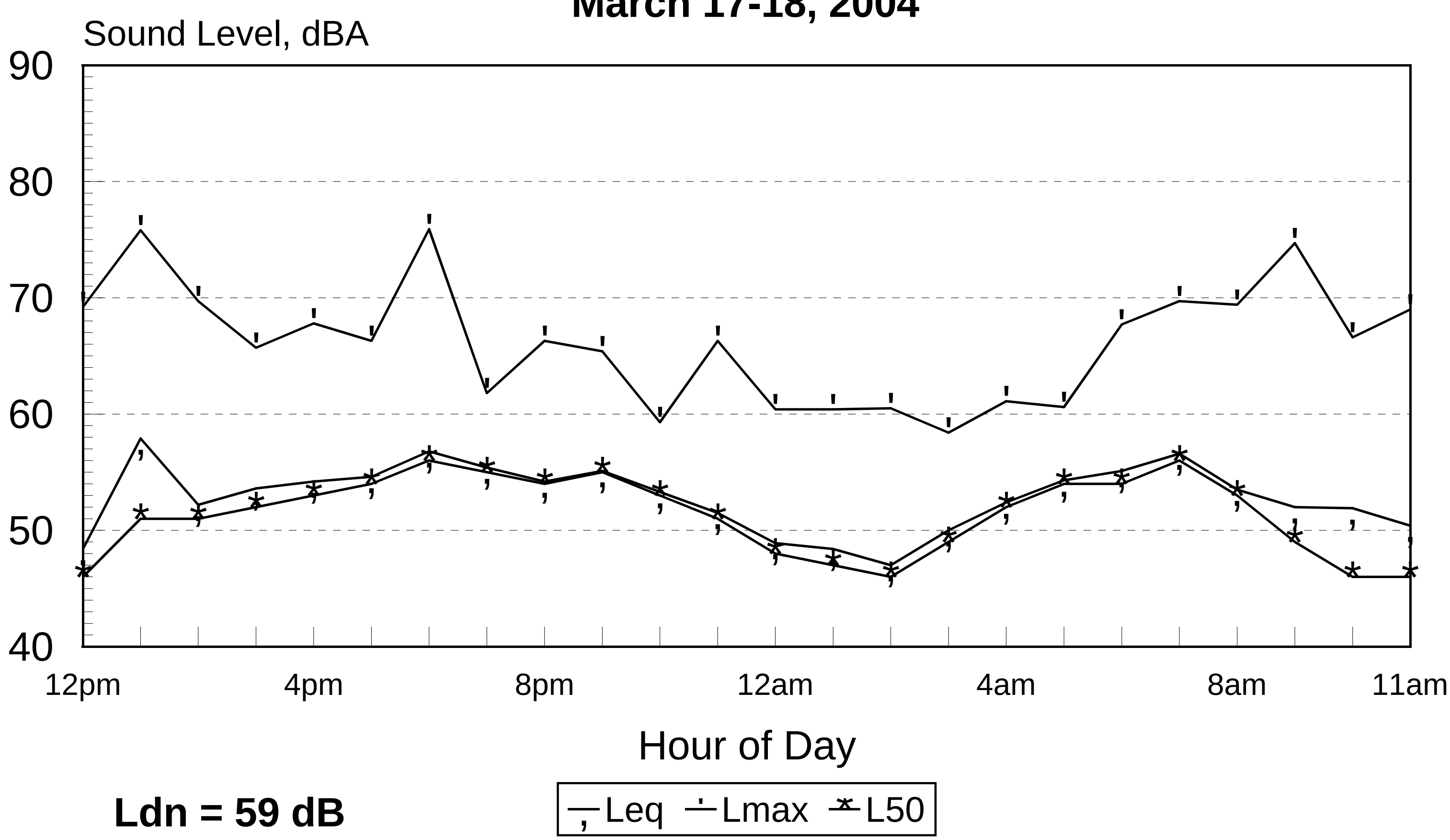
The noise level measurement data shown in Table 1 indicates that the project vicinity is currently exposed to elevated noise levels from Highway 101 traffic. The presence of this major existing noise source is expected to substantially mask noise generated by the proposed Dutra operations at the existing residential uses on the west side of Highway 101 (receivers 1 & 2). Due to the greater separation and partial shielding of the highway from the residences in the industrial area, traffic noise levels are lower in those locations.

Figure 3
Measured Ambient Noise Levels
Richmond Haystack Project - Site A
March 17-18, 2004



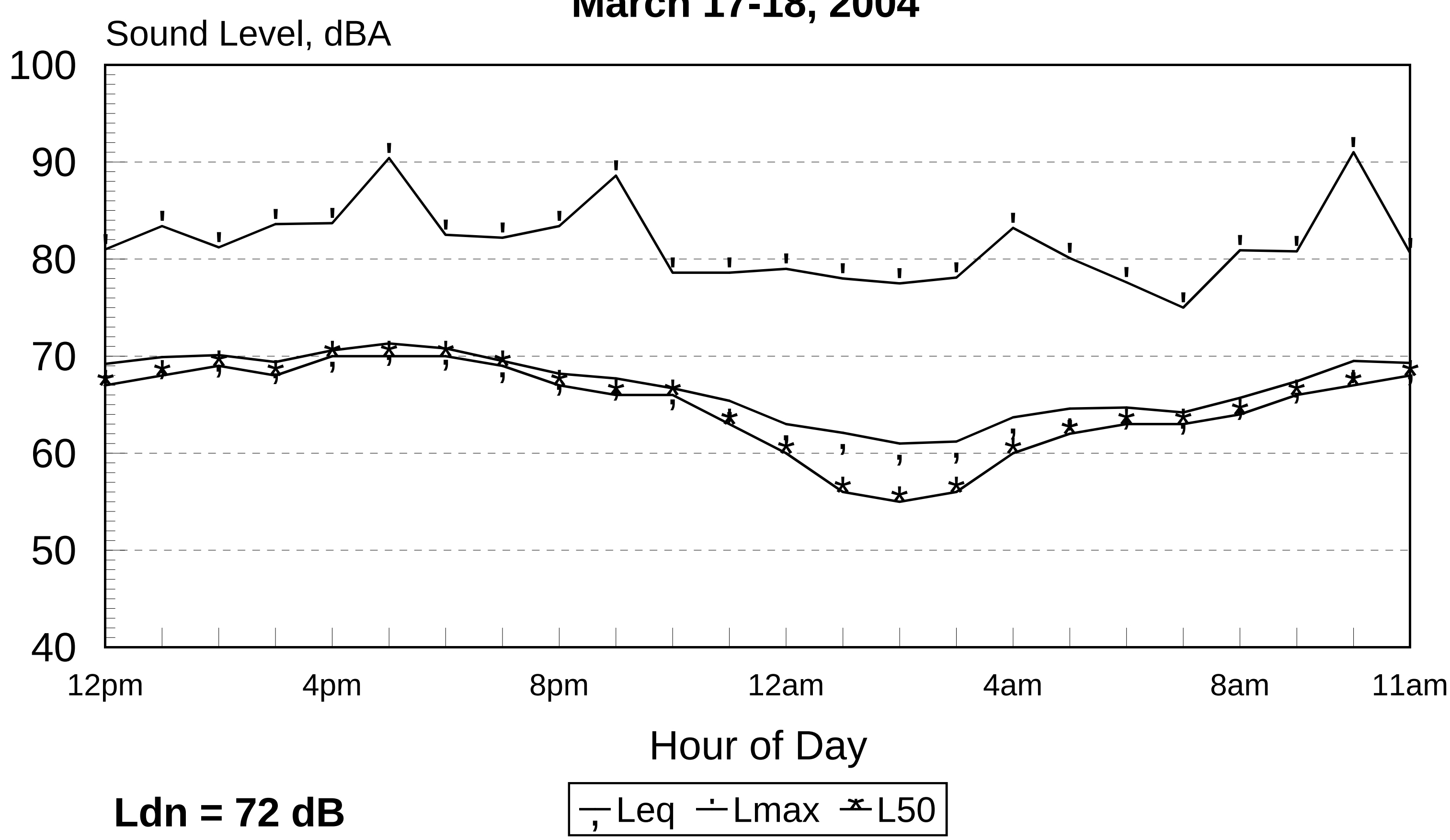
Ldn = 65 dB

Figure 4
Measured Ambient Noise Levels
Richmond Haystack Project - Site B
March 17-18, 2004



Ldn = 59 dB

Figure 5
Measured Ambient Noise Levels
Richmond Haystack Project - Site C
March 17-18, 2004



Ldn = 72 dB

Although ambient noise level measurements were not conducted at Receivers 1 and 2 (see Figure 1), those residences have generally similar sight lines to Highway 101 as do monitoring sites C and A, respectively. Therefore, by correcting the noise level data collected at Sites C and A for the increased distance to Receivers 1 and 2, the existing ambient noise conditions at those receivers was computed. The noise level data collected at Site B is considered to be representative of the noise exposure of Residences 3-4 and the trail way on the east side of the slew. Table 2 shows the existing ambient conditions at the 4 identified residences as well as the parkway area. This data is derived from the data contained in Table 1 and adjusted for distance at Residences 1 and 2.

Table 2
Statistical Summary of Ambient Noise Conditions at Nearest Receivers
Dutra Haystack Project

		Median (L50, dB)		Maximum (Lmax, dB)	
Receiver	Ldn, dB	Day	Night	Day	Night
1	63	59	51	66-83	68-74
2	60	55	50	67-84	62-71
3-4 & Parkway	59	53	50	62-82	58-68

Notes:
The locations of the identified receivers are shown on Figure 1.
Source: Bollard & Brennan, Inc.

CRITERIA FOR ACCEPTABLE NOISE EXPOSURE

Sonoma County Criteria:

The Sonoma County Noise Element contains policies for assessing the compatibility of new projected with respect to noise. Policy NE-1c of the Noise Element States the Following:

> NE-1c) Control non-transportation related noise from new projects. The total noise level resulting from new sources and ambient noise will not exceed the standards in Table 2 as measured at the exterior property line of any affected residential land use. Limit exceptions to the following:
>
> 1) If the ambient noise level exceeds the standard in Table 3, adjust the standard to equal the ambient.
>
> 2) Reduce the applicable standards in Table 3 by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.
>
> 3) Reduce the applicable standards in Table 3 by 5 decibels if they exceed the ambient level by 10 or more decibels.

Table 3
Noise Level Performance Standards
Sonoma County Noise Element

Duration of Intrusive Sound	Daytime Standard (7 a.m. - 10 p.m.)	Nighttime Standard (10 p.m. - 7 a.m.)
30 - 60 minutes per hour	50	45
15 - 30 minutes per hour	55	50
5 - 15 minutes per hour	60	55
1 - 5 minutes per hour	65	60
Less than 1 minute per hour	70	65

Source: Sonoma County Noise Element

Due to the influence of Highway 101 traffic, existing ambient noise levels at the receiver locations reported in Table 2 currently exceed the noise level standards shown in Table 3. According to exception 1 above, the standards of Table 3 are adjusted upwards to equal the ambient where in such cases.

Sonoma County has indicated that the low-frequency noise associated with the proposed asphalt plant operation should be considered in this analysis, and that the "C" weighting network emphasizes low frequency sounds. The County is correct in that low noise levels measured using the "C" weighting network are higher than the same source measured using the "A" weighting network. Because the range of asphalt plant sound levels expected at the nearest residences to the project site will be within the normal range of hearing, and not of the intensity for which the "C" weighting network was developed, and because the County's noise level standards are described above in terms of the "A" weighting network, this analysis is prepared in terms of "A" weighted sound pressure levels. The low frequency components of the proposed asphalt plant have, however, been quantified and accounted for in this analysis.

California Environmental Quality Act Criteria:

The California Environmental Quality Act (CEQA) states that a project shall be considered to have a significant effect on the environment if it generates noise levels in excess of local regulations or contributes to a significant degradation in ambient noise conditions at noise sensitive locations. The Sonoma County noise level standards are described above.

To quantify the threshold at which a project will be considered to contribute to a significant degradation in ambient noise conditions, the following information is considered. Human perception to changes in environmental noise levels varies. Studies have shown that, for similar noise sources, a 3 dB increase in noise is considered to be the threshold at which people commonly perceive that a change has occurred, and a 5 dB change is required before a clearly noticeable change has occurred (Egan, Architectural Acoustics, McGraw Hill, 1988).
Examples of similar noise sources would include the addition of ready mix trucks to a roadway which is already utilized by heavy trucks, such as Highway 101. Examples of dissimilar noise

sources would be the addition of asphalt production and aggregate recycling facilities where none currently exist in the immediate project vicinity today (the existing Dutra operations to the northwest are similar noise sources, but are located sufficiently far away from this site so as not to appreciably contribute to ambient conditions). Barge unloading activities would not constitute a new noise source in the project vicinity, as a similar operation exists north of the project site.

Because the Sonoma County Noise Standards are related to ambient noise conditions, as are the CEQA standards, this analysis assumes that a noise level threshold for the project set equal to existing ambient conditions would be appropriate for assessing noise impacts of this project. Specifically, if the project were to generate noise levels equal to but not exceeding existing ambient conditions, the combined ambient plus project conditions would be 3 dB higher than current ambient conditions alone. This would be perceived as a barely to clearly audible increase, depending on the noise source. Based on this assumption, if the project noise generation does not exceed the ambient noise conditions shown in Table 3, significant noise impacts due to the project would not be identified.

ANALYSIS OF PROJECT-GENERATED NOISE LEVELS

Methodology:

Noise measurements and accepted noise modeling techniques were used to predict noise levels generated by the proposed Dutra Haystack facilities and operations. The specific noise sources identified in this analysis include the following:

A. Asphalt Concrete Facility (including associated on-site truck traffic)
B. Materials Recycling Facility (including associated on-site truck traffic)
C. Barge Unloading
D. Off-Site Truck Traffic

The impacts associated with each of these noise sources at the identified receiver locations are described individually below.

Asphalt Concrete Facility Equipment Noise Levels:

Bollard & Brennan, Inc. utilized noise level data collected at Dutra's existing Petaluma facility and noise level data provided by the manufacturer of the asphalt plant proposed for use at the Haystack site to quantity proposed Asphalt Concrete plant noise emissions. That noise level data indicate that operation of the asphalt plant would be expected to generate noise levels of approximately 75 dB L_{50} and 80 dB L_{max} at a distance of 100 feet from the plant, including truck passages, asphalt drum heating and mixing, feeding of the plant hoppers by a front-loader, and departure of heavy trucks from the site. Table 4 summarizes the predicted Asphalt Plant noise levels at the 4 nearest residences to the proposed asphalt concrete plant. Those residences are labeled 1-4 on Figure 1 of this report.

Table 4
Predicted Unmitigated Asphalt Facility Noise Emissions and Noise Standards
Nearest Residences to Dutra Haystack Project

		Existing		Project	
Residence	Distance (ft)	L_{50}, dB	Lmax, dB	L_{50}, dB	L_{max}, dB
1	1,500	51	68-74	49	54
2	1,400	50	62-71	50	55
3	400	50	58-68	62	67
4	400	50	58-68	62	67

Notes:
1. Receiver locations are illustrated on Figure 1.
2. Existing ambient values shown are for nighttime periods, as the asphalt plant will operate at night.
3. Project noise levels are based on reference levels of 75 dB L_{50} and 80 dB L_{max} at a distance of 100 feet, a 6 dB decrease per doubling of distance from the source, and an offset of -1.5 dB per thousand feet to account for excess ground attenuation and atmospheric attenuation. No corrections were applied for shielding by intervening topography or aggregate stockpiles.

The Table 4 data indicate that predicted asphalt plant noise emissions would be satisfactory at residences 1 and 2, but that the recommended adjusted median noise level standard of 50 dB would be exceeded by approximately 8 to 12 dB at residences 3-4. As a result, noise mitigation measures would be required for this noise source. A discussion of noise mitigation options is provided later in this report.

Recycle Facility Noise Levels:

Bollard & Brennan, Inc. conducted level measurements at Dutra's existing Richmond facility to quantity the noise emission data for the recycle equipment which is proposed for use at the Haystack site. Those measurements indicate that the operation of the recycle facility would generate noise levels of approximately 80 dB L_{50} and 85 dB L_{max} at a distance of 100 feet from the plant, including truck passages, feeding of the plant hopper by a front-loader, and departure of heavy trucks from the site.

Table 5 summarizes the predicted Recycle Plant noise levels at the 4 nearest residences to the proposed recycle plant. Those residences are labeled 1-4 on Figure 1 of this report.

Table 5
Predicted Unmitigated Recycle Facility Noise Emissions and Noise Standards
Nearest Residences to Dutra Haystack Project

		Existing		Project	
Residence	Distance (ft)	L_{50}, dB	Lmax, dB	L_{50}, dB	L_{max}, dB
1	1,400	59	66-83	55	60
2	2,600	55	67-84	48	53
3	1,400	53	62-82	50	60
4	1,200	53	62-82	52	62

Notes:
1. Receiver locations are illustrated on Figure 1.
2. Existing ambient values shown are for daytime periods, as the recycle plant will not operate at night.
3. Project noise levels are based on reference levels of 80 dB L_{50} and 85 dB L_{max} at a distance of 100 feet, a 6 dB decrease per doubling of distance from the source, and an offset of -1.5 dB per thousand feet to account for excess ground attenuation and atmospheric attenuation. No corrections were applied for shielding by intervening topography or aggregate stockpiles.
4. L50 values for Receivers 3-4 were reduced by an additional 5 dB to account for shielding which will be provided by the proposed aggregate stockpiles located along the eastern portion of the site.

The Table 5 data indicate that predicted recycle plant noise emissions are predicted to be satisfactory at all 4 identified residences, but this conclusion is based on daytime only operations and assumes that Receivers 3-4 will be shielded from view of the recycle equipment and operations by intervening aggregate stockpiles.

Barge Unloading Facility Noise Levels:

Bollard & Brennan, Inc. conducted level measurements at Dutra's existing Petaluma barge unloading facility to quantity the noise emissions for the proposed barge unloading equipment which is proposed for use at the Haystack site. Those measurements indicate that barge unloading activities generated noise levels of approximately 72 dB L_{50} and 80 dB L_{max} at a distance of 100 feet from the barge unloading activities.

Table 6 summarizes the predicted Recycle Plant noise levels at the 4 nearest residences to the proposed recycle plant. Those residences are labeled 1-4 on Figure 1 of this report.

Table 6
Predicted Unmitigated Barge Unloading Facility Noise Emissions and Noise Standards
Nearest Residences to Dutra Haystack Project

		Existing		Project	
Residence	Distance (ft)	L_{50}, dB	Lmax, dB	L_{50}, dB	L_{max}, dB
1	2,000	51	68-74	43	51
2	1,700	50	62-71	45	53
3	300	50	58-68	62	70
4	450	50	58-68	58	66

Notes:
1. Receiver locations are illustrated on Figure 1.
2. Existing ambient values shown are for nighttime periods, as the barge unloading operations will occur at night.
3. Project noise levels are based on reference levels of 72 dB L_{50} and 80 dB L_{max} at a distance of 100 feet, a 6 dB decrease per doubling of distance from the source, and an offset of -1.5 dB per thousand feet to account for excess ground attenuation and atmospheric attenuation. No corrections were applied for shielding by intervening topography or aggregate stockpiles.

The Table 6 data indicate that predicted barge unloading noise emissions would be satisfactory at residences 1 and 2, but that the recommended adjusted median noise level standard of 50 dB would be exceeded by approximately 8 to 12 dB at residences 3-4. As a result, noise mitigation measures would be required for this noise source. A discussion of noise mitigation options is provided later in this report.

Off Site Truck Traffic Noise Levels:

As stated in the project description, peak capacity operations of the proposed Dutra Haystack facility would reportedly generate approximately 60 peak hour truck trips.

The Federal Highway Administration Traffic Noise Prediction Model was used to predict traffic noise levels during the peak hour. Based on the number of projected truck trips, the FHWA Model predicts that the average hourly noise level during the peak hour would be approximately 53 dB L_{eq} at a distance of 500 feet from Highway 101. This level would not result in a significant increase in off-site traffic noise levels at exiting residences within the immediate project vicinity.

NOISE MITIGATION OPTIONS CONSIDERED

Any noise problem may be considered as being composed of three basic elements: the noise source, a transmission path, and a receiver. The appropriate acoustical treatment for a given project should consider the nature of the noise source and the sensitivity of the receiver. The problem should be defined in terms of appropriate criteria (L_{dn}, L_{eq}, or L_{max}), the location of the sensitive receiver (inside or outside), and when the problem occurs (daytime or nighttime). Noise control techniques should then be selected to provide an acceptable noise environment for the receiving property while remaining consistent with local aesthetic standards and practical structural and economic limits. Fundamental noise control techniques include the following:

Use of Setbacks:

Noise exposure may be reduced by increasing the distance between the noise source and receiving use. The available noise attenuation from this technique is limited by the characteristics of the noise source, but is generally about 4 to 6 dB per doubling of distance from the source.

For this project, it is not possible to increase setbacks from the barge unloading area to the nearest residences, as that location is fixed. In addition, the Recycle Plant has been located as far as possible from nearby receivers, so no additional setback opportunities exist for that location.

Due to the very close proximity of the Asphalt plant to Receivers 3-4, it is recommended that the plant be relocated as far to the southwest as possible to maximize the distance between that noise source and the nearest residences. If the distance between the proposed asphalt plant and receivers 3 and 4 could be doubled, predicted noise levels would be approximately 6 dB lower than those shown in Table 3 while only increasing asphalt facility noise levels at Receiver1 by 1 dB over that shown in Table 4.

Use of Barriers:

Shielding by barriers can be obtained by placing walls, berms or other structures, such as buildings, between the noise source and the receiver. The effectiveness of a barrier depends upon blocking line-of-sight between the source and receiver, and is improved with increasing the distance the sound must travel to pass over the barrier as compared to a straight line from source to receiver. Barrier effectiveness depends upon the relative heights of the source, barrier and receiver. In general, barriers are most effective when placed close to either the receiver or the source. For maximum effectiveness, barriers must be continuous and free from gaps along their length and height.

There are practical limits to the noise reduction provided by barriers. For this project, a 5 to 10 dB noise reduction may be reasonably attained through shielding by aggregate stockpiles, provided those stockpiles intercept line of sight to the nearby receivers.

The project site plans indicate that the proposed aggregate stockpiles to be located along the eastern site boundary would not provide appreciable shielding of the Asphalt plant at Receivers 3-4, but those stockpiles would shield Recycle plant operations at those receivers. As a result, an offset of -5 dB was applied to Receivers 3-4 to account for this shielding of recycle facility noise emissions. This offset is based on the assumption that the aggregate stockpiles will be of sufficient height to completely shield recycle operations from view of Receivers 3-4.

At the barge unloading area, the proximity of Receiver 3 will result in elevated noise emissions at this location during barge unloading activities. The Table 6 data indicate that a noise reduction of approximately 12 dB would be required to reduce barge unloading noise emissions to 50 dB at that receiver. While it would not be feasible to achieve this degree of noise reduction through barriers alone, it may be possible to achieve the required noise attenuation through a combination of mitigation options, including barriers. Specifically, portable noise barrier should be inserted on the southern portion of the barge itself prior to unloading to completely shield barge unloading activities to the receivers to the south (receivers 3-4). In addition, a barrier or partial enclosure should be constructed around the southern perimeter of the fixed platform which houses the material transfer hopper.

As noted in Table 5, recycle plant operations are predicted to generate noise levels which do not exceed the recommended noise level limits developed based on the ambient noise monitoring conducted for this project. However, because Receiver 1 is elevated and most proximate to the Recycle Equipment, it may be necessary to suspend acoustic panels around the recycle crushers and screens to provide additional shielding in the direction of Receiver 1.

Use of Partial to Complete Enclosures:

Due to the proximity of the proposed Asphalt Plant to the nearest receivers to the east (3-4), and the fact that the proposed aggregate stockpiles will not adequately shield those residences, partial to complete enclosures will be required of the Asphalt plant equipment to provide the required degree of noise reduction. Specifically, a noise reduction of at least 12 dB is recommended for the Asphalt plant at Receivers 3 and 4. Although some additional Asphalt plant facility noise reduction will be achieved through modification to the asphalt plant itself, it is recommended that partial enclosures be constructed around the asphalt burner and truck loading area of the asphalt plant to completely shield those operations from view of the residences to the east. The enclosure material should be acoustically absorptive to prevent reflection of sound in the opposite directions and should be designed and constructed so as to provide an asphalt plant noise reduction of at least 15 dB to the receivers to the east.

In addition, because there is little margin of safety in the direction of Receivers 1 and 2, and because asphalt plant operations would occur during nighttime hours, the enclosure system should be designed to allow the installation of additional panels as may be needed to shield Receivers 1 and 2 to the west.

At the barge unloading area, all transfer points and significant noise-producing components of the conveyor system between the barge and aggregate stockpiles should be placed within acoustic enclosures.

Source Noise Controls:

Source noise control involves providing engineered measures at the noise source to reduce noise emission prior to their transmission to the receivers. For this project, the following specific source noise controls should be implemented to reduce overall facility noise emissions to the maximum extent possible.

A. An in-line duct silencer should be installed at the outlet of the asphalt plant air handling system and should be designed to reduce the noise emissions of that source by at least 10 dB.
B. Available manufactures' options for silencing the asphalt burner should be implemented.
C. All hoppers and chutes at which aggregate materials fall onto a metal surface should be lined with sound deadening material such as heavy neoprene.
D. All mobile equipment used at the facility during nighttime hours should be equipped with radar or strobe based backup alarms.
E. When nighttime asphalt plant production is anticipated, all hoppers which feed the asphalt plant should be filled the previous evening.

Noise Reduction by Building Facade Improvements:

When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through acoustical improvement of building facades. Standard residential construction practices provide 10-15 dB noise reduction for building facades with open windows, and approximately 20-25 dB noise reduction when windows are closed.

Where greater noise reduction is required, acoustical treatment of the building facades can be implemented. Replacement of existing window assemblies and doors with sound rated window and door assemblies can provide a substantial noise reduction within residential dwellings, particularly if existing window and door assemblies are not sound rated or otherwise have acoustic leaks. Specifically, 5-10 dB improvements in acoustic isolation can likely be achieved for Receivers 3-4 through these measures. A specific analysis of each residence would be required to develop the appropriate facade improvement measures, but such measures could considerably reduce the potential for adverse noise effects during nighttime asphalt plant production and barge unloading.

Use of Vegetation:

Trees and other vegetation are often thought to provide significant noise attenuation. However, approximately 100 feet of dense foliage (so that no visual path extends through the foliage) is required to achieve a 5 dB attenuation of traffic noise. Thus the use of vegetation as a noise barrier should not be considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.

Vegetation can be used to acoustically "soften" intervening ground between a noise source and receiver, increasing ground absorption of sound and thus increasing the attenuation of sound with distance. Planting of trees and shrubs is also of aesthetic and psychological value, and may reduce adverse public reaction to a noise source by removing the source from view, even though noise levels will be largely unaffected.

In summary, the effects of vegetation upon noise transmission are minor, and are primarily limited to increased absorption of high frequency sounds and to reducing adverse public reaction to the noise by providing aesthetic benefits.

Sound Absorbing Materials:

Absorptive materials such as fiberglass, foam, cloth and acoustical tiles or panels are used to reduce reflections or reverberation in closed spaces. Their use in exterior environmental noise control may reduce reflections between parallel noise barriers or other reflective surfaces. At all locations where acoustical panel barriers and partial enclosures are recommended for this project, the surface facing the noise source should be acoustically absorbent in nature.

Procurement of Noise Easements:

At the County's discretion, and with the cooperation of the nearest Receivers to the barge unloading area (specifically Receivers 3-4), the procurement of a noise easement may be an appropriate measure for this project. Such easements are commonly used in Airport Sound Insulation programs whereby affected noise-sensitive receivers are compensated for being exposed to periods of elevated noise levels. In this case, because the existing residences are located in an industrial area, there is an expectation that industrial-related activities which currently occur within this area will generate elevated noise levels. Nonetheless, the applicant (with the County's cooperation), could negotiate with the receivers to the east of the project site to implement feasible noise mitigation measures for this project as described above, as well as other forms of compensation, in exchange for a noise easement which will permit elevated noise levels during barge unloading activities.

CONCLUSIONS

Due to elevated noise levels resulting from existing Highway 101 traffic, operations at the project site will be partially masked at the nearest identified receptors. Nonetheless, due to the proximity of those receptors to the project site, noise generated at the Dutra Haystack facility project is predicted to exceed the projects' standards of significance unless substantial noise mitigation measures are incorporated within the project design. Specifically, the following measures are recommended. More detailed descriptions of these recommended measures are provided in the Noise Mitigation Options Considered section of this report.

1. The setback between the project noise sources and receivers should be maximized to the extent feasible. Particular effort should be placed on creating the maximum separation between barge unloading operations and asphalt burner location from the nearest receivers to the east.

2. Noise Barriers should be placed at the following locations:

   a) On the southern portion of the barge to completely screen barge unloading activities in the direction of Receivers 3-4. The barrier should be sufficiently tall and wide to completely intercept line of sight from the front loader to those residences.

   b) Between the crushing and screening equipment of the recycle plant and Receiver 1. Note that suspended curtain barriers will likely be required at these locations due to the elevated position of Receiver 1 relative to the project site.

   c) All panel barriers or acoustical curtains should be acoustically absorbent on the side of the barrier which faces the noise source to prevent unwanted reflections.

3. Enclosures should be installed at the following locations:

   a) Around the barge unloading material transfer hoppers and significant noise-producing components of the conveyor system.

   b) Around the asphalt burner and truck loading areas to provide complete screening of asphalt plant noise in the direction of Receivers 3-4.

   c) All acoustical enclosures should be acoustically absorbent on the side of the enclosure which faces the noise source to prevent unwanted reflections.

4. The following source specific noise control measures should be implemented:

   a) An in-line duct silencer should be installed at the outlet of the asphalt plant air handling system and should be designed to reduce the noise emissions of that source by at least 10 dB.

b) Available manufactures' options for silencing the asphalt burner should be implemented.

c) All hoppers and chutes at which aggregate materials fall onto a metal surface should be lined with sound deadening material such as heavy neoprene.

d) All mobile equipment used at the facility during nighttime hours should be equipped with radar or strobe based backup alarms.

e) When nighttime asphalt plant production is anticipated, all hoppers which feed the asphalt plant should be filled the previous evening.

f) Barge unloading shall progress from the north to the south, thereby leaving intervening stockpiles of aggregate materials to further screen Receivers 3-4 to the south.

g) The tug boat shall either turn off its engines during barge unloading operations or relocate away from Receivers 3-4 while those unloading operations are underway.

5. Building Facade Improvements and Noise Easement Procurement

a) With the County's approval, the applicant should attempt to negotiate a noise easement with the residences located on the industrial property (particularly Receiver 3 which is located closest to the barge unloading area) in exchange for acoustical treatment of the building facades or other compensation. Without such an arrangement with Receiver 3, analysis of additional noise mitigation measures may be required for the barge unloading operations in order to achieve satisfaction with the project standards of significance.

Provided that the noise mitigation measures are incorporated into the project as described above, it is anticipated that the project noise emissions would satisfy the County requirements, and reduce identified impacts to a level of insignificance.

These conclusions are based on the site plan shown on Figure 1, on noise level measurement data collected by Bollard & Brennan, Inc., and on operational information provided by the project applicant. Nonetheless, follow up testing may be appropriate to ensure that the noise mitigation measures have achieved compliance with the County noise standards. Significant variations from the project design and/or assumptions cited in this report could cause actual noise levels to differ from those noise levels predicted herein.

Bollard and Brennan, Inc. has worked with Phoenix E Systems in the past on projects requiring acoustical barriers and enclosure systems. Phoenix E is located in Camarillo, California and can be contacted at (805) 484-0794. Bollard & Brennan, Inc. is not responsible for the performance of noise control materials supplied by Phoenix E or other acoustical products vendors.

Appendix A

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

L_{dn} Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

L_{eq} Equivalent or energy-averaged sound level.

L_{max} The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Appendix B-1

Richmond Haystack Plant Relocation

Continous 24hr Monitoring - Site A

March 17-18, 2004

Hour	Leq	Lmax	L50	L90
12	61	73	56	53
13	61	74	59	55
14	63	81	60	56
15	61	74	59	56
16	63	75	62	58
17	64	79	63	59
18	64	73	64	60
19	62	73	61	57
20	61	74	59	56
21	60	73	58	55
22	59	70	57	54
23	57	69	55	51
0	56	69	53	50
1	55	72	52	48
2	54	69	51	48
3	55	73	53	49
4	57	68	57	53
5	59	71	58	56
6	59	75	58	56
7	62	78	60	57
8	62	73	60	57
9	60	72	57	55
10	60	74	56	53
11	61	72	58	53

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	64	60	62	59	54	57
Lmax (Maximum)	81	72	75	75	68	71
L50 (Median)	64	56	59	58	51	55
L90 (Background)	60	53	56	56	48	52

Computed Ldn, dB	65
% Daytime Energy	83%
% Nighttime Energy	17%

Appendix B-2

Richmond Haystack Plant Relocation

Continous 24hr Monitoring - Site A

March 18-19, 2004

Hour	Leq	Lmax	L50	L90
12	60	74	57	53
13	63	76	61	59
14	64	77	63	60
15	63	75	62	59
16	64	75	63	60
17	64	76	64	60
18	63	72	62	59
19	62	74	61	57
20	61	78	59	56
21	60	73	59	56
22	59	71	57	54
23	57	69	55	51
0	55	72	53	48
1	55	70	52	46
2	55	72	51	46
3	53	67	52	47
4	56	69	55	52
5	59	71	58	56
6	60	74	58	56
7	62	75	60	58
8	62	73	60	58
9	62	74	60	57
10	63	88	60	57
11	62	75	61	56

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	64	60	63	60	53	57
Lmax (Maximum)	88	72	76	74	67	71
L50 (Median)	64	57	61	58	51	55
L90 (Background)	60	53	58	56	46	51

Computed Ldn, dB	65
% Daytime Energy	85%
% Nighttime Energy	15%

Appendix B-3

Richmond Haystack Plant Relocation

Continous 24hr Monitoring - Site B

March 17-18, 2004

Hour	Leq	Lmax	L50	L90
12	48	69	46	44
13	58	76	51	47
14	52	70	51	48
15	54	66	52	50
16	54	68	53	52
17	55	66	54	53
18	57	76	56	54
19	55	62	55	54
20	54	66	54	52
21	55	65	55	53
22	53	59	53	51
23	52	66	51	48
0	49	60	48	45
1	48	60	47	44
2	47	61	46	43
3	50	58	49	45
4	52	61	52	49
5	54	61	54	52
6	55	68	54	52
7	57	70	56	53
8	54	69	53	49
9	52	75	49	46
10	52	67	46	44
11	50	69	46	43

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	48	54	55	47	52
Lmax (Maximum)	76	62	69	68	58	62
L50 (Median)	56	46	52	54	46	50
L90 (Background)	54	43	50	52	43	48

Computed Ldn, dB	58.8
% Daytime Energy	75%
% Nighttime Energy	25%

Appendix B-4

Richmond Haystack Plant Relocation

Continous 24hr Monitoring - Site B

March 18-19, 2004

Hour	Leq	Lmax	L50	L90
12	54	72	46	43
13	51	68	47	44
14	55	67	55	53
15	54	64	54	52
16	56	67	55	53
17	57	69	56	54
18	55	62	55	53
19	55	62	55	54
20	56	63	55	53
21	55	68	54	52
22	53	62	52	50
23	50	59	50	47
0	49	58	49	46
1	47	63	46	43
2	49	64	46	42
3	48	62	47	43
4	51	59	51	47
5	54	59	54	52
6	54	66	54	52
7	56	68	55	54
8	56	67	55	53
9	55	71	54	52
10	54	66	53	51
11	57	82	51	49

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	51	55	54	47	51
Lmax (Maximum)	82	62	68	66	58	61
L50 (Median)	56	46	53	54	46	50
L90 (Background)	54.4	43.5	51.4	52.3	42.3	46.9

Computed Ldn, dB	59
% Daytime Energy	80%
% Nighttime Energy	20%

Appendix B-5

Richmond Haystack Plant Relocation

Continous 24hr Monitoring - Site C

March 17-18, 2004

Hour	Leq	Lmax	L50	L90
12	69	81	67	63
13	70	83	68	64
14	70	81	69	65
15	69	84	68	63
16	71	84	70	67
17	71	90	70	68
18	71	83	70	67
19	70	82	69	65
20	68	83	67	63
21	68	89	66	61
22	67	79	66	59
23	65	79	63	56
0	63	79	60	51
1	62	78	56	47
2	61	78	55	46
3	61	78	56	48
4	64	83	60	54
5	65	80	62	58
6	65	78	63	57
7	64	75	63	58
8	66	81	64	60
9	67	81	66	61
10	69	91	67	63
11	69	81	68	63

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	71	64	69	67	61	64
Lmax (Maximum)	91	75	83	83	78	79
L50 (Median)	70	63	68	66	55	60
L90 (Background)	68	58	63	59	46	53

Computed Ldn, dB	72
% Daytime Energy	85%
% Nighttime Energy	15%

Appendix B-6

Richmond Haystack Plant Relocation
Continous 24hr Monitoring - Site C
March 18-19, 2004

Hour	Leq	Lmax	L50	L90
12	69	83	67	62
13	69	82	68	64
14	71	87	70	67
15	71	84	70	67
16	72	87	71	68
17	72	92	71	68
18	70	88	70	66
19	69	81	69	64
20	68	83	67	62
21	68	80	67	61
22	68	83	66	60
23	66	78	64	56
0	64	77	61	52
1	62	78	57	47
2	62	80	56	45
3	62	79	57	48
4	64	77	61	54
5	66	79	64	60
6	66	80	64	58
7	65	81	64	59
8	64	78	63	59
9	67	84	66	62
10	69	78	68	63
11	70	87	68	65

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	72	64	69	68	62	65
Lmax (Maximum)	92	78	84	83	77	79
L50 (Median)	71	63	68	66	56	61
L90 (Background)	68	59	64	60	45	54

Computed Ldn, dB	72
% Daytime Energy	83%
% Nighttime Energy	17%

APPENDIX I

TRAFFIC DATA

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Draft Transportation Impact Analysis Report for:

Dutra Materials Site Relocation

June 29, 2004

Prepared for:
Dutra Materials
and County of Sonoma

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1. INTRODUCTION

This report presents the results of the transportation impact analysis (TIA) conducted for the proposed relocation of the Dutra Materials distribution plant in Sonoma County, just south of the City of Petaluma, California. The site location is shown on Figure 1. The existing location of the plant is on Petaluma Boulevard South just west of US 101 near the intersection with Rovina Lane. The proposed project would relocate the Dutra Materials plant from its existing location to Petaluma Boulevard South between the US 101 Northbound Off-Ramp and the US 101 Northbound On-Ramp, less than one mile to the south. Because the proposed project does not include an expansion of operations, it is assumed that no new trips will be generated by proposed relocation.

Study Intersections and Periods

The following unsignalized intersections were analyzed due to the potential impacts of the proposed project:

- Petaluma Boulevard South / US 101 Southbound Ramps
- Petaluma Boulevard South / US 101 Northbound On-Ramp

The operations of the key intersections were analyzed during the weekday peak morning period (7:00 AM – 9:00 AM) and peak evening period (4:00 PM – 6:00 PM).

Study Scenarios

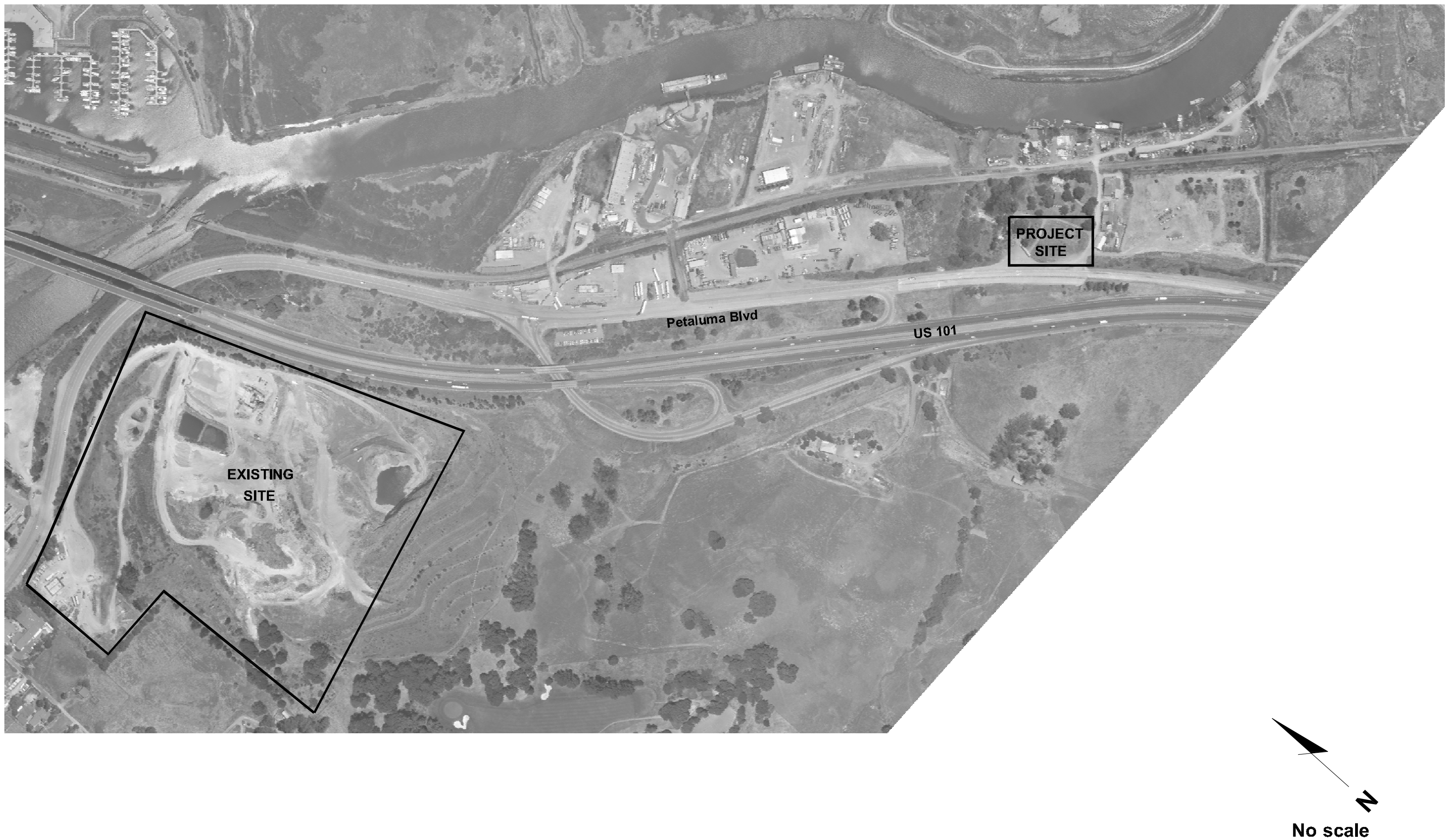
The intersections were analyzed for the following scenarios:

Scenario 1: *Existing Conditions.* Existing volumes obtained from counts, representing peak one-hour traffic conditions during the morning and evening commute periods.

Scenario 2: *Existing Plus Project Conditions.* Existing peak-hour volumes plus project-related shifts to traffic volumes. No new traffic is expected in this scenario.

Scenario 3: *Background Conditions.* Existing plus project conditions peak-hour volumes plus project-generated traffic plus traffic associated with other projects currently planned in the area within the short-tem.

Scenario 4: *Cumulative Conditions*. Existing volumes plus growth projected until 2015 and 2030 using forecast models by the City of Petaluma and County of Sonoma, plus approved development traffic, plus changes to traffic patterns associated with the proposed project.



FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1047-0148\acadgraphics\0148-02 site location

Dutra Petaluma Distribution Site

SITE LOCATION
FIGURE 1

Intersection Level of Service Methodologies

The operations of the key intersections were evaluated using Level of Service (LOS) calculations. LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, as the best operating conditions, to LOS F, or the worst operating conditions. LOS E represents "at-capacity" operations. When volumes exceed capacity, stop-and-go conditions result, and operations are designated as LOS F.

For unsignalized (stop-sign controlled) intersections, the level of service calculations were conducted using the methodology contained in Chapter 17 of the *2000 Highway Capacity Manual*. The LOS rating is based on the average control delay expressed in seconds per vehicle. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration. At two-way or side street stop-controlled intersections LOS was calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay was computed as the average of all movements in that lane. The worst-case movement is reported in this analysis. Table 1 summarizes the relationship between delay and LOS for unsignalized intersections.

Table 1

Level of Service Criteria for Unsignalized Intersections

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10
B	Short traffic delays.	10 < delay ≤ 15
C	Average traffic delays.	15 < delay ≤ 25
D	Long traffic delays.	25 < delay ≤ 35
E	Very long delays.	35 < delay ≤ 50
F	Stop-and-go conditions.	> 50

Source: *2000 Highway Capacity Manual* (Transportation Research Board, 2000).

Traffic Operation Standards

The County of Sonoma has established the following standards for minimum acceptable operating level of LOS as contained in the Circulation and Transit Section of the *Sonoma County General Plan*, 1994:

> **Goal CT-2:** Provide and maintain a highway system capacity to serve projected highway travel demand in 2005 at acceptable levels of service.
>
> **Objective CT-2.1:** Reduce congestion on the countywide highway system by maintaining a "C" level of service or better on designated arterial and collector roadways unless a lower level of service (exists at the time of the *General Plan* publication). A lower level of service is determined to be acceptable due to environmental or community values existing in some portions of the County, or if the project(s) which would cause the lower level of service has an overriding public benefit which outweighs the increased congestion that would result.

The General Plan calls for the highway system to meet projected demand for year 2005 conditions by maintaining LOS C or better operations. This analysis, however, evaluates future scenarios for years 2015 and 2030. Therefore, for purposes of this analysis, the same standards were applied to cumulative conditions (years 2015 and 2030) as were called for in the General Plan for year 2005 conditions.

However, for all scenarios, the application of the LOS C standard to individual movements at unsignalized intersections might lead to excessive delay or maintenance costs. The County General Plan does not distinguish between signalized and unsignalized intersections. However, recent studies for similar projects in this area have identified LOS D as acceptable operating conditions for unsignalized intersections. Therefore, to be consistent with recent precedent in the study area and to minimize unnecessary signalization costs, the LOS D threshold for acceptable operations of unsignalized intersections was used in this analysis, rather than LOS C.

2. EXISTING CONDITIONS

Description of Study Area

The project site is located along Petaluma Boulevard South, between the US 101 Northbound Off-Ramp and the US 101 Northbound On-Ramp in Sonoma County, just south of the City of Petaluma, California. Access to the relocated Dutra Materials site is proposed from Petaluma Boulevard South. The key roadway facilities in the vicinity of the site are described below:

US 101 is a four-lane highway that runs in a north-south direction from San Francisco to Santa Rosa. Direct access to the project site is via the Petaluma Boulevard South off-ramp. Just south of the project site, US 101 consists of six lanes and narrows to four lanes.

Petaluma Boulevard South is a two-lane Principal Arterial Roadway, as defined in the *County of Sonoma General Plan*. This roadway runs parallel to US 101 near the project site, curves underneath US 101, and leads into the City of Petaluma. The project area is comprised of primarily industrial land use. The posted speed limit is 45 mph.

Study Intersections

The following intersections were analyzed due to the potential impacts of the proposed project:

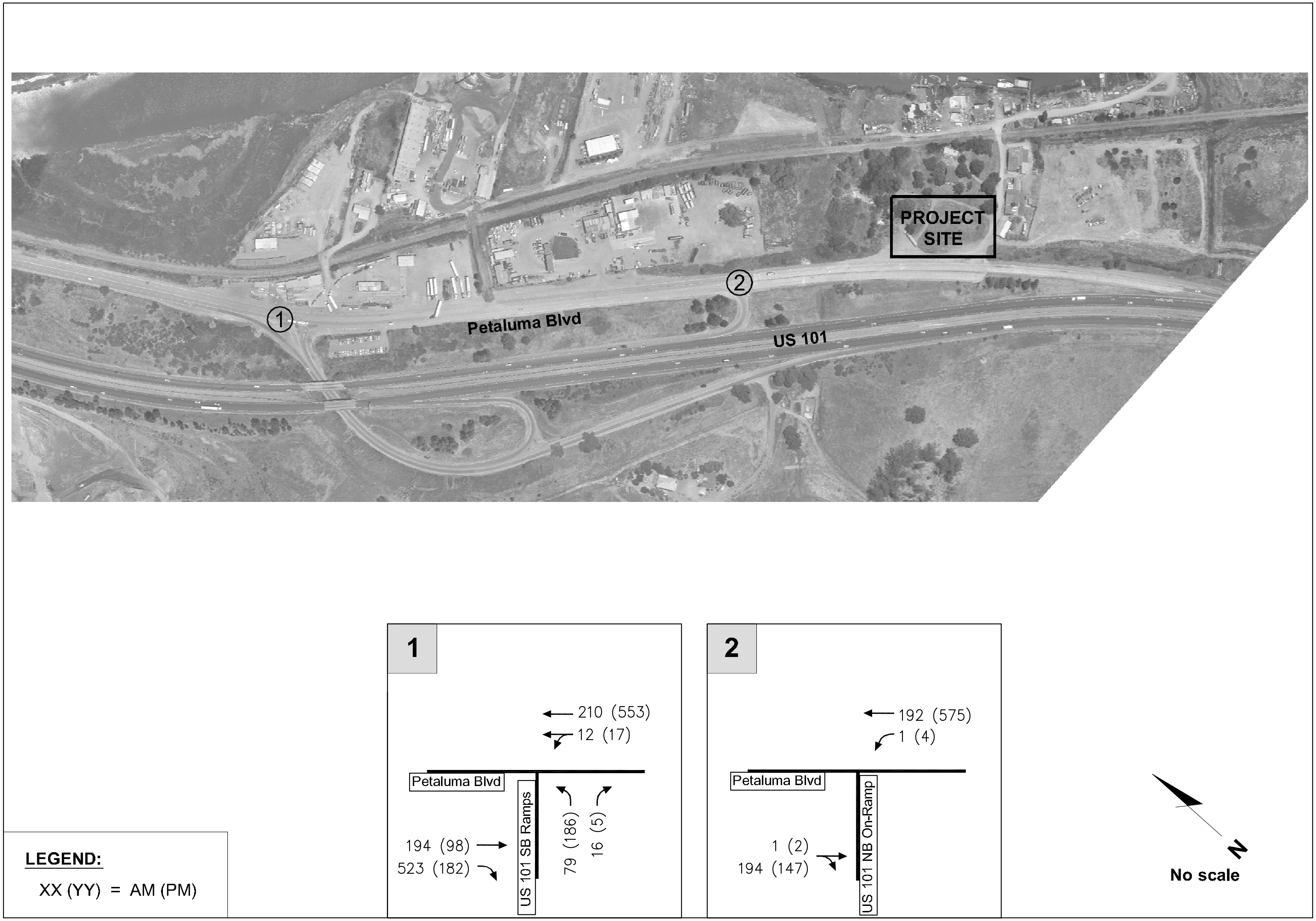
Petaluma Boulevard South/US 101 Southbound Ramps is an unsignalized intersection providing access to and from southbound US 101. Traffic exiting US 101 is required to stop at the intersection; traffic along Petaluma Boulevard South is uncontrolled.

Petaluma Boulevard South/US 101 Northbound On-Ramp is an unsignalized intersection providing access to northbound US 101. Traffic entering US 101 is required to yield at the intersection; through movements along Petaluma Boulevard South are uncontrolled.

Existing Conditions

The key intersections were analyzed under weekday AM and PM peak-hour traffic conditions (7:00 to 9:00 AM and 4:00 to 6:00 PM). Traffic volumes were collected in June 2004 during the commute periods to reflect peak traffic demand. Based on the traffic counts collected in June 2004, the morning peak hour occurs between 7:30 and 8:30 AM and the evening peak hour occurs between 4:45 and 5:45 PM.

Currently, there are several other proposed projects in the vicinity of the proposed Dutra Materials site relocation, along Petaluma Boulevard South. As part of their respective transportation impact analyses performed by W-Trans, another set of recent intersection turning movement counts has been collected at the two study intersections. A comparison of the counts collected by W-Trans and Fehr & Peers shows that the counts collected by W-Trans are somewhat higher than the counts collected by Fehr & Peers. This is likely due to small but typical day-to-day fluctuations in daily traffic patterns. Therefore, in order to ensure that a worst-case scenario was evaluated, the peak hour intersection turning movements collected by W-Trans for other nearby transportation analyses were used in this analysis. Figure 2 presents the existing AM and PM peak-hour turning movement volumes and lane configurations at the key intersections.



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Dutra Petaluma Distribution Site

EXISTING VOLUMES AND LANE CONFIGURATIONS

FIGURE 2

Existing Levels of Service

The peak-hour turning movement volumes and the existing lane configurations were used to calculate the AM and PM peak-hour levels of service at the key intersections. The results of the existing LOS analysis using the peak-hour turning movement volumes and lane configurations are presented in Table 2 and the corresponding calculation sheets are contained in Appendix A.

Table 2

Existing Intersection Levels of Service

Intersection	Peak Hour	Wost-case Movement Delay [1]	LOS[2]
Petaluma Boulevard South/US 101 Southbound Ramps (EBT)	AM PM	11.9 14.8	B B
Petaluma Boulevard South/US 101 Northbound On-Ramp (NBL)	AM PM	7.6 7.6	A A

Notes:
1. Average control delay per vehicle for unsignalized intersections using methodology described in the *2000 Highway Capacity Manual*. LOS calculations conducted using the TRAFFIX level of service analysis software package.
2. LOS = Level of service.

The results of the level of service analysis indicate that the intersection of Petaluma Boulevard South/US 101 Southbound Ramps operates at an acceptable LOS B during both peak hours and that the intersection of Petaluma Boulevard South/US 101 Northbound On-Ramp operates at an acceptable LOS A during both peak hours.

Collision History

Collision records were reviewed to determine potential safety concerns in the study area[1]. According to the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) database, 17 collisions occurred within 150 feet of the intersection of Petaluma Boulevard South/US 101 Southbound Ramps between 1999 and 2001.

Further review was given to collisions on US 101 near the northbound and southbound ramps, with a focus on identification of collisions involving trucks entering the freeway. During the same three-year period (1999 to 2001), 36 collisions were reported within one half mile of the Petaluma Boulevard South interchange. Of these, 22 were in the southbound direction and 14 were in the northbound direction. Each of these collisions was reported to be highway related rather than ramp related.

Eight of these collisions involved trucks, and six of the eight truck-related collisions involved merging in the influence area of the southbound on-ramp. In each of these six cases, the collision involved passenger vehicles and pickups entering the traffic stream and trucks traveling southbound on US 101. Based on the available data, it does not appear that there is a pattern of inappropriate operation of trucks entering or exiting US 101 at Petaluma Boulevard South. Rather, the data suggest that there may be inadequate sight and merge distances for the southbound on-ramp.

[1] *Royal Petroleum Card-Lock Facility Traffic Impact Study.* Whitlock & Weinberger Transportation, Inc., January 2004.

Alternative Transportation Modes

Transit

Golden Gate Transit operates commuter bus service through the City of Petaluma. Two routes operate near the project site. *Route 74* operates between the Petaluma and downtown San Francisco. The route operates on weekdays from 5:00 am to 9:00 am with 20- to 30-minute headways. *Route 80* operates between the Santa Rosa and downtown San Francisco. The route operates on weekdays from 4:00 am to 12:30 am with 30- to 60-minute headways. The closest stop to the project site for both routes is at the intersection of Petaluma Boulevard South/US 101 Southbound Ramps.

Bicycles

Bicycle facilities comprise bike paths (Class I), lanes (Class II), and routes (Class III). Bike paths are paved trails that are separated from roadways. Bike lanes are lanes on roadways designated for bicycle use by striping, pavement legends, and signs. Bike routes are roadways designated for bicycle use by signs only. There are currently no bicycle facilities in the study area.

The County of Sonoma Bicycle Plan calls for a future Class II facility on Petaluma Boulevard South[2]. The Sonoma County Bicycle Plan also calls for a Class I facility to be constructed along the Northwest Pacific Railroad (NWPRR) right-of-way adjacent to the proposed Sonoma-Marin Area Rail Transit (SMART) project. The limits of these proposed facilities are yet unknown. However, although the details have not been defined, it is likely that the Class I facility along the SMART corridor will connect to the bicycle lanes along Petaluma Boulevard South. A logical location for this connection would be near the point where Petaluma Boulevard South crosses underneath US 101 and the railroad right of way extends near Petaluma Boulevard South. This would be north of the proposed project study area. It is unlikely that the proposed Class II bicycle lanes along Petaluma Boulevard South would extend near the project study area because the area is characterized by a freeway interchange and heavy industrial land uses, neither of which operate as good destinations for bicyclists.

Pedestrians

Pedestrian facilities comprise sidewalks, crosswalks, and pedestrian signals. In the project vicinity, no such facilities are provided along Petaluma Boulevard South. Similar to the bicycle issues described above, the project study area is not likely to create notable demand for pedestrian amenities because it is a heavy industrial area serving large trucks adjacent to a freeway interchange with no pedestrian-oriented destinations.

[2] *Royal Petroleum Card-Lock Service Traffic Impact Study*. Whitlock and Weinberger Transportation, Inc. January 2004.

3. EXISTING PLUS PROJECT CONDITIONS

The impacts of the proposed project on the surrounding transportation system are discussed in this chapter. First, the methodology used to estimate the amount of traffic generated by the project is described. Then, the distribution of project traffic to the surrounding roadway system is discussed. The operations of the study intersections are analyzed under project conditions (existing volumes with relocated project-generated traffic) with level of service calculations. Project impacts are identified by comparing the LOS results under project conditions to those under existing conditions.

Project Description

The Dutra Materials distribution plant is located on Petaluma Boulevard South just west of US 101 near the intersection with Rovina Lane. It generates both heavy truck and automobile traffic. The proposed project involves the relocation of the Dutra Materials plant from its existing location to a new location on Petaluma Boulevard South between the US 101 Northbound Off-Ramp and the US 101 Northbound On-Ramp, less than one mile away. It is assumed that no new trips will be generated by proposed relocation.

Project Trip Generation

The number of trips generated by Dutra Materials was estimated using driveway counts conducted in June 2004 during the AM and PM peak periods. The existing Dutra Materials site currently generates 62 AM peak-hour trips (32 inbound/30 outbound) and 5 PM peak-hour trips (2 inbound/3 outbound). The site closes operation at 3:00 PM daily, so the number of trips generated by the project during the PM peak-hour is negligible. The trip generation estimates are summarized in Table 3. For purposes of analysis, trucks trips were adjusted using a Passenger Car Equivalent of 3 to account for the slower behavior of heavy vehicles.

Table 3

Project Trip Generation Estimates [1]

Peak Hour	Truck Volume		Car Volume		Total Volume	
	In	Out	In	Out	In	Out
AM (8:00 – 9:00)	28	30	4	0	32	30
PM (4:00 – 5:00)	1	0	1	3	2	3
Total Trips	**29**	**30**	**5**	**3**	**34**	**33**

Notes:
[1] Trip generation estimates based on trip generation surveys conducted in June 2004.

For purposes of this analysis, it was assumed that the trip generation of the relocated facility would remain the same. One of the reasons for the relocation is that the new site is adjacent to the Petaluma River. As such, some material distribution could be accommodated via barge from the River to the San Francisco Bay, which would likely reduce the demand for truck distribution. However, to assess a worst-case scenario, it was assumed that the current volume of truck traffic would remain following relocation of the site and the use of barges for material distribution.

Project Trip Distribution and Assignment

The trip distribution pattern for the project was estimated based on data provided by Dutra Materials. This information included the following:

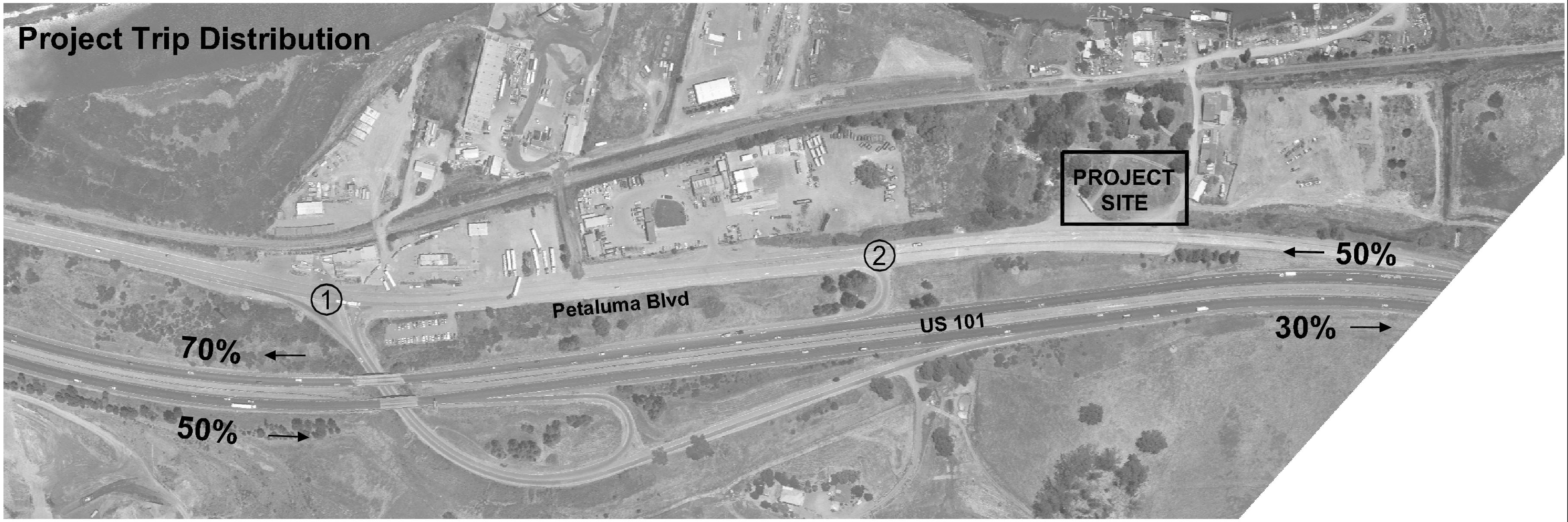
50% of entering vehicles arrive from US 101 Northbound
50% of entering vehicles arrive from US 101 Southbound
70% of exiting vehicles depart to US 101 Northbound
30% of exiting vehicles depart to US 101 Southbound

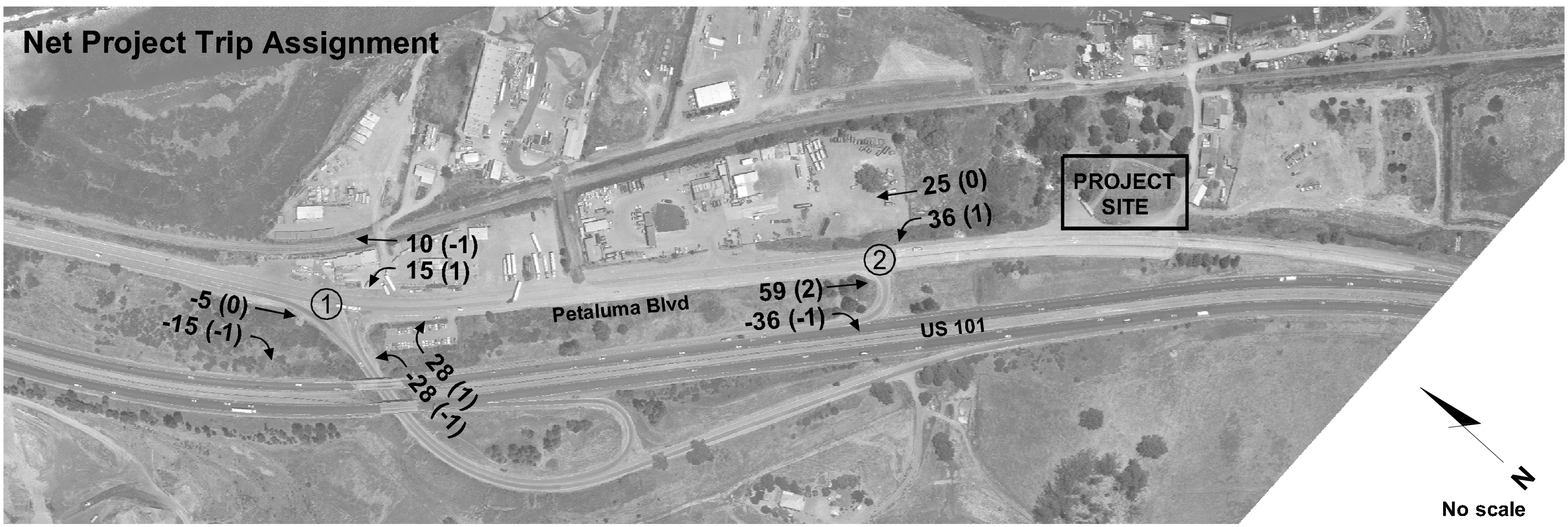
However, the trip generation surveys revealed that the existing traffic associated with the current Dutra Materials site does not exclusively use US 101. In fact, observations indicate that 24 AM peak hour trips and 2 PM peak hour trips currently approach or depart the existing site via Petaluma Boulevard South to the northwest of the project site. These trips likely do not use US 101. Thus, it was assumed all vehicles approaching and departing from the west do not use US 101, but rather other roadways from various locations in Sonoma County. Therefore, the distribution provided by Dutra Materials was only used to assign the trips using US 101. It was assumed that all of the trips that use US 101 would access the existing and proposed new sites via the Petaluma Boulevard South interchange.

Trips generated by the existing project were assigned to the roadway system based on the directions of approach and departure described above. It should be noted that the relocation of the Dutra Materials distribution plant is not expected to cause an increase to overall traffic volumes. Rather, it is expected to redistribute traffic from the old site to the new. This means that some movements at study intersections may experience a decrease while others experience an increase as traffic is shifted from one direction to the other. The changes to existing traffic volumes as a result of the proposed project for the AM and PM peak hours are shown on Figure 3. The changes were applied to existing traffic volumes to estimate volumes under existing plus project conditions as shown on Figure 4.

Existing Plus Project Conditions

Intersection level of service calculations were conducted to evaluate intersection operations under project conditions. The results of the LOS analysis for existing and project conditions are summarized in Table 4. The corresponding LOS calculation sheets are included in Appendix A.





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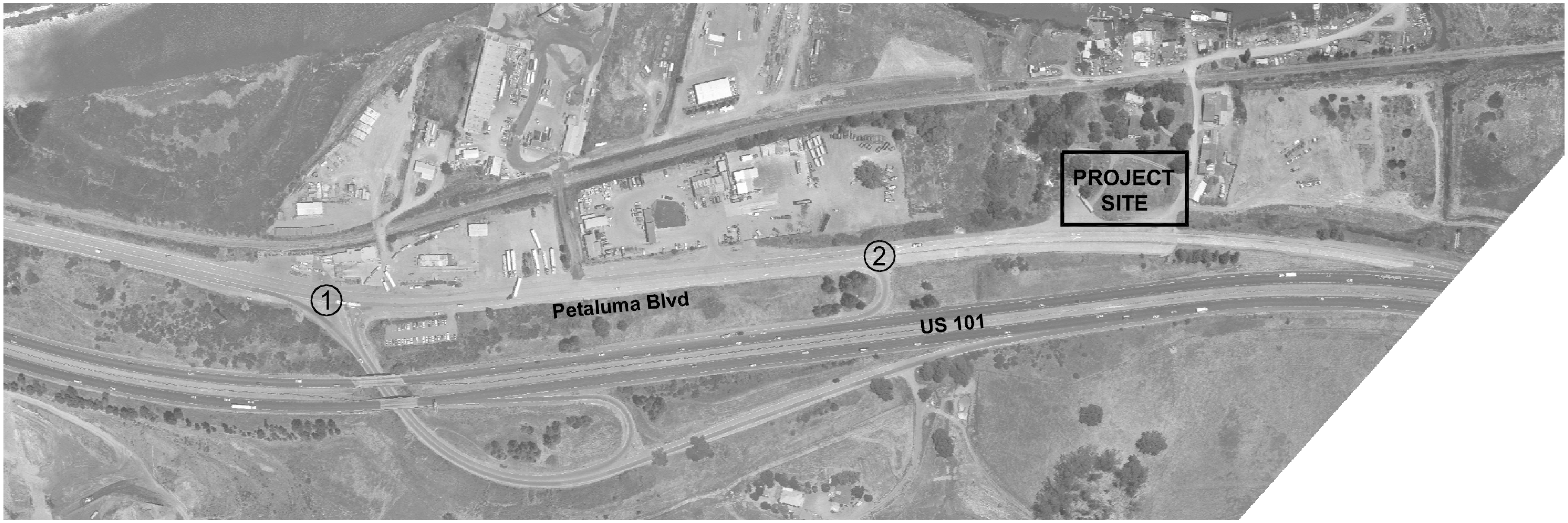
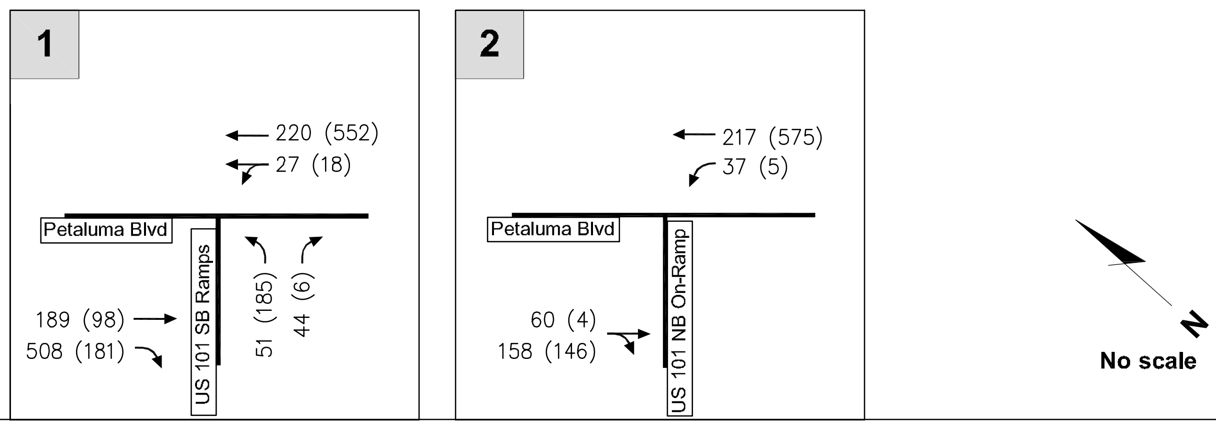
TRIP DISTRIBUTION AND TRIP ASSIGNMENT
FIGURE 3





LEGEND:

XX (YY) = AM (PM)

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EXISTING PLUS PROJECT VOLUMES
FIGURE 4

Table 4

Existing and Project Intersection Levels of Service

Intersection	Peak Hour	Existing		Existing Plus Project	
		Delay[1]	LOS[2]	Delay [1]	LOS[2]
Petaluma Boulevard South/US 101 Southbound Ramps (EBL)	AM PM	11.9 14.8	B B	11.8 14.8	B B
Petaluma Boulevard South/US 101 Northbound On-Ramp (NBL)	AM PM	7.6 7.6	A A	7.8 7.6	A A

Notes:
1 Worst movement control delay per vehicle for unsignalized intersections using methodology described in the *2000 Highway Capacity Manual*. LOS calculations conducted using the TRAFFIX level of service analysis software package.
2 LOS = Level of service.

Source: Fehr & Peers, July 2004

The results of the level of service analysis indicate that both study intersections are expected to continue operating at LOS A or LOS B for the critical stop-controlled conditions under Project Conditions. The proposed project would slightly improve operations at Petaluma Boulevard South/US 101 Southbound Ramps intersection in the AM peak hour. Operations during the PM peak hour would remain the same. Operations at the Petaluma Boulevard South/US 101 Northbound On-Ramp would remain the same during the PM peak hour and would deteriorate slightly during the AM peak hour, but remain at LOS A. Therefore the project would not have a significant impact to intersection operations under existing plus project conditions.

Alternative Transportation Modes

Transit

The proposed project would not affect existing transit service, nor would it conflict with current transit proposals in the area. The relocation of the Dutra Materials distribution plant would not notably affect demands for transit services. Therefore, no significant impact to transit circulation has been identified as part of the proposed project.

Bicycles

As mentioned in the existing conditions section, there are current plans to provide bicycle lanes on Petaluma Boulevard South. However, as described in the same section, the likely implementation of these plans would not involve bicycle facilities along the study portion of Petaluma Boulevard South. This is primarily because this would not be a desirable location for bicyclists due to its industrial nature and its proximity to the freeway interchange.

Pedestrians

Implementation of the proposed project would not change the pedestrian environment in the area. The project would not provide sidewalk facilities. However, the project will not create an increase to pedestrian traffic in the area because the project study area is primarily oriented toward serving large trucks. Thus, no significant impacts to pedestrian circulation were been identified.

4. SITE ACCESS

This chapter discusses the concerns regarding the feasibility and safety of allowing site access at the proposed location due to the high speed of traffic exiting northbound US 101 at Petaluma Boulevard South. Intersection and roadway improvements designed to increase safety are discussed.

Safety Concerns

Site access is one of the critical issues with respect to the project's feasibility. The US 101 Northbound Off-Ramp at Petaluma Boulevard South operates as an exit facility leading directly into an arterial roadway. Vehicles currently exiting onto Petaluma Boulevard South routinely travel faster than the posted 45 miles per hour (mph) speed limit. One reason for this is that the off-ramp formerly served as US 101 prior to the construction of the newer facility, and therefore drivers using the off-ramp travel straight, while the newer freeway construction curves to the west. As a result of this, there is no clear indication to the driver when the off-ramp ends and where the city arterial street begins. The high speed of traffic on this segment is of concern because vehicles may be at risk of colliding with slower moving trucks entering and exiting the project site, as well as other driveways along this portion of Petaluma Boulevard South. Therefore, the design of this roadway facility and the project access are critical to the project's safety.

Recommended Intersection and Roadway Improvements

Intersection and roadway improvements along Petaluma Boulevard South were developed for this project to address the potential safety issues associated with the speed differentials between cars and trucks. In addition, there are currently four other proposed projects along this segment of Petaluma Boulevard South. The site access issues for each of those projects were addressed in their respective transportation impact studies. Those improvements, along with the improvements proposed by this proposed projects are depicted on a single figure, Figure 5, prepared by W-Trans. This figure presents a comprehensive plan for site access along Petaluma Boulevard South.

Recommendations to the project access configuration were developed based on Caltrans and American Association of State Highway Transportation Officials (AASHTO) standards. These improvements were presented to Caltrans representatives in a meeting in Spring 2004. Although no formal approval was provided, a general sense of agreement on these design features was reached between Caltrans and the project applicant. A summary of recommendations for the site access design are described below:

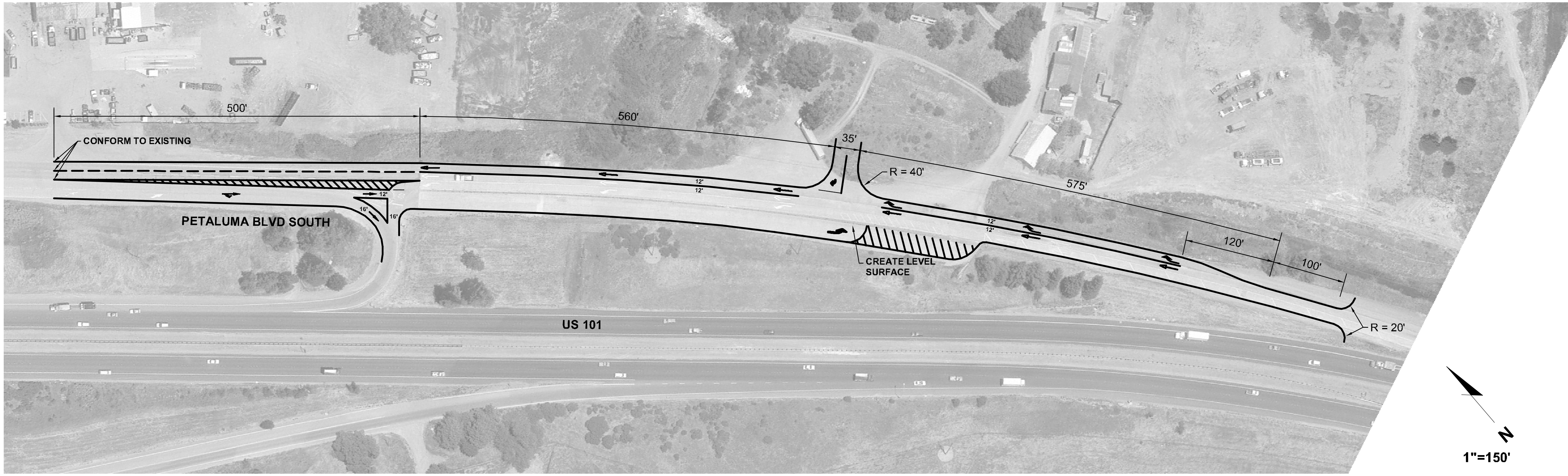
- Provide a clear boundary between off-ramp and City arterial street by changing character of the facility through improvements such as curbs.
- Provide a minimum 400-foot deceleration lane, including 120-foot bay taper, for northbound traffic. (This was based on 50 mph design speed and assumes that vehicles will slow upon exiting the freeway, particularly if character-changing design improvements are implemented. For 70 mph design speed, a 575-foot deceleration lane would be required, but a lane of this length may reduce the effectiveness of character-changing design recommendations).
- Provide a minimum 560-foot acceleration lane for northbound trucks exiting project site (based on 45 mph design speed).
- Provide a minimum 35-foot wide driveway.

- Provide minimum 40-foot curb radius at project driveways.
- Locate project driveway at least 1,100 feet from gore point of the northbound US 101 off-ramp. This distance is the recommended decision sight distance for a 70 mph roadway.
- Create a level surface along Petaluma Boulevard South, south of US 101 Northbound On-Ramp to accommodate southbound left-turns into the project site.
- Reconfigure the intersection of Petaluma Boulevard South / US 101 NB On-Ramp to provide a northbound left-turn lane to provide storage for project truck traffic destined for NB US 101.

Recommended Freeway Ramp Improvements

The safety issues presented by the southbound on-ramp to US 101 was discussed in the existing conditions section. In the past three years, six collisions were reported at this location that involved passenger cars and pickups merging onto US 101 southbound and heavy trucks traveling southbound on US 101. Therefore, it is recommended that additional merging distance be provided on this on-ramp. However, the proposed relocation of the Dutra Materials site would not increase the number of vehicles or trucks using this on-ramp. Therefore, this recommended improvement should occur independently of the Dutra project.

A second concern involves the northbound on-ramp to US 101. This ramp is characterized by a sharp curve and a minimal merge distance. This combination forces vehicles to enter the freeway mainline at much slower speeds than the other mainline traffic. Although improvements to the sharp curve would be very costly, widening of the US 101 facility at this location could provide additional merge distance and improved safety. However, similar to the southbound on-ramp, the Dutra Materials relocation would not increase traffic at this location. Therefore, this recommended improvement should also occur independently of the Dutra project.



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COMPREHENSIVE ACCESS FOR PETALUMA BOULEVARD SOUTH

FIGURE 5

5. BACKGROUND PLUS PROJECT CONDITIONS

This chapter discusses the operations of the study intersections under background conditions. For the intersection level of service analysis, this scenario included existing traffic volumes plus rerouted traffic from the proposed project, plus traffic from other nearby proposed but not yet constructed developments. The background conditions analysis forms the basis against which impacts of the proposed project are identified.

Background Traffic Volumes

The traffic volumes for background conditions were estimated by adding volumes from traffic estimates for other proposed projects in the study area to traffic estimates for project conditions. W-trans provided Fehr & Peers with published reports for other nearby projects. The increases to traffic volumes as a result of each of the projects were obtained from their respective transportation impact study reports and added to project conditions traffic volumes to asses the likely operations of the study intersections when and if all the proposed projects are constructed. Estimated trip generations for individual projects based on the reports provided by W-Trans are presented in Table 5.

Table 5

Proposed Developments

Project Name	Location	Description	AM Peak Hour Trips[5]	PM Peak Hour Trips[5]
Royal Petroleum Card-Lock Gasoline Service [1]	North of Petaluma Boulevard South/Landing Way	Development of 17 card-lock fueling stations	124	124
Shamrock Aggregate Import Facility [2]	Petaluma Boulevard South/Landing Way	Installation of transfer equipment at existing site	91	3
Novato Disposal Service [3]	2543 Petaluma Boulevard South	Installation of recycling facilities at existing site	80	80
Redevelopment of existing Dutra site [4]	Existing Dutra Materials site on Petaluma Boulevard South	Development of 182 single-family detached units and 152 townhomes	106	139
		Total Trips	401	346

Sources:
1. *Royal Petroleum Card-Lock Gasoline Service Traffic Impact Study*. Whitlock & Weinberger Transportation, Inc., January 2004.
2. *Shamrock Aggregate Import Facility Traffic Impact Study*. Whitlock & Weinberger Transportation, Inc., July 2003.
3. *Traffic Analysis for 2543 Petaluma Boulevard South*. Whitlock & Weinberger Transportation, Inc., October 2003.
4. *Cumulative Impacts Evaluation*. Whitlock & Weinberger Transportation, Inc., June 2004.
5. Trips shown are passenger car equivalents.

Trips from the proposed projects were added to traffic volumes in project conditions, and the resulting background traffic volumes are shown on Figure 6. Volume summary worksheets showing the source of background traffic volumes are included in Appendix B.

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Background Intersection Levels of Service

Levels of service were calculated at the study intersection using the background traffic volumes with the recommended lane changes discussed in Chapter 4. Table 6 presents the LOS results under Background Conditions and the corresponding LOS calculation sheets are included in Appendix A.

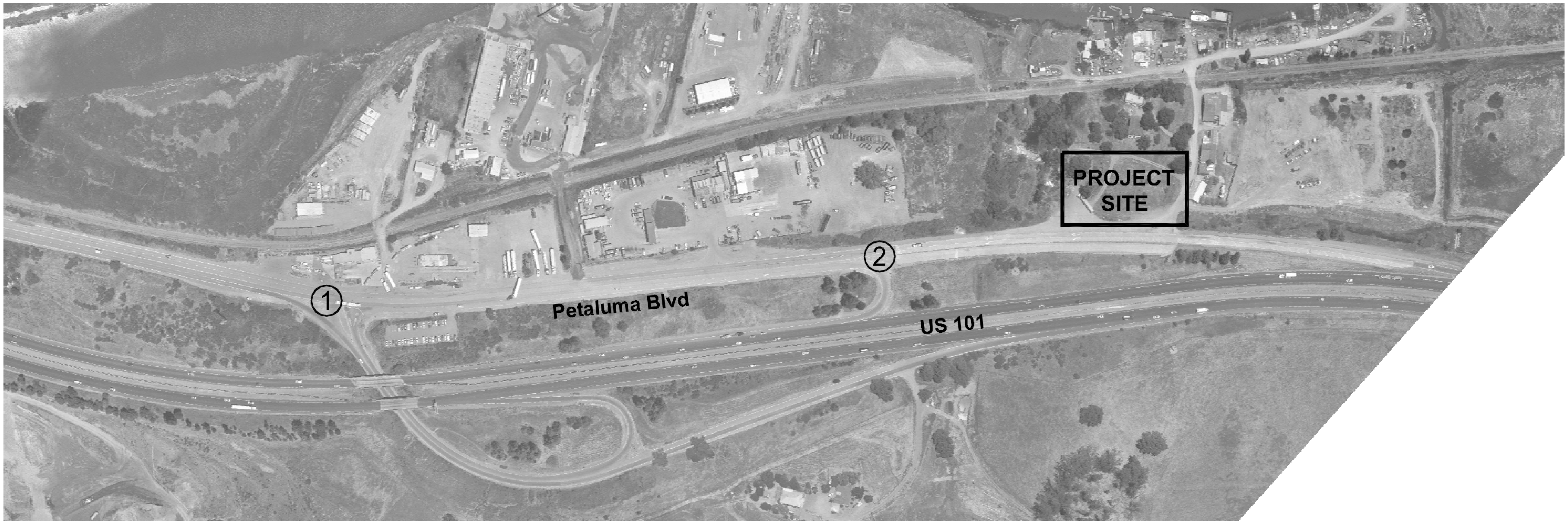
The results of the intersection analysis indicate that the intersection of Petaluma Boulevard South/US 101 Southbound ramps is expected to degrade to LOS D in the AM peak hour and to LOS F in the PM peak hour (a significant impact). The relocation of the Dutra Materials site is not expected to contribute to the significant impact because the proposed project is not adding new trips to the critical movement at this intersection (eastbound left). The intersection of Petaluma Boulevard South/US 101 Northbound On-Ramp would experience a slight increase in delay but would continue to operate at LOS A.

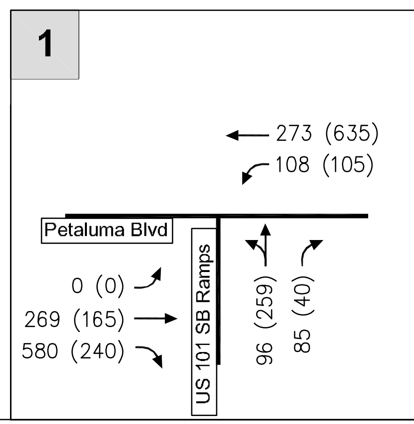
Table 6

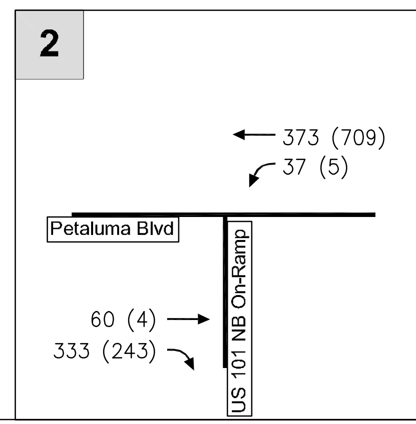
Project and Background Intersection Levels of Service

Intersection	Peak Hour	Existing Plus Project		Background Plus Project	
		Delay[1]	LOS[2]	Delay [1]	LOS[2]
Petaluma Boulevard South/US 101 Southbound Ramps (EBL)	AM PM	11.8 14.8	B B	25.7 **>80.0**	D **F**
Petaluma Boulevard South/US 101 Northbound On-Ramp (NBL)	AM PM	7.8 7.6	A A	8.3 7.9	A A

Notes:
1. Worst movement or approach control delay per vehicle for unsignalized intersections using methodology described in the *2000 Highway Capacity Manual*. LOS calculations conducted using the TRAFFIX level of service analysis software package.
2. LOS = Level of service.
3. Decrease in delay may occur when traffic is added to non-critical movements or critical movements change.







LEGEND:

XX (YY) = AM (PM)

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No scale

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PROJECT PLUS BACKGROUND VOLUMES
FIGURE 6

6. CUMULATIVE CONDITIONS

This chapter presents the results of an analysis of cumulative conditions. Cumulative conditions represent long-term growth to local traffic volumes expected to occur as a result of planned development, based on local and regional adopted plans. This analysis examined future operating conditions for the years 2015 and 2030.

Cumulative Traffic Estimates

The City of Petaluma Traffic Model and County of Sonoma Traffic Model were used to estimate cumulative volumes. First, an annual growth rate of 1.6 percent was applied to existing volumes to obtain traffic forecasts for years 2015 and 2030. This growth factor was based on the City of Petaluma traffic model traffic projections for the year 2025, based on the Central Petaluma Specific Plan EIR and developed by Fehr & Peers. Factored volumes from both models were extracted, and future intersection volumes were estimated using the Furness method. Cumulative traffic volumes from both years and models are presented on Figures 7 and 8 and were obtained from a letter regarding cumulative conditions prepared by W-Trans for other nearby projects[3].

In general, according to the analysis performed by W-Trans, cumulative traffic volumes along this roadway were forecast to be lower in the future than under the background plus project conditions due to the proposed construction of a new interchange at Rainier Avenue and the proposed, so-called southern crossing interchange, just north of the Petaluma Boulevard South interchange.

Cumulative Intersection Levels of Service

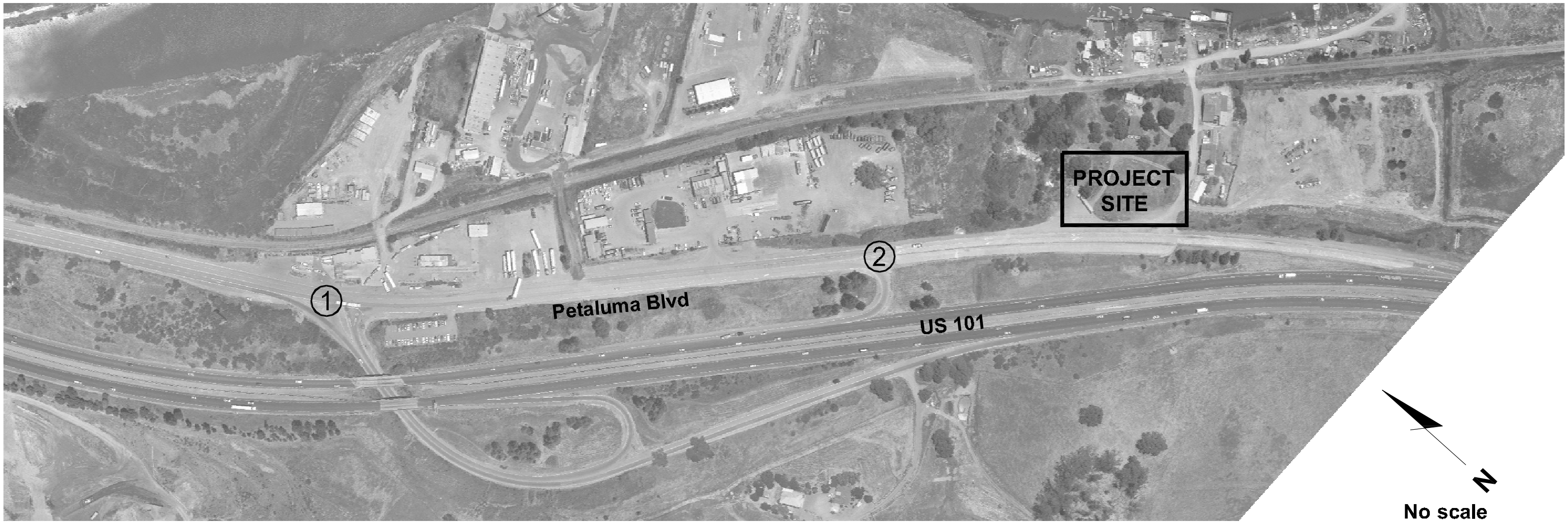
Operations were evaluated with level of service calculations at the study intersectionsusing both traffic models for 2015 and 2030 with and without the approved and pending projects[4]. The results are summarized in Tables 7a and 7b.

For the purposes of this analysis, a 3-lane configuration along Petaluma Boulevard South consisting of one through travel lane in each direction with a center turn lane and bicycle lanes was used. This configuration is consistent with the City of Petaluma's goals to increase safety and to provide Class II bicycle lanes. It also represents a worst-case for the assessment of project impacts.

Both intersections are expected to operate acceptably under cumulative conditions under most conditions. However, the eastbound approach at the intersection of Petaluma Boulevard South/US 101 Southbound Ramps is expected to operate at LOS F during the AM peak hour in 2030 using the City of Petaluma Model. This would be a significant impact.

The proposed relocation of the Dutra Materials site is not expected to contribute to cumulative impacts compared to existing conditions. As discussed under project conditions, the relocation of the Dutra Materials plant would improve operations at this intersection. Therefore, although the cumulative impact to this intersection is expected to be significant, the proposed Dutra Materials relocation project would not contribute to this impact.

[3] *Cumulative Impacts Evaluation*, Whitlock & Weinberger Transportation, Inc. June 2004.
[4] *Ibid*.

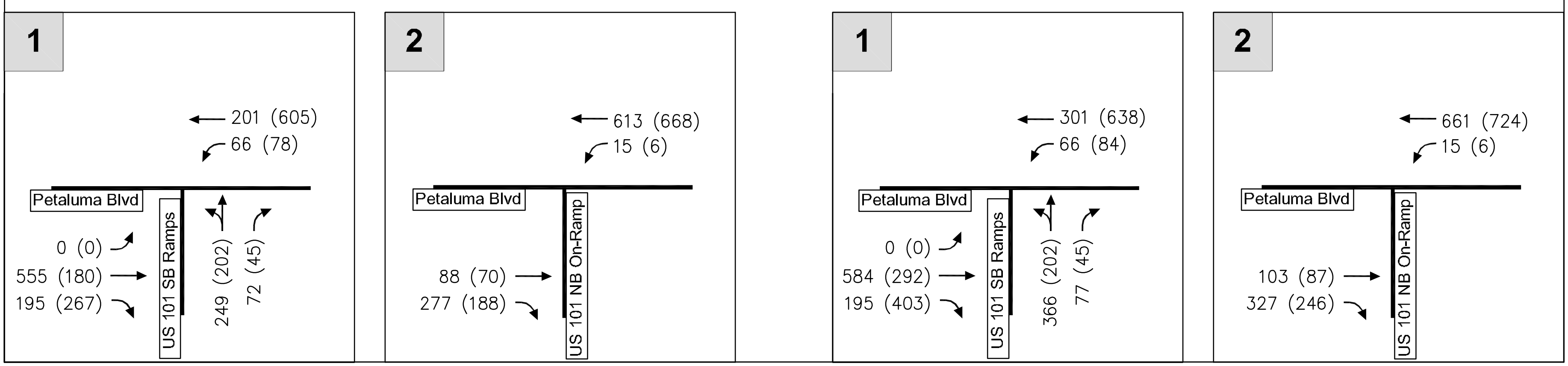


LEGEND:

XX (YY) = AM (PM)

2015

2030

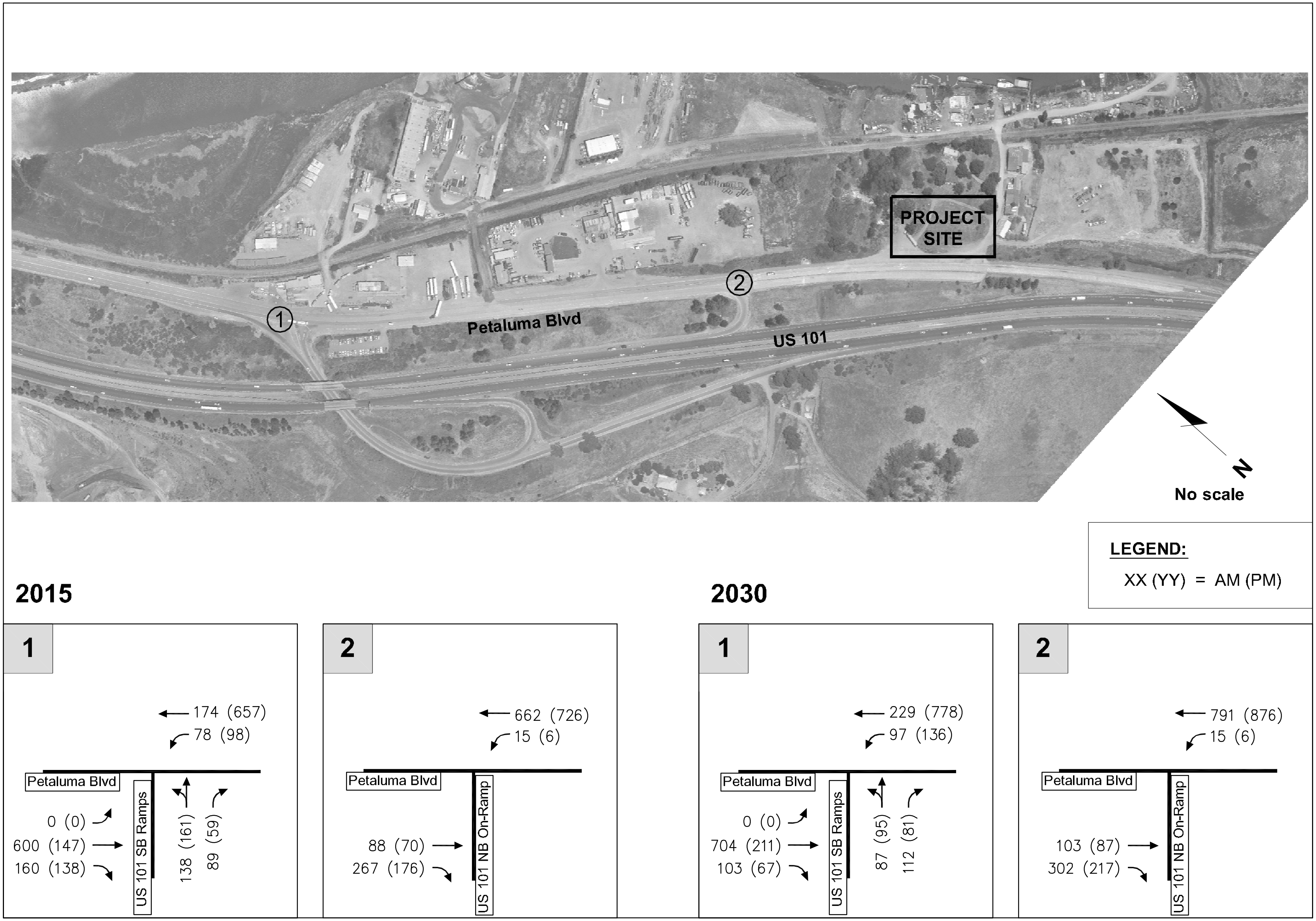


Dutra Petaluma Distribution Site

FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1047-0148\acadgraphics\0148-02 city model

2015 AND 2030 CITY MODEL VOLUMES
FIGURE 7



FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 2004
1047-0148\acadgraphics\0148-02 county model

Dutra Petaluma Distribution Site

2015 AND 2030 COUNTY MODEL VOLUMES
FIGURE 8

Table 7a

Cumulative Intersection Levels of Service

AM Peak Hour

Intersection Approach	**City of Petaluma Model**								**County of Sonoma Model**							
	Future				**Future plus Projects**				**Future**				**Future plus Projects**			
	2015		**2030**		**2015**		**2030**		**2015**		**2030**		**2015**		**2030**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
Petaluma Blvd S/US 101 SB Ramps																
Eastbound Approach	17.1	C	29.9	D	22.3	C	**59.4**	**F**	14.1	B	14.4	B	16.6	C	17.3	C
Northbound Left	8.3	A	8.4	A	8.8	A	8.9	A	8.5	A	8.9	A	9.0	A	9.5	A
Petaluma Blvd S/US 101 NB On-Ramp																
Northbound Left	7.5	A	7.7	A	8.0	A	8.2	A	7.5	A	7.6	A	8.0	A	8.1	A

Notes:
1. Worst movement or approach control delay per vehicle for unsignalized intersections using methodology described in the *2000 Highway Capacity Manual*. LOS calculations conducted using the TRAFFIX level of service analysis software package.
2. LOS = Level of service.

Source:
Cumulative Impacts Evaluation. Whitlock & Weinberger Transportation, Inc. June 2004.

Table 7b

Cumulative Intersection Levels of Service

PM Peak Hour

Intersection Approach	City of Petaluma Model								County of Sonoma Model							
	Future				Future plus Projects				Future				Future plus Projects			
	2015		2030		2015		2030		2015		2030		2015		2030	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Petaluma Blvd S/US 101 SB Ramps																
Eastbound Approach	22.8	C	27.3	D	22.8	C	27.3	D	20.9	C	18.9	C	20.9	C	18.9	C
Northbound Left	7.7	A	8.0	A	7.7	A	8.0	A	7.7	A	7.9	A	7.7	A	7.9	A
Petaluma Blvd S/US 101 NB On-Ramp																
Northbound Left	7.7	A	7.9	A	7.7	A	7.9	A	7.7	A	7.7	A	7.7	A	7.9	A

Notes:
1. Worst movement or approach control delay per vehicle for unsignalized intersections using methodology described in the *2000 Highway Capacity Manual*. LOS calculations conducted using the TRAFFIX level of service analysis software package.
2. LOS = Level of service.

Source:
Cumulative Impacts Evaluation. Whitlock & Weinberger Transportation, Inc. June 2004.

7. CONCLUSIONS

The traffic impacts of the proposed relocation of the Dutra Materials distribution plant were analyzed for the intersections of Petaluma Boulevard South/US 101 Northbound On-Ramp and Petaluma Boulevard South/US 101 Southbound Ramps during the AM and PM peak hours. It was assumed no new trips would be generated by the proposed project, but that some shifts in traffic patterns would occur.

The intersection LOS analysis identified the following:

- No significant impacts were identified to the two study intersections under existing plus project conditions.
- A significant impact was identified at the intersection Petaluma Boulevard South/US 101 Southbound Ramps during the PM peak hour under background plus project conditions. However, the proposed relocation of the Dutra Materials site would not contribute to this significant impact. Rather, the shift in traffic expected as a result of this proposed project would improve operations at this intersection.
- A significant impact was identified at the intersection of Petaluma Boulevard South/US 101 Southbound Ramps during the PM peak hour under year 2030 conditions, based on the City of Petaluma traffic model. However, the proposed project would not contribute to or exacerbate this significant impact.

The site access could be accommodated to meet AASHTO and Caltrans standards. Recommended design features are as follows:

- Provide a clear boundary between off-ramp and City arterial street by changing character of the facility through improvements such as curbs.
- Provide a minimum 400-foot deceleration lane, including 120-foot bay taper, for northbound traffic. (This was based on 50 mph design speed and assumes that vehicles will slow upon exiting the freeway, particularly if character-changing design improvements are implemented. For 70 mph design speed, a 575-foot deceleration lane would be required, but a lane of this length may reduce the effectiveness of character-changing design recommendations).
- Provide a minimum 560-foot acceleration lane for northbound trucks exiting project site (based on 45 mph design speed).
- Provide a minimum 35-foot wide driveway.
- Provide minimum 40-foot curb radius at project driveways.
- Locate project driveway at least 1,100 feet from gore point of the northbound US 101 off-ramp. This distance is the recommended decision sight distance for a 70 mph roadway.
- Create a level surface along Petaluma Boulevard South, south of US 101 northbound on-ramp to accommodate southbound left-turns into the project site.
- Reconfigure the intersection of Petaluma Boulevard South / US 101 northbound on-ramp to provide a northbound left-turn lane to provide storage for project truck traffic destined for northbound US 101.

In addition, the following recommendations should be considered for the on-ramps to US 101 from Petaluma Boulevard South:

- Provide additional merge distance for the southbound on-ramp.
- Provide additional acceleration distance for the northbound on-ramp.

As noted earlier, these improvements should occur independently of the proposed relocation of the Dutra Materials distribution site.

APPENDIX A
EXISTING CONDITION SCENARIO CALCULATIONS

Scenario Report

Scenario:	Existing AM
Command:	Existing AM
Volume:	AM Existing (2006)
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	blank
Trip Distribution:	blank
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	Existing PM
Command:	Existing PM
Volume:	PM Existing (2006)
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	blank
Trip Distribution:	blank
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	No
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	No
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	12	223	0	0	194	523	79	0	16	0	0	0

Major Street Volume: 952
Minor Approach Volume: 95
Minor Approach Volume Threshold: 395

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	18	575	0	0	102	189	194	0	8	0	0	0

Major Street Volume: 884
Minor Approach Volume: 202
Minor Approach Volume Threshold: 427

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 1	0	0 1	1 0	0	0 0	0 0	0	0 0	1! 0	0
Initial Vol:	0	199	5	15	211	0	0	0	0	6	0	11
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			9.7		

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=17]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=447]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 1	0	0 1	1 0	0	0 0	0 0	0	0 0	1! 0	0
Initial Vol:	0	604	0	1	143	0	0	0	0	3	0	3
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			12.5		

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=6]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=754]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		199		5	15		211		0	0		0		0	6		0		11

Major Street Volume: 430
Minor Approach Volume: 17
Minor Approach Volume Threshold: 576

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		604		0	1		143		0	0		0		0	3		0		3

Major Street Volume: 748
Minor Approach Volume: 6
Minor Approach Volume Threshold: 385

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0 1 0 0			0 0 0 1 0			0 0 0 0 0			0 0 0 0 0		
Initial Vol:	1	204	0	0	1	194	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0 1 0 0			0 0 0 1 0			0 0 0 0 0			0 0 0 0 0		
Initial Vol:	4	610	0	0	2	147	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Initial Vol:	1		204		0	0		1		194	0		0		0	0		0		0

Major Street Volume: 400
Minor Approach Volume: 0
Minor Approach Volume Threshold: 601

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Initial Vol:	4		610		0	0		2		147	0		0		0	0		0		0

Major Street Volume: 763
Minor Approach Volume: 0
Minor Approach Volume Threshold: 378

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	0 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 205 0	0 194 0	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	1 0 0 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 614 0	0 0 0	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	0 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 205 0	0 194 0	0 0 0	0 0 0

Major Street Volume: 399
Minor Approach Volume: 0
Minor Approach Volume Threshold: 464

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	1 0 0 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 614 0	0 0 0	0 0 0	0 0 0

Major Street Volume: 614
Minor Approach Volume: 0
Minor Approach Volume Threshold: 349

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                  Level Of Service Computation Report
       2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
*****************************************************************************
Cycle (sec):        100             Critical Vol./Cap.(X):        0.654
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):     12.8
Optimal Cycle:        0             Level Of Service:                 B
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0     0    0     0     0    0     0     0    0     0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      12  223     0     0  194   523    79     0    16     0     0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   12  223     0     0  194   523    79     0    16     0     0     0
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:   12  223     0     0  194   523    79     0    16     0     0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    12  223     0     0  194   523    79     0    16     0     0     0
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
Reduced Vol:   12  223     0     0  194   523    79     0    16     0     0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    12  223     0     0  194   523    79     0    16     0     0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   576  633     0     0  689   799   480     0   567     0     0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.02 0.35  xxxx  xxxx 0.28  0.65  0.16 xxxx  0.03  xxxx xxxx  xxxx
Crit Moves:       ****                   ****  ****
Delay/Veh:    8.9 11.2   0.0   0.0  9.8  15.0  11.0  0.0   8.7   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   8.9 11.2   0.0   0.0  9.8  15.0  11.0  0.0   8.7   0.0  0.0   0.0
LOS by Move:    A    B     *     *    A     C     B    *     A     *    *     *
ApproachDel:      11.1             13.6              10.6            xxxxxx
Delay Adj:        1.00             1.00              1.00             xxxxx
ApprAdjDel:       11.1             13.6              10.6            xxxxxx
LOS by Appr:        B                B                 B                 *
AllWayAvgQ:   0.6 15.4   0.0   0.0 11.4  52.4   5.1  0.0   0.7   0.0  0.0   0.0
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                  Level Of Service Computation Report
       2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
*****************************************************************************
Cycle (sec):        100             Critical Vol./Cap.(X):        0.911
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):     26.8
Optimal Cycle:        0             Level Of Service:                 D
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0     0    0     0     0    0     0     0    0     0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      18  575     0     0  102   189   194     0     8     0     0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   18  575     0     0  102   189   194     0     8     0     0     0
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:   18  575     0     0  102   189   194     0     8     0     0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    18  575     0     0  102   189   194     0     8     0     0     0
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
Reduced Vol:   18  575     0     0  102   189   194     0     8     0     0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    18  575     0     0  102   189   194     0     8     0     0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   570  631     0     0  579   653   483     0   574     0     0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.91  xxxx  xxxx 0.18  0.29  0.40 xxxx  0.01  xxxx xxxx  xxxx
Crit Moves:       ****                   ****  ****
Delay/Veh:    9.1 40.2   0.0   0.0 10.0  10.1  14.4  0.0   8.8   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   9.1 40.2   0.0   0.0 10.0  10.1  14.4  0.0   8.8   0.0  0.0   0.0
LOS by Move:    A    E     *     *    A     B     B    *     A     *    *     *
ApproachDel:      39.2             10.1              14.2            xxxxxx
Delay Adj:        1.00             1.00              1.00             xxxxx
ApprAdjDel:       39.2             10.1              14.2            xxxxxx
LOS by Appr:        E                B                 B                 *
AllWayAvgQ:   0.9  167   0.0   0.0  6.0  11.3  18.2  0.0   0.4   0.0  0.0   0.0
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
*****************************************************************************
Average Delay (sec/veh):      0.6       Worst Case Level Of Service: A[  9.7]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  1  0   0  1  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  199     5    15  211     0     0    0     0     6    0    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  199     5    15  211     0     0    0     0     6    0    11
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  199     5    15  211     0     0    0     0     6    0    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  199     5    15  211     0     0    0     0     6    0    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  199     5    15  211     0     0    0     0     6    0    11
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.9 xxxx   7.0
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   204 xxxx xxxxx  xxxx xxxx xxxxx   337 xxxx   102
Potent Cap.: xxxx xxxx xxxxx  1329 xxxx xxxxx  xxxx xxxx xxxxx   619 xxxx   918
Move Cap.:   xxxx xxxx xxxxx  1329 xxxx xxxxx  xxxx xxxx xxxxx   614 xxxx   918
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   1.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  781 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.7 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             9.7
ApproachLOS:        *                *                *                A
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
*****************************************************************************
Average Delay (sec/veh):      0.1       Worst Case Level Of Service: B[ 12.5]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  1  0   0  1  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  604     0     1  143     0     0    0     0     3    0     3
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  604     0     1  143     0     0    0     0     3    0     3
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  604     0     1  143     0     0    0     0     3    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  604     0     1  143     0     0    0     0     3    0     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  604     0     1  143     0     0    0     0     3    0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.9 xxxx   7.0
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   604 xxxx xxxxx  xxxx xxxx xxxxx   678 xxxx   302
Potent Cap.: xxxx xxxx xxxxx   936 xxxx xxxxx  xxxx xxxx xxxxx   375 xxxx   679
Move Cap.:   xxxx xxxx xxxxx   936 xxxx xxxxx  xxxx xxxx xxxxx   375 xxxx   679
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   8.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  483 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.5 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            12.5
ApproachLOS:        *                *                *                B
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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---------------------------------------------------------------------------
---------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
***************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  7.7]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       1  0  1  0  0   0  0  0  1  0   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1  204     0     0    1   194     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    1  204     0     0    1   194     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1  204     0     0    1   194     0    0     0     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     1  204     0     0    1   194     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1  204     0     0    1   194     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  195 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1349 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1349 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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---------------------------------------------------------------------------
---------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
***************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  7.6]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       1  0  1  0  0   0  0  0  1  0   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4  610     0     0    2   147     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    4  610     0     0    2   147     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    4  610     0     0    2   147     0    0     0     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     4  610     0     0    2   147     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     4  610     0     0    2   147     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  149 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1402 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1402 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
********************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  0.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0   0  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  205    0     0  194    0     0    0    0     0    0    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0  205    0     0  194    0     0    0    0     0    0    0
Added Vol:       0    0    0     0    0    0     0    0    0     0    0    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0  205    0     0  194    0     0    0    0     0    0    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  205    0     0  194    0     0    0    0     0    0    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0  205    0     0  194    0     0    0    0     0    0    0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *    *     *    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx    0 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         *                *                *                *
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
********************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  0.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0   1  0  0  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  614    0     0    0    0     0    0    0     0    0    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0  614    0     0    0    0     0    0    0     0    0    0
Added Vol:       0    0    0     0    0    0     0    0    0     0    0    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0  614    0     0    0    0     0    0    0     0    0    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  614    0     0    0    0     0    0    0     0    0    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0  614    0     0    0    0     0    0    0     0    0    0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *    *     *    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx    0 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         *                *                *                *
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

APPENDIX B
EXISTING PLUS PROJECT SCENARIO CALCULATIONS

Scenario Report

Scenario:	Existing + Project AM
Command:	Existing + Project AM
Volume:	AM Existing (2006)
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	AMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	Existing + Project PM
Command:	Existing + Project PM
Volume:	PM Existing (2006)
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	PMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	No
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	No
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	57	260	0	0	203	505	27	0	145	0	0	0

Major Street Volume: 1025
Minor Approach Volume: 172
Minor Approach Volume Threshold: 363

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	20	578	0	0	100	188	194	0	8	0	0	0

Major Street Volume: 886
Minor Approach Volume: 202
Minor Approach Volume Threshold: 426

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		281		5	15		350		0	0		0		0	6		0		11
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					10.4				

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=17]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=668]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		609		0	1		141		0	0		0		0	3		0		3
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					12.6				

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=6]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=757]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		281		5	15		350		0	0		0		0	6		0		11

Major Street Volume: 651
Minor Approach Volume: 17
Minor Approach Volume Threshold: 433

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		609		0	1		141		0	0		0		0	3		0		3

Major Street Volume: 751
Minor Approach Volume: 6
Minor Approach Volume Threshold: 383

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0 1 0 0			0 0 0 1 0			0 0 0 0 0			0 0 0 0 0		
Initial Vol:	125	286	0	0	189	144	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0 1 0 0			0 0 0 1 0			0 0 0 0 0			0 0 0 0 0		
Initial Vol:	10	615	0	0	2	145	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0	1 0	0	0 0	0 1	0	0 0	0 0	0	0 0	0 0	0
Initial Vol:	125	286	0	0	189	144	0	0	0	0	0	0

Major Street Volume: 744
Minor Approach Volume: 0
Minor Approach Volume Threshold: 387

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0	1 0	0	0 0	0 1	0	0 0	0 0	0	0 0	0 0	0
Initial Vol:	10	615	0	0	2	145	0	0	0	0	0	0

Major Street Volume: 772
Minor Approach Volume: 0
Minor Approach Volume Threshold: 374

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:       0  0  0  1  0   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
Initial Vol:   0  186    47   188  203     0     0    0     0     0    0   225
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             11.1
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.7]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=225]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=849]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:       0  0  1  0  0   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
Initial Vol:   0  614     0     0    0     0     0    0     0     0    0    10
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             12.6
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=10]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=2][total volume=624]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Initial Vol:	0		186		47	188		203		0	0		0		0	0		0		225

Major Street Volume: 624
Minor Approach Volume: 225
Minor Approach Volume Threshold: 345

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Initial Vol:	0		614		0	0		0		0	0		0		0	0		0		10

Major Street Volume: 614
Minor Approach Volume: 10
Minor Approach Volume Threshold: 349

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

```
---------------------------------------------------------------------------
---------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
***************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.681
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):      13.7
Optimal Cycle:        0              Level Of Service:                 B
***************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       1  0  1  0  0    0  0  1  0  1    1  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      12  223    0     0  194  523    79    0   16     0    0    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   12  223    0     0  194  523    79    0   16     0    0    0
Added Vol:     45   37    0     0    9  -18   -52    0  129     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   57  260    0     0  203  505    27    0  145     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:    57  260    0     0  203  505    27    0  145     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   57  260    0     0  203  505    27    0  145     0    0    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:    57  260    0     0  203  505    27    0  145     0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 1.00 0.00  0.00 1.00 1.00  1.00 0.00 1.00  0.00 0.00 0.00
Final Sat.:   549  601    0     0  642  741   468    0  556     0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.10 0.43 xxxx  xxxx 0.32 0.68  0.06 xxxx 0.26  xxxx xxxx xxxx
Crit Moves:       ****                 ****               ****
Delay/Veh:    9.8 12.8  0.0   0.0 10.7 16.9  10.3  0.0 10.6   0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   9.8 12.8  0.0   0.0 10.7 16.9  10.3  0.0 10.6   0.0  0.0  0.0
LOS by Move:   A    B    *     *    B    C     B    *    B     *    *    *
ApproachDel:      12.2             15.1             10.6            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:       12.2             15.1             10.6            xxxxxx
LOS by Appr:        B                C                B                *
AllWayAvgQ:   3.2 21.1  0.0   0.0 13.2 57.8   1.6  0.0  8.9   0.0  0.0  0.0
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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---------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
***************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.915
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):      27.2
Optimal Cycle:        0              Level Of Service:                 D
***************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       1  0  1  0  0    0  0  1  0  1    1  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      18  575    0     0  102  189   194    0    8     0    0    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   18  575    0     0  102  189   194    0    8     0    0    0
Added Vol:      2    3    0     0   -2   -1     0    0    0     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   20  578    0     0  100  188   194    0    8     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:    20  578    0     0  100  188   194    0    8     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   20  578    0     0  100  188   194    0    8     0    0    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:    20  578    0     0  100  188   194    0    8     0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 1.00 0.00  0.00 1.00 1.00  1.00 0.00 1.00  0.00 0.00 0.00
Final Sat.:   570  632    0     0  579  653   483    0  573     0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.92 xxxx  xxxx 0.17 0.29  0.40 xxxx 0.01  xxxx xxxx xxxx
Crit Moves:       ****                 ****  ****
Delay/Veh:    9.1 40.9  0.0   0.0 10.0 10.1  14.4  0.0  8.8   0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   9.1 40.9  0.0   0.0 10.0 10.1  14.4  0.0  8.8   0.0  0.0  0.0
LOS by Move:   A    E    *     *    A    B     B    *    A     *    *    *
ApproachDel:      39.8             10.1             14.2            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:       39.8             10.1             14.2            xxxxxx
LOS by Appr:        E                B                B                *
AllWayAvgQ:   1.0  171  0.0   0.0  5.9 11.2  18.2  0.0  0.4   0.0  0.0  0.0
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
---------------------------------------------------------------------------
---------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
***************************************************************************
Average Delay (sec/veh):      0.4       Worst Case Level Of Service: B[ 10.4]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  1  0   0  1  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  199    5    15  211    0     0    0    0     6    0    11
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0  199    5    15  211    0     0    0    0     6    0    11
Added Vol:       0   82    0     0  139    0     0    0    0     0    0     0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0     0
Initial Fut:     0  281    5    15  350    0     0    0    0     6    0    11
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  281    5    15  350    0     0    0    0     6    0    11
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0     0
Final Vol.:      0  281    5    15  350    0     0    0    0     6    0    11
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.9 xxxx   7.0
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   286 xxxx xxxxx  xxxx xxxx xxxxx   489 xxxx   143
Potent Cap.: xxxx xxxx xxxxx  1238 xxxx xxxxx  xxxx xxxx xxxxx   496 xxxx   863
Move Cap.:   xxxx xxxx xxxxx  1238 xxxx xxxxx  xxxx xxxx xxxxx   492 xxxx   863
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   1.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  681 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.4 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           10.4
ApproachLOS:        *                *                *                B
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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---------------------------------------------------------------------------
---------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
***************************************************************************
Average Delay (sec/veh):      0.1       Worst Case Level Of Service: B[ 12.6]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  1  0   0  1  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  604    0     1  143    0     0    0    0     3    0     3
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0  604    0     1  143    0     0    0    0     3    0     3
Added Vol:       0    5    0     0   -2    0     0    0    0     0    0     0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0     0
Initial Fut:     0  609    0     1  141    0     0    0    0     3    0     3
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  609    0     1  141    0     0    0    0     3    0     3
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0     0
Final Vol.:      0  609    0     1  141    0     0    0    0     3    0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.9 xxxx   7.0
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   609 xxxx xxxxx  xxxx xxxx xxxxx   682 xxxx   305
Potent Cap.: xxxx xxxx xxxxx   932 xxxx xxxxx  xxxx xxxx xxxxx   373 xxxx   677
Move Cap.:   xxxx xxxx xxxxx   932 xxxx xxxxx  xxxx xxxx xxxxx   373 xxxx   677
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   8.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  481 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.6 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           12.6
ApproachLOS:        *                *                *                B
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
********************************************************************************
Average Delay (sec/veh):      1.4       Worst Case Level Of Service: A[  8.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       1  0  1  0  0    0  0  0  1  0    0  0  0  0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1  204    0     0    1  194     0    0    0     0    0    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    1  204    0     0    1  194     0    0    0     0    0    0
Added Vol:    124   82    0     0  188  -50     0    0    0     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  125  286    0     0  189  144     0    0    0     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:   125  286    0     0  189  144     0    0    0     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:   125  286    0     0  189  144     0    0    0     0    0    0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  333 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1199 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1199 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.10 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   10.4 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
********************************************************************************
Average Delay (sec/veh):      0.1       Worst Case Level Of Service: A[  7.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       1  0  1  0  0    0  0  0  1  0    0  0  0  0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4  610    0     0    2  147     0    0    0     0    0    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    4  610    0     0    2  147     0    0    0     0    0    0
Added Vol:      6    5    0     0    0   -2     0    0    0     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   10  615    0     0    2  145     0    0    0     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:    10  615    0     0    2  145     0    0    0     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:    10  615    0     0    2  145     0    0    0     0    0    0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  147 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1405 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1405 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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------------------------------------------------------------------------------
------------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
******************************************************************************
Average Delay (sec/veh):      4.8      Worst Case Level Of Service: B[ 11.1]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  205     0     0  194     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  205     0     0  194     0     0    0     0     0    0     0
Added Vol:      0  -19    47   188    9     0     0    0     0     0    0   225
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  186    47   188  203     0     0    0     0     0    0   225
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  186    47   188  203     0     0    0     0     0    0   225
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  186    47   188  203     0     0    0     0     0    0   225
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   233 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   210
Potent Cap.: xxxx xxxx xxxxx  1306 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   818
Move Cap.:   xxxx xxxx xxxxx  1306 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   818
Volume/Cap:  xxxx xxxx  xxxx  0.14 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.27
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  15.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx  33.6
Control Del:xxxxx xxxx xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  11.1
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     B
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             11.1
ApproachLOS:        *                *                *                 B
******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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------------------------------------------------------------------------------
------------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
******************************************************************************
Average Delay (sec/veh):      0.2      Worst Case Level Of Service: B[ 12.6]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  614     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  614     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0    10
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  614     0     0    0     0     0    0     0     0    0    10
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  614     0     0    0     0     0    0     0     0    0    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  614     0     0    0     0     0    0     0     0    0    10
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   614
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   483
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   483
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   1.9
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  12.6
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     B
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             12.6
ApproachLOS:        *                *                *                 B
******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

APPENDIX C
NEAR TERM NO PROJECT SCENARIO CALCULATIONS

Scenario Report

Scenario:	XAAM
Command:	2015 AM
Volume:	AM 2015
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	blank
Trip Distribution:	blank
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	XAPM
Command:	2015 PM
Volume:	PM 2015
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	blank
Trip Distribution:	blank
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Stop Sign	Stop Sign	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	1 0 0 0 1	0 0 0 0 0
Initial Vol:	145 310 0	0 325 641	153 0 83	0 0 0

Major Street Volume: 1421
Minor Approach Volume: 236
Minor Approach Volume Threshold: 223

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Stop Sign	Stop Sign	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	1 0 0 0 1	0 0 0 0 0
Initial Vol:	161 711 0	0 212 286	315 0 64	0 0 0

Major Street Volume: 1370
Minor Approach Volume: 379
Minor Approach Volume Threshold: 239

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 0 1 0	1 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 417 43	131 363 0	0 0 0	118 0 49
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	39.3

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.8]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=167]
SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1121]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	1 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 830 0	1 298 0	0 0 0	8 0 3
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	20.6

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=11]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1140]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		417		43	131		363		0	0		0		0	118		0		49

Major Street Volume: 954
Minor Approach Volume: 167
Minor Approach Volume Threshold: 301

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		830		0	1		298		0	0		0		0	8		0		3

Major Street Volume: 1129
Minor Approach Volume: 11
Minor Approach Volume Threshold: 243

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	1 460 0	0 1 481	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	4 830 0	0 2 306	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	1 460 0	0 1 481	0 0 0	0 0 0

Major Street Volume: 943
Minor Approach Volume: 0
Minor Approach Volume Threshold: 305

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	4 830 0	0 2 306	0 0 0	0 0 0

Major Street Volume: 1142
Minor Approach Volume: 0
Minor Approach Volume Threshold: 239

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Initial Vol:	0		461		0	0		0		0	0		0		0	0		0		0
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					xxxxxx				

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Initial Vol:	0		834		0	0		0		0	0		0		0	0		0		0
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					xxxxxx				

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0	0 1 0	1	1	0 0 0	0	0	0 0 0	0	0	0 0 0	1
Initial Vol:	0	461	0	0	0	0	0	0	0	0	0	0

Major Street Volume: 461
Minor Approach Volume: 0
Minor Approach Volume Threshold: 552

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0	0 1 0	1	1	0 0 0	0	0	0 0 0	0	0	0 0 0	1
Initial Vol:	0	834	0	0	0	0	0	0	0	0	0	0

Major Street Volume: 834
Minor Approach Volume: 0
Minor Approach Volume Threshold: 347

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                       Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
*********************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
*********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.978
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):       30.1
Optimal Cycle:         0              Level Of Service:                  D
*********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0     0    0     0     0    0     0     0    0     0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     145  310     0     0  325   641   153    0    83     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  145  310     0     0  325   641   153    0    83     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  145  310     0     0  325   641   153    0    83     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   145  310     0     0  325   641   153    0    83     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  145  310     0     0  325   641   153    0    83     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   145  310     0     0  325   641   153    0    83     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   491  530     0     0  575   655   439    0   510     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.30 0.58  xxxx  xxxx 0.57  0.98  0.35 xxxx  0.16  xxxx xxxx  xxxx
Crit Moves:       ****                   ****  ****
Delay/Veh:   12.8 18.2   0.0   0.0 16.5  52.7  14.8  0.0  10.8   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  12.8 18.2   0.0   0.0 16.5  52.7  14.8  0.0  10.8   0.0  0.0   0.0
LOS by Move:    B    C     *     *    C     F     B    *     B     *    *     *
ApproachDel:      16.5             40.5             13.4            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:       16.5             40.5             13.4            xxxxxx
LOS by Appr:        C                E                B                *
AllWayAvgQ:  12.0 38.8   0.0   0.0 36.3 243.2  14.9  0.0   5.4   0.0  0.0   0.0
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                       Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
*********************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
*********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         1.354
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):       88.9
Optimal Cycle:         0              Level Of Service:                  F
*********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0     0    0     0     0    0     0     0    0     0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     161  711     0     0  212   286   315    0    64     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  161  711     0     0  212   286   315    0    64     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  161  711     0     0  212   286   315    0    64     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   161  711     0     0  212   286   315    0    64     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  161  711     0     0  212   286   315    0    64     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   161  711     0     0  212   286   315    0    64     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   482  525     0     0  497   550   449    0   523     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.33 1.35  xxxx  xxxx 0.43  0.52  0.70 xxxx  0.12  xxxx xxxx  xxxx
Crit Moves:       ****                   ****  ****
Delay/Veh:   13.6  192   0.0   0.0 15.0  15.8  26.9  0.0  10.4   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  13.6  192   0.0   0.0 15.0  15.8  26.9  0.0  10.4   0.0  0.0   0.0
LOS by Move:    B    F     *     *    C     C     D    *     B     *    *     *
ApproachDel:     159.0             15.5             24.1            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:      159.0             15.5             24.1            xxxxxx
LOS by Appr:        F                C                C                *
AllWayAvgQ:  14.3  798   0.0   0.0 21.2  30.4  60.7  0.0   4.0   0.0  0.0   0.0
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
*******************************************************************************
Average Delay (sec/veh):      6.9       Worst Case Level Of Service: E[ 39.3]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  417    43   131  363     0     0    0     0   118    0    49
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  417    43   131  363     0     0    0     0   118    0    49
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  417    43   131  363     0     0    0     0   118    0    49
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  417    43   131  363     0     0    0     0   118    0    49
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  417    43   131  363     0     0    0     0   118    0    49
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   460 xxxx xxxxx  xxxx xxxx xxxxx  1063 xxxx   439
Potent Cap.: xxxx xxxx xxxxx  1055 xxxx xxxxx  xxxx xxxx xxxxx   237 xxxx   600
Move Cap.:   xxxx xxxx xxxxx  1055 xxxx xxxxx  xxxx xxxx xxxxx   215 xxxx   600
Volume/Cap:  xxxx xxxx  xxxx  0.12 xxxx  xxxx  xxxx xxxx  xxxx  0.55 xxxx  0.08
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  12.7 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   8.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  265 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  3.9 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 39.3 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    E     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx             39.3
ApproachLOS:        *                *                *                 E
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
*******************************************************************************
Average Delay (sec/veh):      0.2       Worst Case Level Of Service: C[ 20.6]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  830     0     1  298     0     0    0     0     8    0     3
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  830     0     1  298     0     0    0     0     8    0     3
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  830     0     1  298     0     0    0     0     8    0     3
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  830     0     1  298     0     0    0     0     8    0     3
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  830     0     1  298     0     0    0     0     8    0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   830 xxxx xxxxx  xxxx xxxx xxxxx  1130 xxxx   830
Potent Cap.: xxxx xxxx xxxxx   764 xxxx xxxxx  xxxx xxxx xxxxx   216 xxxx   357
Move Cap.:   xxxx xxxx xxxxx   764 xxxx xxxxx  xxxx xxxx xxxxx   216 xxxx   357
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  242 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 20.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx             20.6
ApproachLOS:        *                *                *                 C
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*******************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  8.5]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        1  460     0     0    1   481     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     1  460     0     0    1   481     0    0     0     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     1  460     0     0    1   481     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      1  460     0     0    1   481     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      1  460     0     0    1   481     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  482 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1035 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1035 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*******************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  8.0]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4  830     0     0    2   306     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     4  830     0     0    2   306     0    0     0     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     4  830     0     0    2   306     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      4  830     0     0    2   306     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      4  830     0     0    2   306     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  308 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1203 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1203 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```


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```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*******************************************************************************
Average Delay (sec/veh):      0.0       Worst Case Level Of Service: A[  0.0]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  461     0     0    0     0     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  461     0     0    0     0     0    0     0     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  461     0     0    0     0     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  461     0     0    0     0     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  461     0     0    0     0     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*******************************************************************************
Average Delay (sec/veh):      0.0       Worst Case Level Of Service: A[  0.0]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  834     0     0    0     0     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  834     0     0    0     0     0    0     0     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  834     0     0    0     0     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  834     0     0    0     0     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  834     0     0    0     0     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

APPENDIX D
NEAR TERM PLUS PROJECT SCENARIO CALCULATIONS

Scenario Report

Scenario:	XA + Project AM
Command:	2015 + Project AM
Volume:	AM 2015
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	AMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	XA + Project PM
Command:	2015 + Project PM
Volume:	PM 2015
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	PMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1 0	0	0 0	1 0	1	1 0	0 0	1	0 0	0 0	0
Initial Vol:	190	347	0	0	334	623	101	0	212	0	0	0

Major Street Volume: 1494
Minor Approach Volume: 313
Minor Approach Volume Threshold: 201

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1 0	0	0 0	1 0	1	1 0	0 0	1	0 0	0 0	0
Initial Vol:	163	714	0	0	210	285	315	0	64	0	0	0

Major Street Volume: 1372
Minor Approach Volume: 379
Minor Approach Volume Threshold: 238

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		499		43	131		502		0	0		0		0	118		0		49
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					78.8				

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=3.7]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=167]
SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1342]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		835		0	1		296		0	0		0		0	8		0		3
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					20.6				

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=11]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1143]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	0 1	0	1 0	1 0	0	0 0	0 0	0	0 0	1! 0	0
Initial Vol:	0	499	43	131	502	0	0	0	0	118	0	49

Major Street Volume: 1175
Minor Approach Volume: 167
Minor Approach Volume Threshold: 229

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 0	0	1 0	1 0	0	0 0	0 0	0	0 0	1! 0	0
Initial Vol:	0	835	0	1	296	0	0	0	0	8	0	3

Major Street Volume: 1132
Minor Approach Volume: 11
Minor Approach Volume Threshold: 242

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Initial Vol:	125		542		0	0		189		431	0		0		0	0		0		0
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					xxxxxx				

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Initial Vol:	10		835		0	0		2		304	0		0		0	0		0		0
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					xxxxxx				

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0	1 0	0	0 0	1 0	1	0 0	0 0	0	0 0	0 0	0
Initial Vol:	125	542	0	0	189	431	0	0	0	0	0	0

Major Street Volume: 1287
Minor Approach Volume: 0
Minor Approach Volume Threshold: 198

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0	1 0	0	0 0	1 0	1	0 0	0 0	0	0 0	0 0	0
Initial Vol:	10	835	0	0	2	304	0	0	0	0	0	0

Major Street Volume: 1151
Minor Approach Volume: 0
Minor Approach Volume Threshold: 236

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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--------------------------------------------------------------------------------
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
Initial Vol:    0  442    47   188    0     0     0    0     0     0    0   225
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             14.6
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.9]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=225]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=902]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
Initial Vol:    0  834     0     0    0     0     0    0     0     0    0    10
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             15.4
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=10]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=2][total volume=844]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
```

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 0	1	1 0	0 0	0	0 0	0 0	0	0 0	0 0	1
Initial Vol:	0	442	47	188	0	0	0	0	0	0	0	225

Major Street Volume: 677
Minor Approach Volume: 225
Minor Approach Volume Threshold: 419

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 0	1	1 0	0 0	0	0 0	0 0	0	0 0	0 0	1
Initial Vol:	0	834	0	0	0	0	0	0	0	0	0	10

Major Street Volume: 834
Minor Approach Volume: 10
Minor Approach Volume Threshold: 347

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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```
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
********************************************************************************
Cycle (sec):        100             Critical Vol./Cap.(X):         1.019
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):       34.4
Optimal Cycle:        0             Level Of Service:                  D
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     145  310     0     0  325   641   153    0    83     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  145  310     0     0  325   641   153    0    83     0    0     0
Added Vol:     45   37     0     0    9   -18   -52    0   129     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  190  347     0     0  334   623   101    0   212     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   190  347     0     0  334   623   101    0   212     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  190  347     0     0  334   623   101    0   212     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   190  347     0     0  334   623   101    0   212     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   473  511     0     0  541   611   428    0   500     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.40 0.68  xxxx  xxxx 0.62  1.02  0.24 xxxx  0.42  xxxx xxxx  xxxx
Crit Moves:       ****                   ****              ****
Delay/Veh:   15.0 23.0   0.0   0.0 19.1  65.0  13.4  0.0  14.6   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  15.0 23.0   0.0   0.0 19.1  65.0  13.4  0.0  14.6   0.0  0.0   0.0
LOS by Move:    C    C     *     *    C     F     B    *     B     *    *     *
ApproachDel:      20.2             49.0             14.2           xxxxxx
Delay Adj:        1.00             1.00             1.00            xxxxx
ApprAdjDel:       20.2             49.0             14.2           xxxxxx
LOS by Appr:        C                E                B                *
AllWayAvgQ:  19.0 56.5   0.0   0.0 44.2 287.6   8.7  0.0  20.3   0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
********************************************************************************
Cycle (sec):        100             Critical Vol./Cap.(X):         1.359
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):       89.9
Optimal Cycle:        0             Level Of Service:                  F
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     161  711     0     0  212   286   315    0    64     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  161  711     0     0  212   286   315    0    64     0    0     0
Added Vol:      2    3     0     0   -2    -1     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  163  714     0     0  210   285   315    0    64     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   163  714     0     0  210   285   315    0    64     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  163  714     0     0  210   285   315    0    64     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   163  714     0     0  210   285   315    0    64     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   482  525     0     0  496   550   449    0   523     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.34 1.36  xxxx  xxxx 0.42  0.52  0.70 xxxx  0.12  xxxx xxxx  xxxx
Crit Moves:       ****                   ****  ****
Delay/Veh:   13.7  194   0.0   0.0 14.9  15.8  26.9  0.0  10.4   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  13.7  194   0.0   0.0 14.9  15.8  26.9  0.0  10.4   0.0  0.0   0.0
LOS by Move:    B    F     *     *    B     C     D    *     B     *    *     *
ApproachDel:     160.4             15.4             24.1           xxxxxx
Delay Adj:        1.00             1.00             1.00            xxxxx
ApprAdjDel:      160.4             15.4             24.1           xxxxxx
LOS by Appr:        F                C                C                *
AllWayAvgQ:  14.6  807   0.0   0.0 20.9  30.2  60.7  0.0   4.0   0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
******************************************************************************
Average Delay (sec/veh):     10.7      Worst Case Level Of Service: F[ 78.8]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  1  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  417    43   131  363     0     0    0     0   118    0    49
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  417    43   131  363     0     0    0     0   118    0    49
Added Vol:       0   82     0     0  139     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  499    43   131  502     0     0    0     0   118    0    49
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  499    43   131  502     0     0    0     0   118    0    49
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  499    43   131  502     0     0    0     0   118    0    49
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   542 xxxx xxxxx  xxxx xxxx xxxxx  1285 xxxx   521
Potent Cap.: xxxx xxxx xxxxx   983 xxxx xxxxx  xxxx xxxx xxxxx   174 xxxx   538
Move Cap.:   xxxx xxxx xxxxx   983 xxxx xxxxx  xxxx xxxx xxxxx   156 xxxx   538
Volume/Cap:  xxxx xxxx  xxxx  0.13 xxxx  xxxx  xxxx xxxx  xxxx  0.76 xxxx  0.09
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  13.8 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  197 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  6.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 78.8 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            78.8
ApproachLOS:        *                *                *                F
******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
******************************************************************************
Average Delay (sec/veh):      0.2      Worst Case Level Of Service: C[ 20.6]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  0  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  830     0     1  298     0     0    0     0     8    0     3
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  830     0     1  298     0     0    0     0     8    0     3
Added Vol:       0    5     0     0   -2     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  835     0     1  296     0     0    0     0     8    0     3
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  835     0     1  296     0     0    0     0     8    0     3
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  835     0     1  296     0     0    0     0     8    0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   835 xxxx xxxxx  xxxx xxxx xxxxx  1133 xxxx   835
Potent Cap.: xxxx xxxx xxxxx   761 xxxx xxxxx  xxxx xxxx xxxxx   215 xxxx   354
Move Cap.:   xxxx xxxx xxxxx   761 xxxx xxxxx  xxxx xxxx xxxxx   215 xxxx   354
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  241 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 20.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            20.6
ApproachLOS:        *                *                *                C
******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*********************************************************************************
Average Delay (sec/veh):      0.9       Worst Case Level Of Service: A[  9.5]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        1  0  1  0  0    0  0  1  0  1    0  0  0  0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        1  460     0     0    1   481     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     1  460     0     0    1   481     0    0     0     0    0     0
Added Vol:     124   82     0     0  188   -50     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   125  542     0     0  189   431     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    125  542     0     0  189   431     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    125  542     0     0  189   431     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  620 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  918 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    918 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.14 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   14.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*********************************************************************************
Average Delay (sec/veh):      0.1       Worst Case Level Of Service: A[  8.0]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        1  0  1  0  0    0  0  1  0  1    0  0  0  0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4  830     0     0    2   306     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     4  830     0     0    2   306     0    0     0     0    0     0
Added Vol:       6    5     0     0    0    -2     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    10  835     0     0    2   304     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     10  835     0     0    2   304     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     10  835     0     0    2   304     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  306 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1205 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1205 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.8 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
******************************************************************************
Average Delay (sec/veh):      5.6       Worst Case Level Of Service: B[ 14.6]
******************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  461     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  461     0     0    0     0     0    0     0     0    0     0
Added Vol:      0  -19    47   188    0     0     0    0     0     0    0   225
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  442    47   188    0     0     0    0     0     0    0   225
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  442    47   188    0     0     0    0     0     0    0   225
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  442    47   188    0     0     0    0     0     0    0   225
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   489 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   442
Potent Cap.: xxxx xxxx xxxxx  1029 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   597
Move Cap.:   xxxx xxxx xxxxx  1029 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   597
Volume/Cap:  xxxx xxxx  xxxx  0.18 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.38
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  20.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx  52.5
Control Del:xxxxx xxxx xxxxx   9.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  14.6
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     B
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            14.6
ApproachLOS:        *                *                *                B
******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
******************************************************************************
Average Delay (sec/veh):      0.2       Worst Case Level Of Service: C[ 15.4]
******************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  834     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  834     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0    10
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  834     0     0    0     0     0    0     0     0    0    10
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  834     0     0    0     0     0    0     0     0    0    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  834     0     0    0     0     0    0     0     0    0    10
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   834
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   355
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   355
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.03
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   2.6
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  15.4
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     C
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            15.4
ApproachLOS:        *                *                *                C
******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

APPENDIX E
2020 NO PROJECT SCENARIO CALCULATIONS

Scenario Report

Scenario:	2020 NP AM
Command:	2020 AM
Volume:	AM 2020
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	blank
Trip Distribution:	blank
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	2020 NP PM
Command:	2020 PM
Volume:	PM 2020
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	blank
Trip Distribution:	blank
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	97	347	0	0	336	762	149	0	62	0	0	0

Major Street Volume: 1542
Minor Approach Volume: 211
Minor Approach Volume Threshold: 188

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	111	842	0	0	202	308	330	0	45	0	0	0

Major Street Volume: 1463
Minor Approach Volume: 375
Minor Approach Volume Threshold: 210

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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```
Peak Hour Delay Signal Warrant Report
Intersection #2 Petaluma Boulevard South at Landing Way
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:       0  0  0  1  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:   0  929    30    91  451    0     0    0    0    76    0    38
ApproachDel:    xxxxxx           xxxxxx           xxxxxx            108.4
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=3.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=114]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1615]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
```

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.


```
Peak Hour Delay Signal Warrant Report
Intersection #2 Petaluma Boulevard South at Landing Way
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:       0  0  1  0  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
Initial Vol:   0  931     0     1  361    0     0    0    0     7    0     4
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             23.6
------------|---------------||---------------||---------------||---------------|
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=11]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1304]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
```

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L		T		R	L		T		R	L		T		R	L		T		R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		929		30	91		451		0	0		0		0	76		0		38

Major Street Volume: 1501
Minor Approach Volume: 114
Minor Approach Volume Threshold: 145

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L		T		R	L		T		R	L		T		R	L		T		R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		931		0	1		361		0	0		0		0	7		0		4

Major Street Volume: 1293
Minor Approach Volume: 11
Minor Approach Volume Threshold: 196

SIGNAL WARRANT DISCLAIMER
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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	1 425 0	0 1 431	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	5 939 0	0 3 291	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	1 425 0	0 1 431	0 0 0	0 0 0

Major Street Volume: 858
Minor Approach Volume: 0
Minor Approach Volume Threshold: 338

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	5 939 0	0 3 291	0 0 0	0 0 0

Major Street Volume: 1238
Minor Approach Volume: 0
Minor Approach Volume Threshold: 211

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0 1 0 1			1 0 0 0 0			0 0 0 0 0			0 0 0 0 1		
Initial Vol:	0	427	0	0	0	0	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0 1 0 1			1 0 0 0 0			0 0 0 0 0			0 0 0 0 1		
Initial Vol:	0	944	0	0	0	0	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0 1 0 1			1 0 0 0 0			0 0 0 0 0			0 0 0 0 1		
Initial Vol:	0	427	0	0	0	0	0	0	0	0	0	0

Major Street Volume: 427
Minor Approach Volume: 0
Minor Approach Volume Threshold: 578

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0 1 0 1			1 0 0 0 0			0 0 0 0 0			0 0 0 0 1		
Initial Vol:	0	944	0	0	0	0	0	0	0	0	0	0

Major Street Volume: 944
Minor Approach Volume: 0
Minor Approach Volume Threshold: 305

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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```
---------------------------------------------------------------------------
---------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
***************************************************************************
Cycle (sec):        100           Critical Vol./Cap.(X):         1.141
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):    53.3
Optimal Cycle:        0           Level Of Service:                  F
***************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign       Stop Sign        Stop Sign        Stop Sign
Rights:           Include         Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      97  347    0     0  336  762   149    0   62     0    0    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   97  347    0     0  336  762   149    0   62     0    0    0
Added Vol:      0    0    0     0    0    0     0    0    0     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   97  347    0     0  336  762   149    0   62     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:    97  347    0     0  336  762   149    0   62     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   97  347    0     0  336  762   149    0   62     0    0    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:    97  347    0     0  336  762   149    0   62     0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 1.00 0.00  0.00 1.00 1.00  1.00 0.00 1.00  0.00 0.00 0.00
Final Sat.:   495  537    0     0  586  668   440    0  512     0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.20 0.65 xxxx  xxxx 0.57 1.14  0.34 xxxx 0.12  xxxx xxxx xxxx
Crit Moves:       ****                 ****  ****
Delay/Veh:   11.6 20.5  0.0   0.0 16.5 100.8 14.6  0.0 10.4   0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  11.6 20.5  0.0   0.0 16.5 100.8 14.6  0.0 10.4   0.0  0.0  0.0
LOS by Move:   B    C    *     *    C    F     B    *    B     *    *    *
ApproachDel:      18.6             75.0              13.4            xxxxxx
Delay Adj:        1.00             1.00              1.00             xxxxx
ApprAdjDel:       18.6             75.0              13.4            xxxxxx
LOS by Appr:        C                F                 B                *
AllWayAvgQ:   7.0 50.0  0.0   0.0 37.6 516.1 14.4  0.0  3.9   0.0  0.0  0.0
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
---------------------------------------------------------------------------
---------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
***************************************************************************
Cycle (sec):        100           Critical Vol./Cap.(X):         1.611
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):   148.7
Optimal Cycle:        0           Level Of Service:                  F
***************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign       Stop Sign        Stop Sign        Stop Sign
Rights:           Include         Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     111  842    0     0  202  308   330    0   45     0    0    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  111  842    0     0  202  308   330    0   45     0    0    0
Added Vol:      0    0    0     0    0    0     0    0    0     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  111  842    0     0  202  308   330    0   45     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:   111  842    0     0  202  308   330    0   45     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  111  842    0     0  202  308   330    0   45     0    0    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:   111  842    0     0  202  308   330    0   45     0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 1.00 0.00  0.00 1.00 1.00  1.00 0.00 1.00  0.00 0.00 0.00
Final Sat.:   478  523    0     0  499  553   452    0  528     0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.23 1.61 xxxx  xxxx 0.41 0.56  0.73 xxxx 0.09  xxxx xxxx xxxx
Crit Moves:       ****                 ****  ****
Delay/Veh:   12.3  302  0.0   0.0 14.5 16.7  28.7  0.0 10.0   0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  12.3  302  0.0   0.0 14.5 16.7  28.7  0.0 10.0   0.0  0.0  0.0
LOS by Move:   B    F    *     *    B    C     D    *    B     *    *    *
ApproachDel:     267.9             15.9              26.5            xxxxxx
Delay Adj:        1.00             1.00              1.00             xxxxx
ApprAdjDel:      267.9             15.9              26.5            xxxxxx
LOS by Appr:        F                C                 D                *
AllWayAvgQ:   8.6 1272  0.0   0.0 19.5 35.1  68.2  0.0  2.7   0.0  0.0  0.0
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                 Level Of Service Computation Report
       2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
*****************************************************************************
Average Delay (sec/veh):      8.3       Worst Case Level Of Service: F[108.4]
*****************************************************************************
Approach:     North Bound     South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled    Uncontrolled      Stop Sign       Stop Sign
Rights:          Include         Include         Include         Include
Lanes:       0  0  0  1  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  929    30    91  451     0     0     0     0    76     0    38
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  929    30    91  451     0     0     0     0    76     0    38
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:    0  929    30    91  451     0     0     0     0    76     0    38
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  929    30    91  451     0     0     0     0    76     0    38
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
Final Vol.:     0  929    30    91  451     0     0     0     0    76     0    38
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   959 xxxx xxxxx  xxxx xxxx xxxxx  1577 xxxx   944
Potent Cap.: xxxx xxxx xxxxx   682 xxxx xxxxx  xxxx xxxx xxxxx   115 xxxx   306
Move Cap.:   xxxx xxxx xxxxx   682 xxxx xxxxx  xxxx xxxx xxxxx   103 xxxx   306
Volume/Cap:  xxxx xxxx  xxxx  0.13 xxxx  xxxx  xxxx xxxx  xxxx  0.74 xxxx  0.12
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  13.8 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  11.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  132 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  5.5 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  108 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx            108.4
ApproachLOS:        *                 *                 *                 F
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                 Level Of Service Computation Report
       2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
*****************************************************************************
Average Delay (sec/veh):      0.2       Worst Case Level Of Service: C[ 23.6]
*****************************************************************************
Approach:     North Bound     South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled    Uncontrolled      Stop Sign       Stop Sign
Rights:          Include         Include         Include         Include
Lanes:       0  0  1  0  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  931     0     1  361     0     0     0     0     7     0     4
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  931     0     1  361     0     0     0     0     7     0     4
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:    0  931     0     1  361     0     0     0     0     7     0     4
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  931     0     1  361     0     0     0     0     7     0     4
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
Final Vol.:     0  931     0     1  361     0     0     0     0     7     0     4
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   931 xxxx xxxxx  xxxx xxxx xxxxx  1294 xxxx   931
Potent Cap.: xxxx xxxx xxxxx   699 xxxx xxxxx  xxxx xxxx xxxxx   172 xxxx   311
Move Cap.:   xxxx xxxx xxxxx   699 xxxx xxxxx  xxxx xxxx xxxxx   172 xxxx   311
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  10.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  205 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 23.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx             23.6
ApproachLOS:        *                 *                 *                 C
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*******************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  8.3]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        1  425     0     0    1   431     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     1  425     0     0    1   431     0    0     0     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     1  425     0     0    1   431     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      1  425     0     0    1   431     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      1  425     0     0    1   431     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  432 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1081 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1081 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*******************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  8.0]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        5  939     0     0    3   291     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     5  939     0     0    3   291     0    0     0     0    0     0
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     5  939     0     0    3   291     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      5  939     0     0    3   291     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      5  939     0     0    3   291     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  294 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1218 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1218 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.4 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*****************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  0.0]
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  0  1    1  0  0  0  0    0  0  0  0  0    0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  427     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  427     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  427     0     0    0     0     0    0     0     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  427     0     0    0     0     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  427     0     0    0     0     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*****************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service: A[  0.0]
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  0  1    1  0  0  0  0    0  0  0  0  0    0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  944     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  944     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  944     0     0    0     0     0    0     0     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  944     0     0    0     0     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  944     0     0    0     0     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*****************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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APPENDIX F
2020 PLUS PROJECT SCENARIO CALCULATIONS

Scenario Report

Scenario:	2020 WP AM
Command:	2020 + Project AM
Volume:	AM 2020
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	AMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	2020 WP PM
Command:	2020 + Project PM
Volume:	PM 2020
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	PMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	Yes / Yes
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	142	384	0	0	345	744	97	0	191	0	0	0

Major Street Volume: 1615
Minor Approach Volume: 288
Minor Approach Volume Threshold: 168

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	1 0	0	0 1	0 0	0	0 0
Initial Vol:	113	845	0	0	200	307	330	0	45	0	0	0

Major Street Volume: 1465
Minor Approach Volume: 375
Minor Approach Volume Threshold: 210

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

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Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	0 1	0	1 0	1 0	0	0 0	0 0	0	0 0	1! 0	0
Initial Vol:	0	1011	30	91	590	0	0	0	0	76	0	38
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			221.4		

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=7.0]
   SUCCEED - Vehicle-hours greater than or equal to 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=114]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1836]
   SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 0	0	1 0	1 0	0	0 0	0 0	0	0 0	1! 0	0
Initial Vol:	0	936	0	1	359	0	0	0	0	7	0	4
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			23.6		

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=11]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1307]
   SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER

This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		1011		30	91		590		0	0		0		0	76		0		38

Major Street Volume: 1722
Minor Approach Volume: 114
Minor Approach Volume Threshold: 98 [less than minimum of 100]

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1!	0	0
Initial Vol:	0		936		0	1		359		0	0		0		0	7		0		4

Major Street Volume: 1296
Minor Approach Volume: 11
Minor Approach Volume Threshold: 196

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	0 0	0	0 0	0 0	0	0 0
Initial Vol:	125	507	0	0	189	381	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	1 0	1	0 0	0 0	1	0 1	0 0	0	0 0	0 0	0	0 0
Initial Vol:	11	944	0	0	3	289	0	0	0	0	0	0
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	125 507 0	0 189 381	0 0 0	0 0 0

Major Street Volume: 1202
Minor Approach Volume: 0
Minor Approach Volume Threshold: 221

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	11 944 0	0 3 289	0 0 0	0 0 0

Major Street Volume: 1247
Minor Approach Volume: 0
Minor Approach Volume Threshold: 209

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 0	1	1 0	0 0	0	0 0	0 0	0	0 0	0 0	1
Initial Vol:	0	408	47	188	0	0	0	0	0	0	0	225
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			14.0		

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.9]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=225]
SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=868]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Lanes:	0 0	1 0	1	1 0	0 0	0	0 0	0 0	0	0 0	0 0	1
Initial Vol:	0	944	0	0	0	0	0	0	0	0	0	10
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			17.2		

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=10]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=2][total volume=954]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 1	1 0 0 0 0	0 0 0 0 0	0 0 0 0 1
Initial Vol:	0 408 47	188 0 0	0 0 0	0 0 225

Major Street Volume: 643
Minor Approach Volume: 225
Minor Approach Volume Threshold: 437

SIGNAL WARRANT DISCLAIMER
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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 1	1 0 0 0 0	0 0 0 0 0	0 0 0 0 1
Initial Vol:	0 944 0	0 0 0	0 0 0	0 0 10

Major Street Volume: 944
Minor Approach Volume: 10
Minor Approach Volume Threshold: 305

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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```
------------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):         1.194
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):        59.7
Optimal Cycle:         0               Level Of Service:                  F
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      97  347     0     0  336   762   149    0    62     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   97  347     0     0  336   762   149    0    62     0    0     0
Added Vol:     45   37     0     0    9   -18   -52    0   129     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  142  384     0     0  345   744    97    0   191     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   142  384     0     0  345   744    97    0   191     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  142  384     0     0  345   744    97    0   191     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   142  384     0     0  345   744    97    0   191     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   477  517     0     0  551   623   429    0   501     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.30 0.74  xxxx  xxxx 0.63  1.19  0.23 xxxx  0.38  xxxx xxxx  xxxx
Crit Moves:       ****                   ****             ****
Delay/Veh:   13.2 26.7   0.0   0.0 19.1 122.2  13.2  0.0  13.8   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  13.2 26.7   0.0   0.0 19.1 122.2  13.2  0.0  13.8   0.0  0.0   0.0
LOS by Move:    B    D     *     *    C     F     B    *     B     *    *     *
ApproachDel:      23.0             89.6             13.6            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:       23.0             89.6             13.6            xxxxxx
LOS by Appr:        C                F                B                *
AllWayAvgQ:  12.1 73.4   0.0   0.0 45.8 591.0   8.2  0.0  17.1   0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
------------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):         1.616
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):       150.0
Optimal Cycle:         0               Level Of Service:                  F
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     111  842     0     0  202   308   330    0    45     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  111  842     0     0  202   308   330    0    45     0    0     0
Added Vol:      2    3     0     0   -2    -1     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  113  845     0     0  200   307   330    0    45     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   113  845     0     0  200   307   330    0    45     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  113  845     0     0  200   307   330    0    45     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:   113  845     0     0  200   307   330    0    45     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  0.00  0.00 1.00  1.00  1.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   479  523     0     0  498   553   452    0   528     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.24 1.62  xxxx  xxxx 0.40  0.55  0.73 xxxx  0.09  xxxx xxxx  xxxx
Crit Moves:       ****                   ****  ****
Delay/Veh:   12.3  304   0.0   0.0 14.5  16.7  28.7  0.0  10.0   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  12.3  304   0.0   0.0 14.5  16.7  28.7  0.0  10.0   0.0  0.0   0.0
LOS by Move:    B    F     *     *    B     C     D    *     B     *    *     *
ApproachDel:     269.3             15.8             26.5            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:      269.3             15.8             26.5            xxxxxx
LOS by Appr:        F                C                D                *
AllWayAvgQ:   8.8 1282   0.0   0.0 19.2  34.8  68.2  0.0   2.7   0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
********************************************************************************
Average Delay (sec/veh):     14.3       Worst Case Level Of Service: F[221.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  929    30    91  451     0     0    0     0    76    0    38
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  929    30    91  451     0     0    0     0    76    0    38
Added Vol:       0   82     0     0  139     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0 1011    30    91  590     0     0    0     0    76    0    38
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0 1011    30    91  590     0     0    0     0    76    0    38
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0 1011    30    91  590     0     0    0     0    76    0    38
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1041 xxxx xxxxx  xxxx xxxx xxxxx  1798 xxxx  1026
Potent Cap.: xxxx xxxx xxxxx   635 xxxx xxxxx  xxxx xxxx xxxxx    83 xxxx   274
Move Cap.:   xxxx xxxx xxxxx   635 xxxx xxxxx  xxxx xxxx xxxxx    74 xxxx   274
Volume/Cap:  xxxx xxxx  xxxx  0.14 xxxx  xxxx  xxxx xxxx  xxxx  1.02 xxxx  0.14
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  15.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  11.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   98 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  7.6 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  221 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           221.4
ApproachLOS:         *                *                *                F
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
********************************************************************************
Average Delay (sec/veh):      0.2       Worst Case Level Of Service: C[ 23.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  931     0     1  361     0     0    0     0     7    0     4
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  931     0     1  361     0     0    0     0     7    0     4
Added Vol:       0    5     0     0   -2     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  936     0     1  359     0     0    0     0     7    0     4
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  936     0     1  359     0     0    0     0     7    0     4
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  936     0     1  359     0     0    0     0     7    0     4
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   936 xxxx xxxxx  xxxx xxxx xxxxx  1297 xxxx   936
Potent Cap.: xxxx xxxx xxxxx   696 xxxx xxxxx  xxxx xxxx xxxxx   171 xxxx   309
Move Cap.:   xxxx xxxx xxxxx   696 xxxx xxxxx  xxxx xxxx xxxxx   171 xxxx   309
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  10.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  204 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 23.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            23.6
ApproachLOS:         *                *                *                C
********************************************************************************
Note: Queue reported is the distance per lane in feet.
```


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```
----------------------------------------------------------------------------------
----------------------------------------------------------------------------------
                       Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
**********************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
**********************************************************************************
Average Delay (sec/veh):      1.0      Worst Case Level Of Service: A[  9.3]
**********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        1  425     0     0    1   431     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     1  425     0     0    1   431     0    0     0     0    0     0
Added Vol:     124   82     0     0  188   -50     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   125  507     0     0  189   381     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    125  507     0     0  189   381     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    125  507     0     0  189   381     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:   4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:   2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   570 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:   959 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:     959 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:   0.13 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    13.4 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   9.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
**********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
----------------------------------------------------------------------------------
----------------------------------------------------------------------------------
                       Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
**********************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
**********************************************************************************
Average Delay (sec/veh):      0.1      Worst Case Level Of Service: A[  8.0]
**********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        5  939     0     0    3   291     0    0     0     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     5  939     0     0    3   291     0    0     0     0    0     0
Added Vol:       6    5     0     0    0    -2     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    11  944     0     0    3   289     0    0     0     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     11  944     0     0    3   289     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     11  944     0     0    3   289     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:   4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:   2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   292 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  1220 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    1220 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:   0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.8 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   8.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
**********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                   Level Of Service Computation Report
       2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*********************************************************************************
Average Delay (sec/veh):      5.6      Worst Case Level Of Service: B[ 14.0]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  427     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  427     0     0    0     0     0    0     0     0    0     0
Added Vol:      0  -19    47   188    0     0     0    0     0     0    0   225
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  408    47   188    0     0     0    0     0     0    0   225
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  408    47   188    0     0     0    0     0     0    0   225
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  408    47   188    0     0     0    0     0     0    0   225
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   455 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   408
Potent Cap.: xxxx xxxx xxxxx  1060 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   624
Move Cap.:   xxxx xxxx xxxxx  1060 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   624
Volume/Cap:  xxxx xxxx  xxxx  0.18 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.36
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  19.3 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx  49.1
Control Del:xxxxx xxxx xxxxx   9.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  14.0
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     B
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            14.0
ApproachLOS:        *                *                *                B
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                   Level Of Service Computation Report
       2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*********************************************************************************
Average Delay (sec/veh):      0.2      Worst Case Level Of Service: C[ 17.2]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  944     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  944     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0    10
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  944     0     0    0     0     0    0     0     0    0    10
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  944     0     0    0     0     0    0     0     0    0    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  944     0     0    0     0     0    0     0     0    0    10
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   944
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   306
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   306
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.03
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   3.0
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  17.2
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     C
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            17.2
ApproachLOS:        *                *                *                C
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```

APPENDIX G
PROJECT START UP CONDITION CALCULATIONS

Scenario Report

Scenario:	XAP_STARTUP_ AM
Command:	2015 + Project AM
Volume:	AM 2015
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	AMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Scenario Report

Scenario:	XAP_STARTUP_ PM
Command:	2015 + Project PM
Volume:	PM 2015
Geometry:	Improved
Impact Fee:	Default Impact Fee
Trip Generation:	PMGen
Trip Distribution:	TheDistr
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Signal Warrant Summary Report

Intersection	Base Met [Del / Vol]	Future Met [Del / Vol]
# 1 Petaluma Boulevard South at US101 S	???	Yes
# 2 Petaluma Boulevard South at Landing	??? / ???	No / No
# 3 Petaluma Boulevard South at US101 N	??? / ???	No / No
# 4 Petaluma Blvd South at Dutra Drivew	??? / ???	No / No

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0
Initial Vol:	210		319		0	0		306		623	101		0		160	0		0		0

Major Street Volume: 1458
Minor Approach Volume: 261
Minor Approach Volume Threshold: 212

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #1 Petaluma Boulevard South at US101 SB Ramps

Future Volume Alternative: Peak Hour Warrant Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0
Initial Vol:	163		714		0	0		210		285	315		0		64	0		0		0

Major Street Volume: 1372
Minor Approach Volume: 379
Minor Approach Volume Threshold: 238

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

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Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 0 1 0	1 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 491 43	131 421 0	0 0 0	118 0 49
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	58.8

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=2.7]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=167]
SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1253]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Delay Signal Warrant Report

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	1 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 835 0	1 296 0	0 0 0	8 0 3
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	20.6

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=11]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=1143]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction. Consideration of the other signal warrants, which is beyond the scope of this software, may yield different results.

Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 0 1 0	1 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 491 43	131 421 0	0 0 0	118 0 49

Major Street Volume: 1086
Minor Approach Volume: 167
Minor Approach Volume Threshold: 256

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #2 Petaluma Boulevard South at Landing Way

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 0	1 0 1 0 0	0 0 0 0 0	0 0 1! 0 0
Initial Vol:	0 835 0	1 296 0	0 0 0	8 0 3

Major Street Volume: 1132
Minor Approach Volume: 11
Minor Approach Volume Threshold: 242

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	73 534 0	0 109 431	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	1 0 1 0 0	0 0 1 0 1	0 0 0 0 0	0 0 0 0 0
Initial Vol:	10 835 0	0 2 304	0 0 0	0 0 0
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Initial Vol:	73		534		0	0		109		431	0		0		0	0		0		0

Major Street Volume: 1147
Minor Approach Volume: 0
Minor Approach Volume Threshold: 238

SIGNAL WARRANT DISCLAIMER
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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Initial Vol:	10		835		0	0		2		304	0		0		0	0		0		0

Major Street Volume: 1151
Minor Approach Volume: 0
Minor Approach Volume Threshold: 236

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 1	1 0 0 0 0	0 0 0 0 0	0 0 0 0 1
Initial Vol:	0 442 67	108 0 0	0 0 0	0 0 165
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	13.3

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.6]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=165]
SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=782]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
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Peak Hour Delay Signal Warrant Report

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Lanes:	0 0 1 0 1	1 0 0 0 0	0 0 0 0 0	0 0 0 0 1
Initial Vol:	0 834 0	0 0 0	0 0 0	0 0 10
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	15.4

Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=10]
FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=2][total volume=844]
SUCCEED - Total volume greater than or equal to 650 for intersection with less than four approaches.

SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed this warrant are probably more likely to meet one or more of the other volume based signal warrant (such as the 4-hour or 8-hour warrants).

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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Initial Vol:	0		442		67	108		0		0	0		0		0	0		0		165

Major Street Volume: 617
Minor Approach Volume: 165
Minor Approach Volume Threshold: 451

SIGNAL WARRANT DISCLAIMER
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Peak Hour Volume Signal Warrant Report [Urban]

Intersection #4 Petaluma Blvd South at Dutra Driveway

Future Volume Alternative: Peak Hour Warrant NOT Met

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Lanes:	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Initial Vol:	0		834		0	0		0		0	0		0		0	0		0		10

Major Street Volume: 834
Minor Approach Volume: 10
Minor Approach Volume Threshold: 347

SIGNAL WARRANT DISCLAIMER
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---------------------------------------------------------------------------
---------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
***************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.981
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):      29.9
Optimal Cycle:        0              Level Of Service:                 D
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:        1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     145  310    0    0  325  641  153    0   83    0    0    0
Growth Adj:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:  145  310    0    0  325  641  153    0   83    0    0    0
Added Vol:     65    9    0    0  -19  -18  -52    0   77    0    0    0
PasserByVol:    0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:  210  319    0    0  306  623  101    0  160    0    0    0
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume:   210  319    0    0  306  623  101    0  160    0    0    0
Reduct Vol:     0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:  210  319    0    0  306  623  101    0  160    0    0    0
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Vol.:   210  319    0    0  306  623  101    0  160    0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes:       1.00 1.00 0.00 0.00 1.00 1.00 1.00 0.00 1.00 0.00 0.00 0.00
Final Sat.:   490  527    0    0  557  635  431    0  503    0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.43 0.60 xxxx xxxx 0.55 0.98 0.23 xxxx 0.32 xxxx xxxx xxxx
Crit Moves:       ****                ****                ****
Delay/Veh:   15.2 19.0  0.0  0.0 16.3 54.2 13.2  0.0 12.7  0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:  15.2 19.0  0.0  0.0 16.3 54.2 13.2  0.0 12.7  0.0  0.0  0.0
LOS by Move:    C    C    *    *    C    F    B    *    B    *    *    *
ApproachDel:      17.5             41.7             12.9            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:       17.5             41.7             12.9            xxxxxx
LOS by Appr:        C                E                B                *
AllWayAvgQ:  21.3 42.0  0.0  0.0 33.7 242.5  8.5  0.0 12.9  0.0  0.0  0.0
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
---------------------------------------------------------------------------
---------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #1 Petaluma Boulevard South at US101 SB Ramps
***************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        1.359
Loss Time (sec):      0 (Y+R=4.0 sec) Average Delay (sec/veh):      89.9
Optimal Cycle:        0              Level Of Service:                 F
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:        1  0  1  0  0   0  0  1  0  1   1  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     161  711    0    0  212  286  315    0   64    0    0    0
Growth Adj:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:  161  711    0    0  212  286  315    0   64    0    0    0
Added Vol:      2    3    0    0   -2   -1    0    0    0    0    0    0
PasserByVol:    0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:  163  714    0    0  210  285  315    0   64    0    0    0
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume:   163  714    0    0  210  285  315    0   64    0    0    0
Reduct Vol:     0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:  163  714    0    0  210  285  315    0   64    0    0    0
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Vol.:   163  714    0    0  210  285  315    0   64    0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes:       1.00 1.00 0.00 0.00 1.00 1.00 1.00 0.00 1.00 0.00 0.00 0.00
Final Sat.:   482  525    0    0  496  550  449    0  523    0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.34 1.36 xxxx xxxx 0.42 0.52 0.70 xxxx 0.12 xxxx xxxx xxxx
Crit Moves:       ****                ****  ****
Delay/Veh:   13.7  194  0.0  0.0 14.9 15.8 26.9  0.0 10.4  0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:  13.7  194  0.0  0.0 14.9 15.8 26.9  0.0 10.4  0.0  0.0  0.0
LOS by Move:    B    F    *    *    B    C    D    *    B    *    *    *
ApproachDel:     160.4             15.4             24.1            xxxxxx
Delay Adj:        1.00             1.00             1.00             xxxxx
ApprAdjDel:      160.4             15.4             24.1            xxxxxx
LOS by Appr:        F                C                C                *
AllWayAvgQ:  14.6  807  0.0  0.0 20.9 30.2 60.7  0.0  4.0  0.0  0.0  0.0
***************************************************************************
Note: Queue reported is the distance per lane in feet.
```

```
----------------------------------------------------------------------------
----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
****************************************************************************
Average Delay (sec/veh):      8.8      Worst Case Level Of Service: F[ 58.8]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  1  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  417    43   131  363     0     0    0     0   118    0    49
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  417    43   131  363     0     0    0     0   118    0    49
Added Vol:       0   74     0     0   58     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  491    43   131  421     0     0    0     0   118    0    49
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  491    43   131  421     0     0    0     0   118    0    49
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  491    43   131  421     0     0    0     0   118    0    49
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   534 xxxx xxxxx  xxxx xxxx xxxxx  1196 xxxx   513
Potent Cap.: xxxx xxxx xxxxx   990 xxxx xxxxx  xxxx xxxx xxxxx   197 xxxx   544
Move Cap.:   xxxx xxxx xxxxx   990 xxxx xxxxx  xxxx xxxx xxxxx   177 xxxx   544
Volume/Cap:  xxxx xxxx  xxxx  0.13 xxxx  xxxx  xxxx xxxx  xxxx  0.67 xxxx  0.09
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  13.7 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  221 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  5.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 58.8 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    F     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             58.8
ApproachLOS:        *                *                *                 F
****************************************************************************
Note: Queue reported is the distance per lane in feet.
```



```
----------------------------------------------------------------------------
----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #2 Petaluma Boulevard South at Landing Way
****************************************************************************
Average Delay (sec/veh):      0.2      Worst Case Level Of Service: C[ 20.6]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  1  0  0   1  0  1  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  830     0     1  298     0     0    0     0     8    0     3
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  830     0     1  298     0     0    0     0     8    0     3
Added Vol:       0    5     0     0   -2     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  835     0     1  296     0     0    0     0     8    0     3
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  835     0     1  296     0     0    0     0     8    0     3
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  835     0     1  296     0     0    0     0     8    0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx   6.5 xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx   3.6 xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   835 xxxx xxxxx  xxxx xxxx xxxxx  1133 xxxx   835
Potent Cap.: xxxx xxxx xxxxx   761 xxxx xxxxx  xxxx xxxx xxxxx   215 xxxx   354
Move Cap.:   xxxx xxxx xxxxx   761 xxxx xxxxx  xxxx xxxx xxxxx   215 xxxx   354
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  241 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 20.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             20.6
ApproachLOS:        *                *                *                 C
****************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*******************************************************************************
Average Delay (sec/veh):      0.6      Worst Case Level Of Service: A[  8.9]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1  460     0     0    1   481     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    1  460     0     0    1   481     0    0     0     0    0     0
Added Vol:     72   74     0     0  108   -50     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   73  534     0     0  109   431     0    0     0     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    73  534     0     0  109   431     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    73  534     0     0  109   431     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  540 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.:  985 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:    985 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.07 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    7.2 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```



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-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Petaluma Boulevard South at US101 NB On-Ramp
*******************************************************************************
Average Delay (sec/veh):      0.1      Worst Case Level Of Service: A[  8.0]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        1  0  1  0  0   0  0  1  0  1   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4  830     0     0    2   306     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    4  830     0     0    2   306     0    0     0     0    0     0
Added Vol:      6    5     0     0    0    -2     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   10  835     0     0    2   304     0    0     0     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    10  835     0     0    2   304     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    10  835     0     0    2   304     0    0     0     0    0     0
Critical Gap Module:
Critical Gp:  4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:  2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  306 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: 1205 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   1205 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.8 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
*******************************************************************************
Note: Queue reported is the distance per lane in feet.
```

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                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*********************************************************************************
Average Delay (sec/veh):      4.1       Worst Case Level Of Service: B[ 13.3]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  461    0     0    0    0     0    0    0     0    0    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0  461    0     0    0    0     0    0    0     0    0    0
Added Vol:       0  -19   67   108    0    0     0    0    0     0    0  165
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0  442   67   108    0    0     0    0    0     0    0  165
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  442   67   108    0    0     0    0    0     0    0  165
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0  442   67   108    0    0     0    0    0     0    0  165
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx   2.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   509 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   442
Potent Cap.: xxxx xxxx xxxxx  1011 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   597
Move Cap.:   xxxx xxxx xxxxx  1011 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   597
Volume/Cap:  xxxx xxxx  xxxx  0.11 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.28
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  10.7 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx  33.7
Control Del:xxxxx xxxx xxxxx   9.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  13.3
LOS by Move:    *    *    *     A    *    *     *    *    *     *    *     B
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            13.3
ApproachLOS:        *                *                *                B
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
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                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #4 Petaluma Blvd South at Dutra Driveway
*********************************************************************************
Average Delay (sec/veh):      0.2       Worst Case Level Of Service: C[ 15.4]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1   1  0  0  0  0   0  0  0  0  0   0  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  834    0     0    0    0     0    0    0     0    0    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0  834    0     0    0    0     0    0    0     0    0    0
Added Vol:       0    0    0     0    0    0     0    0    0     0    0   10
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0  834    0     0    0    0     0    0    0     0    0   10
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  834    0     0    0    0     0    0    0     0    0   10
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0  834    0     0    0    0     0    0    0     0    0   10
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.3
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.4
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   834
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   355
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   355
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.03
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   2.6
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  15.4
LOS by Move:    *    *    *     *    *    *     *    *    *     *    *     C
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            15.4
ApproachLOS:        *                *                *                C
*********************************************************************************
Note: Queue reported is the distance per lane in feet.
```