

## Section 9 Criteria for Standard OWTS

### 9.1 Standard OWTS

- A. A standard OWTS consists of an approved septic tank and standard dispersal trenches. A standard OWTS may include a pump system to enable the installation of a dispersal field up-slope of the structure to be served.
- B. Standard OWTS may be allowed in areas with a soil percolation rate of 60 minutes per inch or less.
- C. The minimum soil depth below the leaching trench shall be 3 feet for a Standard OWTS with soil percolation rates of 1 to 120 MPI.
- D. Standard OWTS may not be installed on slopes exceeding 30 percent.
- E. Sizing of standard OWTS shall be based on Table 7.2a Sewage Application/Soil Loading Rates (gallons per square foot per day) at 120 gallons per bedroom. Lineal footage sizing requirement is based on the consideration of sidewall area only. Credit is not given for trench bottom area. Note: 20 percent reduction allowed with installation of low flow fixtures.
- F. The required lineal feet of standard leach line is determined by the Design Flow Rate divided by the Soil Loading Rate (Table 7.2a) divided by the trench lineal area available (sidewall infiltration only, bottom area is not included). For example a 2 bedroom house at 120 gallons per day per bedroom equals 240 gallons per day. A percolation rate of 30 minutes per inch equals 0.56 gallons per square foot per day. 12 inches of gravel below the pipe times 2 equals 2 square feet per linear foot. Thus 240 divided by 0.56 divided by 2 equals 214 linear feet required. See Table 9.1 for example linear feet of leach line based on assumed effluent quality, flow rate, hydraulic loading rate and absorption area

**Table 9.1 – Illustrative Table for Linear Footage of Leach Line  
per Number of Bedrooms for a Standard Septic System**

<b>Texture</b>	<b>Structure Shape</b>	<b>Structure Grade</b>	<b>Hydraulic Loading (gallons/square foot/day)</b>	<b>Leach Line Length (feet) 1 Bedroom</b>	<b>Leach Line Length (feet) 2 Bedroom</b>	<b>Leach Line Length (feet) 3 Bedroom</b>	<b>Leach Line Length (feet) 4 Bedroom</b>
Coarse sand, sand, loamy coarse sand	Single grain	Structureless	1.2	50	100	150	200
Fine sand, loamy fine sand	Single grain	Structureless	0.6	100	200	300	400
Sandy loam, loamy sand	Massive Platy	Structureless	0.35	171	343	514	686
Sandy loam, loamy sand	Massive Platy	Weak	0.35	171	343	514	686
Sandy loam, loamy sand	Prismatic, blocky, granular	Weak	0.5	120	240	360	480

**Table 9.1 – Illustrative Table for Linear Footage of Leach Line  
per Number of Bedrooms for a Standard Septic System (Continued)**

<b>Texture</b>	<b>Structure Shape</b>	<b>Structure Grade</b>	<b>Hydraulic Loading (gallons/square foot/day)</b>	<b>Leach Line Length (feet) 1 Bedroom</b>	<b>Leach Line Length (feet) 2 Bedroom</b>	<b>Leach Line Length (feet) 3 Bedroom</b>	<b>Leach Line Length (feet) 4 Bedroom</b>
Sandy loam, loamy sand	Prismatic, blocky, granular	Moderate, strong	0.8	75	150	225	300
Loam, silt loam, sandy clay loam, fine sandy loam	Massive Platy	Structureless Weak					
Loam, silt loam, sandy clay loam, fine sandy loam	Prismatic, blocky, granular	Weak, moderate	0.5	120	240	360	480
Loam, silt loam, sandy clay loam, fine sandy loam	Prismatic, blocky, granular	Strong	0.8	75	150	225	300
Sandy clay, silty clay loam, clay loam	Massive Platy	Structureless Weak, moderate strong					
Sandy clay, silty clay loam, clay loam	Prismatic, blocky, granular	Weak, moderate	0.35	171	343	514	686
Sandy clay, silty clay loam,	Prismatic, blocky,	Strong	0.6	100	200	300	400
Clay, silty clay	Massive Platy	Structureless Weak, moderate, strong					
Clay, silty clay	Prismatic, blocky, granular	Weak					
Clay, silty clay	Prismatic, blocky, granular	Moderate, strong	0.2	300	600	900	1200

Assumptions:

Hydraulic Loading Rate assumes Septic Tank Effluent

Flow Rate per Bedroom = 120 gallons per day per bedroom

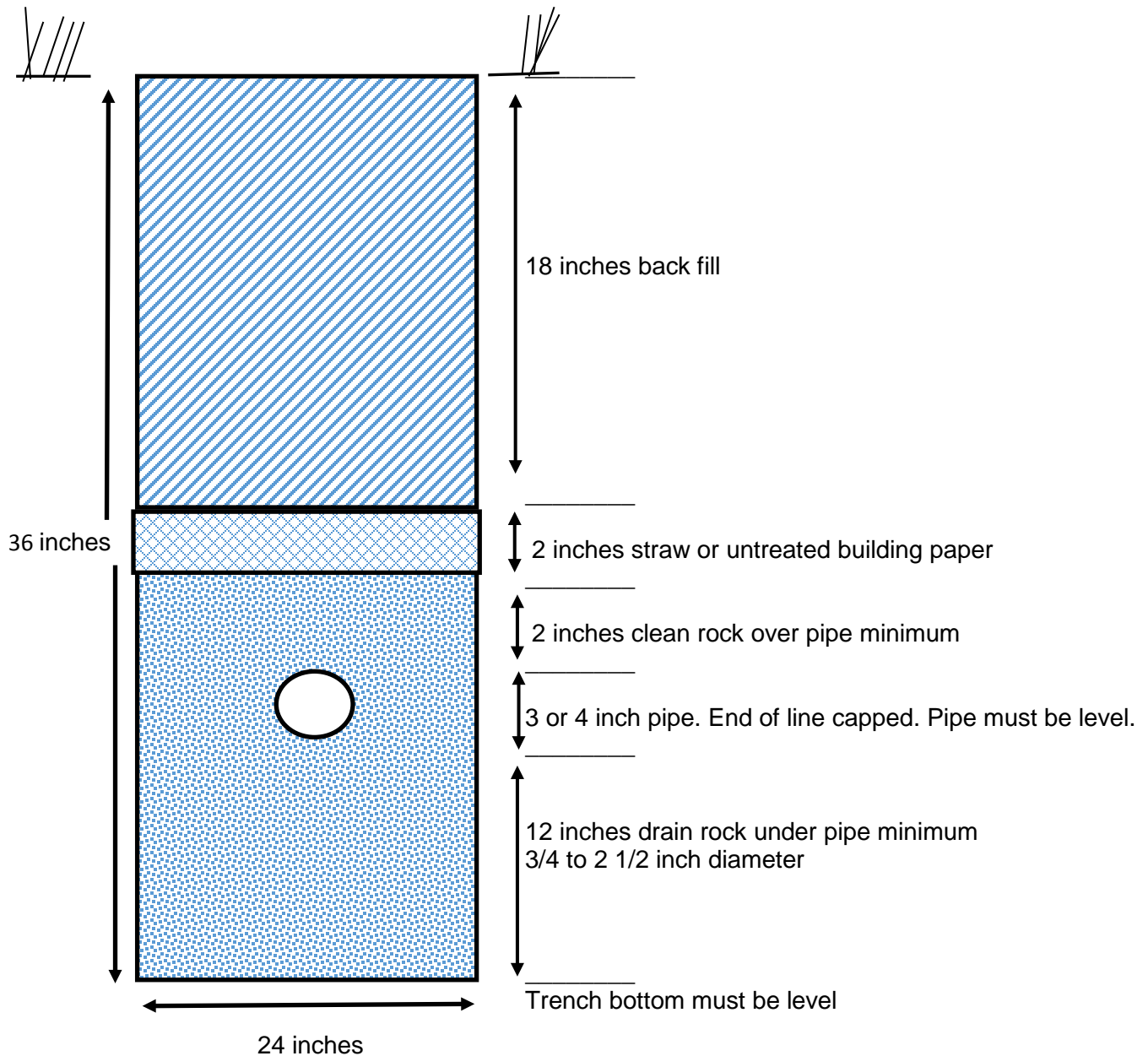
Absorption Area per Length = 2 square feet / linear foot

Trench Length = no. Bedrooms times Bedroom Flow Rate / (Hydraulic Loading times Absorption Area per Length)

## 9.2 Standard Dispersal Trench

- A. Dispersal trenches shall be installed on contour.
- B. Dispersal trenches shall be placed a minimum of eight feet on center regardless of the depth of drain rock.
- C. The depth of the dispersal trenches, dependent on the slope, percolation depth, or type of standard OWTS is found in Table 7.8a.
- D. The dispersal trenches shall be constructed in maximum lengths of 100 feet and at widths between 18 and 24 inches. The bottom of the dispersal trench shall be level to within a tolerance of 3 inches in 100 feet.
- E. Dispersal trenches shall contain double-washed rock filter material of 3/4 to 2 ½ inches in diameter, perforated sewage distribution pipe, geotextile filter fabric, and back-filled with a minimum of 12 inches of soil.
- F. The Permit Authority may permit gravel-less trench construction. The design, manufacturing and materials shall be durable and approved by the Permit Authority (See Section 9.4).
- G. A concrete or plastic distribution box shall precede each dispersal trench for the receipt and distribution of wastewater into the trenches. There shall be a minimum distance of 4 feet between the distribution box and the dispersal trench.
- H. Distribution boxes shall be placed for serial distribution of wastewater on sloping ground.
- I. Distribution boxes shall be placed for equal distribution of wastewater on flat terrain.
- J. The distribution box shall be placed in native soils at the appropriate depth. A minimum of 12 inches of backfill shall be placed above the distribution box or extended to grade with a riser. The distribution box shall not be placed in over-excavated soils.
- K. Metal detection markings, a 2 foot by ½ inch galvanized pipe or rebar shall be installed flush and vertical at each distribution box and in a vertical position against the trench wall at the end of the leach line, and also in the middle of lines that are longer than 50 feet. The pipe or rebar shall not be placed at a depth greater than 24 inches.
- L. Construction and paving over leaching systems and replacement areas is prohibited.
- M. Refer to Figure 9.2 Standard dispersal trench detail.

**Figure 9.2 – Standard Leach Line Trench**



### 9.3 Seepage Pits

A. Seepage Pits may be allowed under the following conditions:

1. Separation of the bottom of seepage pits to groundwater shall not be less than 10 feet.
2. Seepage pits shall be no deeper than 6 feet.
3. Seepage pits can only be installed if a satisfactory dispersal trench installation cannot be installed.

4. It is recommended that seepage pits be at least the same size (gallorage capacity) as the septic tank size that would be required based upon the number of bedrooms in the dwelling.
5. All seepage pits shall be completely filled with drain rock. No redwood seepage boxes will be permitted.

## **9.4 General System Installation Requirements**

- A. OWTS shall be installed in accordance with the plans approved by the Permit Authority. Permit Authority staff must approve any changes in the installation plan prior to installation.
- B. OWTS shall be located so as to be accessible for maintenance and repairs. Septic tanks and sump tanks shall be located so as to allow vacuum pumping.
- C. The building sewer and distribution piping shall be constructed with materials in conformance to building sewer standards identified in the Uniform Plumbing Code. The sewer and distribution piping shall have approved watertight fittings with clean-outs provided in accordance with the Uniform Plumbing Code. Piping shall be ABS or PVC Schedule 40 or better.
- D. Dosing siphons are prohibited.
- E. Leaching area side-walls should be left with rough surfaces prior to backfill.
- F. Construction of OWTS shall be avoided during the rainy season except when demonstrated by a qualified consultant that unsaturated soil conditions exist and compaction and smearing will not occur. Dispersal trenches are to be back-filled as soon after final construction inspection as possible. Trenches that have remained uncovered during any substantial rain may require abandonment or entire retrenching.

## **9.5 Gravel-less Drain Field Systems**

- A. Gravel-less drain field systems replace conventional rock and pipe standard OWTS drain fields.
- B. Gravel-less chambers are typically made of recycled plastic and must be pre-approved by the Permit Authority.
  1. Chambers are usually installed in an 18 or 24-inch wide trench.
  2. The chambers are interlocking arches that form a continuous drainage area with louvers to allow dispersal of the effluent into the soil.
  3. Sizing of the OWTS dispersal field is based on the height of the louvers sidewall infiltration area only. No credit is given for the trench bottom area. For example, if the chambers have louvers to a height of 9.5 inches, an infiltrative area of 1.6 square feet per linear foot is available.
    - a. Any other configuration must be reviewed on a case by case basis.

- C. Cylindrical bundles typically consist of a geosynthetic aggregate held in place with a high density polyethylene netting, with or without a 4-inch polyethylene pipe, and must be pre-approved by the Permit Authority.
  - 1. Bundles are usually installed in an 18 or 24-inch wide trench.
  - 2. The bundles, also referred to as cylinders, are typically 12 or 18 inches in diameter.
  - 3. Sizing of the OWTS dispersal field is based on the sidewall area beneath the invert, the number and the configuration of the bundles placed in the trench. No credit is given for the trench bottom area. For example, a bundle with a diameter of 12 inches containing the pipe, installed in a square configuration with 3 additional bundles without pipe, installed in a 24-inch trench, provide an infiltrative area of 3.0 square feet per linear foot.
    - a. Any other configuration must be reviewed on a case by case basis.
- D. Where soil and site conditions allow, approved chamber and cylindrical bundle systems may be installed in lieu of conventional gravel trench at depths up to 60 inches, as measured from the base of the trench to ground surface.
- E. Minimum 12 inches of soil cover is required over the cylindrical bundle(s) or chambers.
- F. Trench spacing, prevention of soil infiltration from cover soil, and all other requirements are the same as for gravel trenches.
- G. The chamber and cylindrical bundle systems are not to be installed in locations that would be subject to vehicular traffic, such as driveways or parking areas.

## **9.6 Filled Land Systems**

- A. Filled Land OWTS are systems where imported soil is imported and compacted to a minimum depth of 12 inches over native soil for the dispersal trench area of the system.
  - 1. The system must be designed by a qualified consultant.
  - 2. Filled Land proposals for subdivisions which have received tentative map approval based on the prior filled land septic system policy dated January 1, 2009 shall not be deemed acceptable for processing of the septic requirements for the subdivision.
  - 3. All the test holes in the area proposed for the Filled Land system and the reserve replacement area and within a 20-foot radius of the proposed perimeter of the leachfield shall be evaluated per standard system percolation test criteria. See Table 9.6 for allowable trench depth into native soil.

**Table 9.6 – Filled Land OWTS Trench and Fill Requirements**

Trench Depth Into Native (inches)	Gravel Depth Below Pipe (inches)	Fill Material Needed (inches)
15	12	15
18	12	12
18	15	15
21	18	15
21	12	9
24	21	15
24	18	12
24	12	6
27	24	15
27	18	9
27	12	6
30	24	12
30	18	6
30	12	No Fill. Standard System.

4. A full description of the complete installation including quality, kind and grade of all materials, equipment, construction workmanship and methods of assembly and installation shall be provided.
5. Proof of soil below the bottom of the trench is the same as for standard systems and can be demonstrated by percolation testing, soil morphology, and texture analysis. At a minimum, 3 feet of continuous acceptable soil is required below the proposed trench bottom. A variance for an alternative system (for example incorporation of an approved pretreatment unit) may justify reduction of the setback to 2 feet below trench bottom.
6. Filled Land Systems are limited to areas not exceeding 25 percent slope.
7. All dispersal trenches shall be a minimum of 12 inches in depth into native soil.
8. Gravel depth above pipe is to be 2 to 3 inches.
9. Gravel depth below pipe is to be not less than 12 inches unless a variance is approved. See Table 9.5 for permissible gravel depth below pipe.
10. Trench width of 18 to 24 inches.
11. Increased trench depth and gravel depth is permissible with a subsequent reduction of fill soil. A minimum of 6 inches of fill for any trench depth is required. A minimum of 15 inches of soil is always required above the pipe. See Table.9.5 for fill material requirements.
12. Use of gravel-less drain field systems, as described in Section 9.4, are permitted.



13. The absorptive quality of imported soil for the leachfield cover shall be equal to or better than the native soil meeting percolation test requirements. Sand, gravel, rock or compost does not qualify as acceptable cover material for filled land systems.
14. Cover material for filled land systems shall be constructed in not more than 8 inch layers to approximately the same relative compaction as the upper soil horizon native to the site. Certified results of the soil density test may be required to be submitted to the Permit Authority Well and Septic Section by the RCE or REHS.
  - a. The fill is to be of uniform depth extending to a distance at least 15 feet from the center of any trench in all directions except the up slope distance may be reduced to 5 feet with additional fill to maintain a 5 to 1 taper for a total of 10 feet from the center of the up slope dispersal trench on slopes above 5 percent.
  - b. The down and side slope toes of the fill should be tapered at a 5 to 1 ratio beginning 15 feet from any leachfield or proposed leachfield expansion area to provide a total of 20 feet from the center of any trench.
15. Reserve replacement areas must be demonstrated as per other standard systems. A 100 percent reserve replacement area for pre October 1971 parcels and 200 percent for post October 1971 parcels is required. Fill material is not required to be placed on the reserve placement area prior to permitting of the replacement system.
16. Site specifications for fill shall indicate that vegetation is to be removed and surface prepared to permit good mixing of the native soil and fill material added.
  - a. Areas with closely-spaced trees in excess of 24 inches in diameter are generally not suitable for filled-land systems.
  - b. Rototilling to prepare the site for fill is prohibited.
  - c. A single pass 6 inch rip of the surface soil to ensure a good mixing of the native soil and the fill material is required. Ripping shall be parallel to the topographic contours.
  - d. Wheeled tractors are to be minimized in the dispersal area at this time to avoid soil compaction.
17. Specifications on Filled Land proposals require the fill to be completed before any leaching trenches are constructed.
18. Construction of any dispersal field should be avoided during the rainy season. Lines are to be back-filled as soon after final construction inspection as possible. Lines which have remained uncovered during any substantial rain may require abandonment or entire retrenching. The fill area shall be seeded or sodded with appropriate vegetation after construction of the dispersal field is complete. Appropriate erosion control measures shall also be in place.

## **9.7 Shallow Sloping OWTS**

- A. The determination of site suitability for a "shallow sloping OWTS," a standard OWTS that may be installed where depth of permeable soil is inadequate to provide for 15 feet to breakout from the leach pipe to the surface of a slope in areas with slopes from 12-½ to 30 percent, may be considered provided the following conditions are met:
  1. The system must be designed by a qualified consultant.

2. If 1 or more soil profiles performed on the site at the depths required for 15 foot-to-breakout prove unsatisfactory and are supported by soils profiles, then additional tests to justify a “shallow sloping system” may be considered.
  3. 8 or more percolation test holes (in no instance less than 36 inches in depth) are required:
    - a. at least 6 in the primary/replacement area;
    - b. 1 hole 25 feet downslope; and
    - c. 1 hole 50 feet downslope of the lowest leach line in the primary/replacement area to show the permeable top soil is continuous (for example adequate distance and depth of soil exists to provide filtration and treatment of effluent).
  4. Percolation rates of 1 to 60 minutes per inch are required.
    - a. Percolation rates of faster than 5 minutes per inch may require additional evidence that breakout of effluent to the surface or contamination of beneficial waters will not occur.
  5. The percolation test report must evaluate slope stability. Proposed leachfield areas which are identified on geologic maps of Sonoma County as unstable or questionable must be surveyed by a Registered Geologist. Any mitigations recommended by the geologist are to be incorporated into the system design.
  6. Any proposed leachfield area with outcroppings of bedrock or impermeable soil horizons is not acceptable for a “shallow sloping system.”
- B. The design criteria for a “shallow sloping OWTS” includes the following:
1. Any “shallow sloping OWTS” proposed under these criteria shall be designed by a Qualified Consultant.
  2. Dispersal fields are to be set back a minimum of 50 feet from any bank, natural or manmade, unless otherwise specified by Table 7.2b or where more stringent requirements may apply.
  3. Leachfields and reserve replacement areas shall be placed so as to utilize as much of the upper contours of the site as possible. Serial distribution is required unless an approved parallel distribution system is developed.
  4. Trenches must be at least 18 inches wide and a minimum of 36 inches deep. Construct dispersal trenches with 12 inches of gravel under the pipe, 2 inches of gravel over the pipe, and 18 inches of earth backfill. If there is more than 36 inches of soil as shown by percolation tests and more than 12 inches of gravel can be used, credit for use of additional trench sidewall may be granted. Non-residential designs will be based on Permit Authority, EPA, or other approved design criteria.
  5. Space trenches at least 10 feet on center (8 feet solid earth between trench walls).
  6. Amount of leaching trench required for each primary field will be determined from the number of bedrooms and approved percolation rate.

- a. Construct two primary leachfields divided by an approved diversion valve which can be alternated on at least a yearly basis.
  - b. Each primary field shall be equal to 100 percent of the pre-determined lineal requirement.
  - c. Provide a monument for the diversion valve.
7. All dispersal fields are to be provided with an intercept drain unless no significant watershed exists above the system.
- a. Exceptions must be justified by satisfactory wet-weather groundwater determinations.
  - b. Intercept drains shall be installed according Section 8.6.
  - c. Drainage diversions shall not influence neighboring properties.
  - d. All surface drainage shall be diverted away from the leachfield area.
  - e. All perforated portion of intercept drains must be a minimum of 25 feet from any property line unless a variance is justified.

C. The following additional requirements apply to “shallow sloping OWTS”:

- 1. Construction of the dispersal field should be during the dry portion of the typical Sonoma County year. The rainy season should be avoided. Lines are to be back-filled as soon after final construction inspection as possible. Lines which have remained uncovered during any substantial rain may require abandonment or entire retrenching.
- 2. Benching is not permitted during construction of the dispersal field.
- 3. The area of the leachfield should be stabilized by sodding or seeding with native grasses to control erosion.
- 4. No animals may be contained, housed, or pastured over the dispersal field. The soil in the dispersal field area shall not be disturbed by cultivation or tilling.
- 5. If any lot is to be created utilizing a “shallow sloping system” design, appropriate deed restrictions shall be recorded prior to validation of the land division.

## 9.8 Standard Shallow Trench Pressure Distribution (STPD) OWTS

- A. If desired by the property owner, a STPD OWTS may be permitted as a Standard OWTS, rather than a Non-Standard OWTS, under the following conditions:
- 1. The percolation rate is 60 minutes per inch or less at proposed trench bottom and otherwise meets the Section 7 Site Evaluation and Investigation Requirements.
  - 2. Gravel size of 3/4 to 2-1/2 inches is allowed.
  - 3. Except for the percolation test rate of 60 minutes per inch or faster and gravel size, the proposed OWTS otherwise meets all other Section 13.4 STPD site, design and construction criteria.
  - 4. A STPD that meets the above referenced requirements shall not be subject to the reporting requirements of Section 13.