

# Section 8 Criteria for OWTS Components

## 8.1 Septic Tank Requirements

- A. These requirements shall apply to all septic tanks in new OWTS and replacement systems.
  1. Septic tanks shall be International Association of Plumbing and Mechanical Officials (IAPMO) approved. Septic tanks shall be sealed with an approved sealant so it is watertight. Wood septic tanks and metal septic tanks are prohibited.
  2. Septic tanks shall have at least 2 compartments separated by a baffle or equivalent arrangement. The inlet compartment shall have a capacity of not less than 2/3 the total volume.
  3. An inlet tee and outlet tee is required.
  4. Each compartment of the septic tank shall have access provided by a manhole having not less than 24 inches in minimum dimensions with a close fitting manhole cover equipped with a durable handle to facilitate removal.
  5. A clean-out to finished grade shall be provided between the structure and the septic tank.
  6. Each compartment shall be provided with a riser extended from each manhole cover to the surface of the ground so as to facilitate inspection and maintenance of the septic tank. The riser shall be of equal size or larger than the manhole cover and shall be constructed of durable material. All joints shall be properly sealed with a sealant and/or an interlocking mechanism approved by the Permit Authority.
  7. A corrosion-resistant, NSF rated effluent filter approved by the Permit Authority, capable of screening solids in excess of 3/16 of an inch in diameter, shall be provided in the outlet tee.
  8. All connections from building to septic tank must conform to construction standards per the approved County Code requirements.

## 8.2 Septic Tank Sizing

- A. The minimum liquid capacity of any septic tank installed shall be 750 gallons. Septic tanks intended to serve single family dwellings shall be sized on the number of bedrooms in the dwelling. The septic tank size for commercial OWTS shall be based on the peak daily sewage flow formula of  $V$  (net volume in gallons) equals  $1,125$  plus  $0.75Q$  (daily wastewater flow in gallons).
- B. Minimum required septic tank sizing is shown in Table 8.2.

**Table 8.2 – Septic Tank Capacity**

Bedrooms	Tank Capacity (gallons) Pre-Cast Tank
1-2	750
3	1,000
4	1,200
5-6	1,500
Additional Bedrooms	250 per bedroom

### **8.3 Septic Tank Water Tight Test Requirements**

- A. New and replacement septic tanks, pretreatment tanks and sump tanks shall be tested for water tightness.
- B. Plan submittals shall have language stating the requirement and procedure for water tight testing.
- C. A water tight test inspection shall be scheduled with the Permit Authority. The inspection results shall be recorded as a pass or fail by the Permit Authority.
- D. In the event of a failed water tight test, a re-test is allowable. A reinspection fee will be assessed prior to scheduling the retesting.
- E. The testing procedure:
  - 1. The tanks shall be installed properly, according to industry standard or manufacturers' requirements with the back fill placed around the tank(s) at a level below the invert of the inlet pipe and outlet pipe areas.
  - 2. The licensed contractor shall fill the septic tank, pretreatment tank, and or sump tank with water.
  - 3. The water shall be filled up into the riser(s) a minimum of 2 inches.
  - 4. The water level shall be marked at the beginning of the water tight test.
  - 5. The test duration shall be 30 minutes.
  - 6. A water level decline of 1/8 inch or more indicates a failed water tight test.

### **8.4 Sump & Pump System**

- A. A pump system can be a supplement to an OWTS. A pump in a standard system is utilized to enable the installation of a dispersal field up-slope of the structure to be served. The effluent at the higher elevation is distributed to the dispersal field by gravity flow.
- B. A pump system is a major feature in an alternative OWTS that allows intermittent balanced dosing or pressurizing of effluent in the dispersal system. Any sump and pump must be designed, inspected and hydraulically tested for proper operation by the designer and Permit Authority staff prior to final approval of the installation.

### **8.5 Sump & Pump Requirements**

- A. Sewage effluent sump and pump general requirements area as follows:
  - 1. Specifications for the sump and pump, including the pump performance curve, must be submitted with the design for the OWTS.
  - 2. Design information shall include the following:
    - a. Relative elevations of the pump and dispersal field pipe;
    - b. Total dynamic head loss through the effluent piping and valves;
    - c. Pump run times; and

- d. Design flow rate (gallons per minute).
3. All sump pump systems and distribution systems must be inspected and hydraulically tested for proper operation by the designer and Permit Authority staff prior to final approval of the installation and occupancy of the structure.

B. Required features of the sump are as follows:

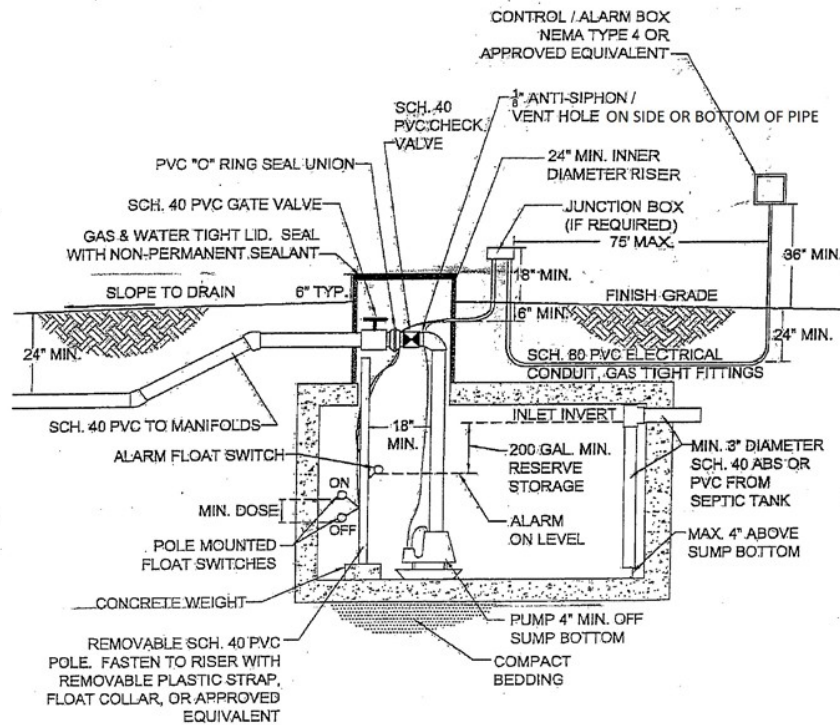
1. The minimum working capacity of all sumps is 300 gallons, including:
  - a. The design dose volume.
  - b. A minimum 200 gallon additional storage capacity between the high water alarm and inlet.
  - c. The minimum working capacity of sumps for non-standard OWTS is 500 gallons or 3 times the designed dose, whichever is greater.
  - d. Alternative configurations may be approved for systems utilizing pretreatment and repairs if justified by the designer.
2. Concrete tanks shall be a monolithic casting or joints sealed with appropriate sealants.
  - a. Concrete tanks shall be made of sulfate-resisting cement, Specification C 150, Type II or highly sulfate-resisting cement, Specification C 150, Type V or coated with an asphalt emulsion or equivalent on the inside.
  - b. The coated interior shall be allowed to dry for at least 24 hours.
  - c. Asphalt emulsion or tar shall not be used as joint sealants.
3. Sump tanks shall be constructed of solid durable materials, which are not subject to excessive corrosion and degradation in the presence of domestic sewage and shall be watertight.
  - a. They shall meet the IAPMO construction standards for septic tanks of the said material (glass-fiber-reinforced polyester, polyethylene, synthetic fiber reinforced).
  - b. Wood and/or metal tanks are not allowed.
4. All sumps shall have a riser that extends to at least 2 inches above the finished grade.
  - a. Risers shall be sealed watertight to the sump chamber with materials suited for the specific application.
  - b. Wood risers are not allowed.
  - c. Risers and lids in traffic areas shall be traffic rated and may be flush with the ground elevation.
5. All pipes and/or electrical conduits entering the sump tank or riser shall be sealed to make the passage gas and water tight.
  - a. If the pipes and/or electrical conduits enter a synthetic tank or plastic riser, rubber grommets shall be used
  - b. Non-shrink grouts should be used with concrete tanks or risers.
6. Sumps on downhill runs shall be placed within 30 feet of the leachfield, unless greater distances are allowed. When practical, sumps shall be located at a lower elevation than the leachfield.
  - a. The sump tank location must be accessible for a septic tank pumper to pump the tank.

7. A pre-screening device or filter capable of screening solids in minimum 3/16 inches size shall be installed in the septic tank or sump chamber to assist in preventing suspended solids from reaching the pump.
8. Wastewater shall exit the sump only through pump and pressure lines. Gravity overflows are prohibited.

C. Required features of the pump are as follows:

1. Float controls for the pump and audio/visual alarm shall be mounted to a Schedule 40 PVC pole, mounted inside a pump chamber, which can be removed for maintenance. See Figure 8.4a.

**Figure 8.4a – Sump Detail**



SUMP DETAIL  
(NOT TO SCALE)

2. Control floats shall be attached to the PVC pole by plastic tie straps or plastic float collars.
  - a. Stainless steel straps will not be accepted.
3. The pump shall be mounted a minimum of 4 inches above the bottom of the sump chamber.
  - a. If applicable, non-corrosive materials shall be used to support the pump.
4. For the situations where a pump must be installed in the second chamber of the septic tank, the pump shall be placed in a screened pump vault within the second chamber.
  - a. Microdosing shall be required to minimize swings in the liquid level.

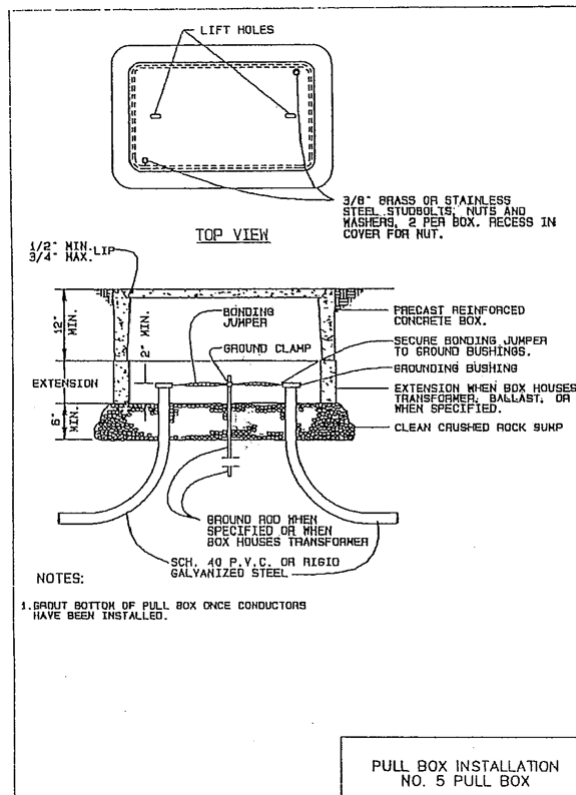
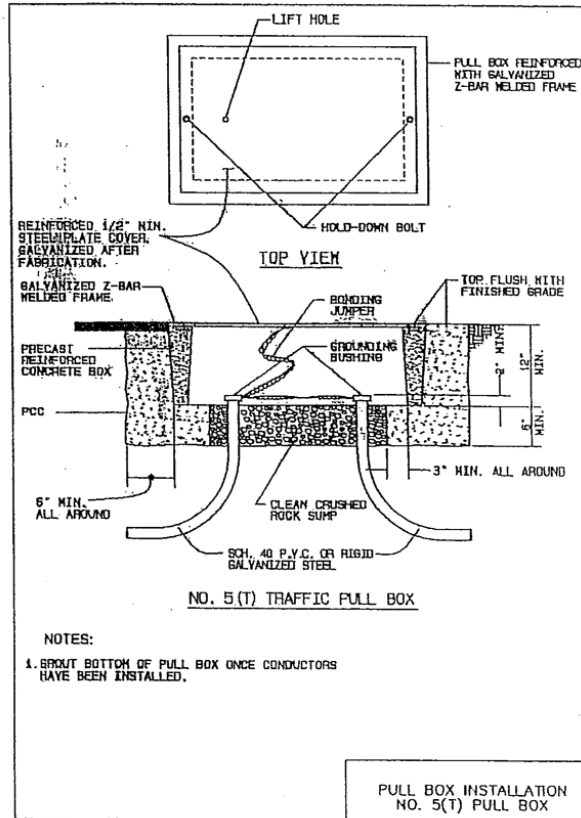
D. Required electrical features are as follows

1. All materials, connections, and specifications shall meet the California Electric Code.
  - a. In all cases in which a sump with a pump is used for an OWTS, the contractor/owner shall obtain an electrical permit from Permit Authority or City Building Department having jurisdiction.
  - b. The Permit Authority shall be responsible for inspection and approval of all electrical code requirements.
  - c. Disconnecting means (control panel or disconnecting switch) shall be located in sight from the pump location per the County adopted electrical code.

2. The alarm shall be equipped with:
  - a. A loud (87 decibels at a 10-foot minimum horizontal distance from the alarm location) audio alarm operated by a float switch or switches to indicate an “alarm” situation.
  - b. A minimum sized 7/8-inch diameter red light shall be mounted on the face of the panel, which shall glow as long as the “alarm” condition exists.
  - c. A momentary “alarm test/alarm silence” switch to test the alarm light and horn to simulate an “alarm” condition and to silence the audio alarm horn.
3. An approved listed model or type of float switch shall be used to activate each pump. The alarm/control panel shall be equipped with a motor contactor for the pump and a pump hand/off/automatic switch to manually run the pump bypassing the control panel automatic mode and to test the alarm.
4. Power supply to each circuit breaker in the control panel shall be from a separate dedicated circuit with circuit protection, of equivalent or higher amperage rating, at the power supply panel.
  - a. The alarm/control panel shall be equipped internally with separate circuit protection for the control and pump circuitry.
    - i. Multiplex (more than 1 pump) systems shall have separate power supply circuits.
    - ii. Separate circuits are required for controls and each pump.
    - iii. Joint circuits may be acceptable for existing sump/pump systems that were installed prior to this requirement if fused pursuant to the current Electrical Code.
  - b. Pump protection shall be provided by a thermal magnetic circuit breaker for overload protection.
    - i. If the pump is single-phase, the motor windings shall have internal thermal overload protection.
    - ii. If the pump is 3-phase, the circuit protection in the alarm/control box shall be equipped with an adjustable thermal overload protection.
5. Below grade electrical splices shall be placed in a Sonoma County approved pull box installation or a Sonoma County approved external splice box with waterproof splice connectors.
  - a. Traffic-rated pull boxes shall be used in traffic and adjacent areas. See Figure 8.4b.
6. Electrical non-metallic splice boxes may be placed within the sump chamber for existing sump/pump systems that were installed prior to this requirement. They shall be gas-tight boxes with waterproof splice connectors.
7. The pump power lead and the float switch control wires may run in a common conduit. High voltage and low voltage conductors shall be run in separate conduits.
  - a. All cords going into the sump shall be individually sealed with non-metallic gas tight fittings in either the riser, junction box or alarm/control panel as appropriate.
  - b. Metallic gas tight fittings are not allowed.
  - c. All exposed PVC conduit shall be Schedule 80.
8. The control panel and its contents shall be UL listed.
  - a. The control panel shall be placed in an easily accessible location.

- b. A non-resettable dose counter shall be installed in control boxes utilized for non- standard OWTS.
- c. If a dose counter is not provided, a non-resettable flow meter shall be provided on the outgoing line to the dispersal field. Additionally, systems with flush modes shall be equipped with a flow meter on the return line. The flow meter shall read in gallons per minute and total gallons.
- d. The control panel shall be equipped so settings can be adjusted manually on-site.
- e. Control boxes that must be opened to view the dose counter shall be equipped with a clear plastic or Pyrex safety shield inside the control box.
- f. The control box shall be labeled "Caution-Electrical Hazard."
- g. The dose settings (time or gallons), calculated dose volume and float settings shall be posted on the inside of the panel.

Figure 8.4b – Sump and Pump Requirements





9. All exterior mounted alarm and controller enclosure shall be NEMA Type 4. If the alarm/controller is mounted more than 75 feet from any residence or commercial structure served by the system, a separate audible/visible alarm shall be provided at the primary structure connected to the OWTS.
  - a. The enclosure for the remote and audio/visual alarm shall be NEMA Type 1 if mounted indoors.

E. Required features of sewage piping are as follows:

1. The effluent line entering the sump shall be minimum of 3 inch diameter, ABS Sch 40 or PVC Sch 40, and shall be sealed with a coupling integrally cast into the tank, a properly fit neoprene grommet or with non-shrink grout as appropriate.
  - a. The effluent line shall be turned down with a sanitary tee fitting and drop that extend to within 4 inches of the tank floor.
2. Minimum 1 inch PVC Schedule 40 from pump to dispersal field is required with:
  - a. A 1/8-inch diameter anti-siphon and air vent hole located between the pump and check valve angled down and away from the floats;
  - b. PVC check valve;
  - c. PVC gate or ball valve and union(s).
3. Brass type fittings, valves, and piping are prohibited in sump chambers.
4. High points in the transmission line after the sump may require an "air relief valve" depending on the design situation.

## 8.6 Alternating Leachfields

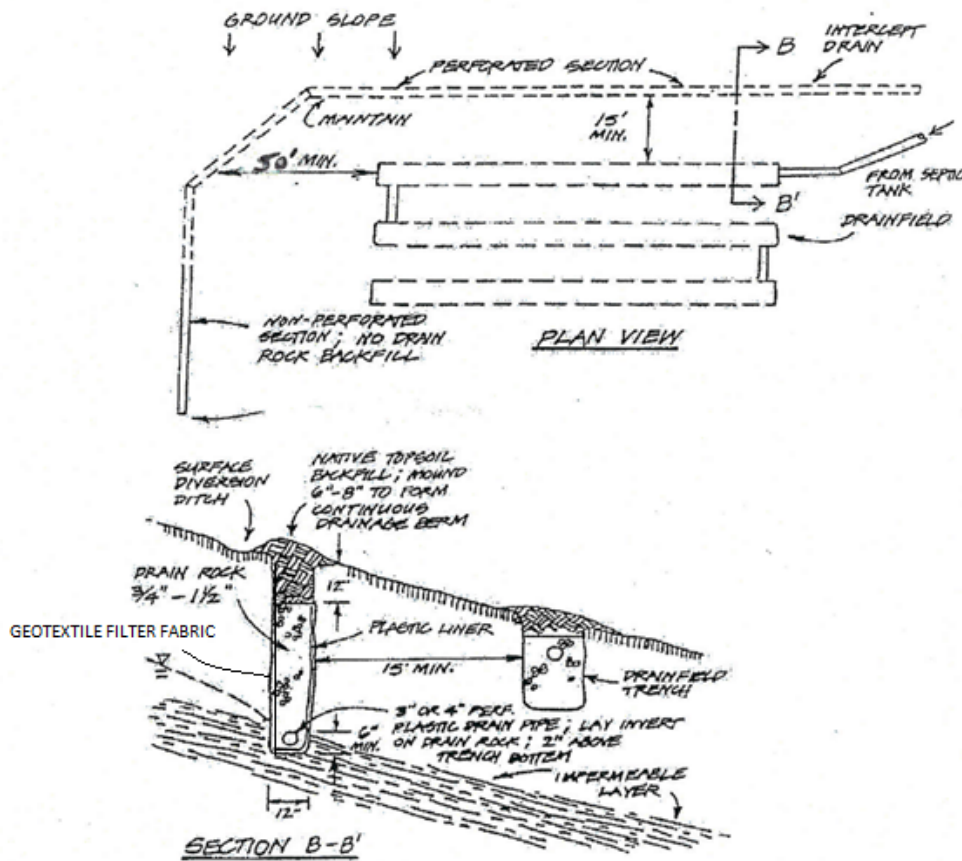
- A. Alternating leachfields are required for OWTS of greater than 500 lineal feet of leach line.
- B. An approved diversion valve, or dosing tank with pump(s), is required for alternating leachfields.
- C. Each primary field shall be equal to 75 percent of the primary leachfield lineal requirement.
- D. For installations of from 500 to 1,000 lineal feet of leach line, the dosing requirement may be satisfied by any one of the following approaches:
  1. Dosing tank with a pump which discharges the tank once every 3 to 4 hours.
  2. Alternating leachfields with an approved diversion valve.
  3. 2 or more septic tank/leachfield systems, with neither system exceeding 500 lineal feet of leach line.
- E. For installations of greater than 1,000 lineal feet of leach line, the dosing requirement may be satisfied by any of the following approaches:
  1. Dosing tank with 2 pumps dosing alternately and each serving  $\frac{1}{2}$  of the leachfield.
  2. 3 or more septic tank/leachfield systems, with no system exceeding 500 lineal feet.

## 8.7 Intercept Drains

- A. The design of the intercept drain is dependent on the size of the contributing drainage area, the amount of water that must be removed, the soil's hydraulic properties, and the available slope of the site. The use of intercept drains to lower the level of perched groundwater in the immediate dispersal field area shall be acceptable only under the following conditions:
1. The design plan shall be signed and stamped by a Qualified Consultant.
  2. Natural ground slope is greater than 5 percent.
  3. Site investigations indicate groundwater to be perched on bedrock, hardpan, or an impermeable soil layer.
  4. The intercept drain extends from ground surface into bedrock, hardpan, or impermeable soil layer. See Figure 8.6.
  5. A trench minimum width of 1 foot.
  6. The upslope side of the trench shall be lined with a geotextile filter fabric.
  7. The down slope side of the trench shall be lined with 10 to 12 millimeter polyethylene sheeting.
  8. The drain rock shall be  $\frac{3}{4}$  to 2-inch diameter in size and washed, contain less than 1 percent fines (sand, very fine silt, and clay) and extend from trench bottom to within 6 to 12 inches of grade and backfilled to grade with native soil.
  9. The collection pipe shall consist of 4-inch diameter perforated drain pipe, oriented with holes down and installed on top of the drain rock, approximately 2 to 4 inches above trench bottom.
  10. The outlet pipe shall consist of a minimum 4-inch solid (non-perforated) drain pipe at the point of discharge with placement of rip rap and be maintained free and clear.
  11. The trench and pipe shall be sloped for gravity flow at a minimum 1 percent gradient throughout the trench and extending to the outlet point.
  12. Cleanouts to grade are required
    - a. At the upslope end of the drain;
    - b. At bends of 45 degrees or greater;
    - c. At least every 100 feet along the length of the drain.
- B. The perforated section of an intercept drain shall not be located less than 15 feet upgradient nor 25 feet laterally or 25 feet downgradient of a septic tank. The perforated section of an intercept drain shall not be located less than 15 feet upgradient nor 50 feet laterally or 50 feet downgradient of a dispersal area or non-standard system.
- C. The non-perforated or solid section of a drain pipe shall not be located less than 5 feet upgradient nor 10 feet laterally or 10 feet downgradient of a septic tank. The non-perforated section or solid section of drain pipe shall not be located less than 10 feet upgradient nor 15 feet laterally or 15 feet downgradient of a dispersal area or non-standard system.
- D. Where all of the above conditions cannot be met, actual performance of the intercept drain shall be demonstrated prior to approval for an OWTS permit.

E. Interceptor drains are required and shall be installed according to Section 18.A.8.b and c (West Petaluma Variance Prohibition Special Standards Area).

**Figure 8.7 – Interceptor Drain**



## 8.8 Stream and Driveway Crossings

- A. All pipe used within the watercourse setbacks or under a driveway must be PVC Schedule 40 or other approved material.
- B. All effluent transmission pipes used for stream crossings must be pressure tested at the time of installation and prior to final inspection. Pressure testing shall be conducted in accordance with the most current version of the Sonoma County Water System Standards, Section 8, Inspection and Testing (including record drawings).
  - 1. Buried pipe must have a minimum of 4 feet of cover over the portion of the pipe under the center line of the stream.
    - a. This may be reduced to 1 foot if the portion of the pipe under the stream banks is encased (sleeved) in ABS Schedule 40, PVC, cast iron, or concrete pipe extending a minimum of 25 feet beyond the high water elevation mark on both sides of the stream.
  - 2. Pipe must be encased (sleeved) with cast iron or well casing whenever it is exposed or above the stream.
    - a. Pipe must be 1 foot above the 100 year flood elevation.
    - b. Pipe must be either covered with fill over a culvert or hung by approved hangers every 4 feet from an appropriate supporting structure as specified in the California Plumbing Code.
- C. All effluent transmission pipes used for driveway crossings must have a minimum of 1 foot of native cover over the pipe and encased (sleeved) with ABS Schedule 40, PVC, cast iron, or concrete pipe extending a minimum of 5 feet beyond the driveway edges.