

SECTION 5

OWTS PERFORMANCE, MONITORING, AND EVALUATION

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A. OWTS OPERATIONAL PERFORMANCE REQUIREMENTS

1. General

- a. All onsite wastewater treatment systems (OWTS) shall function in such a manner as to:
 - (1) Be sanitary and not create a health hazard or nuisance;
 - (2) Prevent backup or release of wastewater or wastewater effluent into the structure(s) being served by the OWTS; and
 - (3) Not discharge wastewater or wastewater effluent onto the ground surface or into surface water, or in such a manner that groundwater may be adversely impacted.
- b. All OWTS and the individual components shall meet the performance requirements for the specific site conditions and application for which they are approved.
- c. All OWTS shall be operated in compliance with applicable performance requirements particular to the type of system, the facility served, and the site conditions.

2. Conventional Systems

- a. All septic tanks shall be structurally sound, watertight, provide clarified effluent, have adequate space available for sludge and scum storage, and operate in such a manner as to not create odors or vector attraction, be properly vented, and have a functional baffle and sanitary tees for inlet/outlet from tank chambers.
- b. Dispersal systems shall: (a) have adequate dispersal capacity for the structures and/or uses served; (b) not result in seepage or saturated soil conditions within 12 inches of ground surface in or adjacent to the dispersal field; and (c) be free from soil erosion or instability.
- c. Effluent shall not continuously pond at a level above the invert (bottom) of the perforated distribution pipe in the dispersal trench or serial distribution overflow line, as applicable.
- d. All components of the OWTS shall be functional and in proper working order.

3. Supplemental Treatment

In addition to meeting criteria in 1 and 2 above, supplemental treatment systems shall comply with the following performance requirements.



- a. Effluent Quality. Effluent produced by all supplemental treatment systems shall comply with the following minimum 30-day average constituent limitations:

Constituent	(1) For Use with Trench Systems	(2) For Use with Drip Dispersal Systems	(3) Where Pathogen or Nitrogen treatment Required*
Biochemical Oxygen Demand (BOD), mg/L	30	20	Per (1) or (2), as applicable
Total Suspended Solids (TSS), mg/L	30	20	Per (1) or (2), as applicable
Fecal Coliform, MPN/100 ml	N/A	N/A	200
Total Nitrogen, % reduction (effluent/influent)	N/A	N/A	50%

*Due to: (1) proximity to public water supply well or surface water intake per SWRCB OWTS Policy and the County Ordinance Section 4.84.120 or (2) location within an Advanced Protection Management Area subject to SWRCB OWTS Policy supplemental treatment limits (10.9 and/or 10.10). Where applicable, additional requirements for pathogens include: (a) minimum 3-ft separation to groundwater below dispersal field; and (b) minimum 12 inches of soil cover over dispersal piping. Note: TMDL requirements may be stricter than requirements of this Section.

- b. Sand Filters. Sand filters shall:

- (1) be operated to maintain uniform effluent distribution throughout the sand filter bed;
- (2) not result in continuously ponded effluent on the distribution bed infiltrative surface;
- (3) be operated and maintained to prevent channeling of flow, erosion of the sand media or other conditions that allow short-circuiting of effluent through the system;
- (4) not result in leakage of effluent through the sand filter liner or supporting structure; and



- (5) conform to applicable requirements for pressure distribution in Section A.4 below.
- c. Proprietary Treatment Units. Proprietary treatment units shall comply with the following:
 - (1) The unit and its components shall be structurally sound, free from defects, be watertight, and not create odor or vector attraction nuisance.
 - (2) The unit shall be operated in accordance with the approved manufacturer and certification/listing organization standards.

4. Alternative Dispersal System

In addition to the requirements in 1. and 2. above, alternative dispersal systems shall also comply with the following.

- a. Pressure Distribution Systems.
 - a. Pump tanks, risers and lids shall be structurally sound, watertight and store wastewater effluent in such a manner as to not create odors or vector attraction.
 - b. Pumps, floats, alarms and associated controls shall be in good condition and operate in accordance with design specifications.
 - c. Dispersal field and components shall:
 - (a) be operable and in good condition;
 - (b) maintain uniform distribution of effluent throughout the dispersal field;
 - (c) not result in continuously ponded effluent in the dispersal trench (or bed) to a level above the invert (bottom) of the distribution pipe; and
 - (d) in the case of pressure-dosed sand trenches, not result in continuously ponded effluent above the sand interface.
- b. Subsurface Drip Dispersal Systems. Subsurface drip dispersal systems and components shall:
 - (1) not result in seepage or saturated soil conditions above the depth of the dripline within or anywhere along the perimeter of the dripfield;
 - (2) be free from erosion, slumping or other soil disturbance that threatens to expose or cause damage to drip dispersal tubing or appurtenances;



- (3) conform to applicable requirements for pressure distribution in A.4 above;
and
- (4) be operated and maintained in accordance with manufacturer recommendations.

B. OWTS MONITORING REQUIREMENTS

1. General

A monitoring program will be established for each alternative OWTS as a condition of the operating permit at the time of permit issuance, and may be amended at the time of permit renewal. The purpose of this monitoring is to ensure that the alternative OWTS is functioning satisfactorily to protect water quality and public health and safety.

2. MONITORING ELEMENTS

The monitoring requirements will vary depending on the specific type of alternative OTWS, typically including the following:

- a. Recording of wastewater flow based on water meter readings, pump event counter, elapsed time meter, in-line flow meter, or other approved methods;
- b. Measurement and recording of water levels in inspection risers/pipes in the dispersal field;
- c. Inspection and observation of pump operation and other mechanical equipment;
- d. Water quality analysis of selected water samples taken from points in the treatment process, from groundwater monitoring wells, or from surface streams or drainages; typical water quality parameters include total and fecal coliform, nitrate, BOD, and suspended solids;
- e. General review and inspection of treatment and dispersal area for evidence of seepage, effluent surfacing, erosion or other indicators of system malfunction;
and
- f. Other monitoring as recommended by the system designer or equipment manufacturer.



3. Monitoring Frequency

The required frequency of monitoring for each alternative OWTS installation will be established in the operating permit, generally in accordance with the following minimum schedule:

- Years 1 through 4 of operation: semi-annual monitoring
- Years 5 and beyond: annual monitoring

Monitoring frequency may be increased for larger flow OWTS (e.g., >2,500 gpd), where warranted because of the complexity of the design or sensitive nature of the site (i.e., impaired areas). Monitoring frequency may be increased for any system if problems are experienced.

4. Monitoring Responsibility

Monitoring of alternative OWTS shall be conducted by or under the supervision of one of the following:

- a. Registered Civil Engineer;
- b. Professional Geologist;
- c. Registered Environmental Health Specialist; or
- d. Other onsite wastewater maintenance providers recognized by Environmental Health as having experience in the construction and/or operation of OWTS as evidenced by either of the following:
 - (1) possession of a valid contractor's license (A, C-36 or C-42); or
 - (2) completion of an onsite wastewater certification training course by a third party entity, such as the California Onsite Wastewater Association (COWA), National Association of Waste Transporters (NAWT), National Sanitation Foundation (NSF), or other acceptable training program as determined by the director.

Additionally, Environmental Health staff may require third-party or County inspection and monitoring of any alternative OWTS where deemed necessary because of special circumstances, such as the complexity of the system or the sensitive nature of the site. The costs for such additional monitoring would be the responsibility of the owner.



5. Reporting

Monitoring results shall be submitted to Environmental Health staff in accordance with reporting guidelines provided in this Manual and as specified in the operating permit. The monitoring report shall be signed by the party responsible for the monitoring. Notwithstanding formal monitoring reports, Environmental Health staff shall be notified immediately of any system problems observed during system inspection and monitoring that threaten public health or water quality.

6. Post-Seismic Inspections

In addition to regular inspection and monitoring activities, post-seismic inspection and evaluation of alternative OWTS located in high-risk seismic areas may be required in the event of an earthquake causing significant ground shaking in the region, as determined by Environmental Health staff in consultation with other County departments. Environmental Health staff will be responsible for issuing appropriate notices when such inspections are required; those conducting the inspections will be required to report the inspection results to Environmental Health staff. The purpose of such inspections will be to assess and document any damage to the OWTS and to implement corrective measures, as needed, in a timely manner. Post-seismic inspection shall be in accordance with the standard inspection requirements specified in the applicable operating permit for each OWTS, along with any additional requirements that may be prescribed by Environmental Health staff, in consultation with other County departments, based on the intensity, location and other aspects of the particular seismic event.

7. Data Review

Environmental Health staff will, from time-to-time, compile and review monitoring and inspection results for alternative OWTS and will provide a summary of results to the San Francisco Bay and Central Coast Regional Water Quality Control Boards as part of required OWTS-water quality assessment per the State Water Board's OWTS Policy. Based on this review, Environmental Health staff may require corrective action for specific properties or certain types of alternative OWTS, or general changes in monitoring and inspection requirements.

C. OWTS PERFORMANCE EVALUATION GUIDELINES

1. Purpose and Performance Criteria

San Mateo County Ordinance requires the completion of an OWTS inspection and performance evaluation in connection with certain types or level of changes or additions to an existing building served by an OWTS. Guidelines for these



inspections are prescribed below. These guidelines may also be useful and employed for other circumstances, such as OWTS inspections in connection with property transfers, for lending institutions, etc.

The purpose of these inspections is to determine, on an individual basis, whether an existing OWTS is functional and meets minimum standards of performance established by the San Mateo County Environmental Health Division. The following performance criteria are established as minimum requirements:

- a. There is no surfacing effluent at any time;
- b. The effluent is not discharged directly to groundwater; i.e., the dispersal trenches do not extend to or below the seasonal high groundwater level;
- c. There is always positive flow to the dispersal field from the septic tank, with no backup to the tank or house plumbing during high groundwater conditions;
- d. There is an adequately sized septic tank for the structure being served and it must be serviceable - e.g. access risers for maintenance. The septic tank must be water tight and constructed of approved materials; and
- e. There is no indication that the existing OWTS is adversely affecting any beneficial uses of surface water or groundwater.

2. Inspection Responsibility

The inspections may be carried out by any of the following:

- a. Registered Civil Engineer;
- b. Registered Environmental Health Specialist;
- c. Professional Geologist (also meeting the requirements of 4a or 4b below); or
- d. Other onsite wastewater maintenance providers recognized by Environmental Health as having experience in the construction and/or operation of OWTS as evidenced by either of the following:
 - (1) possession of a valid contractor's license (A, C-36 or C-42); or
 - (2) completion of an onsite wastewater certification training course by a third party entity, such as the California Onsite Wastewater Association (COWA), National Association of Waste Transporters (NAWT), National Sanitation Foundation (NSF), or other acceptable training program as determined by the director.



Maintenance provider shall provide documentation to Environmental Health staff demonstrating minimum qualifications.

The individual conducting the field inspection work shall be familiar with the testing and inspection procedures outlined in this document.

3. Background Data

Prior to conducting the field inspection, compile and review background information pertaining to the property, structures and OWTS. This should include permit information, site plan, "As Built" drawings of the OWTS, prior inspection results, etc. Important information to look for are the location of the septic tank and dispersal field, the locations of all buildings, decks, cut banks, creeks, wells, reserve area, direction and percentage of slope, any other items which may affect the OWTS, and identification of the reserve dispersal field area(s) and evaluate any conflicting encroachment by buildings or other site development.

4. Initial Site Observations

- a. First, walk the property to confirm the location of the septic tank, dispersal field, and other pertinent features of the system.
- b. Next check setbacks between the existing dispersal field and reserve areas and any man-made structures, e.g., to confirm no building foundations recently added within or too close to the existing dispersal field or expansion areas.
- c. Check septic tank and dispersal field areas for any obvious signs of existing system problems such as surfacing effluent, odors, gray water bypasses, saturated soil in the dispersal field area, or any other condition that may suggest an existing or impending problem.
- d. Determine if the system has dual dispersal fields and, if so, locate and check the diversion valve: (a) to see that it is functional; and (b) to determine which field is in service. Note all observations. To the extent possible, determine the length of each line and depth of pipe (below ground surface). This may require probing with a fiberglass rod or hand excavation.



5. Septic Tank Inspection

- a. Access Risers. First, locate the septic tank and determine if permanent access risers have been installed on the tank. If equipped with risers, check their general condition. Ideally, the risers should be properly grouted or sealed to the top of the septic tank to prevent groundwater and/or surface water intrusion. The lids of the risers should also be properly sealed to prevent odors or the entry of insects, (e.g., flies, mosquitoes, etc.). Any observed defects in the access risers should be noted. If the tank lacks access risers, this information should be noted; and the property owner should be provided information about access risers and advised to have them installed.
- b. Opening the Tank. After inspecting the access risers carefully remove the riser lids. Take care to prevent or minimize damage and disturbance to adjacent vegetation and yard area. Concrete lids are heavy and may be "cemented" in place by silt. A steel bar or other suitable tool may be needed to assist in opening the lids. During the tank inspection process, personnel should wear protective boots and gloves (neoprene) to guard against infection from pathogenic organisms.
- c. Structural Condition. Once the tank is open observe and probe the structural condition of the septic tank to check for any obvious signs of cracking or other structural defects in the tank. A steel rod is used to probe the walls and bottom of the tank. Normally, the tank will need to be pumped-out to perform this procedure.

Inspect the inlet and outlet sanitary "tees" to make sure they are in satisfactory condition, properly positioned, and free of scum accumulation, rocks, root matter or other obstructions. Note any problems and assess whether or not additional tests or observations are necessary to verify the structural integrity of the tank.

- d. Liquid Level. Measure and note the liquid level in the tank with respect to the outlet pipe. In a properly functioning system, the level in the tank should be even with the invert (i.e., bottom) of the outlet pipe. If the liquid level is below the outlet pipe, the tank is probably leaking. If the liquid is above the pipe, the dispersal field is either flooded or the line to the field is obstructed or possibly set with an improper grade.



- e. **Tank Capacity.** Determine the capacity of the septic tank (in gallons) from as-built plans or from measurements of the width, length and depth (below outlet pipe) of the tank. Compare the capacity with the established water use/wastewater flow rates for the property or building size (e.g., bedroom count).

6. Hydraulic Load Test

- a. **General.** After tank inspection, proceed with a hydraulic load test (HLT) of the septic tank and dispersal field. The described here is only for conventional gravity-fed dispersal trench systems, and does not apply if the system utilizes a pump. A separate test for pump systems is described in the next section.

The HLT is conducted by surcharging the septic tank with about 150 gallons of water over a 20 to 30-minute period, and then observing the rise of water in the tank and the subsequent draining process. Tracer dye, added to the tank during the test, may be used to assist in investigating the possible contribution of effluent where surface wetness/seepage is suspected or observed.

Alternatively, a portable water meter can be installed between the house faucet and the hose to directly measure the water volume added.

- b. **Test Procedures.** Step-by step procedures for the HLT are as follows:
 - (1) Measure the location of the static water level in the septic tank (at the outlet side) as an initial reference point.
 - (2) Begin surcharging the tank with water to start the HLT.
 - (3) Observe any rise in the liquid level at the outlet pipe and measure the final level at the end of filling. Typically, the liquid level will rise from an inch or two, at which point the liquid level should stabilize for the remainder of filling, and then return to the initial level in a matter of minutes after filling is stopped.
 - (4) After the filling cycle is finished, observe the water level decline in the tank until it returns to the initial level; note how much time this takes. If the initial level is not attained within 30 minutes, terminate the test and note water level.



- c. **System Rating.** Based on the water level readings during the test, assign a hydraulic performance rating to the system in accordance with the guidelines provided in Table 1 below. It should be emphasized that these are guidelines only; and special circumstances may be cause for modifying the evaluation and rating of a particular system. A system receiving a "Failed" rating will likely require upgrading and/or additional investigation to determine the underlying cause(s).

6. Final Dispersal System Inspection

At the completion of the HLT, check the dispersal system area and down-slope areas again for indications of surfacing effluent, wetness, or odors. If any of these conditions exist as a result of the HLT, this would likely be considered evidence of system failure. If the field observations of wetness are not obviously the result of the HLT, further investigation may be necessary to determine if the dispersal system is failing and the cause of the failure. Additional investigative work may include water quality sampling (for total and fecal coliform, ammonia and nitrate) or dye testing. The cause of seepage could be related to gopher holes, site drainage or erosion problems, excessive water use or simply the age of the system.

**TABLE 1
HYDRAULIC LOAD TEST RATING GUIDELINES**

RATING	SEPTIC TANK RESPONSE TO HYDRAULIC LOADING
EXCELLENT	No noticeable rise in water level during filling.
SATISFACTORY	Maximum water level rise of about 2 inches, with decline to initial level within about 15 minutes after end of filling.
MARGINAL	Maximum water level rise of about 3 inches, with decline to initial level within about 30 minutes after end of filling.
POOR	Water level rise of more than 3 inches, with decline not reaching initial level within 30 minutes after end of filling.
FAILED	Water level rise of more than 3 inches, with no noticeable decline within 30 minutes after end of filling.



8. Pump Systems

For systems equipped with an effluent pump, the following inspection procedures should be followed. This is in addition to inspection of the septic tank as described under Section E. "Septic Tank Inspection".

- a. Pump Test. The pump test is conducted by adding sufficient water to the basin to activate the pump "ON" control, and observing the operation of the system over at least one pumping cycle. The total amount of water added should be about 150 gallons, to approximate the same hydraulic loading of the dispersal field as for gravity systems.

Using a garden hose, the water may be added to the outlet side of the septic tank, or directly to the pump basin. If filling the basin directly, be careful to minimize turbulence and disturbance of sediment or sludge that may have collected in the basin. This can be best accomplished by directing the stream of water against the interior side of the chamber, rather than directly toward the bottom of the pump chamber.

Observe the filling of the basin, and note and measure the point at which the pump is activated. Immediately stop the filling operation and observe the pumping cycle until the pump shuts off. While the pump is discharging, examine the piping system (where exposed) for any leaks. Even small leaks could be a forewarning of possible breaks in the pressure line at some point in the future; and these should be corrected as soon as possible.

Note and measure the depth at which the pump shuts off, and calculate the volume of water between the "ON" and "OFF" measurements. Compare this dose with the design dose volume specified for the system. If the dose is too high or too low, float controls should be readjusted to correct the dose. Any adjustments to the pump system should be done by a licensed and properly qualified contractor (not by the inspector, unless so qualified).

The pumping cycle (from "ON" to "OFF") level should be timed and the results recorded on the inspection form. Typically, if the pump is sized and operating properly, pump operation lasts about 1 to 5 minutes per dose. Pump cycles lasting longer than this may indicate a flooded dispersal field and/or pump or piping deficiencies. If this is observed, it should be noted and further investigation of the pump and dispersal field should be conducted to determine the specific cause.



Dividing the pump volume (in gallons) by the pump cycle time (in minutes) will give an approximate pump discharge rate (in gpm). Check the observed pump rate against the design requirement for the system, and note any discrepancy.

If during filling of the pump basin, the pump does not activate when the water reaches the high liquid level control (i.e., "ON" float), discontinue the pump test. This indicates a pump failure, defective float switch or wiring problems and will require the repair service of a competent contractor familiar with these types of systems. The pump system failure should be noted, communicated immediately to the resident/owner, and followed up with prompt corrective action.

- b. Dispersal System Inspection. At the completion of the pump test, check the dispersal system area for signs of seepage in the same manner as previously described for gravity-fed systems following hydraulic loading.
- c. Audio and Visual Alarm. Test the pump system audio and visual alarm to confirm that it can be heard at the house/building if mounted at the pump tank.

9. CLEAN-UP

At the completion of the OWTS inspection and testing, replace all access lids and clean all tools before leaving the site. All tools and equipment that come into contact with wastewater should be cleaned and disinfected with a 1:5 bleach solution, then rinsed with fresh water; and all contaminated rinse water should be disposed of in the septic tank.

10. OPTIONAL SOIL BORING.

Ideally, as part of the performance evaluation a hand-augured boring should also be made within or adjacent to the dispersal field for observation of soils and groundwater conditions. If a hand-auger boring is not feasible and the area is known or estimated to have high groundwater conditions, a motorized drill rig or excavator may be necessary. This is especially important if the performance evaluation is in connection with a proposed building remodel or other system expansion. If groundwater is observed in the test hole, measure the depth to water prior to and following the HLT. Backfill the test hole before leaving the site.

