

Onsite Systems Manual

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**Colusa County
Department of Planning, Building, and
Environmental Health Services**

Environmental Health Division

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COLUSA COUNTY ONSITE SYSTEMS MANUAL

INTRODUCTION

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Introduction

This Onsite Systems Manual (also “Onsite Manual” or “Manual”) provides the policy, procedural and technical details for implementation of the provisions of the Colusa County Onsite Wastewater Systems Ordinance, codified in Chapter 36 of the Colusa County Code. Specifically, Section 36.1.5 provides that:

- a. The director is authorized to issue standards and guidelines, including policies, procedures and technical details, to carry out the purposes of this Chapter, which shall be contained in a document titled the Onsite Systems Manual.*
- b. The Onsite Systems Manual shall be developed, maintained and amended as necessary by the director and shall provide a reasonable process for seeking input from the affected public and OWTS practitioners in connection with its development and when changes are made.*
- c. The Onsite Systems Manual and any amendments shall be subject to approval by the Central Valley Regional Water Quality Control Board in accordance with applicable State requirements and policies for onsite wastewater treatment systems.*
- d. The type and manner of design and construction of OWTS shall conform to the standards as required by this Chapter and the Onsite Systems Manual.*
- e. The director shall maintain records pertaining to the permitting, installation, inspection, repairs and variances issued in regard to OWTS and prepare and submit applicable reports and information to the Regional Water Board in accordance with provisions of the State OWTS Policy.*

This Manual is intended to provide technical guidance for designers, installers, maintenance providers and owners of onsite wastewater treatment systems. It is expected that the Manual will be reviewed and updated from time-to-time, typically every few years, to keep pace with new issues, policies, procedures, and technologies affecting the use and management of onsite wastewater treatment systems. The Manual is divided into seven main parts as follows:

Part 1: Policies and Administrative Procedures

Part 2: Siting, Design and Construction Requirements for OWTS

Part 3: Requirements for Alternative OWTS

Part 4: Operation, Monitoring and Performance Guidelines

Part 5: OWTS User Information

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COLUSA COUNTY ONSITE SYSTEMS MANUAL

PART 1

POLICIES AND ADMINISTRATIVE PROCEDURES

Part 1

POLICIES AND ADMINISTRATIVE PROCEDURES

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1.1 Introduction

Part 1 of the Onsite Systems Manual provides an overview and clarification of various onsite wastewater treatment systems (OWTS) policies and administrative procedures pertaining to:

- OWTS installation permits;
- Development and OWTS requirements for site approval for building projects, subdivisions, lot line adjustments, use permits, remodeling projects, and secondary dwelling;
- Requirements for unincorporated properties located near public sanitary sewer systems;
- Provisions and permitting requirements for alternative treatment and dispersal systems;
- Amendments to this Onsite Systems Manual; and
- Fees, forms and supplementary information.

1.2 Installation Permit Requirements

A permit must be obtained from the Colusa County Environmental Health Department (CCEH) to construct, reconstruct, or repair an onsite wastewater treatment and dispersal system. Permits will only be issued in those areas of the County where a sanitary sewer is not available within 200 feet of the structure. OWTS cannot be used if soil conditions, topography, high groundwater or other factors indicate this method of sewage disposal is unsuitable.

To obtain a permit, three (3) sets of the site plan showing the proposed OWTS, and any required supporting documents, must be submitted to CCEH for review and approval. Details regarding the site plan and other required submittal information are provided in this Manual as follows.

1.3 Development Requirements

Land use and building permit applications are evaluated for adequate sewage disposal and domestic water supply. Evaluation/testing of any existing OWTS may also be required to determine condition and adequacy. Requirements for associated with different types of development situations are as follows:

A. New Systems on Newly Created Lots

Individual OWTS serving new improvements on lots created subsequent to the approval of Colusa County Code Chapter 36 and the requirements contained in this Onsite Systems Manual, revisions or amendments thereto, shall comply in all respects to the requirements in force at the time of the approval of the Tentative Map approving such lot without the necessity of a variance from the elements of such regulations.

B. New Systems on Existing Legal Lots of Record

Individual OWTS serving new improvements on lots created prior to approval of Colusa County Code Chapter 36 and the requirements contained in this Onsite Systems Manual, revisions or amendments thereto shall comply in all respects to the current requirements. The Director may consider variances from these regulations as provided herein.

C. Modification to Existing Systems

Where an existing OWTS is proposed to be expanded, replaced or relocated because of proposed major changes to an existing structure served by an OWTS, such as addition of bedrooms for a residence or changes in use or expansion of a nonresidential structure, the following criteria shall apply:

1. If the property currently is within 200 feet of a public sewer main and it is physically and legally possible to connect to such main as determined by the Director, no expansion of the existing OWTS will be allowed and connection to a public sewer will be required.
2. If the property does not meet the above criteria requiring connection to a public sewer, a performance evaluation of the existing OWTS shall be completed in accordance with guidelines provided in Part 4 of this Manual. Based on the results of the evaluation, the OWTS may continue to be used and/or may require enlargement or other modifications in accordance with current siting and design requirements to accommodate any increase in sewage flow. If it is determined by the Director that the existing disposal field is not functioning properly, it shall be

repaired or replaced as required by the Director. In the event said system does not utilize a septic tank which satisfies current requirements, a new septic tank complying with these requirements shall be installed.

3. If the existing OWTS design included a specified reserve area, then this reserve area shall not be used in any way that would preclude its intended use unless a substitute area is provided or it can be clearly demonstrated that the system was built or can be modified so as to not require a reserve area.

D. Repair of Existing Systems

If repair of an OWTS is required by the Director and the property currently is within 200 feet of a public sewer main and it is physically and legally possible to connect to such main as determined by the Director, then connection to a public sewer main shall be required unless the cost of connection is more than twice the cost of an onsite repair.

Where the property requiring an OWTS repair or corrective action is not able to connect to a public sewer, the OWTS shall be repaired or replaced in a manner that brings the OWTS into substantial conformance with requirements of the Ordinance and Manual to the greatest extent practicable. The repair work shall be implemented as soon as is reasonably possible and in accordance with any time limits issued by the Director.

The overall goal with all OWTS repairs is to obtain a practical, timely and effective long-term correction to the failure condition. In determining the level of corrective work required, the CCEH will take into consideration a variety of factors, generally according to the following priorities:

1. Soil characteristics and groundwater separation
2. Setbacks from wells and streams
3. Ground slope and setback from unstable landforms
4. OWTS sizing standards
5. Other setback criteria, e.g., foundations, pipelines, trees

Submittal requirements for OWTS repairs may vary case-by-case, and will depend on the nature of the failure condition, the property location and type of occupancy, and the type of corrective work needed.

E. Land Divisions, Lot Splits and Lot-line Adjustments

Every tentative map for which individual OWTS are proposed shall include sufficient information to demonstrate conformance with applicable requirements contained in the OWTS Ordinance and this Manual. This shall include, but not be limited to:

1. Soil profiles and percolation tests as specified in Part 2.
2. Schematic layouts including drainfield location and building envelope to verify that a drainfield of sufficient size can be installed to accommodate the potential sewage loading from the proposed lot without need of a variance from these regulations. For proposed residential lots, the design shall be based on a 3-bedroom residence.
3. For subdivision of a lot with existing residence(s) the existing OWTS must be in good working order and demonstrate the potential to meet current requirements for the existing number of bedrooms. Suitable replacement area of a sufficient size to construct a replacement system that conforms to these regulations shall be provided.

F. Location of OWTS

An OWTS serving a building or buildings shall be located on the same building site, lot or parcel as the building(s). Where an existing parcel is found to be unsuitable to accommodate an OWTS, the system may be located on another contiguous lot (provided the contiguous lot has sufficient replacement area) or parcel within a non-revocable easement specifically designated for such sewage disposal system.

G. Notification to Public Water Supply Owner(s)

1. **Proposed OWTS.** Where CCEH staff determines the proposed OWTS dispersal system is closer than 150 feet to a public water well, or closer than 1,200 feet to a public water system surface water intake in a location tributary to the intake, steps will be taken to notify and consider input from the public water supply owner(s) as follows:
 - a. Notification of the proposed OWTS application will be sent to the water system owner(s). The notification will be accompanied by a copy of the permit application and supporting OWTS design information, including documented soils, topography, groundwater and percolation data.
 - b. The owner(s) receiving notification of proposed OWTS installations per (a) above will be afforded a 15-day period in which to submit comments on the proposed OWTS application.

- c. Prior to issuing an OWTS installation permit for any system per (a) above, CCEH will review and consider any comments and recommendations submitted by affected water system owner(s) per (b) above.
 - d. Upon issuance and/or denial of an OWTS installation permit per (a) above, CCEH will provide notification to the affected water system owner(s) of the action taken.
2. **Failing OWTS.** Where CCEH becomes aware of a failing OWTS located closer than 150 feet to a public water well, or closer than 2,500 feet to a public water system surface water intake in a location tributary to the intake, CCEH shall notify the respective owner(s) and the SWRCB Division of Drinking Water as soon as practicable, but no later than 72 hours from the time of discovery of the failing OWTS.

H. Common/Community OWTS

OWTS serving more than one lot or parcel, regardless of ownership, shall be operated and maintained under the authority of an entity with appropriate authority to monitor and maintain the system. Notification will be provided to the Regional Water Board for review and comment on any proposed community OWTS serving multiple discharges under separate ownership. The Regional Water Board may, on a case-by-case basis, decide to assume permitting authority for the system depending upon factors related to the potential threat to water quality, public health or the complexity of the wastewater system.

1.4 Alternative Systems

To provide a broader range of OWTS treatment and dispersal options for new construction and repair/replacement situations, alternatives to conventional OWTS may be used in accordance with certain general provisions and specific requirements as follows:

A. General provisions.

1. Alternative OWTS may be permitted by the Director for the repair or upgrading of any existing OWTS and for new construction on any legally-created parcel where: (a) it is determined that sewage cannot be disposed of in a sanitary manner by a conventional OWTS; or (b) the Director determines that an alternative system would provide equal or greater protection to public health and the environment than a conventional OWTS.
2. Alternative OWTS may be approved by the Director used in connection with the creation of new lots (subdivisions).
3. Types of alternative systems permitted are limited to those for which siting and design standards have been adopted and incorporated in this Manual.
4. All alternative systems must be installed by a contractor duly licensed by the Contractors State License Board of the State of California to install OWTS.

B. Specific Requirements

1. **Design and Installation Permit.** Alternative OWTS require design by a licensed professional and completion of site evaluation and installation permitting as required for conventional OWTS. Additional engineering and design requirements applicable to different types of alternative OWTS are contained in Part 4 of this Manual.
2. **Operating Permits.** A County-issued operating permit is required for all alternative systems. Operating permits are intended to serve as the basis for verifying the adequacy of alternative system performance and ensuring on-going maintenance, including requirements for system inspection, monitoring and reporting of results to the CCEH, along with the requirement for permit renewal, typically on an annual basis.
3. **Performance Monitoring and Reporting.** Performance monitoring and reporting is required for all alternative OWTS in accordance with conditions established by the CCEH at part of the operating permit. Performance monitoring requirements are covered in Parts 4 and Part 5 of this Manual.

4. **Design and Construction Guidelines.** Design and construction guidelines for approved alternative treatment and dispersal technologies are provided in Part 4 of this Manual.

1.5 Variances

As provided in Colusa County OWTS Ordinance, Section 36.4.1, variance from the terms of the Ordinance and/or requirements as prescribed this Onsite Systems Manual may be granted by the Director under the following conditions:

- A.** The variance will not harm the public health, safety and welfare of the people of Colusa County;
- B.** Due to special conditions or exceptional characteristics of the property, its location or surroundings, a literal enforcement of the Ordinance and the Onsite Systems Manual would result in unnecessary hardship;
- C.** The hardship was not caused with the intent to avoid the requirements of the Ordinance or the Onsite Systems Manual; and
- D.** The variance will not have any adverse environmental effect on the use of the adjoining property.

1.6 Amendments to the Manual

The CCEH will periodically review and make amendments to the various procedures and technical information contained in this Onsite Systems Manual, typically every few years. The amendments may include recommended changes originating from CCEH staff, RWQCB staff, other departments or agencies, contractors and consultants working in the OWTS industry, or other affected groups or individuals. Any substantive changes in requirements, such as changes in design criteria or addition of alternative design options, are will be submitted to the RWQCB for review and approval.

The general format for considering changes to this Manual are as follows:

- A.** CCEH will announce its intent to entertain and review proposed changes, including a due date for submission of proposals. CCEH may establish, with Board of Supervisors approval, a fee to be charged for proposals that relate to proprietary equipment, systems or materials.
- B.** Proposals received shall include a description of the proposed change(s) along with supporting rationale, technical information, and specific language/text additions or changes.
- C.** CCEH will conduct a preliminary internal review to determine the completeness and general merit of the proposal, and request additional information, as applicable.
- D.** CCEH will circulate the proposal(s) for review by local consultants, contractors and maintenance providers, and others as deemed appropriate. CCEH will convene a workshop-meeting with interested parties to review and discuss the proposal.
- E.** Based on the CCEH review and workshop findings, proposals acceptable to the Director and warranting further consideration will be forwarded to the RWQCB for review and approval; changes will be incorporated following RWQCB approval.

1.7 Forms, Fees, and Supplementary Information

Fees, as prescribed by Resolution of the Board of Supervisors of the County of Colusa, are payable separately to the CCEH for services described throughout this Manual. See CCEH website for listing of applicable fees.

The following forms and supplementary information are provided:

- Application for a Site Evaluation
- Septic System Permit Application
- Testing procedures

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COLUSA COUNTY ONSITE SYSTEMS MANUAL

PART 2

SITING CRITERIA, DESIGN AND CONSTRUCTION REQUIREMENTS FOR OWTS

Part 2

SITING CRITERIA, DESIGN AND CONSTRUCTION REQUIREMENTS

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- 2.8 CUMULATIVE IMPACT ASSESSMENT GUIDELINES**

2.1 Introduction

A. GENERAL.

This part of the Onsite Systems Manual provides technical standards and guidelines for the design and construction of various onsite wastewater treatment and disposal technologies and components as authorized for implementation of Colusa County Onsite Wastewater Ordinance, County Code Chapter 36. General requirements and principles include the following:

1. Where permitted by County Code Chapter 36, the building sewer shall be permitted to be connected to an OWTS in accordance with the provisions of these technical standards
2. The type of OWTS shall be determined on the basis of location, soil characteristics, topography, groundwater conditions, and shall be designed to receive all sewage from the building(s) served.
3. The system, except as otherwise approved, shall consist of a septic tank with effluent discharging into a subsurface disposal field.
4. Provisions are included for the approved use of alternative OWTS, which refers to a type of OWTS that utilizes either a method of wastewater treatment other than a conventional septic tank and/or a method of wastewater dispersal other than conventional drainfield trenches for the purpose of producing a higher quality wastewater effluent and improved performance of and siting options for effluent dispersal.
5. No property shall be improved in excess of its capacity to properly treat and absorb sewage effluent by the means provided in County Code and these technical standards.
6. For new divisions of land, soil profiles, percolation tests and groundwater determinations will be required on every parcel unless the CCEH determines, on a case-by-case basis, that such testing is not necessary due to the availability of sufficient information to demonstrate conformance with applicable siting criteria for all proposed OWTS locations.
7. Nothing contained in this section shall be construed to prevent the director from requiring compliance with additional requirements beyond those contained herein, where such additional requirements are essential to maintain a safe and sanitary condition.

2.2 Siting Criteria and Site Evaluation

A. SITING CRITERIA.

Approval of any conventional OWTS shall require compliance with the following minimum siting criteria.

1. **Soil Depth.** For conventional OWTS, minimum depth of soil beneath the bottom of the dispersal field shall be 5 feet. For alternative OWTS, minimum soil depth may be reduced to 3 feet for trench systems, and 2 feet for mounds and sub-surface drip dispersal methods.
2. **Vertical separation to ground water.** Minimum vertical separation distance between the bottom of the dispersal system and groundwater shall be determined according to soil percolation rate and type of OWTS per **Table 2-1** below.

Table 2-1.
Minimum vertical separation to ground water

Type of OWTS	Percolation Rate (mpi)	Vertical Separation Distance to Ground Water			
		2'	3'	5'	20'
Conventional Trench or Bed	1-4 5-120			X	X
Conventional Trench w/Supplemental Treatment Pressure Distribution Trench At-grade	1-4 5-120		X	X	
Pressure Distribution w/Supplemental Treatment At-grade w/Supplemental Treatment Mound System Sub-surface Drip Dispersal	1-4 5-120	X	X		

3. **Soil Percolation Rate.** The average soil percolation rate in the proposed disposal field area shall not be faster than one minute per inch (1 mpi) nor slower than 120 mpi, determined in accordance with procedures prescribed in this Manual. Soils having percolation rates between 1 and 5 mpi will require either:
 - a. An increase in the minimum vertical separation to groundwater to 20 feet for conventional leaching trenches or bed system; or

- b. Use of an alternative OWTS and compliance with lesser depths to groundwater as allowed in this manual and accordance with methods and requirements for alternative OWTS detailed in Part 3 of this Manual.
4. **Ground Slope.** Maximum ground slope in the disposal field area shall not exceed thirty (30) percent. Where ground slope exceeding 30 percent is proposed for a dispersal system under the provisions of a variance, a supporting geotechnical evaluation, performed by a registered professional, shall be required. Such evaluation shall address slope stability, drainage, and other factors as appropriate to verify that the proposed dispersal system will not degrade water quality, create a nuisance, affect soil stability, or present a threat to public health or safety.
5. **Horizontal Setbacks.** Minimum horizontal setback distances from various site features to OWTS components shall be as listed in **Table 2-2**.

Table 2-2.
Minimum horizontal setback distances for OWTS

Site Feature	Minimum Setback Distance (feet)		
	To Building Sewer	To Septic Tank ¹	To Disposal Field
Building or structures	2	5	8
Property line adjoining private property	Clear	5	5
Non-public water supply wells and springs	50	100	100
Public water supply wells	50	150	150 ²
Streams (perennial or seasonal flow)			
• General (from top of bank)	-	100	100
• Between 1,200 to 2,500 ft from public water system intake ³	-	100	200
• Within 1,200 ft from public water system intake ³	-	100	400
Lakes and Reservoirs (from high water mark)			
• General	-	200	200
• Within 1,200 feet from a public water supply intake ³	-	400	400
Non-classified stream or drainage ditch	-	25	25
Cuts or steep embankments (from top of cut/embankment)	-	10	4 X h ^{4,5}
Unstable land mass	-	100	100 ⁵
Large trees	-	10	-
Disposal field	-	5	4
Onsite domestic water line	1	5	5
Distribution box	-	-	5
Pressure public water main	10	10	10

¹ Also applies to supplemental treatment units and pump/dosing tanks;

² 200' for trench >10' deep; where dispersal system is more than 20 feet deep and within 600 feet of a public water well, the horizontal setback required to achieve a two-year travel time for microbiological contaminants shall be evaluated by a qualified professional.

³ For areas tributary to and upstream of water supply intake; setback distance measured from high water mark. Exceptions allowed per SWRCB OWTS Policy, as follows: (a) for replacement OWTS, comply to the maximum extent practicable and incorporate supplemental treatment unless director finds no impact or significant threat to water source; (b) for new OWTS on pre-existing lot of record (pre-May 13, 2013), comply to maximum extent practicable and incorporate supplemental treatment for pathogens and nitrogen per sections 10.9 and 10.10 of SWRCB OWTS Policy, or appropriate alternate siting and operational criteria.

⁴ h equals the height of cut or embankment, in feet.

⁵ Setback distance may be reduced in accordance with recommendations provided in a geotechnical report prepared by a civil engineer or professional geologist.

6. **Areas of Flooding.** OWTS shall not be located in any floodway or in low-lying areas subject to annual flooding (e.g., 2-yr return frequency) on the basis of flood mapping or historical evidence acceptable to the director. OWTS located within the 100-yr floodplain shall be constructed with appropriate measures to minimize infiltration of floodwaters into the system and discharges from the system into the floodwater.

7. **OWTS Located on Property Served.** OWTS shall be located on the same property as the building(s) being served. An exemption or variance may be granted by the Director for existing lots of record, where the OWTS may be located on an adjoining property within a non-revocable easement.

B. SITE EVALUATION.

Prior to approving the use of an OWTS, a site evaluation is required in all instances to allow proper system design and to determine compliance with the site suitability criteria specified in this Manual. Site evaluations shall be conducted by qualified professionals, and evaluations shall be made in accordance with the following general requirements and referenced procedures. The CCEH shall be notified prior to the site evaluation to coordinate with and allow for verification by department staff.

1. **General Site Features.** Site features to be determined by inspection shall include:

- a. Land area available for treatment components and for primary and reserve dispersal fields.
- b. Ground slope in the primary and reserve dispersal area(s).
- c. Location of cut banks, fills, or evidence of past grading activities, natural bluffs, sharp changes in slope, soil landscape formations, and unstable land forms within 100 feet of the primary and reserve dispersal area(s).

- d. Location of wells, streams, and other bodies of water within 200 feet of the primary and reserve dispersal area(s).
- e. To the extent possible, the location of existing OWTS within 100 feet of the primary and reserve dispersal area(s).

2. Soil Profiles.

- a. Soil characteristics shall be evaluated by soil profile test pit observations. A minimum of one test pit in the primary dispersal field and one in the reserve area shall be required for this purpose. Additional soil profiles may be required if the initial two profiles show conditions which are dissimilar to the extent that they do not provide sufficient information for design and/or determination of code compliance.
- b. An augured test hole may be an acceptable alternative to a test pit where the CCEH determines that:
 - 1) The use of a backhoe/excavator is impractical because of access or because of the fragile nature of the soils; or
 - 2) It is necessary only to verify conditions expected on the basis of prior soils investigations; or
 - 3) It is done in connection with geotechnical investigations.
- c. The following factors shall be observed and reported from the ground surface to a limiting condition, up to a minimum of five (5) feet below the bottom of the proposed dispersal system, which may be reduced to three (3) feet where an alternative OWTS is proposed.
 - 1) Thickness and coloring of soil layers, soil structure, and texture according to United States Department of Agriculture (USDA) classification.
 - 2) Depth to a limiting condition such as hardpan, rock strata, impermeable soil layer, or saturated soil conditions.
 - 3) Depth to observed groundwater.
 - 4) Depth to and description of soil mottling (redoximorphic features).
 - 5) Other prominent soil features which may affect site suitability, such as coarse fragments, consistence, roots and pores, and moisture content.

- 3. **Depth to Groundwater Determination.** The anticipated highest level of groundwater in the primary and reserve area shall be estimated:

- a. As the highest extent of soil mottling observed in the examination of soil profiles; or
- b. By direct observation of groundwater levels during the time of year when the highest groundwater conditions are expected or known to occur, i.e., wet weather testing period as defined by the CCEH.

Where there is a discrepancy between soil profile indicators (mottling) and direct observations, the direct observations shall govern.

4. **Percolation Testing.** Determination of a site's suitability for dispersal of effluent and for OWTS design shall be made by the completion of percolation testing in accordance with procedures detailed in this Manual.
5. **Cumulative Impact Assessment.** Colusa County OWTS Ordinance Article 3 authorizes CCEH to require the completion of additional technical studies ("cumulative impact assessment") for OWTS proposals in situations where cumulative impacts on groundwater and/or watershed conditions are of potential concern. Where required, such studies shall be conducted in accordance with the guidelines provided in Part 2.8 of this Manual. The results shall be submitted for review by CCEH as part of the project/site evaluation process, and may be the basis for denial, modification or imposition of specific conditions for the OWTS proposal, in addition to other siting and design criteria.
6. **Reporting.** All site evaluation information, including test results for primary and reserve dispersal areas, shall be submitted to the CCEH with the OWTS permit application.

2.3 Wastewater Design Flows

A. GENERAL.

Daily wastewater flow estimates shall be developed for use in design, evaluation and monitoring of all OWTS.

B. SINGLE FAMILY RESIDENCES AND SECOND UNITS.

Wastewater flows used for design of OWTS for single family residences and second units shall be based on a factor of 120 gal/day per bedroom for the first three (3) bedrooms, plus 60 gal/day for each additional bedroom, as indicated in **Table 2-3**. The design flows for a primary residence and secondary dwelling unit shall be determined independently, regardless of whether the flows are treated separately or combined in a single OWTS.

Table 2-3.
Wastewater Design Flows for
Single Family Residences and Second Units

No. of Bedrooms	Design Flow (gal/day)
1	120
2	240
3	360
4	420
5	480
6	540
>6	+ 60 per bedroom

C. MULTIPLE DWELLING UNITS AND NON-RESIDENTIAL FACILITIES.

Wastewater flows used for the design of OWTS for multiunit residences and non-residential projects shall be developed based on full consideration of projected activities, occupancy, and facilities. **Table 2-4** provides guidelines for use in estimating design wastewater flows. For facilities not listed in **Table 2-4** the wastewater design flow shall be estimated based on either: (a) appropriate literature references (e.g., US EPA) for the type of facility proposed; or (b) documented wastewater flow monitoring data for a comparable facility. Additionally, the director may consider adjustment to the criteria listed in **Table 2-4** for specific facilities based upon documented wastewater flow monitoring data. In all cases, the design proposal shall include sufficient technical information to support the proposed design flow estimate. Notwithstanding the above, minimum design flow for any OWTS shall not be less than 120 gpd.

**Table 2-4.
Estimated Sewage Flow Rates**

Type of Occupancy	Design Flow (gallons per day)
Airports	
- Per employee	15
- Per passenger	5
Auto washers	Per equipment mfg.
Bowling alleys, snack bar only (per lane)	75
Camps (per person)	
- With central comfort station	35
- With flush toilets, no showers	25
- Day camps, no meals served	15
- Summer and seasonal	50
Churches, sanctuary, religious halls (per seat)	
- without kitchen	5
- with kitchen waste	7
Dance halls (per person)	5
Day care (per patron, employee)	15
Factories and industrial buildings (per employee)	
- no showers	25
- with showers	35
- cafeteria, add	5
Hospitals	
- per bed	250
- kitchen waste only (per bed)	35
- laundry waste only (per bed)	5
Hotels, no kitchen waste (per bed x 2)	60
Institutions (per person)	
- resident	75
- nursing home	125
- rest home	125
Laundries, self-service	
- minimum 10 hours per day (per wash cycle)	50
- commercial	Per manufacturer
Motel (per bed space)	
- no kitchen	50
- with kitchen	60
Offices (per employee)	20
Parks	
- mobile homes (per space)	250
- picnic parks, toilets only (per parking space)	20
- Recreational vehicles (per space)	
• without water hook-up	75
• with water and sewer hook-up	100

Type of Occupancy	Design Flow (gallons per day)
Restaurants – cafeterias	
- per employee	20
- toilet (per customer)	7
- kitchen waste (per meal)	6
- add for cocktail lounge (per customer)	2
- kitchen waste – disposable service (per meal)	2
Schools	
- staff and office (per person)	20
- elementary students (per student)	15
- intermediate and high (per student)	20
• with gym and showers,	5
• with cafeteria, add	3
- boarding, total waste (per person)	100
Service station, toilets	3
- for 1 st bay	1,000
- add for each additional bay	500
Stores	
- per employee	20
- public restrooms, add per 10 ft ² of floor space	1
Swimming pools, public (per person)	10
Theaters	
- auditoriums (per seat)	5
- drive-in (per space)	10

D. FLOW EQUALIZATION.

Flow equalization may be used for non-residential and mixed use facilities that experience significant, regular and predictable fluctuations in wastewater flows. Examples of applicable facilities include, but are not limited to:

- religious facilities
- schools
- special event venues

Flow equalization is the process of controlling the rate of wastewater flow through an OWTS by providing surge storage capacity and timed-dosing of the incoming flow. Installed following the septic tank, it allows peak surges in wastewater flow (e.g., from a weekend event) to be temporarily stored and metered into the treatment system and/or dispersal field at a relatively even (“average”) rate over an extended number of days (e.g., during the subsequent week). This generally aids OWTS performance.

Where flow equalization is proposed to be incorporated in an OWTS the following apply:

1. The septic tank capacity shall be sized based on the peak daily flow for the facility;
2. The design flow used for sizing supplemental treatment unit(s) and/or the dispersal field may be based on the equalized ("average") flow rate rather than the peak daily flow rate for the facility;
3. Engineering calculations and specifications must be submitted substantiating the proposed design and operation of the flow equalization system; and
4. An operating permit for the OWTS shall be required and shall include provisions for monitoring and documenting compliance with the flow equalization design parameters.

2.4 Septic Tank Requirements

- A. GENERAL.** Septic tank design shall be such as to produce a clarified effluent consistent with accepted standards and shall provide adequate space for sludge and scum accumulation.
- B. MINIMUM CAPACITY.** Septic tanks must have a minimum capacity of one thousand (1,000) gallons or twice the peak daily wastewater flow for the facility served, whichever is greater. Minimum septic tank capacity for assisted care facilities shall be equal to three times the peak daily wastewater flow.
- C. TWO COMPARTMENTS.** Septic tanks must be of two-compartment construction, with the first compartment equal to two-thirds the total tank volume. The compartments must be separated by a baffle or equivalent arrangement.
- D. PARTITIONS AND BAFFLES.** Partitions or baffles between compartments shall be of solid, durable material and shall extend not less than 4 inches above the liquid level. The transfer port between compartments shall be a minimum size equivalent to the tank inlet, but in no case less than 4 inches in size, shall be installed in the inlet compartment side of the baffle so that the entry into the port is placed 65 percent to 75 percent in the depth of the liquid. Wooden baffles are prohibited.
- E. MATERIALS.** Septic tanks must be watertight, properly vented and constructed of reinforced concrete, heavyweight reinforced concrete blocks, fiberglass or other durable, non-corrodible materials as approved by the director.
- F. STRUCTURAL DESIGN.** Septic tanks shall be designed to withstand any anticipated weight placed above it. All septic tanks shall be listed and approved by IAPMO or an ANSI accredited testing organization; exception to this requirement may be granted where structural design calculations for the septic tank are provided by a California registered civil engineer.

The structural design of septic tanks shall comply with the following requirements:

1. Each such tank shall be structurally designed to withstand all anticipated earth or other loads. Septic tank covers shall be capable of supporting an earth load of not less than 500 pounds per square foot (lb/ft^2) where the maximum coverage does not exceed 3 feet.
2. In flood hazard areas, tanks shall be anchored to counter buoyant forces during conditions of the design flood. The vent termination and service manhole of the tank shall be not less than 2 feet above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or the outflow of the contents of the tanks during conditions of the design flood.

- G. ACCESS OPENINGS.** Access to each septic tank compartment must be provided by a manhole opening at least twenty inches in diameter. Wherever a first compartment exceeds twelve (12) feet in length, an additional manhole shall be provided over the baffle wall.
- H. ACCESS RISERS.** A riser must extend from each manhole opening to within no more than 6 inches from the surface of the ground. The riser must be of a size larger than the manhole opening, be both gas- and water-tight, be constructed of durable material and equipped with a secure cover. Access openings at grade or above shall be locked or secured to prevent unauthorized access.
- I. EFFLUENT FILTER.** The outlet of the septic tank shall be fitted with an effluent filter capable of screening solids in excess three-sixteenths (3/16) of an inch in diameter and conforming to NSF/ANSI Standard 46 or as otherwise approved by the director.
- J. TANK CONNECTIONS.** All connections from building to septic tank must conform to construction standards as required by the County building official.
- K. PIPE OPENING SIZES.** The inlet and outlet pipe openings shall not be larger in size than the connecting sewer pipe. The vertical leg of round inlet and outlet fittings shall not be less in size than the connecting sewer pipe nor less than 4 inches. A baffle-type fitting shall have the equivalent cross-sectional area of the connecting sewer pipe and not less than a 4-inch horizontal dimension where measured at the inlet and outlet pipe inverts.
- L. PIPE EXTENSION.** The inlet and outlet pipe or baffle shall extend 4 inches above and not less than 12 inches below the water surface. The invert of the inlet pipe shall be at a level not less than 2 inches above the invert of the outlet pipe.
- M. FREE VENT AREA.** Inlet and outlet pipe fittings or baffles and compartment partitions shall have a free vent area equal to the required cross-sectional area of the house sewer or private sewer discharging therein to provide free ventilation above the water surface from the disposal field or seepage pit through the septic tank, house sewer, and stack to the outer air.
- N. SIDEWALLS.** The sidewalls shall extend not less than 9 inches above the liquid depth. The cover of the septic tank shall be not less than 2 inches above the back vent openings.
- O. WATER-TIGHTNESS TESTING REQUIREMENTS.** Septic tanks or other primary components shall be filled with water to flow line prior to requesting inspection. Seams or joints shall be left exposed (except the bottom), and the tank shall remain water-tight. All new septic tank installations and modifications to existing septic tanks shall undergo water-tightness testing as follows:

1. **Tanks Located in Areas of Shallow Groundwater or Flooding.** The testing shall be done with the access risers in place and the inlet and outlet pipes plugged. The tank shall be filled with water to a level extending a minimum of two (2) inches into the risers, and monitored for a 1-hour period, with no measurable drop in the water level.
2. **All Other Tanks.** The tank shall be filled with water to a level even with the invert of the outlet pipe, and monitored for a 1-hour period, with no measurable drop in water level.

2.5 Conventional Dispersal Trenches

- A. GENERAL.** The construction dimensions of the OWTS disposal field shall be based on soils analysis and percolation tests and in accordance with specifications and other requirements provided in this section.
- B. TRENCH SPECIFICATIONS.** Conventional subsurface dispersal trench systems shall meet the specifications in **Table 2-5**.

Table 2-5.
Conventional OWTS Dispersal Trench Design*

Parameter	Requirement
Trench length	Determined based on design flow and percolation rate per Table 2-6 . Recommended maximum of 100' per trench
Trench width	18 inches minimum; 36 inches maximum
Trench Depth	2.5 feet minimum; 8 feet maximum
Minimum cover over rock, in inches	12 inches
Depth of rock under pipe (minimum)	12 inches
Depth of rock over pipe (minimum)	2 inches
Size of rock	¾ to 2½ inches
Spacing of trenches, center to center, in feet, minimum	2 times the depth of rock below pipe; 6 feet minimum, plus 1-foot additional spacing for every 5% increase in dispersal area ground slope above 20%

*Note: leaching chambers used in lieu of standard pipe and drain rock shall comply with all trench specifications in **Table 2-5** except those referring to “rock”.

C. TRENCH SIZING.

1. **Design Flow.** Design wastewater flow used for determining the required square footage and length of dispersal trench shall be determined in accordance with the criteria in this Manual.
2. **Wastewater Application Rates.** The wastewater application rate(s) used for determining the required infiltrative surface area and overall trench length shall be based on the criteria in **Table 2-6** using representative percolation test results for the soil zone corresponding with trench bottom depth.

Table 2-6.
Wastewater Application Rates for Conventional Dispersal Trench Sizing¹

Percolation Rate (MPI)	Wastewater Application Rate (gpd/ft ²)
1-5	1.2
10	0.80
24	0.60
30	0.56
45	0.45
60	0.35
90	0.20
91-120	0.20

¹ Interpolate between reference values for other percolation rates; see Page 34 of Part 2 for expanded table listing interpolated values.

3. **Effective Infiltrative Area.**
 - a. **Standard Requirement.** For trench sizing, the “effective infiltrative area” shall be limited to four (4) square feet per lineal foot of trench length, which may include any combination of trench bottom area and trench sidewall area below the invert of the perforated distribution pipe. For example, this may be comprised of: (a) 1.5-ft wide bottom area plus two sidewalls of 1.25 feet each; (b) 2-ft wide bottom area plus two sidewalls of 1 foot each; and so on.
 - b. **Deep Trench Exception.** Under certain (favorable) soil and site conditions where deeper dispersal trench (e.g., up to 8-feet deep) construction is acceptable, the effective infiltrative surface may be increased up to a maximum of eight (8) square feet per lineal foot. This exception is applicable to individual residential OWTS, where the dispersal site meets all conventional OWTS siting criteria, and further limited to sites where: (a) ground slope is <20%; and (b) soil percolation rate is in the range of 5 to 60 mpi.

4. **Trench Length Calculation.** Required trench length for 100% capacity dispersal field shall be calculated as follows:

$$\text{Trench Length, } L = Q / (R \cdot A)$$

Where:

Q = Design wastewater flow, gpd

R = Wastewater application rate, in gpd/ft²

A = Total infiltrative area per lineal foot of trench, in ft² (4 feet standard)

5. **Leaching Chambers.** Where leaching chambers are used in lieu of standard pipe and drain rock, the system shall be sized on the basis of bottom absorption area only (nominal unit width). A sizing reduction up to no more than 30% is allowed for IAPMO-certified chamber systems.
6. **Primary Field and 100% Reserve Area.** Total dispersal trench capacity shall be calculated and provided for a 100% primary field (installed), plus a 100% reserve area to be set aside and maintained for possible future replacement of the primary system.

D. DISPERSAL TRENCH INSTALLATION.

1. Trench Excavation and Preparation.

- a. Trenches shall be placed in undisturbed earth and shall not be covered by paving or other impermeable or compacted surface.
- b. The bottom of a trench shall be excavated level, with a variation of no more than 2 inches per 100 lineal feet of trench; trenches shall be aligned parallel to the ground surface contours to the greatest extent practicable.
- c. Trenches must not be excavated when the soil is so wet that smearing or compaction occurs. In clayey soils when glazing occurs, the trench surfaces shall be scarified to the depth of the glazing and the loose material removed.

2. Drain Rock Material.

- a. Drain rock material in the trench must be washed and free of fines, and varying in size between 0.75 inches to 2.5 inches.
- b. Drain rock shall be placed in the trenches to the depth and grade specified.
- c. Perforated drain pipe shall be placed on the drain rock in an approved manner, and then the drain lines packed and covered with additional rock to a minimum depth of two (2) inches over the top of the pipe.

- d. An approved filter fabric silt barrier (geotextile) shall be placed over the drain rock prior to backfilling with natural earth to original grade.

3. **Piping and Distribution.**

- a. **Perforated Distribution Lines.** Distribution (drain) lines shall be constructed of perforated ABS pipe, perforated PVC pipe, or other materials approved by the Director, provided that sufficient openings are available for distribution of the effluent into the trench area.
 - b. **Distribution Boxes.** Where two or more drain lines are installed, an approved distribution box of sufficient size to receive lateral lines shall be installed at the head of each disposal field. The inverts of outlets shall be level, and the invert of the inlet shall be not less than 1 inch above the outlets. Distribution boxes shall be designed to ensure equal flow and shall be installed on a level concrete slab in natural or compacted soil.
 - c. **Laterals.** Laterals from a distribution box to the disposal field shall be approved pipe with watertight joints. Multiple disposal field laterals, where practicable, shall be of uniform length.
 - d. **Connections.** Connections between a septic tank and a distribution box shall be laid with approved pipe with watertight joints on natural ground or compacted fill.
 - e. **Inspection Riser.** A capped inspection riser shall be installed within each trench to provide a means of observing the effluent level in the trench.
4. **Leaching Chambers.** Plastic leaching chambers approved by the Director may be used in lieu of pipe and filter material. Chamber installations shall follow the rules for disposal fields, where applicable, and shall conform to manufacturer's installation instructions.

2.6 Inspection and Testing

At a minimum, inspection of conventional OWTS installation should include the items listed below.

1. Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;
2. Open trench inspection of dispersal trench dimensions and conditions;
3. Drain rock and perforated pipe materials and placement;
4. Location and proper installation of diversion valve, as applicable;
5. Location, size, materials and water-tightness testing of septic tank (per Section 2.4.O of this Manual; and
6. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, and final trench backfill/cover.

Any field changes to the approved OWTS design shall be documented in a set of “as-built” drawings supplied to CCEH by the system designer or installer, which shall be required before final written notice of installation approval is issued by CCEH. Additional requirements pertaining to inspection and testing of alternative OWTS installations are detailed in Part 3 of this Manual.

2.7 Site Modifications

A. COVER FILL SYSTEMS.

1. Description.

The term “cover fill” refers to a dispersal trench system where the trenches are excavated entirely below grade, but up to 12 inches of soil fill is placed on top of native grade to provide the required backfill cover over the pipe and drain rock. The wastewater is dispersed into the native soils, not into the fill soil. The purpose is to allow for shallower trench depths where necessary or desirable to meet soil depth and groundwater separation requirements. It provides for improved use of the absorption capacity of the near surface soils, which tend to be most permeable and most effective for absorption and treatment of wastewater effluent. This is a design modification for use with a conventional dispersal trench system. Cover fill also be used in conjunction with certain alternative dispersal systems (shallow pressure distribution, pressure-dosed sand trench, and drip dispersal) presented in Part 3 of this Manual.

2. Siting Criteria.

- a. **Setbacks.** All horizontal setback siting criteria applicable to conventional OWTS as specified in Section 2.2 of this Manual shall apply to OWTS where cover fill is used. Required setback distances for dispersal trenches shall be measured from the edge of trench, not from the edge of the installed cover fill.
- b. **Soil Depth, Groundwater Separation and Percolation.** Soil depth, groundwater separation and percolation shall conform to the requirements applicable to the type and design of the dispersal system proposed.
- c. **Ground Slope.** Maximum allowable ground slope for cover fill systems shall be 20%.

3. Design and Construction Requirements.

- a. **Dispersal Trenches.** The drain rock and perforated pipe sections shall be installed entirely within native soil, and all other aspects of the dispersal trench design shall be in conformance with requirements for conventional dispersal fields, as specified in Section 2.5 of this Manual or, in the case of an alternative dispersal system, in accordance with requirements for the particular type of system (e.g., pressure distribution trench, drip dispersal, etc) and detailed in Part 3 of this Manual.
- b. **Site Preparation.** Prior to placement of fill material, all vegetation shall be removed and the ground surface ripped or ploughed to a depth approximately

6 to 10 inches to permit good mixing of native soil and fill material.

- c. **Fill Material.** The soil used for fill shall be similar in texture to the native surface soil in the dispersal field area. Sand, gravel or rock do not qualify as acceptable material for cover fill. Particle size analysis (hydrometer method) of the dispersal site soils and fill soil shall be required for CCEH review and acceptance of the proposed fill soil, except in cases where the fill is obtained from similar soils at the project site.
- d. **Sequencing.** The fill shall be placed prior to dispersal trench excavation and installation of dispersal piping and appurtenances.
- e. **Areal Coverage.** The fill shall be continuous and constructed to provide a uniform soil cover of at least 12 inches over the dispersal trenches. The fill shall extend a minimum distance of 15 feet from the edge of trench in the down-slope direction and 10 feet in the upslope and side-slope directions. On a level site, the fill shall extend a minimum of 10 feet in all directions. The toe of the fill shall be tapered at no less than a 3:1 grade, beginning at the above required 15-foot or 10-foot distance, as applicable. Where the primary and secondary dispersal fields are adjacent to one another, the cover fill should be continuous over both fields.
- f. **Fill Compaction.** Fill shall be placed in layers ("lifts") of not more than six (6) inches, and compacted to approximately the same dry density as the native soil. Normal compaction procedures to achieve this requirement shall consist of track-rolling each lift, two passes minimum. Alternative compaction procedures may be allowed by CCEH in accordance with recommendations and supporting technical data supplied by a registered civil engineer.
- g. **Revegetation and Erosion Control.** Following system installation, measures shall be taken to revegetate the soil fill and adjacent disturbed areas, and to apply other erosion control measures, as needed, such as straw mulch, silt fencing, straw wattles, and hay bales.

B. CURTAIN DRAINS.

1. Description.

Controlling surface water and shallow perched groundwater may be an essential part of protecting the integrity and performance of OWTS dispersal fields in certain situations. A particular situation of concern is in areas where rainfall readily percolates through very permeable surface soils and perches along the contact with the less permeable substrata. Dispersal trenches can act as a collection area for this transient subsurface water flow, and in the worst case may be flooded during heavy rain events or throughout the rainy season. This reduces the dispersal capacity during the wet season; and it can also contribute to a long-term decline in

the dispersal system effectiveness and potential surface failures. One of the most effective drainage measures is a “curtain drain” (also called “subdrain” or “french drain”), which consists of a gravel-filled trench installed uphill of a drainfield system, designed to intercept shallow perched groundwater flow and divert it away from or around the dispersal field.

2. Siting Criteria.

- a. **Setbacks.** The following horizontal setbacks shall apply to curtain drains.

Table 2-7
Horizontal Setbacks Requirements for Curtain Drains

Reference Location	Horizontal Setback Distance* (ft)
Uphill of the dispersal field	15
Lateral of the dispersal field (along slope contour)	25
Downhill of the dispersal field	50

* measured from edge of dispersal trench to edge of curtain drain trench (perforated pipe section)

- b. **Site Investigation.** Prior to approval of a curtain drain installation, a site investigation shall be conducted to:
- 1) Document the presence or strong probability of groundwater perching on bedrock or a clearly definable restrictive/impermeable soil layer; and
 - 2) Determine appropriate depth and location for curtain drain and outlet point, based on soil, groundwater, and other site conditions.

3. Design and Construction Requirements.

A curtain drain shall consist of a gravel-filled trench constructed as shown in the attached schematic diagram and designed in accordance with the following specifications:

- a. **Trench Width.** 12 inches minimum.
- b. **Trench Depth.** Shall extend to a depth of at least 6 inches into the underlying impermeable layer.
- c. **Filter/Backfill Material.** Filter material shall be clean, durable 3/4 to 1½-inch drain rock, extending from trench bottom to within 6 to 12 inches of grade; backfill to grade with native soil.

- d. **Filter Fabric.** A geotextile “filter fabric” envelope shall surround the drain rock.
- e. **Perforated Collection Pipe.** 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.
- f. **Outlet Pipe.** The outlet pipe shall consist of minimum 4-inch diameter solid (non-perforated) drain pipe.
- g. **Cleanouts.** Provide cleanouts to grade:
 - 1) At the upslope end of the drain;
 - 2) At bends of 45° or greater; and (c) at least every 400 feet along the length of the drain.
- h. **Slope.** The trench and pipe shall be sloped for gravity flow at a minimum 1% gradient throughout the trench and extending to the outlet point.
- i. **Outlet Protection.** Protect downslope outlet against blockage or damage through the use of screening, rock cover, junction box or other suitable means.
- j. **Erosion Control.** Provide erosion protection at drain outlet point.

2.8 Cumulative Impact Assessment Guidelines

- A. GENERAL PROVISIONS.** Colusa County OWTS Ordinance Article 3 authorizes CCEH to require the completion of additional technical studies (“cumulative impact assessment”) for OWTS proposals in situations where cumulative impacts on groundwater and/or watershed conditions are of potential concern. Cumulative impacts from OWTS may occur due to such factors as the constituent levels in the wastewater (e.g., nitrogen content), the volume of wastewater flow, the density of OWTS discharges in a given area, and/or the sensitivity and beneficial uses of water resources.

Cumulative impact assessments to address potential concerns shall be conducted in accordance with the requirements outlined in these guidelines. The results of the assessment shall be submitted for review by CCEH and may be the basis for denial, modification or imposition of specific conditions for the OWTS proposal, in addition to other siting and design criteria.

- B. CUMULATIVE IMPACT ISSUES.** The primary issues to be addressed in cumulative impact assessments will normally include the following:

1. **Groundwater Mounding.** A rise in the water table, referred to as "groundwater mounding", may occur beneath or down-gradient of OWTS as a result of the concentrated or high volume of hydraulic loading from one or more systems in a limited area.
2. **Groundwater Nitrate Loading.** Discharges from OWTS contain high concentrations of nitrogen that may contribute to rises in the nitrate level of local and regional aquifers.

For individual cases, CCEH may identify and require analysis of cumulative impact issues other than those listed above which could pose potential water quality, public health, or safety risks.

- C. QUALIFICATIONS.** Cumulative impact assessments required for alternative system proposals shall be performed by or under the supervision of one of the following licensed professionals:

1. Registered Civil Engineer
2. Registered Environmental Health Specialist
3. Registered Geologist

Additionally, the licensed professional assuming responsibility for the cumulative impact assessment should have training and experience in the fields of water quality

and hydrology acceptable to the CCEH.

- D. CASES REQUIRING CUMULATIVE IMPACT ASSESSMENT.** Cases where cumulative impact assessments shall be required are listed in **Table 2-8**. Additionally, CCEH reserves the right to require the completion of a cumulative impact assessment in any case where, special circumstances related to the size, type, or location of the OWTS warrant such analysis.

**Table 2-8.
Projects Requiring Cumulative Impact Assessment***

Type of Project	Lot Size (acres)	Design Wastewater Flow (gpd)	Groundwater Mounding Analysis	Nitrate Loading Analysis
Residence, including 2 nd dwelling unit(s)	-	< 750	No	No
Residence, including 2 nd dwelling unit(s)	< 1	750 +	No	Yes
Multiunit and Non-residential	< 1	750 +	No	Yes
	-	1,500+	Yes	No
	-	2,500+	Yes	Yes
Subdivisions	2.5+	-	No	No
	<2.5	-	No	Yes

*Note: CCEH may also require cumulative impact assessment based on project or site specific conditions.

** The hydrological and water quality analysis requirements may be modified depending on site specific conditions and the extent to which the OWTS discharge contributes flow to catchment area supporting the vernal pool.

E. METHODS.

1. Groundwater Mounding Analysis

- a. Analysis of groundwater mounding effects shall be conducted using accepted principles of groundwater hydraulics. The specific methodology shall be described and supported with accompanying literature references, as appropriate.
- b. Assumptions and data used for the groundwater mounding analysis shall be stated along with supporting information. A map of the project site showing the location and dimensions of the proposed system(s) and the location of other nearby OWTS, wells and relevant hydrogeologic features (e.g., site

- topography, streams, drainage channels, subsurface drains, etc.) shall be provided.
- c. The wastewater flow used for groundwater mounding analyses shall be the design sewage flow, unless supported adequately by other documentation or rationale.
 - d. Groundwater mounding analyses shall be used to predict the highest rise of the water table and shall account for background groundwater conditions during the wet weather season.
 - e. All relevant calculations necessary for reviewing the groundwater mounding analysis shall accompany the submittal.
 - f. Any measures proposed to mitigate or reduce the groundwater mounding effects shall be presented and described as to their documented effectiveness elsewhere, special maintenance or monitoring requirements or other relevant factors.

2. Nitrate Loading.

- a. Analysis of nitrate loading effects shall, at a minimum, be based upon construction of an annual chemical-water mass balance. The specific methodology shall be described and supported with accompanied literature references as appropriate.
- b. Assumptions and data for the mass balance analysis shall be stated, along with supporting information. Such supporting information should include, at a minimum:
 - 1) Climatic data (e.g., precipitation, evapotranspiration rates);
 - 2) Groundwater occurrence, depth and flow direction(s);
 - 3) Background groundwater quality data, if available;
 - 4) Soil conditions and runoff factors;
 - 5) Wastewater characteristics (i.e., flow and nitrogen content); and,
 - 6) Other significant nitrogen sources in the impact area (e.g., livestock, other waste discharges, etc.)
- c. A map of the project siting showing the location and dimensions of the proposed system(s) and the location of other nearby OWTS, wells and

relevant hydrogeologic features (e.g., site topography, streams, drainage channels, subsurface drains, etc.) shall be provided.

- d. The wastewater flow (average) used for nitrate loading analyses shall be as follows, unless adequately supported by other documentation or rationale:

- 1) For individual residential systems: 50 gpd/bedroom;
- 2) For multi-family residential systems and other non-residential systems: average monthly wastewater flow for the proposed OWTS;

- e. Minimum values used for the total nitrogen concentration of septic tank effluent shall be as follows, unless supported adequately by other documentation or rationale:

- 1) Residential wastewater: 70 mg/l
- 2) Non-residential wastewater: as determined from sampling of comparable system(s) or from literature values.

CCEH may require the use of more conservative values than cited above if the values are judged (by CCEH) not likely to be representative of the proposed system(s).

- f. All relevant calculations necessary for reviewing the nitrate loading analysis shall accompany the submittal.
- g. Any measures proposed to mitigate or reduce the nitrate loading effects shall be presented and described as to their documented effectiveness elsewhere, special maintenance or monitoring requirements or other relevant factors.

F. EVALUATION CRITERIA.

- 1. **Groundwater Mounding.** The maximum acceptable rise of the water table for short periods of time (e.g., one to two weeks) during the wet weather season, as estimated from groundwater mounding analyses, shall be as follows:
 - a. General Requirement for all OWTS. Groundwater mounding shall not result in more than a 50-percent reduction in the required minimum depth to seasonally high groundwater per Section 2.2 of this Manual, as applicable, for the type of OWTS and site conditions. For example, where a 5-foot vertical separation to the native groundwater level is required, a short-term “mounding” rise of the water table to within 2.5 feet of trench bottom would be acceptable during peak wet weather conditions. Where a 3-foot vertical separation is required, a short-term rise to within 1.5 feet of trench bottom would be acceptable.

- b. Requirement for Large Systems. Notwithstanding (a) above, for all OWTS with design flows of 2,500 gpd or more (i.e., "large systems"), the groundwater mounding analysis shall demonstrate that the minimum required groundwater separation, per Section 2.2 of this Manual, will be maintained beneath the system during peak wet weather conditions.

CCEH may require, in any individual case or in specific geographical areas, a minimum of 2 feet of groundwater clearance ("mounded" conditions) where deemed necessary for protection of public health, or based upon specific requirements or recommendations of the Regional Water Board.

2. **Nitrate Loading.** Minimum criteria for evaluating the cumulative nitrate loading from proposed OWTS shall be as follows:

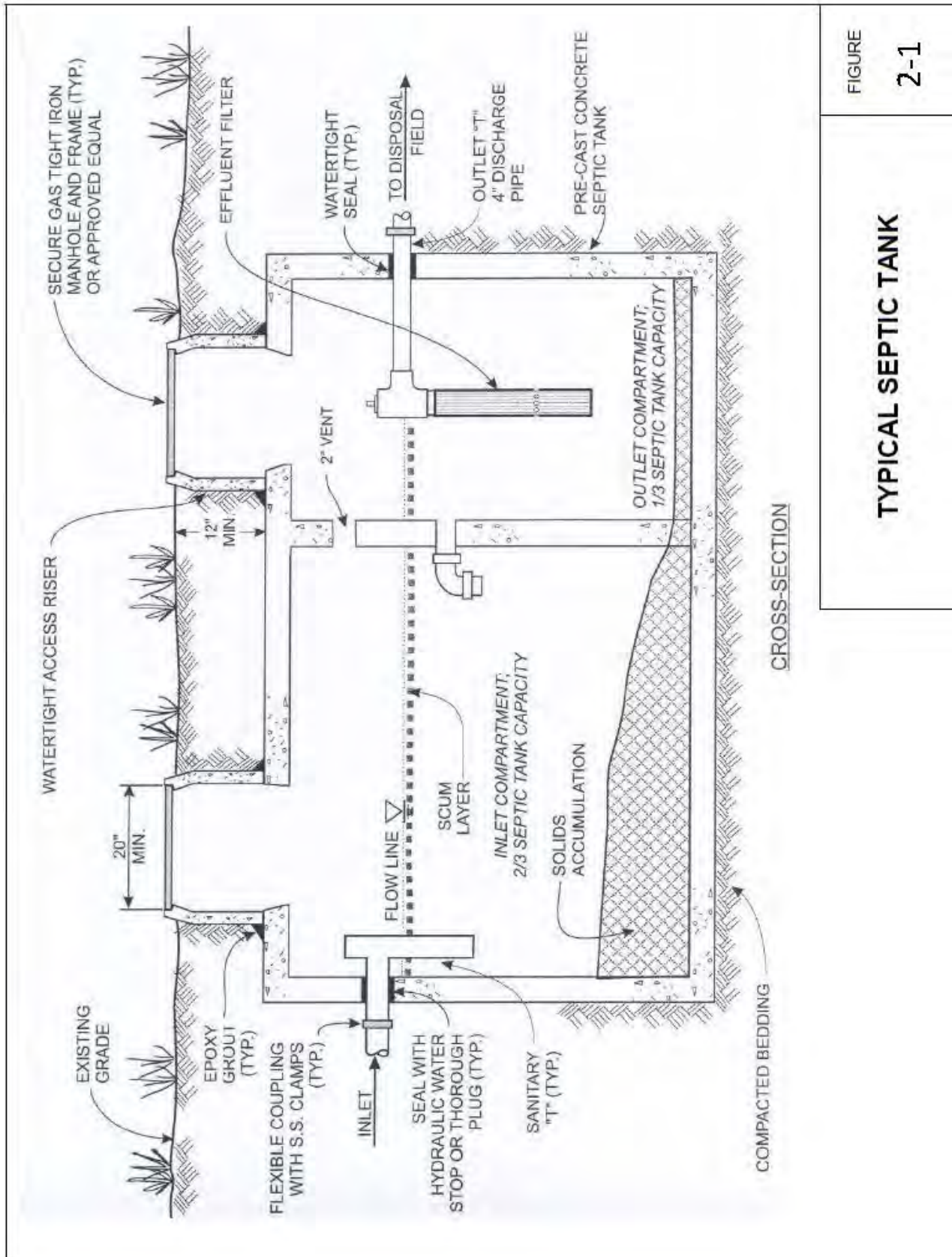
a. For Areas Served By Individual Water Wells.

- 1) Existing Lots of Record: New OWTS on existing lots of record shall not cause the groundwater nitrate-nitrogen concentration to exceed 7.5 mg-N/L at the nearest existing or potential point of groundwater withdrawal (e.g., water well location); and
- 2) New Subdivisions: The total loading of nitrate from new subdivisions shall not result in an average groundwater nitrate-nitrogen concentration over the geographical extent of the subdivision that exceeds 7.5 mg-N/L.

b. For Areas Not Served by Individual Water Wells.

- 1) Existing Lots of Record: OWTS installed on existing lots of record shall not cause the groundwater nitrate-nitrogen concentration to exceed 10 mg-N/L at the nearest existing or potential point of groundwater withdrawal (e.g., water well location); and
- 2) New Subdivisions. The total loading of nitrate from new subdivisions shall not result in an average groundwater nitrate-nitrogen concentration over the geographical extent of the subdivision that exceeds 10 mg-N/L.

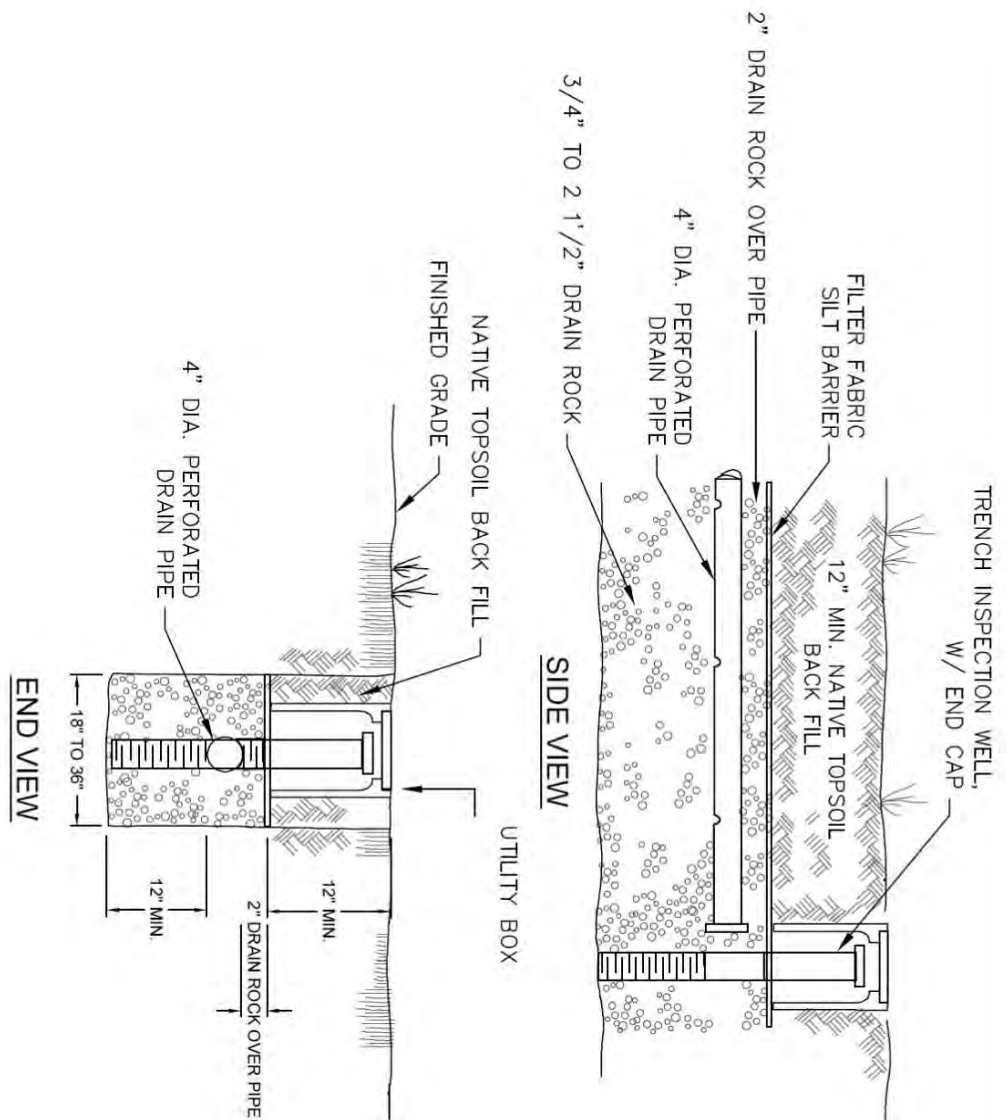
CCEH may require, in any individual case or specific geographical areas, more stringent nitrate-nitrogen compliance criteria when deemed necessary for protection of public health, or based on specific requirements or recommendations of the Regional Water Board.



FIGURE

2-1

TYPICAL SEPTIC TANK



**CONVENTIONAL
LEACHING TRENCH**

**FIGURE
2-2**

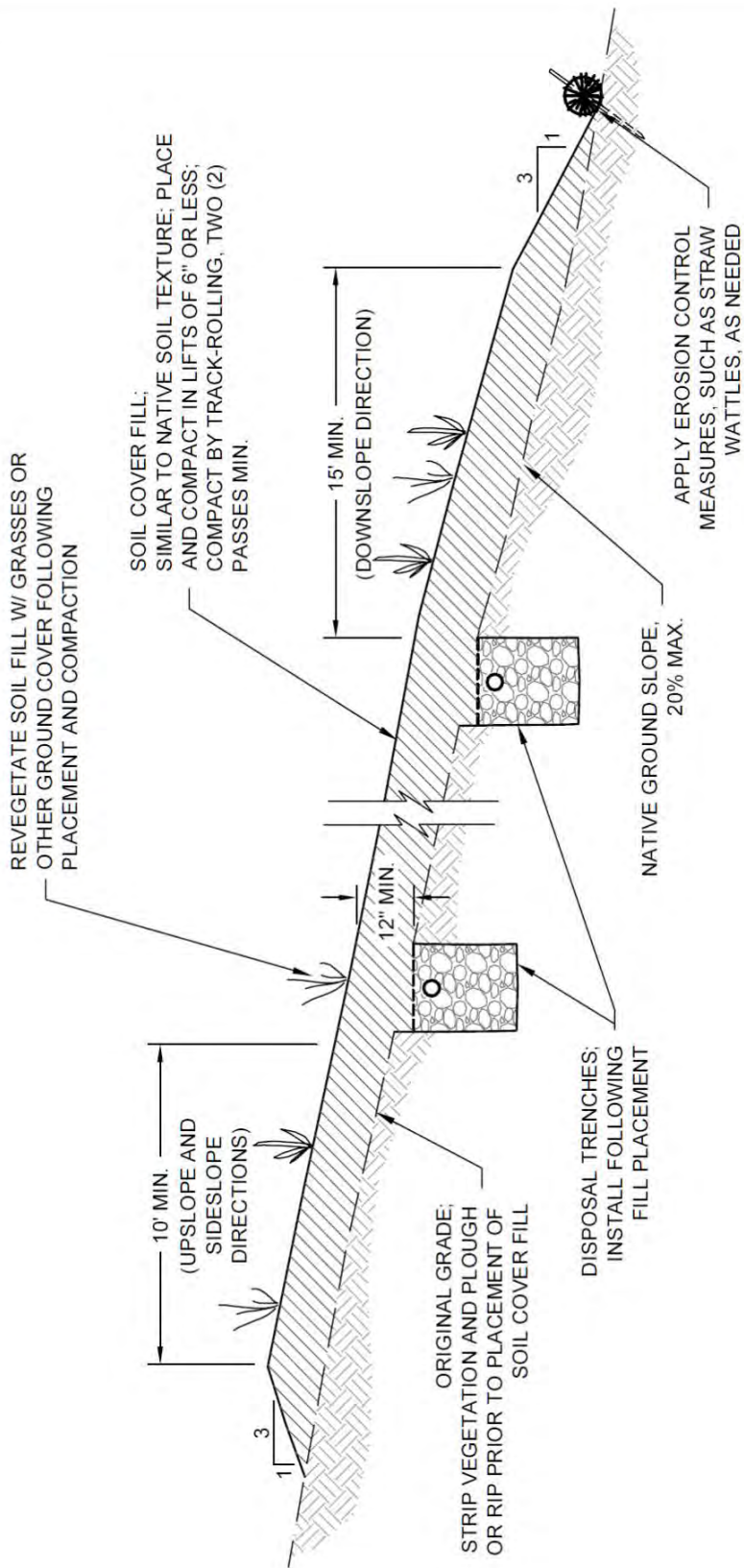
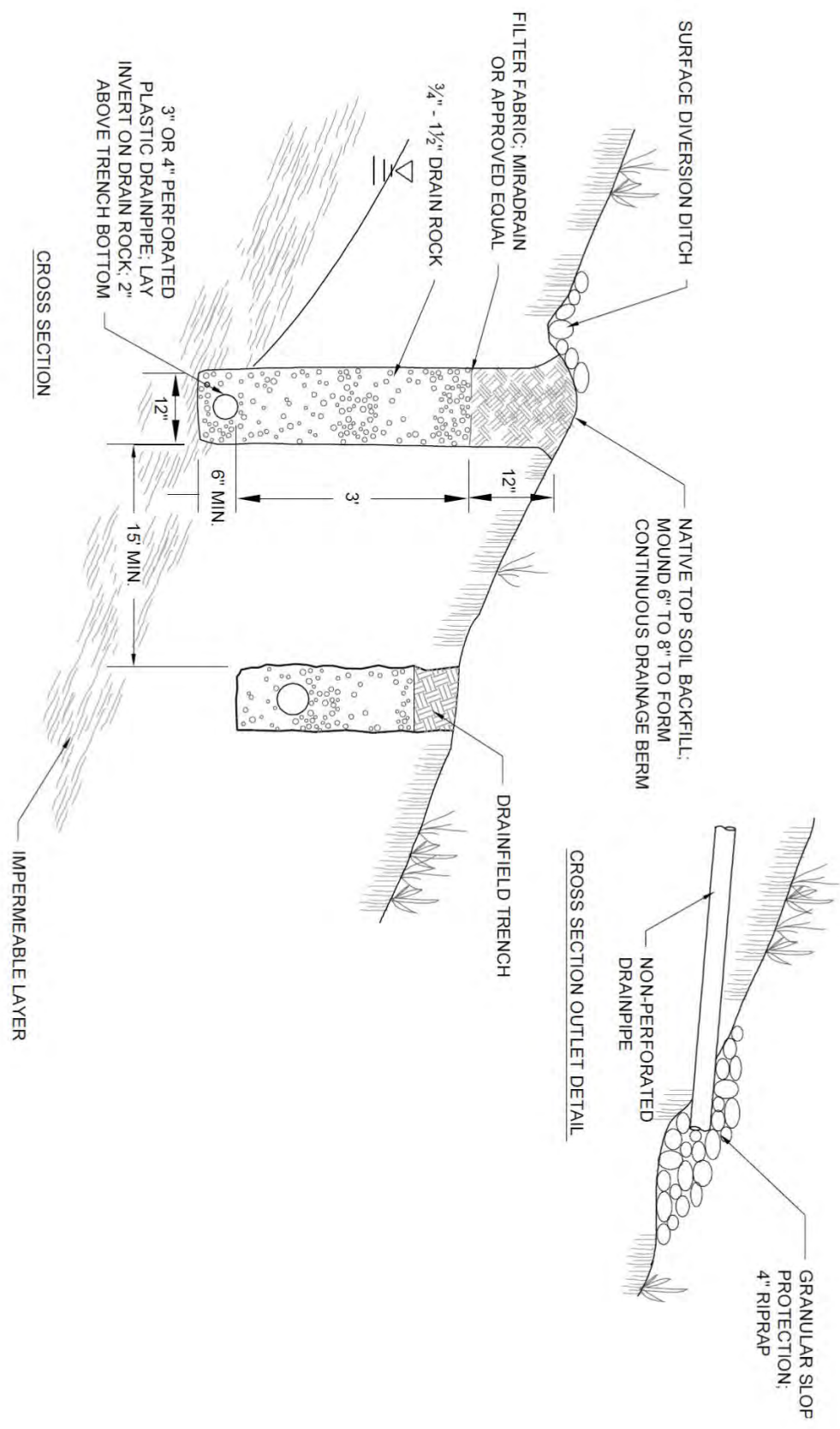


FIGURE
2-3

COVER FILL SYSTEM
CROSS-SECTION



CURTAIN DRAIN SCHEMATIC DETAIL

FIGURE
2-4

Standard Wastewater Application Rates - Interpolated Values				
Percolation Rate (MPI)	Application Rate (gpd/ft ²)		Percolation Rate (MPI)	Application Rate (gpd/ft ²)
1 to 5	1.20		51	0.41
6	1.12		52	0.40
7	1.04		53	0.40
8	0.96		54	0.39
9	0.88		55	0.38
10	0.80		56	0.38
11	0.78		57	0.37
12	0.77		58	0.36
13	0.75		59	0.36
14	0.74		60	0.35
15	0.72		61	0.35
16	0.70		62	0.34
17	0.68		63	0.34
18	0.67		64	0.34
19	0.65		65	0.33
20	0.64		66	0.33
21	0.63		67	0.33
22	0.62		68	0.32
23	0.61		69	0.32
24	0.60		70	0.32
25	0.59		71	0.31
26	0.59		72	0.31
27	0.58		73	0.31
28	0.57		74	0.30
29	0.57		75	0.30
30	0.56		76	0.30
31	0.55		77	0.29
4	0.55		78	0.29
33	0.54		79	0.29
34	0.53		80	0.28
35	0.52		81	0.28
36	0.52		82	0.28
37	0.51		83	0.27
38	0.50		84	0.27
39	0.49		85	0.27
40	0.49		86	0.26
41	0.48		87	0.26
42	0.47		88	0.26
43	0.46		89	0.25
44	0.46		90	0.25
45	0.45		91-120	0.20
46	0.44			
47	0.44			
48	0.43			
49	0.43			
50	0.42			

COLUSA COUNTY ONSITE SYSTEMS MANUAL

PART 3

ALTERNATIVE OWTS REQUIREMENTS

Part 3

ALTERNATIVE OWTS REQUIREMENTS

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3.1 Introduction

A. GENERAL.

“Alternative OWTS” is a type of OWTS that utilizes either a method of wastewater treatment other than a conventional septic tank for the purpose of producing a higher quality wastewater effluent and/or a method of wastewater dispersal other than a gravity fed drain field trench for effluent dispersal.

As provided in the Colusa County Code (Section 36.3.12), Alternative OWTS may be used for system repairs, existing lots of record, and for land divisions, in accordance with conditions and requirements in this Manual as approved by the director.

This section of the Onsite Systems Manual provides technical guidance and requirements for the application, design, construction and management of various alternative onsite wastewater treatment and dispersal technologies deemed to be suited to the conditions and constraints in Colusa County.

B. ALTERNATIVE TREATMENT SYSTEMS.

Requirements are provided for the following alternative treatment systems:

- Intermittent Sand Filters
- Proprietary Treatment Units

County Code allows for the future addition of other alternative treatment systems, as may be approved by the director and the California Regional Water Quality Control Board. Upon approval, such other alternative treatment systems will be incorporated into this Manual, including a listing of applicable requirements, similar to the information provided for intermittent sand filters and proprietary treatment units.

Dispersal systems receiving effluent from an alternative treatment system shall be sited, designed and constructed in accordance with the respective design and construction requirements for the particular type of dispersal system (e.g., conventional trenches, pressure distribution, mound system, or drip dispersal), as specified in this Manual.

C. ALTERNATIVE DISPERSAL SYSTEMS.

Requirements are provided for the following types of alternative dispersal systems.

- Pressure Distribution Trench Systems
- Mound Systems
- Subsurface Drip Dispersal

County Code allows for the future addition of other alternative dispersal systems, as may be approved by the director and the California Regional Water Quality Control Board. Upon approval, such other alternative dispersal systems will be incorporated into this Manual, including a listing of applicable requirements, similar to the information provided for those listed above.

D. OPERATION AND MAINTENANCE GUIDELINES.

Operation and maintenance guidelines for each alternative OWTS installation shall be supplied to the system owner by the designer, with a copy also provided to CCEH. Final approval of system installation shall be contingent upon confirmation by CCEH that required operation and maintenance guidelines have been provided.

Minimum items expected to be contained in the operation and maintenance guidelines include the following:

1. General description of the OWTS, design capacity, and any special permit or operating conditions;
2. Brief description of the key components and their function;
3. For each component, describe recommended inspection and maintenance activities, including frequency; provide copies of manufacturer operation and maintenance instructions and “trouble-shooting” guides, as applicable;
4. General preventative measures for proper use and maintenance of the OWTS (e.g., “Dos and Don’ts”);
5. Copy of system plans or “as-built” drawings, as applicable.
6. Contact information for the following:
 - a. Designer
 - b. Installer
 - c. Maintenance contractor
 - d. Environmental Health Department
7. Other information, references or documents, as appropriate.

3.2 Requirements for Intermittent Sand Filters

A. DESCRIPTION.

Intermittent sand filters (ISF) are used to provide supplemental treatment of septic tank effluent prior to discharge to the dispersal system. They are used to improve or restore the capacity of the dispersal field, reduce pathogenic bacteria and can provide additional nitrogen removal.

Sand filtration is well established in sanitary engineering practice for more than 100 years as a passive, reliable “biofilm” treatment process. An ISF consists of a packed-bed filter of medium-grained sand, designed for single pass-through treatment of septic tank effluent; it is sometimes referred to as a “single pass filter”.

Effluent from sand filters may be discharged to conventional leachfields and to any type of alternative dispersal system identified in this Manual. Effluent from an ISF designed and operated in accordance with these requirements will be considered to meet the criteria for “supplemental treatment”.

B. SITING CRITERIA.

1. **Sand Filter Treatment Unit.** All siting criteria for septic tanks as specified Part 2 of this Manual shall also apply to intermittent sand filters and associated tanks and pumping units.
2. **Dispersal Systems Receiving Sand Filter Effluent.** Dispersal systems receiving sand filter effluent are subject to all siting criteria for conventional septic tank-dispersal trench systems, with certain exceptions as noted. Exceptions allowed for supplemental treatment may include reduction in vertical separation distance to groundwater from standard 5 feet to minimum of 2 feet (measured from bottom of dispersal trench). Refer to the adopted requirements for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

C. DESIGN CRITERIA.

1. **Septic Tank Pretreatment.** Sand filter treatment units shall be preceded by a septic tank, sized for the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation requirements in Part 2 of this Manual.
2. **Pressure Dosing.** Septic tank effluent shall be applied to the sand filter treatment unit by pressure dosing (i.e., pump system). The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

- a. Uniform dosing of effluent over the surface application area of the sand filter distribution bed;
- b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;
- c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;
- d. Dosing volume set to achieve a minimum of 3 to 5 doses per day at design flow conditions; and
- e. At least one distribution lateral for every 36 inches of bed width.

Additional requirements for the design and construction of pressure distribution systems contained in "Requirements for Pressure Distribution Systems" shall also apply.

Also, where a sand filter is used in conjunction with a gravity-fed dispersal system, the dosing pump system for the sand filter shall provide emergency storage capacity equal to at least one full day of wastewater flow at design conditions.

- 3. **Wastewater Application Rate.** The wastewater application rate used for sizing the surface area of the sand filter shall be as follows:
 - a. 1.2 gpd/ft² for individual residential OWTS
 - b. 1.0 gpd/ft² for all commercial, industrial, institutional, and multi-residential OWTS

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the sand filter may be required for high strength waste flows, such as those from restaurants.

- 4. **Containment Liner.** The sand filter shall be provided with an impermeable containment liner to prevent leakage out of or into the filter. The liner shall consist of either: (a) 30 mil plastic; (b) reinforced poured-in-placed concrete; or (c) an equivalent impermeable structure or barrier.
- 5. **Finished Grade.** The finished grade of the sand filter shall be at or above the surrounding ground elevation. Above-ground installation shall be structurally supported with retaining wall(s), as required.
- 6. **Shape.** The sand filter shall not be restricted as to its shape in plan view; i.e., it may be square, rectangular or an irregular shape.

7. **Multiple Units.** The sand filter may be divided into compartments or multiple units.
8. **Sand Filter Media.**
- a. **Sand Specification.** The sand media shall be a medium to coarse sand that meets the gradation specifications in **Table 3-1**.
 - b. **Sand Depth.** The minimum sand depth below the gravel distribution bed shall be 24 inches.

Table 3-1.
Sand Media Specifications

Sieve Size	Percent Passing
3/8	100
#4	90-100
#10	62-100
#16	45-62
#30	25-55
#50	5-20
#60	0-10
#100	0-4
#200	0-2

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to CCEH to verify conformance with the above specifications.

9. **Gravel Distribution Bed.**
- a. **Material.** The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.
 - b. **Depth.** Pea gravel shall extend a minimum of 6 inches below the invert and 2 inches above the top of the distribution piping. If the distribution piping is installed with chambers, the pea gravel depth below the distribution pipe may be reduced from 6 inches to 4 inches, and the 2-inch pea gravel cover may be eliminated.
10. **Silt Barrier.** The gravel distribution bed shall be covered in its entirety with a geotextile ("filter fabric") silt barrier. Filter fabric shall be either polyester, nylon or polypropylene, or any combination thereof, and shall be similar to that used for

under-drain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.

11. Cover.

- a. **Material.** A soil cover shall be placed over the distribution bed, consisting of a medium, loamy-textured soil.
- b. **Depth.** Soil cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed. Soil cover shall be crowned or sloped to promote rainfall runoff.

12. Under-drain.

- a. **Material.** The under-drain beneath the sand media shall consist of 3/8" washed pea gravel with 4-inch diameter perforated drain pipe, installed with perforations oriented down.
- b. **Depth.** The pea gravel under-drain shall have a minimum depth of 9 inches.
- c. **Grade.** The under-drain shall be constructed and the drain pipe set with a minimum grade of 1% toward the outlet point.
- d. **Watertight Outlet "Boot".** The sand filter under-drain shall be equipped with a watertight outlet "boot" for connection of piping to the dosing tank. An exception to this is for intermittent sand filters that are equipped with an internal pump system for direct dosing to the disposal field (see paragraph #15 below).
- e. **Clean-out Riser.** For clean-out and inspection purposes the upslope end of the perforated drain pipe in the under-drain shall be equipped with a vertical riser constructed of non-perforated pipe of equal diameter. The riser shall extend to finished grade of the sand filter.

13. Air Manifold. An air manifold shall be installed within the pea gravel under-drain for the purpose of introducing forced air to into the sand filter media, as needed, for maintenance or drainage rehabilitation. The air manifold shall consist of small diameter PVC piping, with drilled perforations (pointed down), and positioned above the perforated under-drain pipe. The manifold shall be connected to a vertical leader pipe that extends to the surface of the sand filter, fitted with a threaded pipe cap or plug at the top where a portable air line can be connected.

14. Inspection Pipes. A vertical inspection pipe shall be installed in the gravel distribution bed of each sand filter compartment. The pipe shall extend from finished grade to the pea gravel-sand interface of the distribution bed and shall

be perforated in the pea gravel zone only. Inspection pipes shall be 2-inch to 4-inch diameter plastic pipe and fitted with a wrench-tight cap or pipe plug. Perforations shall consist of hacksaw slots at nominal 1" spacing; alternatively, commercially slotted pipe may be used. Inspection pipes shall be sealed against surface infiltration with a bentonite or concrete annular seal through the soil backfill zone.

15. **Internal Pump System (ISF only).** In lieu of gravity flow from the sand filter to the dispersal field (or dispersal field dosing system), an internal pump system may be installed within the intermittent sand filter for dosing directly to the dispersal field. In such applications:
 - a. Pump chamber shall be seated at or below the bottom of the under-drain;
 - b. Pump operating depth shall be entirely within the depth of the under-drain; and,
 - c. Storage volume equal to at least 50 percent of the disposal field dose volume shall be provided in the network of perforated drain pipe within the under-drain.

D. ENGINEERING PLANS AND CONSTRUCTION.

1. **Reference Guidelines.** In addition to the requirements set forth herein, design and construction of sand filter systems shall utilize applicable guidelines contained in the following references:
 - a. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended.
 - b. "Design Manual – Onsite Wastewater Treatment and Disposal Systems", U.S. Environmental Protection Agency, October 1980.
2. **Engineering Plans.** Engineering plans for sand filter systems shall include:
 - a. All relevant elevation data and hydraulic calculations;
 - b. Specific step-by-step construction guidelines and notes for use by the installer;
 - c. Recommended make and model of all components;
 - d. Recommended pump system components, with cut-sheet depicting float settings;

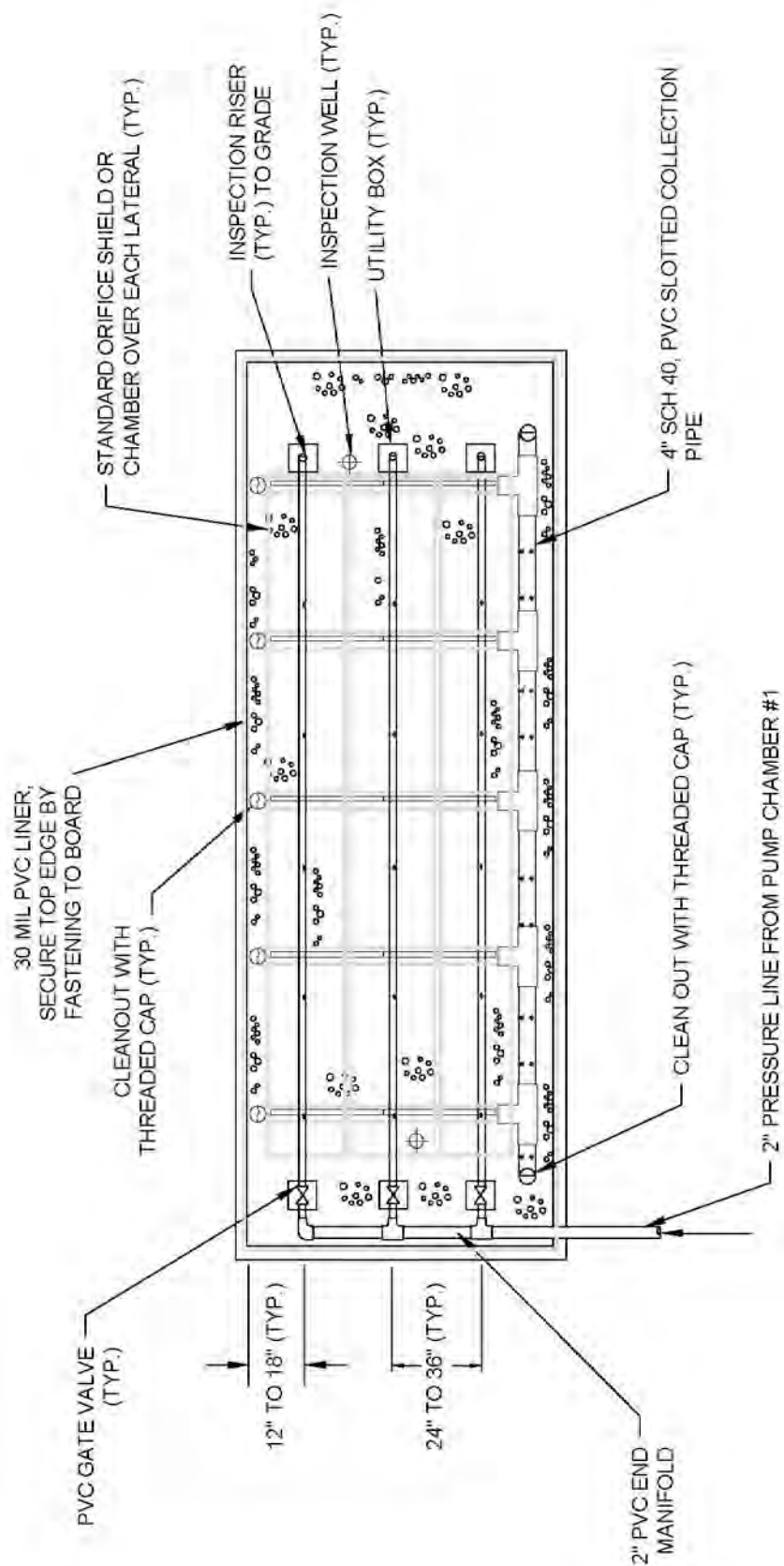
- e. Control panel programming;
 - f. Inspection schedule listing critical control points; and
 - g. Operation and maintenance guidelines.
3. **Construction Inspection.** At a minimum, inspection of the sand filter system installation should include the items listed below. Joint inspection by the designer, contractor, and CCEH may be required.
- a. Pre-construction inspection where the construction staking or marking of the sand filter is provided and construction procedures discussed;
 - b. Water tightness of septic tank and dosing (pump) tank;
 - c. Sand filter dimensions, structure and liner;
 - d. Under-drain piping and filter rock;
 - e. Sand quality and placement;
 - f. Piping installation and hydraulic (“squirt”) test of the distribution system;
 - g. Functioning and setting of all control devices; and
 - h. Final inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection pipes are installed; erosion control has been completed, and O&M guidelines provided for owner.

E. MANAGEMENT REQUIREMENTS.

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for intermittent sand filter system are outlined in **Table 3-2** below.

Table 3-2.
Intermittent Sand Filter System Management Requirements

	Work	Minimum Frequency
Inspection	• Observe surface conditions on and around filter for effluent leakage, drainage/infiltration, erosion or other problems. • Check/measure water level in inspection pipes in filter bed. • Perform all inspection work as recommended by designer or equipment manufacturer. • Perform inspection protocol for pump systems (per O&M Guidelines and Performance Evaluation Guidelines, Part 4 of this Manual). • Record observations.	• According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Maintenance	• Purge laterals. • Perform squirt and balance laterals. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by designer or equipment manufacturer. • Record work done.	• According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history. • Responsive maintenance as necessary.
Water Monitoring & Sampling	• Report observation findings and maintenance actions, including notation of problems and corrective actions. • Record dose counter and elapsed time meter readings from control panel.	• According to permit conditions, if applicable.
Reporting	• Report findings to CCEH per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report emergency or failure conditions to CCEH immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.



PLAN VIEW

INTERMITTENT SAND FILTER PLAN VIEW

3.3 Requirements for Proprietary Treatment Units

F. DESCRIPTION.

Propriety treatment units cover a category of manufactured or “package” systems specifically developed for residential and other small-scale sewage treatment applications. Most proprietary designs currently available fall into two general categories: (1) aerobic treatment units (ATUs); and (2) media filters.

1. **Aerobic Treatment Units (ATUs).** ATUs utilize forced air to oxidize the wastewater, promoting aerobic decomposition of the wastewater solids. These systems provide supplemental treatment of wastewater for improvement in dispersal field performance; they also provide varying degrees of nitrogen removal. In general, ATUs can be relied on to produce secondary quality effluent, better than 30 mg/L BOD and TSS. ATUs are generally not as effective in reducing pathogen levels as are systems that incorporate media filtration. However, some ATUs provide reduction in nitrogen levels equal to or greater than that provided by sand filters and other media filters.
2. **Media Filters.** This includes proprietary designs that function similar to sand filters. In these systems the sand is replaced with an alternate media; peat, gravel or textile are a few examples. Textile and other media filters have been found to produce effluent quality reasonably similar to recirculating sand filters, and provide similar capabilities in overcoming various soil and site constraints.

Effluent from proprietary treatment units may be discharged to conventional dispersal trenches and to any type of alternative dispersal system identified in this Manual. Effluent from proprietary treatment units designed and operated in accordance with these guidelines will be considered to meet the criteria for “supplemental treatment”.

B. SITING CRITERIA.

1. **Treatment Unit.** All siting criteria for septic tanks, as specified in Part 2 of this Manual shall also apply to proprietary treatment units and associated tanks and pumping units.
2. **Dispersal Systems Receiving Proprietary Treatment Effluent.** Dispersal systems receiving effluent from a proprietary treatment unit are subject to all siting criteria for conventional septic tank-dispersal trench systems, except as modified in accordance with adopted requirements for the specific type of alternative dispersal system proposed, including any allowances for the incorporation of supplemental treatment. Allowances for supplemental treatment may include reduced vertical separation distances. Refer to the adopted

guidelines for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

C. DESIGN AND CONSTRUCTION REQUIREMENTS.

1. **NSF Standard 40.** The proprietary treatment unit shall be listed by the National Sanitation Foundation (NSF) as meeting the NSF Standard 40, Class 1 performance evaluation, or have certification by a third-party listing agency as complying with NSF Standard 40 performance requirements. The treatment unit shall be manufactured and installed in accordance with the design specifications used to determine compliance to NSF Standard 40. This specification is applicable to treatment units for wastewater flows of up to 1,500 gpd and is based on compliance with US EPA standards for secondary treatment of municipal wastewater, including 30-day average effluent limits of 25 mg/L for CBOD₅ and 30 mg/L for TSS. Treatment units for flows in excess of 1,500 gpd will require either (a) certification by a third-party listing agency of equivalent performance; or (b) third party engineering review of the design proposal.
2. **Design Sewage Flow.** Sizing and design of proprietary treatment units shall be based on the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 2 of this Manual.
3. **Tanks.** All tanks housing a proprietary treatment unit shall be structurally sound, water-tight and capable of withstanding 1,000 pounds of weight.
4. **Controls.** Control panels shall be designed and configured in such a manner that, in the event of a treatment unit malfunction, an alarm system will be triggered and discharge from the treatment system to the dispersal field will be interrupted until the treatment unit malfunction is rectified. At a minimum, the alarm system shall include an audible and visual alarm located within the building served by the system.
5. **Emergency Storage Provisions.** Where a proprietary treatment unit is used in conjunction with a gravity-fed dispersal system, the system shall provide emergency storage capacity equal to at least one full day of wastewater flow at design conditions.
6. **Compliance with Manufacturer Requirements.** The designer and installer shall follow the proprietary manufacturer's design, installation, construction, and operations procedures.
7. **Engineering Plans.** Engineering plan submittals for proprietary treatment units shall provide documentation of compliance with manufacturer requirements and sufficient design analysis to verify the appropriateness of the treatment unit for the proposed application. Engineering plans shall contain specific step-by-step

construction guidelines and notes for use by the installer, including any manufacturer instructions.

8. **Installer Requirements.** Anyone installing a proprietary treatment unit shall be trained and certified by the system manufacturer. Documentation verifying conformance to this requirement shall be provided to CCEH prior to system installation.
9. **Maintenance Contract.** The applicant must demonstrate that a written maintenance agreement with a qualified service provider has been obtained for the proposed proprietary treatment unit to ensure satisfactory post-construction operation and maintenance. A maintenance agreement must be maintained valid for the life of the treatment unit.
10. **Construction Inspection.** The following minimum inspections prior to commencing construction or covering any elements of the system shall be required. Joint inspection by the designer, installer, and CCEH may be required.
 - a. Pre-construction inspection where the construction staking or marking of the treatment unit is to be placed and installation procedures are discussed;
 - b. Testing of the treatment unit:
 - 1) Function and setting of all control devices and alarms.
 - 2) Water-tightness of septic tank, treatment tank(s), and dosing tank, as applicable.
 - c. Final Inspection:
 - 1) A letter from the designer that the treatment unit has been installed and is operating in conformance with design specifications shall be provided
 - 2) A valid, signed maintenance agreement between the applicant/property owner and service provider shall be provided.
 - 3) Copies of operation and maintenance guidelines provided for system owner and service provider.

D. MANAGEMENT REQUIREMENTS.

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for proprietary treatment systems are outlined in **Table 3-3** below.

Table 3-3.
Proprietary Treatment System Management Requirements

	Work	Minimum Frequency
Inspection	Inspection to be in accordance with manufacturer specifications.	According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Maintenance	Perform all maintenance as required and in accordance with equipment manufacturer specifications.	According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Water Monitoring & Sampling	Monitoring to be in accordance with manufacturer specifications.	If required, according to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Reporting	- Report findings to CCEH per permit requirements. - Standard report to describe findings, analyze performance, and detail actions taken. - Report crisis or failure conditions to CCEH immediately.	According to permit conditions, typically every year, depending on system size, usage, history, location.

3.4 Requirements for Pressure Distribution Trenches

A. DESCRIPTION.

Pressure distribution (PD) trench systems are a variation of a conventional gravity drainfield system that use a pump and small-diameter pressure piping to achieve broad, uniform distribution of wastewater throughout the dispersal field for improved soil absorption and better treatment of percolating effluent. Pressure distribution can be used in conjunction with standard trench designs and for chamber systems; and can be used in conjunction with either septic tank effluent or with supplemental treatment.

B. APPLICATIONS.

Pressure distribution trench systems are permitted and/or required for the following situations:

1. To allow reduction of vertical separation to groundwater or soil depth below trench bottom from 5 feet to: (a) 3 feet for septic tank effluent; or (b) 2 feet for effluent receiving supplemental treatment;
2. For large flow systems, e.g., with dispersal field lengths (primary) exceeding 500 lineal feet; and
3. Others as may be determined necessary due to site-specific soil, geology or other conditions.

C. SITING CRITERIA.

1. **Setbacks.** Horizontal setback requirements for PD trench systems shall be those applicable to conventional dispersal fields, as specified in Part 2 of this Manual.
2. **Vertical Separation Requirements.**
 - a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater for PD trench systems receiving septic tank effluent, as measured from trench bottom, shall be three (3) feet.
 - b. **Soil Depth.** Minimum depth of soil, as measured from trench bottom to impermeable soil or rock, for PD trench systems shall be three (3) feet.
3. **Reserve Area/Dual System.** A reserve area having suitable site conditions and sufficient area for full, 100% replacement of the primary PD dispersal field shall be provided, or a complete dual primary and secondary PD system shall be installed initially, with the two fields interconnected with an approved flow

diversion device (pressure-rated), intended to allow alternate use of the two fields.

D. DESIGN CRITERIA.

1. **Treatment.** Pressure distribution may be used with either septic tank effluent or with supplemental treatment.
2. **Design Sewage Flow.** PD trench systems shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation requirements in Part 2 of this Manual.
3. **Pressure Dosing.** Septic tank effluent shall be applied to the PD trench system by pressure dosing, utilizing a pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:
 - a. Uniform dosing of septic tank effluent throughout the system of PD trenches;
 - b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;
 - c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system; and
 - d. Dosing volume to achieve minimum of 3 to 5 doses per day at design flow conditions.
4. **Dispersal Trenches.** PD trenches shall conform to the same design and construction requirements as standard trenches, per Part 2 of this Manual, with the exception that the piping system shall consist of pressure piping rather than gravity piping.
5. **Pressure Distribution Piping.**
 - a. **Pressure-Rated Pipe Material.** All pipe, fittings and valves shall be pressure-rated PVC pipe, minimum 150 psi.
 - b. **Solvent Welded.** All joints in the pressure piping system shall be solvent welded.
 - c. **Pipe Sizing.** All pressure distribution pipes and fittings, including transport lines, manifolds, laterals and valves, must be adequately sized for the design flow, and shall be designed to minimize frictional losses to the maximum extent practicable.

- d. **Thrust Blocks.** Concrete thrust blocks, or equivalent restraint, shall be provided at sharp changes in piping directions.
 - e. **Shut-off Valves.** The distribution lateral for each trench shall be fitted with a shut-off valve to adjust or terminate the flow to individual trenches. This valve may be either a ball or gate valve, and shall be located in a utility/valve box.
 - f. **Lateral End Riser.** The end of each lateral shall be fitted with a 90° long sweep to facilitate line cleaning and hydraulic testing. The end riser pipe shall also be fitted with a ball valve and/or threaded end cap or plug, housed in a valve box.
6. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in this Manual.
7. **Trench Sizing.** PD trench sizing shall conform to the same sizing requirements as standard trenches, as applicable, per Part 2 of this Manual.

E. ENGINEERING PLANS AND CONSTRUCTION.

1. **Reference Guidelines.** In addition to the requirements set forth herein, design and construction of PD trench systems shall utilize applicable guidelines contained in the following references:
- a. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended.
 - b. "Design Manual – Onsite Wastewater Treatment and Disposal Systems", U.S. Environmental Protection Agency, October 1980.
2. **Engineering Plans.** Engineering plans for PD trench systems shall include:
- a. All relevant elevation data and hydraulic calculations;
 - b. Specific step-by-step construction guidelines and notes for use by the installer;
 - c. Erosion control plans for any site over 20% slope;
 - d. Recommended make and model of all components;
 - e. Recommended pump system components, with cut-sheet depicting float settings;

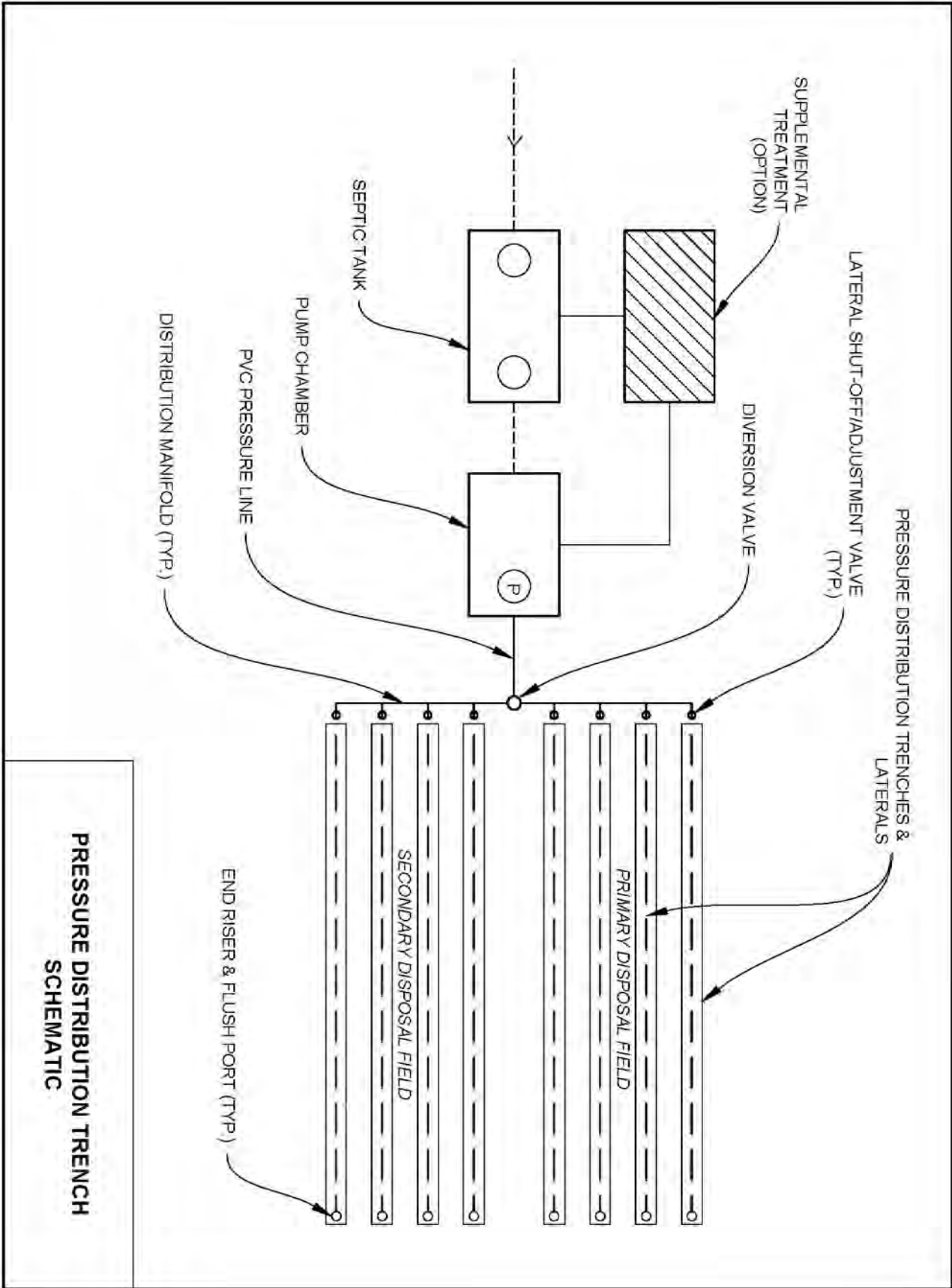
- f. Control panel programming;
 - g. An inspection schedule listing critical control points; and
 - h. Operation and maintenance guidelines.
3. **Construction Inspection.** At a minimum, inspection of the PD trench system installation should include the items listed below. This is in addition to inspection work required for a supplemental treatment system, if used. Joint inspection by the designer, contractor, and CCEH may be required.
- a. Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;
 - b. Water tightness of septic tank and dosing (pump) tank;
 - c. Layout and excavation of dispersal trenches and piping;
 - d. Drain rock material and placement;
 - e. Piping installation and hydraulic (“squirt”) test of the distribution system;
 - f. Functioning and setting of all control devices; and
 - g. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, erosion control has been completed and operation and maintenance guidelines are provided for owner.

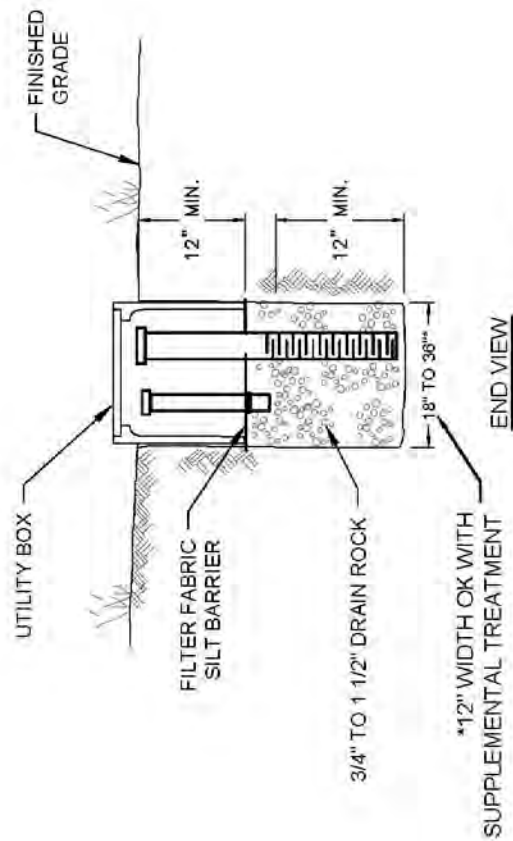
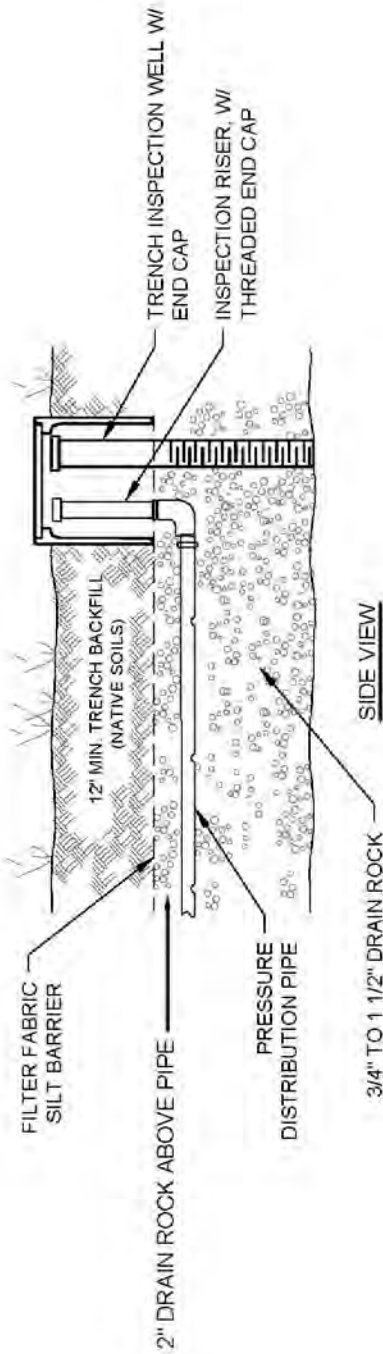
F. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for pressure distribution trench systems are outlined in **Table 3-4**.

Table 3-4.
Pressure Distribution Trench System Management Requirements

	Work	Minimum Frequency
Inspection	• Conduct routine visual observations of disposal field and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, or other problems. • Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 4 of this Manual).	• Every 6 to 12 months.
Maintenance	• Purge laterals, squirt and balance. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. • Investigate and repair erosion, drainage or other disposal field problems, as needed. • Investigate and perform distribution system corrective work, as required. • Record work done.	• Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	• Measure and record water levels in trench inspection pipes. • Obtain and analyze water samples from any monitoring wells, as applicable, per permit requirements.	• Measure trench water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	• Report findings to CCEH per permit requirements. • Standard report to include dates, inspection pipe and monitoring well readings (as applicable), and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to CCEH immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.





PRESSURE DISTRIBUTION TRENCH

3.5 Requirements for Mound Systems

A. DESCRIPTION.

A mound system consists of an elevated sand bed with a gravel distribution bed covered by soil fill. Mound systems are intended to raise the soil absorption system above grade and provide further treatment (sand filtration) of effluent before it reaches native soils. Mounds utilize the shallow surface soils for broad distribution of effluent, and are used to mitigate high water table and shallow soil conditions on flat or gently sloping terrain. Mound systems can be used where there are at least two feet of permeable surface soils (above the water table or restrictive soils) on slopes up to 20 percent, depending upon percolation characteristics.

B. SITING CRITERIA.

1. **Setbacks.** Horizontal setback requirements for mound systems shall be those applicable to conventional disposal fields, as specified in Part 2 of this Manual.
2. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from ground surface, shall vary according to soil percolation rate as follows:

<u>Percolation Rate, MPI</u>	<u>Depth to Groundwater</u>
1-4	3 feet
5-120	2 feet

3. **Soil Depth.** Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for mound systems shall be 2 feet. This soil depth requirement shall apply within the mound fill area and in the adjacent area extending a distance of 25 feet down-slope of the mound system.
4. **Percolation Rate.** Average percolation rate for mound systems shall be within the range of 1 to 120 minutes per inch (MPI), as determined from testing at depths of 1 to 2 feet below ground surface. These percolation requirements shall apply within the mound fill area and in the adjacent area extending a distance of 25 feet down-slope of the mound system.
5. **Ground Slope.** Maximum ground slope for mound systems shall be 20% where the percolation rate is in the range of 1 to 60 MPI. For soils with a percolation rate greater than 60 MPI, maximum ground slope for mound systems shall be 15%.
6. **Reserve Area/Dual System.** A reserve area having suitable site conditions and sufficient area for full, 100% replacement of the primary mound shall be provided or a complete dual primary and secondary mound system shall be installed initially.

C. DESIGN CRITERIA

1. **Treatment.** The mound system shall be preceded by a septic tank sized for the design sewage flow and constructed in accordance with requirements contained in Part 2 of this Manual.
2. **Design Sewage Flow.** The mound system shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 2 of this Manual.
3. **Pressure Dosing.** Septic tank effluent shall be applied to the mound system by pressure dosing, utilizing a pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:
 - a. Uniform dosing of septic tank effluent over the surface application area of the mound distribution bed;
 - b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;
 - c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;
 - d. Dosing volume to achieve a minimum of 3 to 5 doses per day at design flow conditions; and
 - e. At least one distribution lateral for every 36 inches of bed width.
 - f. Additional requirements for design and construction of pressure distribution piping systems contained in "Requirements for Pressure Distribution Trenches" shall also apply.
4. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in this Manual.

5. Sand Fill.

- a. **Sand Specifications.** The sand media shall be a medium to coarse sand which meets the following gradation specifications:

Sieve Size	Percent Passing
3/8	100
#4	90 – 100
#10	62 – 100
#16	45 – 82
#30	25 – 55
#50	5 – 20
#60	0 – 10
#100	0 – 4
#200	0 – 2

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to CCEH to verify conformance with the above specifications.

- b. **Sand Depth.** The minimum depth of sand fill, below the gravel distribution bed, shall be 12 inches. The minimum depth of sand fill shall be increased to 24 inches for sites where the average percolation rate is between 1 and 5 MPI; such sites also require greater separation to groundwater below ground surface (3 feet rather than 2 feet).
- c. **Lateral Dimensions.** The sand shall be placed as a continuous fill extending in lateral dimensions as necessary to meet the following minimum requirements:
- 1) Top of the sand fill shall extend horizontally beyond the gravel distribution bed:
 - i. 1 foot in the upslope direction
 - ii. 2 feet in the down-slope direction
 - iii. 2 feet in the longitudinal (side) direction
 - 2) Maximum slope of the top of the sand surface shall be 3 horizontal to 1 vertical.
 - 3) Bottom of the sand fill shall be large enough to meet minimum mound sizing requirements based on basal area and linear loading rate criteria per D.9 below.

6. Gravel Distribution Bed

- a. **Material.** The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.
- b. **Depth.** Pea gravel shall extend a minimum of 6 inches below the invert and 2 inches above the top of the distribution piping.
- c. **Width.** Maximum width of the distribution bed shall be 10 feet.
- d. **Level.** The bottom of the distribution bed shall be level; and the down-slope side shall be parallel to the slope contour.

7. Silt Barrier.

The gravel distribution bed shall be covered in its entirety with a geotextile ("filter fabric") silt barrier. Filter fabric shall either be polyester, nylon or polypropylene, or any combination thereof, and shall be suitable for under-drain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.

8. Soil Cover.

- a. **Material.** A continuous soil cover shall be placed over the entire distribution bed and sand fill. The soil cover shall consist of a medium, loamy-textured soil.
- b. **Depth.** Soil cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed, and 12 inches minimum over the sand fill portion of the mound. Soil cover over the distribution bed shall be crowned to promote rainfall runoff, and compacted by track-rolling, minimum two passes.
- c. **Lateral Extension.** The soil cover shall extend a minimum of 4 feet beyond the perimeter edge of the sand fill in all directions.

9. Wastewater Application Rate.

The wastewater application rates used for sizing the surface area of the distribution bed and the basal area of the sand fill shall be as follows:

a. Distribution Bed.

- 1) 1.2 gpd/ft^2 for individual residential OWTS; and
- 2) gpd/ft^2 for commercial, industrial, institutional and multi-residential OWTS.

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the mound distribution bed may be required for high strength waste flows, such as from restaurants.

- b. **Sand Basal Area.** The basal area of the sand fill shall be sized to meet maximum basal wastewater application rates and linear loading requirements as follows:

1) **Basal Wastewater Application Rates.**

i. **Effective Application Area.**

- For level sites (0 - 2% slope) the effective basal wastewater application area includes the entire sand fill basal area.
- For sloping sites (>2% slope) the effective basal wastewater application area includes the sand basal area immediately below and directly down-slope (at right angles to the natural slope contours) of the distribution bed.

- ii. **Wastewater Flow.** The wastewater flow used for sizing the basal area shall be the design sewage flow for the system.

- iii. **Application Rates.** The maximum basal application rate shall be based on the demonstrated percolation rate of the upper 12 to 24 inches of soil depth as shown in **Table 3-5**.

Table 3-5.
Basal Wastewater Application Rates¹

Percolation Rate (MPI)	Wastewater Application Rate (gpd/ft ²)
1-5	1.2
10	1.2
24	1.2
30	1.12
45	0.68
60	0.53
90	0.25
91-120	0.2

¹ Interpolate between reference values for other percolation rates; see Page 49 of Part 3 for expanded table listing interpolated values.

2) **Linear Loading Requirements**

- i. **Linear Loading Rate Definition.** Linear loading rate is defined as the volume of wastewater flow (in gpd) divided by the effective length of the disposal system measured along the slope contour.

- ii. **Effective Length.** The effective length (L) of the mound system for determining the linear loading rate shall be the length of the gravel distribution bed along the down-slope edge. Separate linear loading rate calculations shall be made for the primary and secondary (reserve) systems. The effective length of each mound may overlap for purposes of determining compliance with linear loading rate criteria, since only one system would be in operation at a given time.
- iii. **Wastewater Flow.** The wastewater flow used for determining the linear loading rate shall be as follows:
 - 100 gpd/bedroom for residential systems;
 - Design sewage flow rate for commercial, institutional, industrial and multi-residential systems.
- iv. **Loading Rate Criteria.** Maximum linear loading rates for mound systems vary according to ground slope and percolation rate as indicated in **Table 3-6**. If a variance from these criteria is proposed, it must be supported by detailed groundwater mounding analysis carried out in accordance with accepted methodology and/or scientific references dealing with water movement in soils and utilizing site specific hydraulic conductivity (permeability) data.

Table 3-6.
Maximum Linear Loading Rates (gpd/lineal foot)

Soil Depth (ft)	Ground Slope (%)	Percolation Rate (MPI)		
		1-30	31-60	61-120
2 to 2.5	0-10	5	4	3
	11-20	6	5	4
2.5 to 3.0	0-10	7	6	5
	11-20	8	7	6
3.0 to 4.0	0-10	9	8	7
	11-20	10	9	8
> 4.0	0-10	11	10	9
	11-20	12	11	10

c. **Dual Mound Systems.**

- 1) **Dual System Requirement.** Dual mound systems shall be required for any system where, due to space constraints, the sand fill run-out of the primary mound overlaps the sand fill run-out area of the secondary mound.
 - 2) **Distribution Bed Placement.** Dual mound systems shall have at least two distinctly separate distribution beds. The beds may be placed within one continuous mound or in separate mounds. The distribution beds may be placed end-to-end or upslope/down-slope of one another subject to meeting minimum sizing requirements for basal and linear loading rates per D.9.b above.
 - 3) **Distribution Bed Separation.** The minimum lateral (i.e., end-to-end) separation between distribution beds in a dual mound system shall be six feet.
 - 4) **Effective Basal Area.** For dual mound systems the effective basal area for sizing the two systems shall not overlap.
 - 5) **Alternate Dosing.** The distribution beds for dual mound systems shall be designed and operated to provide alternate dosing and resting of the beds.
- d. **Inspection Pipes.** A minimum of six inspection pipes shall be installed within and around mound systems as follows:
- 1) One shall be located near the center of the mound, extending from the mound surface to the bottom of the gravel distribution bed.
 - 2) One shall be located within the effective basal area (outside of the distribution bed), extending from the mound surface to 6 inches into the native soil.
 - 3) Four shall be located, respectively, midway along each of the four sides of the mound, near the toe of the slope, extending from ground surface to a depth of 5 feet or to the depth of impermeable materials, whichever is less.
 - 4) Inspection pipes shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug and a bottom cap. All pipes shall be perforated beginning at a depth of 18 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing, or equivalent commercially-slotted pipe. To prevent

surface water infiltration, inspection pipes shall be sealed with a bentonite or concrete annular seal (or equivalent) to a depth of 12 inches, minimum.

D. ENGINEERING PLANS AND CONSTRUCTION

1. **Reference Guidelines.** Construction of mound systems shall be in accordance with guidelines contained in the following references:
 - a. "Design and Construction Manual for Wisconsin Mounds", Small Scale Waste Management Project, University of Wisconsin, Madison, January 2000, including any amendments.
 - b. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002.
2. **Engineering Plans.** Engineering plans for mound systems shall include:
 - a. All relevant elevation data and hydraulic calculations;
 - b. Specific step-by-step construction guidelines and notes for use by the installer;
 - c. Erosion control plan;
 - d. Recommended make and model of all components;
 - e. Recommended pump system components, with cut-sheet depicting float settings;
 - f. Control panel programming;
 - g. An inspection schedule listing critical control points; and
 - h. Operation and maintenance guidelines.
3. **Construction Inspection.** At a minimum, inspection of the mound system installation should include the following. Joint inspection by the designer, contractor, and CCEH may be required.
 - a. Pre-construction inspection where the construction staking or marking of the mound system is provided and construction procedures discussed;
 - b. Water tightness of septic tank and dosing (pump) tank;
 - c. Clearing and ripping/plowing of the mound basal area soils;

- d. Sand material and placement;
- e. Pea gravel distribution bed and piping installation;
- f. Hydraulic (“squirt”) test of the distribution system;
- g. Functioning and setting of all control devices;
- h. Placement of filter fabric silt barrier and soil cover;
- i. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection pipes are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner.

E. MANAGEMENT REQUIREMENTS

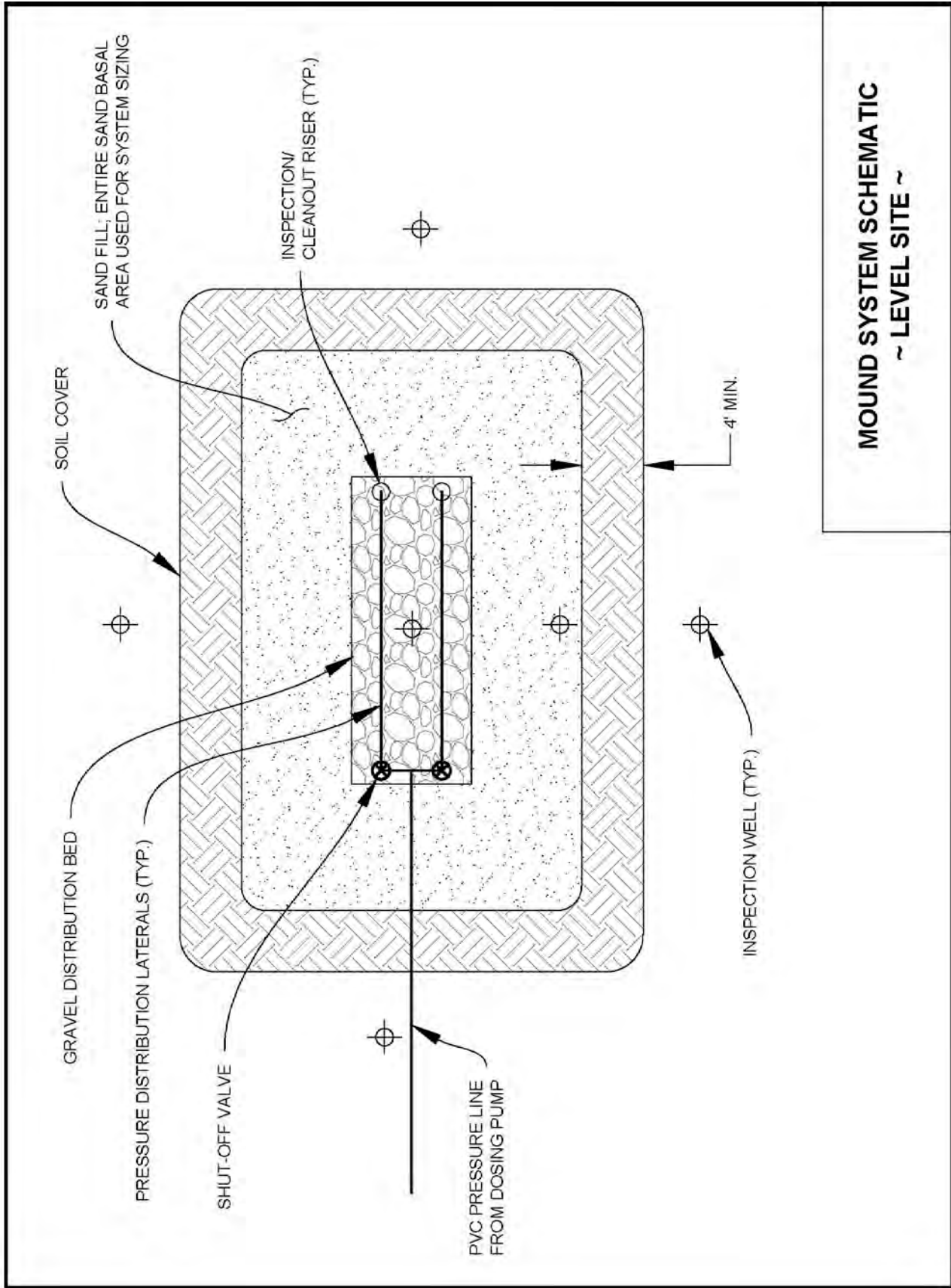
Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for mound systems are outlined in **Table 3-7** below.

**Table 3-7.
Mound System Management Requirements**

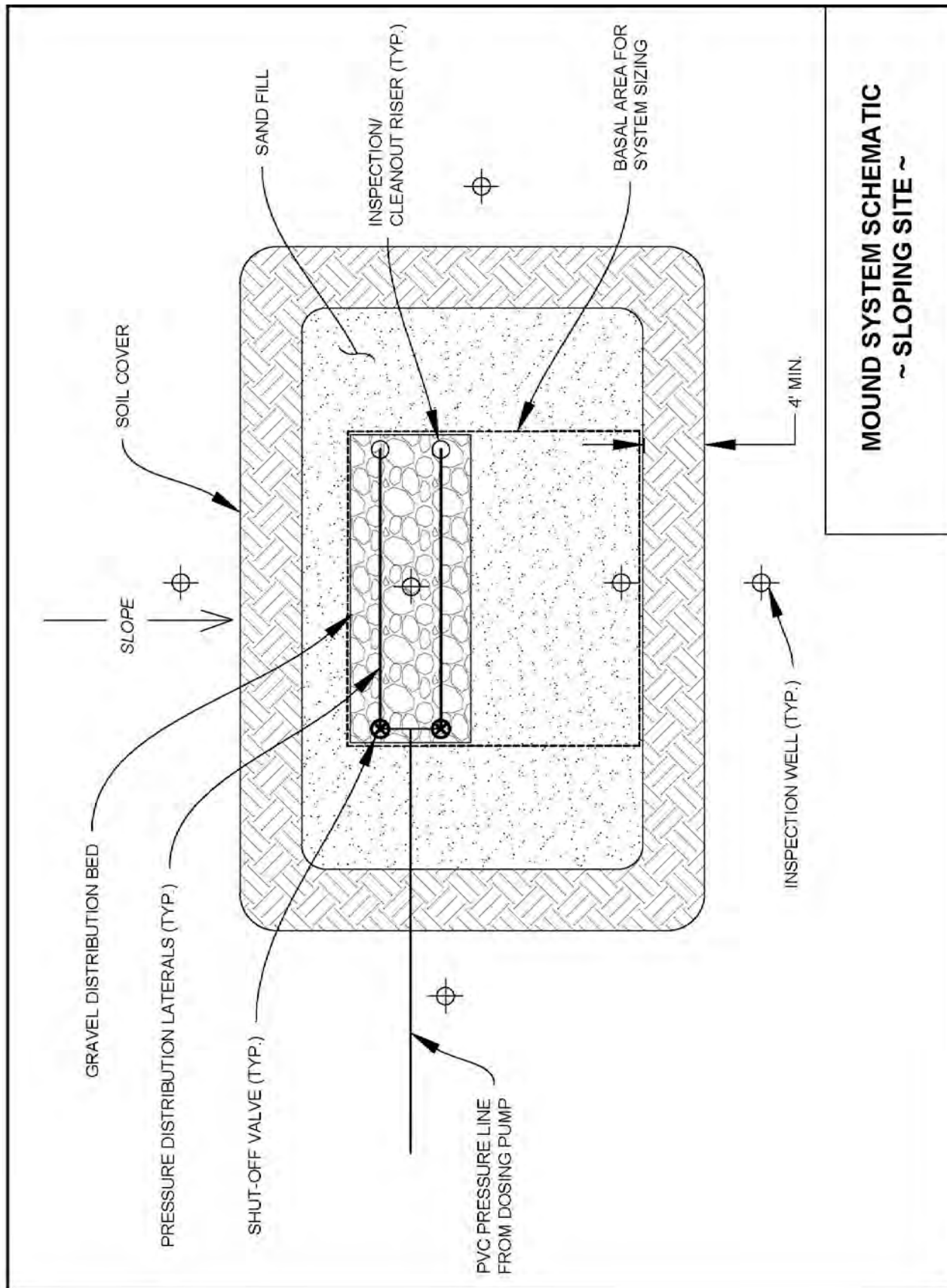
	Work	Frequency
Inspection	▪ Conduct routine visual observations of mound and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, gophers or other problems. ▪ Perform all inspections of pump and appurtenances (per O&M Manual and Performance Evaluation Guidelines, Part 4 of this Manual). ▪ Record observations.	▪ Every 6 to 12 months.
Maintenance	▪ Purge laterals, squirt and balance. ▪ Exercise valves to ensure functionality. ▪ Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. ▪ Maintain mound area landscape vegetation, as req'd ▪ Investigate and repair erosion, drainage or other disposal field problems, as needed. ▪ Investigate and perform distribution system corrective work, as required ▪ Record work done.	▪ Distribution system maintenance annually. ▪ Other maintenance as required.
Water Monitoring & Sampling	▪ Measure and record water levels in inspection pipes in distribution bed, sand fill and around mound perimeter. ▪ Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements.	▪ Measure mound system water levels annually. ▪ Other monitoring according to permit conditions, as applicable.

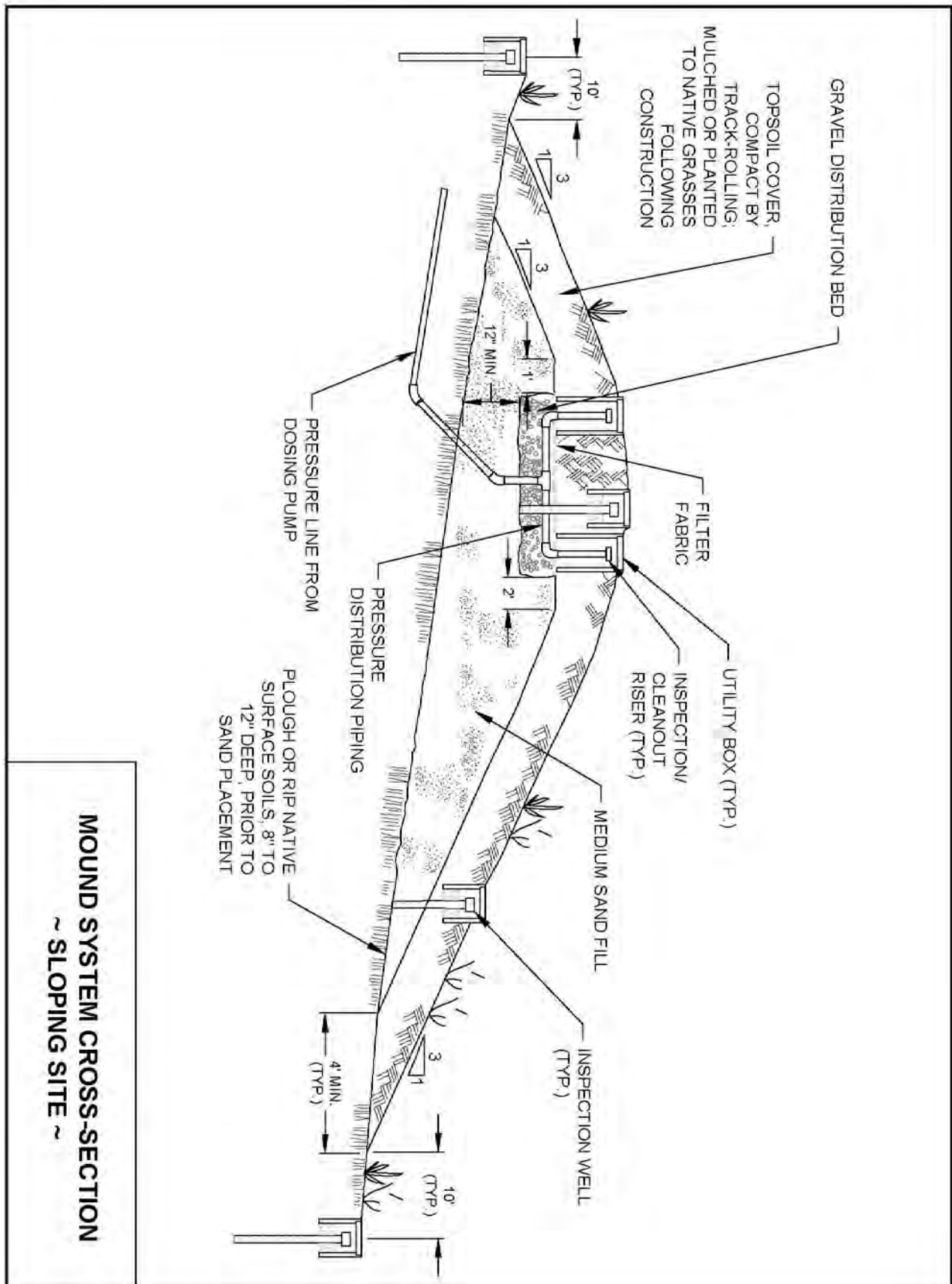
Reporting	▪ Report findings to CCEH per permit requirements. ▪ Standard report to include dates, inspection pipe and monitoring well readings (as applicable) and other data collected, work performed, corrective actions taken, and performance summary. ▪ Report public health/water quality emergency to CCEH immediately.	▪ According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.
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3.6 Requirements for Sub-Surface Drip Dispersal

A. DESCRIPTION

Subsurface drip dispersal is a method for disposal of treated wastewater that uses special drip tubing designed for use with wastewater. The dripline is placed normally 9 to 12 inches below ground surface and makes use of the most biologically active soil zone for distribution, nutrient uptake and evapotranspiration of the wastewater. A drip dispersal system is comprised of small-diameter ($\frac{1}{2}$ " to 1") laterals ("driplines"), usually spaced about 24 inches apart, with small-diameter emitters ($\frac{1}{8}$ ") located at 12 to 24 inches on-center along the dripline. Effluent is conveyed under pressure to the laterals, normally with timed doses. Prior to dispersal the effluent requires supplemental treatment.

Drip dispersal has several advantages, including: (a) it can be effective in very shallow soil conditions since it distributes the wastewater very uniformly to substantially all of the available soil in the field; (b) it can be installed in multiple small discontinuous "zones", allowing the hydraulic load to be spread widely rather than concentrated in one main area; (c) installation on steeper slopes causes less soil disturbance and erosion or slope stability hazards; and (d) water movement away from the drip emitters is substantially by unsaturated/capillary flow, which maximizes contact with and treatment by the soil.

B. SITING CRITERIA

1. **Setbacks.** Horizontal setback requirements for subsurface drip dispersal systems shall be those applicable to conventional disposal fields, as specified in Part 2 of this Manual.
2. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from the bottom of the dripline shall be 2 feet.
3. **Soil Depth.** Minimum depth of soil, as measured from the bottom of the dripline to impermeable soil or rock, shall be 2 feet.
4. **Percolation Rate.** The average soil percolation rate in the proposed subsurface drip dispersal field area shall be within the range of 1 to 120 minutes per inch (MPI), as determined at depths of 1 to 2 feet below ground surface.
5. **Ground Slope.** Ground slope in areas used for drip dispersal shall be less than 30 percent.
6. **Dual System.** Two drip dispersal fields, each one hundred percent of the total size required for the design sewage flow, shall be installed and interconnected

with an approved flow diversion device (pressure-rated), to allow alternate or combined use of the two fields.

C. DESIGN CRITERIA

1. **Treatment:** The following treatment requirements shall apply in connection with the use of subsurface drip dispersal systems:
 - a. Wastewater effluent discharged to any drip dispersal system shall be treated to at least a secondary level through an approved supplemental treatment system, in accordance with applicable guidelines provided in this Manual.
 - b. All drip dispersal systems shall include a filtering device capable of filtering particles larger than 100 microns; this device shall be located downstream of the supplemental treatment system.
2. **Design Sewage Flow:** Subsurface drip dispersal systems shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 2 of this Manual.
3. **Wastewater Application Rates:** Wastewater application rates used for sizing drip dispersal fields shall be based on soil percolation rate in accordance with the criteria in **Table 3-8**. In applying these criteria, the wastewater application area refers to the ground surface area encompassed by the drip dispersal field.

Table 3-8.
Wastewater Application Rates for Subsurface Drip Dispersal Fields

Soil Percolation Rate (MPI)	Soil Type* (information only)	Wastewater Application Rate (gpd/ft ²)
1-4	Medium-Coarse Sand	1.4
5-10	Fine Sand	1.2
11-20	Sandy Loam	1.0
21-30	Loam	0.7
31-45	Clay Loam	0.6
46-60	Silt-Clay Loam	0.4
61-120	Clay, non-swell	0.2

*Soil types listed for reference information only; design shall be based on site-specific percolation data.

4. Dripfield Sizing.

- a. Minimum sizing of the dripfield area shall be equal to the design wastewater flow divided by the applicable wastewater application rate from **Table 3-8**. As an example, for a design flow of 450 gpd in soils having an average percolation rate between 46 and 60 MPI, the minimum required dripfield area for a single (100%) would be:

$$450 \text{ gpd} / 0.4 \text{ gpd/ft}^2 = 1,125 \text{ ft}^2$$

- b. For sizing purposes, effective ground surface area used for drip field sizing calculations shall be limited to no more than 4.0 square feet per drip emitter. For example, 200 lineal feet of dripline with emitters at 2-foot spacing would provide a total of 100 emitters (200/2) and could be used for dispersal to an effective area of up to 400 ft² (100 emitters x 4 ft²/emitter). Conversely, if wastewater flow and percolation design information indicate the need for an effective area of 1,000 ft², the dripline design and layout would have to be configured to provide a minimum of 250 emitters spaced over the required 1,000 ft² of dispersal area.
 - c. Dripfields may be divided into multiple zones which may be located in different areas of a site, as desired or needed to provide the required dripfield size. A single continuous dripfield area is not required. However, any areas proposed for drip dispersal shall be supported by field observations and measurements to verify conformance with soil suitability and other site requirements. Differences in soil conditions and percolation characteristics from one zone to another may require the use of correspondingly different wastewater application rates and dripfield sizing for each zone.
5. **Pressure Dosing.** Secondary-treated effluent shall be delivered to the dripfield by pressure, employing a pump system and timed dosing. The pressure distribution system shall be designed in accordance with accepted engineering practices and manufacturer recommendations for drip dispersal systems to achieve, at a minimum:
 - a. Uniform dosing of treated effluent;
 - b. An adequate dosing volume and pressure per manufacturer's guidelines;
 - c. Adequate flow rate, final filtering of effluent and suitable piping network to preclude solids accumulation in the pipes and driplines or clogging of discharge emitters;
 - d. A means of automatically flushing the filter and driplines at regular intervals; and

- e. Suitable access provisions for inspection, testing and adjustment of the dripfield and components.

Additional requirements for design and construction of pressure distribution piping systems contained in “Requirements for Pressure Distribution Trenches” shall also apply.

- 6. **Pump System:** The pump system shall be:
 - a. Appropriate for sewage applications;
 - b. Of the size and type to meet the hydraulic design requirements; and
 - c. Designed and constructed in accordance with pump system requirements provided in this Manual.
- 7. **Dripline Material:** Dripline shall be manufactured and intended for use with secondary quality wastewater, with minimum 45 mil tubing wall thickness, bacterial growth inhibitor(s), and means of protection against root intrusion.
- 8. **Dripfield Layout:** The bottom of each dripline row shall be level and parallel to the slope contour.
- 9. **Dripline Depth:** The dripline depth shall be installed at a depth between nine (9) and twelve (12) inches below native grade. Deeper placement of driplines may be considered by CCEH on a case-by-case basis.
- 10. **Length of Individual Driplines:** The maximum dripline length shall be designed in accordance with accepted engineering practices and in accordance with the manufacturer's criteria and recommendations.
- 11. **Line and Emitter Spacing:** Line and emitter spacing shall be designed as appropriate for soil conditions, slope, and contour. There shall be a minimum spacing of 12 inches between emitters and no emitter shall be located less than 12 inches from the supply and return manifolds.
- 12. **Dual System Operation.** Unless exempted by CCEH, all drip dispersal systems shall be installed as dual (200% capacity) drip fields, and shall normally be operated with both fields in use. Doses may be alternated among different zones in both the primary and secondary fields, or all zones may be dosed simultaneously. Secondary drip fields should not be left dormant for long periods of time (e.g., more than a few weeks at a time).
- 13. **Inspection Pipes.** A minimum of three (3) inspection pipes, minimum 3 feet in depth, shall be installed for the purpose of monitoring groundwater levels or for water quality sampling within and around subsurface drip dispersal fields as

follows:

- a. One pipe shall be located within the dripfield area.
- b. One pipe shall be located 10 to 15 feet up-gradient of the dripfield.
- c. One pipe shall be located 10 to 15 feet down-gradient of the dripfield.
- d. Inspection pipes shall be constructed of 2" to 4" diameter pipe (or equivalent), equipped with a wrench-tight cap or pipe plug and a bottom cap. All standpipes shall be perforated beginning at a depth of 12 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw (nickel) slots at nominal 1" spacing, or equivalent commercially-slotted pipe. Inspection standpipes shall be sealed with a concrete annular seal (or equivalent) for stability and to prevent surface infiltration.

D. ENGINEERING PLANS AND CONSTRUCTION

1. **Reference Guidelines.** Installation of subsurface drip dispersal systems shall be in accordance with applicable manufacturer guidelines and recommendations.
2. **Engineering Plans.** Engineering plans for subsurface drip dispersal systems shall include:
 - a. All relevant elevation data and hydraulic calculations;
 - b. Specific step-by-step construction guidelines and notes for use by the installer;
 - c. Erosion control plan for any site over 20%;
 - d. Recommended make and model of all components;
 - e. Recommended pump system components, with cut-sheet depicting float settings;
 - f. Control panel programming;
 - g. An inspection schedule listing critical control points; and
 - h. Operation and maintenance guidelines.
3. **Construction Inspection.** At a minimum, inspection of the drip dispersal system installation should include the following. This is in addition to inspection work required for the treatment system. Joint inspection by the designer, contractor,

and CCEH may be required.

- a. Pre-construction inspection where the construction staking or marking of the drip lines, supply and return piping, pump system and appurtenances is provided and construction procedures discussed;
- b. Water tightness of effluent dosing (pump) tank;
- c. Drip field layout, piping materials and installation, and all associated valves and connections;
- d. Hydraulic testing of the drip system;
- e. Functioning and setting of all control devices; and
- f. Final Inspection to verify that all construction elements are in conformance with the approved plans, specifications, and manufacture recommendations, all inspection pipes are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner and service provider.

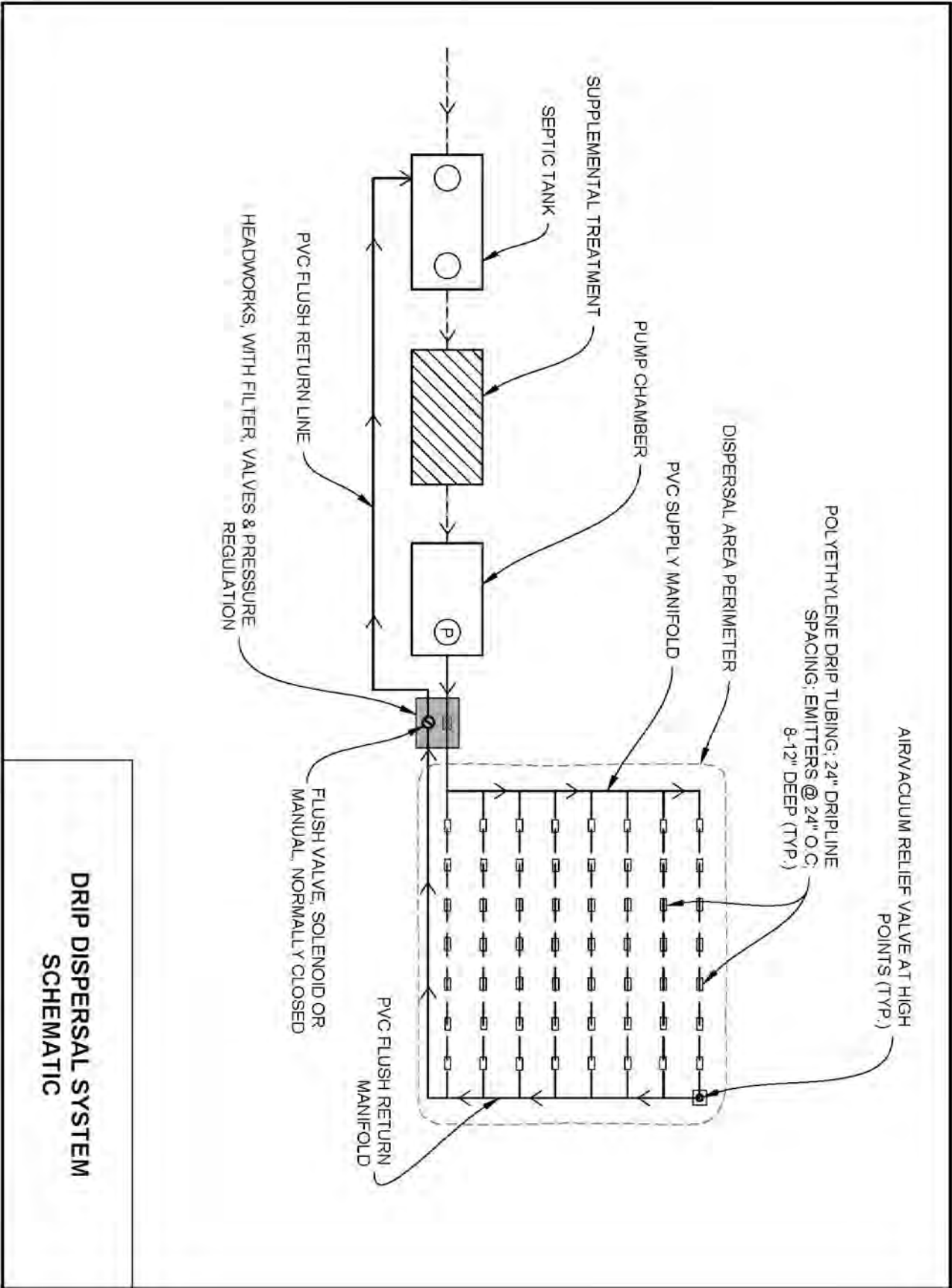
E. MANAGEMENT REQUIREMENTS

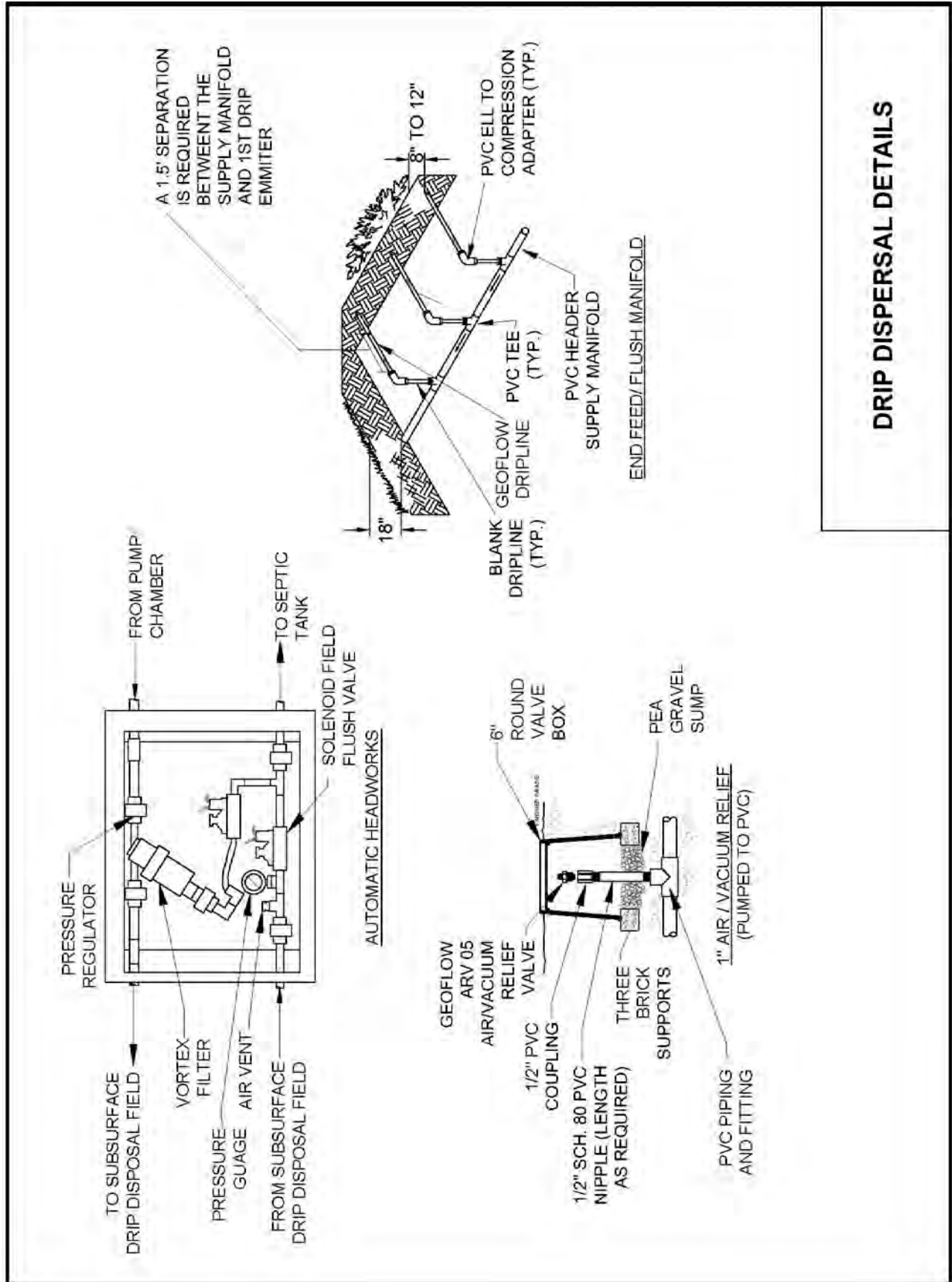
Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for subsurface drip dispersal systems are outlined in **Table 3-9**.

Table 3-9.
Drip Dispersal System Management Requirements

	Work	Minimum Frequency
Inspection	• Conduct routine visual observations of drip field, downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, gophers or other problems. • Conduct routine physical inspections of system components, including valves, filters, and headworks box(es). • Perform special inspections of drip field at time of any landscaping work or other digging in drip field area. • Perform inspections of dosing pump(s) and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 4 of this Manual). • Record observations.	• Every 6 to 12 months.

Maintenance	• Manually remove and clean filter. • Clean and check operation of pressure reducing valves. • Clean flush valves and vacuum release valves.	• Clean filter every 6 months. • Other maintenance annually.
Water Monitoring & Sampling	• Measure and record water levels in dispersal field inspection pipes, as applicable, per permit requirements. • Obtain and analyze water samples from dispersal field monitoring wells, as applicable, per permit requirements.	• According to permit conditions, if applicable.
Reporting	• Report findings to CCEH per permit requirements. • Standard report to include dates, monitoring well and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to CCEH immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.





DRIP DISPERSAL DETAILS

Mound Basal Area Wastewater Application Rates - Interpolated Values				
Percolation Rate (MPI)	Application Rate (gpd/ft ²)		Percolation Rate (MPI)	Application Rate (gpd/ft ²)
1-24	1.20		61	0.52
25	1.19		62	0.51
26	1.17		63	0.50
27	1.16		64	0.49
28	1.15		65	0.48
29	1.13		66	0.47
30	1.12		67	0.46
31	1.09		68	0.46
32	1.06		69	0.45
33	1.03		70	0.44
34	1.00		71	0.43
35	0.97		72	0.42
36	0.94		73	0.41
37	0.91		74	0.40
38	0.89		75	0.39
39	0.86		76	0.38
40	0.83		77	0.37
41	0.80		78	0.36
42	0.77		79	0.35
43	0.74		80	0.34
44	0.71		81	0.33
45	0.68		82	0.32
46	0.67		83	0.31
47	0.66		84	0.31
48	0.65		85	0.30
49	0.64		86	0.29
50	0.63		87	0.28
51	0.62		88	0.27
52	0.61		89	0.26
53	0.60		90	0.25
54	0.59		91-120	0.20
55	0.58			
56	0.57			
57	0.56			
58	0.55			
59	0.54			
60	0.53			

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COLUSA COUNTY ONSITE SYSTEMS MANUAL

PART 4

PERFORMANCE, MONITORING AND EVALUATION REQUIREMENTS FOR OWTS

Part 4

PERFORMANCE, MONITORING AND EVALUATION REQUIREMENTS FOR OWTS

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- 4.1 OWTS PERFORMANCE REQUIREMENTS**
- 4.2 OWTS MONITORING REQUIREMENTS**
- 4.3 OWTS PERFORMANCE EVALUATION GUIDELINES**

4.1 OWTS PERFORMANCE REQUIREMENTS

A. GENERAL

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

B. CONVENTIONAL SYSTEMS

1. All septic tanks shall be structurally sound, watertight, provide clarified effluent, have adequate space available for sludge and scum storage, operate in such a manner as to not create odors or vector attraction, be properly vented, and have a functional baffle(s).
2. 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.
3. 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.
4. All components of the OWTS shall be functional and in proper working order.

C. SUPPLEMENTAL TREATMENT

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

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

Constituent	(1) Where required for reduced separation to GW	(2) Where Pathogen or Nitrogen treatment Required
Biochemical Oxygen Demand (BOD), mg/L	30	30
Total Suspended Solids (TSS), mg/L	30	30
Fecal Coliform, MPN/100 ml	N/A	200*
Total Nitrogen, % reduction (effluent/influent)	N/A	50%**

*Due to proximity to public water supply well or surface water intake per SWRCB OWTS Policy Section 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.

** Due to proximity to public water supply well per SWRCB OWTS Policy Section 10.9. Per results or recommendation of cumulative impact assessment, Colusa County OWTS Code Chapter 36.

2. **Sand Filters.** Sand filters shall:
 - a. Be operated to maintain uniform effluent distribution throughout the sand filter bed;
 - b. Not result in continuously ponded effluent on the distribution bed infiltrative surface;
 - c. 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;
 - d. Not result in leakage of effluent through the sand filter liner or supporting structure; and
 - e. Conform to applicable requirements for pressure distribution in D.1 below.

3. **Proprietary Treatment Units.** Proprietary treatment units shall comply with the following:
 - a. The unit and its components shall be structurally sound, free from defects, be watertight, and not create odor or vector attraction nuisance.
 - b. The unit shall be operated in accordance with the approved manufacturer and certification/listing organization standards.

D. ALTERNATIVE DISPERSAL SYSTEMS

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

1. 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:
 - 1) Be operable and in good condition;
 - 2) Maintain uniform distribution of effluent throughout the dispersal field;
 - 3) Not result in continuously ponded effluent in the dispersal trench (or bed) to a level above the invert (bottom) of the distribution pipe; and
 - 4) In the case of pressure-dosed sand trenches, not result in continuously ponded effluent above the sand interface.

2. Mound Systems. Mound systems shall:

- a. Not result in seepage or saturated soil conditions within 12 inches of ground surface anywhere along the perimeter toe or edge of the system;
- b. Be free from erosion, slumping or damage to the soil cover;
- c. Not result in continuously ponded effluent within the gravel distribution bed or in the sand fill (for mounds); and
- d. Conform to applicable requirements for pressure distribution in D.1 above.

3. Subsurface Drip Dispersal Systems. Subsurface drip dispersal systems and components shall:

- a. Not result in seepage or saturated soil conditions above the depth of the dripline within or anywhere along the perimeter of the dripfield;
- b. Be free from erosion, slumping or other soil disturbance that threatens to expose or cause damage to drip dispersal tubing or appurtenances;
- c. Conform to applicable requirements for pressure distribution in D.1 above; and
- d. Be operated and maintained in accordance with manufacturer recommendations.

4.2 OWTS MONITORING REQUIREMENTS

A. 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. Said monitoring shall be performed to ensure that the alternative OWTS is functioning satisfactorily to protect water quality and public health and safety.

B. MONITORING ELEMENTS.

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

1. Recoding of wastewater flow based on water meter readings, pump event counter, elapsed time meter, in-line flow meter, or other approved methods;
2. Measurement and recording of water levels in inspection/monitoring pipes in the dispersal field;
3. Inspection and observation of pump operation and other mechanical equipment;
4. Water quality 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;
5. General review and inspection of treatment and dispersal area for evidence of seepage, effluent surfacing, erosion or other indicators of system malfunction; and
6. Other monitoring as recommended by the system designer or equipment manufacturer.

C. MONITORING FREQUENCY.

The required frequency of monitoring for each 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) or where warranted because of the complexity of the design or sensitive nature of the site. Monitoring frequency may be increased for any system if problems are experienced.

D. MONITORING RESPONSIBILITY.

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

1. Registered Civil Engineer;
2. Professional Geologist;
3. Registered Environmental Health Specialist; or
4. Other onsite wastewater maintenance provider approved by the director based on meeting the following minimum license and experience/training requirements:
 - a. Possession of a valid contractor's license (General Engineering Class A, C-36 or C-42); and
 - b. 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.
 - c. The director may also consider registration and experience conducting onsite wastewater system inspection and maintenance of OWTS in another jurisdiction (e.g., neighboring county) as qualifying experience for approval as an onsite wastewater maintenance provider in Colusa County.

Additionally, the director 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.

D. REPORTING.

Monitoring results shall be submitted to the director 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, the director shall be notified immediately of any system problems observed during system inspection and monitoring that threaten public health or water quality.

E. DATA REVIEW.

The director will, from time-to-time, compile and review monitoring and inspection results for alternative OWTS and will provide a summary of results to the Central Valley Regional Water Quality Control Board at least once every five (5) years. Based on this

review, the director may require corrective action for specific properties or certain types of alternative OWTS, or general changes in monitoring and inspection requirements.

4.3 OWTS PERFORMANCE EVALUATION GUIDELINES

A. PURPOSE AND PERFORMANCE CRITERIA.

Inspection and performance evaluation of an OWTS may be required in connection with certain types or level of changes or additions to an existing building served by an OWTS. The guidelines to be followed for such 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 Colusa County Environmental Health Division (CCEH). The following performance criteria are established as minimum requirements:

1. There is no surfacing effluent at any time.
2. The effluent is not discharged directly to groundwater; i.e., the dispersal trenches do not extend to or below the seasonal high groundwater level.
3. 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.
4. 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.
5. There is no indication that the existing OWTS is adversely affecting any beneficial uses of surface water or groundwater.

The following sets forth procedures for conducting performance evaluations, to assure consistency and thoroughness in verifying the functioning status of existing OWTS.

B. INSPECTION RESPONSIBILITY.

The individual conducting the field inspection work shall be qualified in the operation and maintenance of OWTS and trained specifically in the testing and inspection procedures outlined in this document.

Inspections shall be carried out by any of the following:

1. Registered Civil Engineer
2. Professional Geologist
3. Registered Environmental Health Specialist

4. Other onsite wastewater maintenance provider approved by the director based on meeting the following minimum license and experience/training requirements:
 - a. Possession of a valid contractor's license (General Engineering Class A, C-36 or C-42); and
 - b. 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.

The director may also consider registration and experience conducting onsite wastewater system inspection and maintenance of OWTS in another jurisdiction (e.g., neighboring county) as qualifying experience for approval as an onsite wastewater maintenance provider in Colusa County.

C. BACKGROUND DATA.

Prior to conducting the onsite performance inspection, compile and review available background information pertaining to the property, structures and septic system, such as:

1. Permit information,
2. Site plan
3. "As built" drawings
4. Prior inspection results, etc.

Identify on site plan, as applicable and to the extent possible, location of the following:

1. Septic tank, dispersal field and reserve area;
2. Site improvements such as buildings, decks, paved areas, etc.
3. Creeks, wells, and other water/drainage features;
4. Cut banks, ground slope (% and direction);
5. Potential issues to be investigated during site inspection.

D. INITIAL SITE RECONNAISSANCE.

1. Initially, walk the property to confirm the location of the septic tank, dispersal field, and other pertinent features of the system, such as distribution boxes, diversion valve, etc.
2. Determine the length of each line and the depth of the drainpipe (below ground surface) for comparison with observed groundwater conditions.
3. Check setbacks between the existing dispersal field and expansion areas and any man-made structures.
4. Check the septic tank and dispersal field areas for any obvious signs of existing problems such as surfacing effluent, odors, greywater bypasses, selective fertility, etc.
5. If possible, hand-auger a boring within or adjacent to the dispersal field for observation of soils and groundwater conditions.

E. SEPTIC TANK INSPECTION.

1. **Access Risers.** Check for:
 - a. General structural condition;
 - b. Properly grouted or sealed to the top of the septic tank to prevent groundwater and/or surface water intrusion;
 - c. Lids of the risers should also be properly sealed to prevent odors or the entry of insects, (e.g., flies, mosquitoes, etc.).
2. **Opening the Tank.** Carefully remove the septic tank lids. Concrete lids are heavy and may be "cemented" in place by silt. Use steel bar or other suitable tool to aid in opening the lids. Always wear protective boots and gloves (neoprene) to guard against infection from pathogenic organisms.
3. **Structural Condition.**
 - a. Visually observe the septic tank to check for any obvious signs of cracking or other structural defects in the tank.
 - b. Use a steel rod to probe the walls and bottom of the tank. Normally, the tank will not need to be pumped-out to perform this procedure.
 - c. Inspect the inlet and outlet sanitary "tees" to assure that they are in satisfactory condition, properly positioned, and free of scum accumulation,

rocks, root matter or other obstructions.

2. **Liquid Level.** Measure and note the liquid level at outlet pipe. The level should be even with the invert (i.e., bottom) of the outlet pipe. Liquid level below the outlet pipe normally indicates a leak in tank. Liquid level above the pipe normally indicates a flooded disposal field, line blockage, or the line to the field is set with an improper grade.
3. **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 with the established water use/wastewater flow rates for the property.

F. HYDRAULIC LOAD TEST.

1. General

- a. After tank inspection proceed with the hydraulic load test of the septic tank and dispersal field. The test described here is for conventional gravity-fed dispersal trench systems. Section I describes test procedures for pumping systems.
- b. Conduct the test by surcharging the septic tank with about 150 gallons of water over a 20- to 30- minute period, and then observe the rise of water in the tank and the subsequent draining process.
- c. Although not always conclusive, tracer dye, added to the tank, can assist in investigating contribution from effluent where surface wetness/seepage is suspected or observed.
- d. Use a garden hose discharging into the outlet side of the tank to surcharge the tank. Leave the hose outlet at least 12 inches above the water level in the tank to prevent cross-contamination.
- e. Before starting the test, determine the flow rate from the hose (i.e., with 5-gallon bucket and stop watch) to properly gauge the amount of surcharge water added to the tank. Alternatively, install a portable water meter between the house faucet and the hose to directly measure the water volume added.

2. Test Procedures

- a. Measure the location of the static water line in the septic tank (at the outlet side) as an initial reference point.
- b. Begin surcharging the tank with water to start the hydraulic load test.

- c. 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.
- d. After the filling cycle is finished, observe the water level decline in the septic tank until the initial level is reached; and record the time to achieve this. If the initial level is not attained within 30 minutes, terminate the test and note the final water level.

3. System Rating

Based upon the water level readings during the test, assign a hydraulic performance rating to the system in accordance with the guidelines provided in **Table 4-1**. 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).

**TABLE 4-1
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.

G. FINAL LEACHFIELD INSPECTION.

At the completion of the hydraulic load test, check the dispersal field area and downslope areas again for indications of surfacing effluent, wetness, or odors. If any of these conditions exist as a result of the hydraulic load test, this would likely be considered evidence of system failure. If the field observations of wetness are not

obviously the result of the hydraulic load test, further investigation may be necessary to determine if the dispersal field 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.

H. PUMP SYSTEMS.

The following procedures are for systems equipped with an effluent pump. This is in addition to inspection of the septic tank as described under “F. Septic Tank Inspection”.

1. Pump Tank Inspection

- a. Remove the pump access cover and basin lid, taking care that no soil or other material enters the basin.
- b. Note any signs of scum or sludge buildup, indications of previous pump failure (such as scum line above the high water alarm switch), or evidence of soil or roots entering the basin. Look for any signs of groundwater infiltration or surface water inflow to the basin.
- c. Inspect the float controls to see that they have free movement, and check the electrical junction box (if located in the basin or access riser) for any obvious signs of corrosion.
- d. Test the pump system audio and visual alarm to confirm that it can be heard at the house if mounted at the pump tank.
- e. Measure the dimensions of the pump basin and determine the amount of emergency storage capacity for comparison with the system design and County guidelines (usually 1 to 1.5 days of daily flow).

2. Pump Test

- a. Conduct the pump test by adding sufficient water to the basin to activate the pump "ON" control, and observing the performance of the system over at least one pumping cycle.
- b. Add about 150 gallons, to approximate the same hydraulic loading of the dispersal field as for gravity systems. Using a garden hose, add the water to the outlet side of the septic tank, or directly to the pump basin.
- c. If filling the basin directly, take care to minimize turbulence and disturbance of sediment or sludge that may have collected in the basin. Direct the stream of

water against the interior side of the chamber, rather than directly toward the bottom of the pump chamber.

- d. 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.
- e. 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.
- f. 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, readjust float controls 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).
- g. Time the pumping cycle (from "ON" to "OFF") level and record 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, note and investigate the pump and dispersal field further to determine the specific cause.
- h. Divide the pump volume (in gallons) by the pump cycle time (in minutes) to determine the approximate pump discharge rate (in gpm). Check the observed pump rate against the design requirement for the system, and note any discrepancy.
- i. Resume water loading to the pump tank until the 150-gallon target volume is reached; observe the pump operation throughout.
- j. 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. Note the pump system failure and communicate immediately to the resident/owner, and followed up with prompt corrective action.

3. Dispersal Field Inspection

At the completion of the pump test, check the dispersal field area for signs of seepage in the same manner as previously described for gravity-fed systems

following hydraulic loading.

I. CLEAN UP.

At the completion of the OWTS inspection and testing, replace all access lids and clean all tools before leaving the site. Clean and disinfect all tools and equipment that come into contact with wastewater with a 1:5 bleach solution, then rinse with fresh water and dispose all contaminated rinse water in the septic tank.

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COLUSA COUNTY ONSITE SYSTEMS MANUAL

PART 5

OWTS USER INFORMATION

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Your Septic System is your responsibility!

Did you know that as a homeowner you're responsible for maintaining your septic system? Did you know that maintaining your septic system protects your investment in your home? Did you know that you should periodically inspect your system and pump out your septic tank?

If properly designed, constructed and maintained, your septic system can provide long-term, effective treatment of household wastewater. If your septic system isn't maintained, you might need to replace it, costing you thousands of dollars. A malfunctioning system can contaminate groundwater that might be a source of drinking water. And if you sell your home, your septic system must be in good working order.

This guide will help you care for your septic system. It will help you understand how your system works and what steps you can take as a homeowner to ensure your system will work properly. To help you learn more, consult the resources listed at the back of this booklet. A helpful checklist is also included at the end of the booklet to help you keep track of your septic system maintenance.

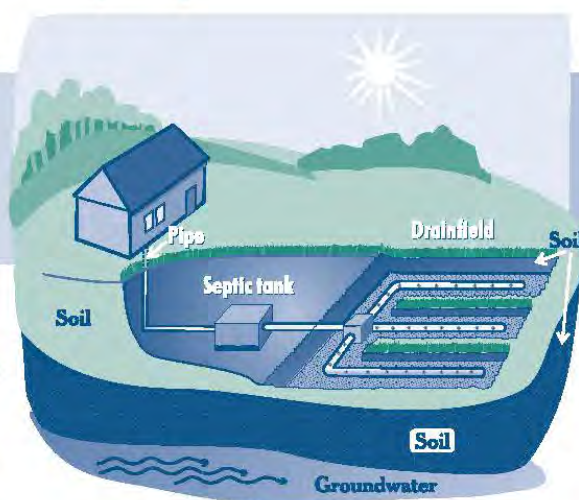
Top Four Things You Can Do to Protect Your Septic System

1. Regularly inspect your system and pump your tank as necessary.
2. Use water efficiently.
3. Don't dispose of household hazardous wastes in sinks or toilets.
4. Care for your drainfield.

How does it work?

Components

A typical septic system has four main components: a pipe from the home, a septic tank, a drainfield, and the soil. Microbes in the soil digest or remove most contaminants from wastewater before it eventually reaches groundwater.



Typical septic system

Septic system aliases:

- On-lot system
- Onsite system
- Individual sewage disposal system
- Onsite sewage disposal system
- Onsite wastewater treatment system

Pipe from the home

All of your household wastewater exits your home through a pipe to the septic tank.

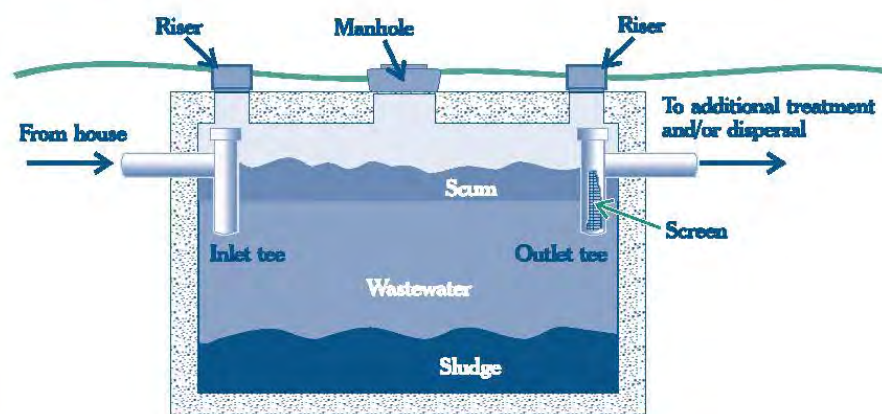
Septic tank

The septic tank is a buried, watertight container typically made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow solids to settle out (forming sludge) and oil and grease to float to the surface (as scum). It also allows partial decomposition of the solid materials. Compartments and a T-shaped outlet in the

septic tank prevent the sludge and scum from leaving the tank and traveling into the drainfield area. Screens are also recommended to keep solids from entering the drainfield.

Newer tanks generally have risers with lids at the ground surface to allow easy location, inspection, and pumping of the tank.

Typical single-compartment septic tank with ground-level inspection risers and screen

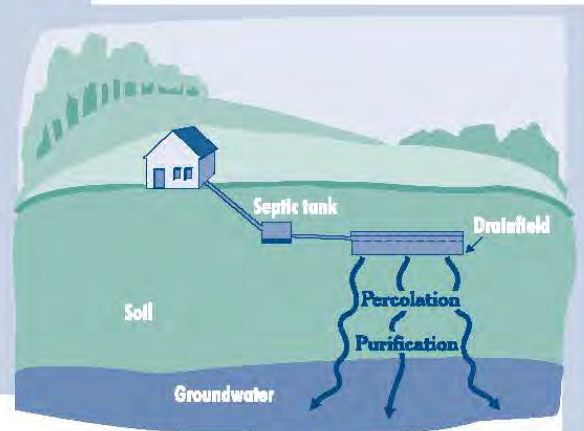


Tip

To prevent buildup, sludge and floating scum need to be removed through periodic pumping of the septic tank. Regular inspections and pumping are the best and cheapest way to keep your septic system in good working order.

Finding Your System

Your septic tank, drainfield, and reserve drainfield should be clearly designated on the “as-built” drawing for your home. (An “as-built” drawing is a line drawing that accurately portrays the buildings on your property and is usually filed in your local land records.) You might also see lids or manhole covers for your septic tank. Older tanks are often hard to find because there are no visible parts. An inspector/pumper can help you locate your septic system if your septic tank has no risers.



Drainfield

The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. The partially treated wastewater is pushed along into the drainfield for further treatment every time new wastewater enters the tank.

If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in plumbing fixtures and prevent treatment of all wastewater.

A reserve drainfield, required by many states, is an area on your property suitable for a new drainfield system if your current drainfield fails. Treat this area with the same care as your septic system.

Soil

Septic tank wastewater flows to the drainfield, where it percolates into the soil, which provides final treatment by removing harmful bacteria, viruses, and nutrients. Suitable soil is necessary for successful wastewater treatment.

Alternative systems

Because many areas don't have soils suitable for typical septic systems, you might have or need an alternative system. You might also have or need an alternative system if there are too many typical septic systems in one area or the systems are too close to groundwater or surface waters. Alternative septic

systems use new technology to improve treatment processes and might need special care and maintenance. Some alternative systems use sand, peat, or plastic media instead of soil to promote wastewater treatment. Other systems might use wetlands, lagoons, aerators, or disinfection devices. Float switches, pumps, and other electrical or mechanical components are often used in alternative systems. Alternative systems should be inspected annually. Check with your local health department or installer for more information on operation and maintenance needs if you have or need an alternative system.

Why should I maintain my septic system?

When septic systems are properly designed, constructed, and maintained, they effectively reduce or eliminate most human health or environmental threats posed by pollutants in household wastewater. However, they require regular maintenance or they can fail. Septic systems need to be monitored to ensure that they work properly throughout their service lives.

Saving money

A key reason to maintain your septic system is to save money! Failing septic systems are expensive to repair or replace, and poor maintenance is often the culprit. Having your septic system inspected regularly is a bargain when you consider the cost of replacing the entire system. Your system will need pumping depending on how many people live in the house and the size of the system. An unusable septic system or one in disrepair will lower your property value and could pose a legal liability.

Protecting health and the environment

Other good reasons for safe treatment of sewage include preventing the spread of infection and disease and protecting water resources. Typical pollutants in household wastewater are nitrogen, phosphorus, and disease-

causing bacteria and viruses. If a septic system is working properly, it will effectively remove most of these pollutants.

With one-fourth of U.S. homes using septic systems, more than 4 billion gallons of wastewater per day is dispersed below the ground's surface. Inadequately treated sewage from septic systems can be a cause of ground-water contamination. It poses a significant threat to drinking water and human health because it can contaminate drinking water wells and cause diseases and infections in people and animals. Improperly treated sewage that contaminates nearby surface waters also increases the chance of swimmers contracting a variety of infectious diseases. These range from eye and ear infections to acute gastrointestinal illness and diseases like hepatitis.

How do I maintain my septic system?

Inspect and pump frequently

You should have a typical septic system inspected at least every 3 years by a professional and your tank pumped as recommended by the inspector (generally every 3 to 5 years). Alternative systems with electrical float switches, pumps, or mechanical components need to be inspected more often, generally once a year. Your service provider should inspect for leaks and look at the scum and sludge layers in your septic tank. If the bottom of the scum layer is within 6 inches of the bottom of the outlet tee or the top of the sludge layer is within 12 inches of the outlet tee, your tank needs to be pumped. Remember to note the sludge and scum levels determined by your service provider in your operation and maintenance records. This information will help you decide how often pumping is necessary. (See the checklist included at the end of the booklet.)

What Does an Inspection Include?

- Locating the system.
- Uncovering access holes.
- Flushing the toilets.
- Checking for signs of back up.
- Measuring scum and sludge layers.
- Identifying any leaks.
- Inspecting mechanical components.
- Pumping the tank if necessary.

Four major factors influence the frequency of pumping: the number of people in your household, the amount of wastewater generated (based on the number of people in the household and the amount of water used), the volume of solids in the wastewater (for example, using a garbage disposal increases the amount of solids), and septic tank size.

Some makers of septic tank additives claim that their products break down the sludge in septic tanks so the tanks never need to be pumped. Not everyone agrees on the effectiveness of additives. In fact, septic tanks already contain the microbes they need for effective treatment. Periodic pumping is a much better way to ensure that septic systems work properly and provide many years of service. Regardless, every septic tank requires periodic pumping.

In the service report, the pumper should note any repairs completed and whether the tank is in good condition. If the pumper recommends additional repairs he or she can't perform, hire someone to make the repairs as soon as possible.

Use water efficiently

Average indoor water use in the typical single-family home is almost 70 gallons per person per day. Leaky toilets can waste as much as 200 gallons each day. The more water a household conserves, the less water enters the septic system. Efficient water use can improve the operation of the septic system and reduce the risk of failure.

High-efficiency toilets

Toilet use accounts for 25 to 30 percent of household water use. Do you know how many gallons of water your toilet uses to empty the bowl? Most older homes have toilets with 3.5- to 5-gallon reservoirs, while newer high-efficiency toilets use 1.6 gallons of water or less per flush. If you have problems with your septic system being flooded with household water, consider reducing the volume of water in the toilet tank if you don't have a high-efficiency model or replacing your existing toilets with high-efficiency models.



Faucet aerators and high-efficiency showerheads

Faucet aerators help reduce water use and the volume of water entering your septic system. High-efficiency showerheads or shower flow restrictors also reduce water use.

Water fixtures

Check to make sure your toilet's reservoir isn't leaking into the bowl. Add five drops of liquid food coloring to the reservoir before bed. If the dye is in the bowl the next morning, the reservoir is leaking and repairs are needed.

A small drip from a faucet adds many gallons of unnecessary water to your system every day. To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). This is the total amount of clean water traveling to your septic system each day from that little leak.



Use Water Efficiently!

- **Install high-efficiency showerheads**
- **Fill the bathtub with only as much water as you need**
- **Turn off faucets while shaving or brushing your teeth**
- **Run the dishwasher and clothes washer only when they're full**
- **Use toilets to flush sanitary waste only (not kitty litter, diapers, or other trash)**
- **Make sure all faucets are completely turned off when not in use**
- **Maintain your plumbing to eliminate leaks**
- **Install aerators in the faucets in your kitchen and bathroom**
- **Replace old dishwashers, toilets, and clothes washers with new, high-efficiency models.**

For more information on water conservation, please visit www.epa.gov/owm/water-efficiency/index.htm

Watch your drains

What goes down the drain can have a major impact on how well your septic system works.

Waste disposal

What shouldn't you flush down your toilet? Dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, and other kitchen and bathroom items that can clog and potentially damage septic system components if they become trapped. Flushing household chemicals, gasoline, oil, pesticides, antifreeze, and paint can stress or destroy the biological treatment taking place in the system or might contaminate surface waters and groundwater. If your septic tank pumper is concerned about quickly accumulating scum layers, reduce the flow of floatable materials like fats, oils, and grease into your tank or be prepared to pay for more frequent inspections and pumping.

Washing machines

By selecting the proper load size, you'll reduce water waste. Washing small loads of laundry on the large-load cycle wastes precious water and energy. If you can't select load size, run only full loads of laundry.



Doing all the household laundry in one day might seem like a time-saver, but it could be harmful to your septic system. Doing load after load does not allow your septic tank time to adequately treat wastes. You could be flooding your drainfield without allowing sufficient recovery time. Try to spread water usage throughout the week. A new Energy Star clothes washer uses 35 percent less energy and 50 percent less water than a standard model.

Care for your drainfield

Your drainfield is an important part of your septic system. Here are a few things you should do to maintain it:

- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.
- Keep roof drains, basement sump pump drains, and other rainwater or surface water drainage systems away from the drainfield. Flooding the drainfield with excessive water slows down or stops treatment processes and can cause plumbing fixtures to back up.

What can make my system fail?

If the amount of wastewater entering the system is more than the system can handle, the wastewater backs up into the house or yard and creates a health hazard.

You can suspect a system failure not only when a foul odor is emitted but also when partially treated wastewater flows up to the ground surface. By the time you can smell or see a problem, however, the damage might already be done.

By limiting your water use, you can reduce the amount of wastewater your system must treat. When you have your system inspected and pumped as needed, you reduce the chance of system failure.

A system installed in unsuitable soils can also fail. Other failure risks include tanks that are inaccessible for maintenance, drainfields that are paved or parked on, and tree roots or defective components that interfere with the treatment process.

Failure symptoms

The most obvious septic system failures are easy to spot. Check for pooling water or muddy soil around your septic system or in your basement. Notice whether your toilet or sink backs up when you flush or do laundry. You might also notice strips of bright green grass over the drainfield. Septic systems also fail when partially treated wastewater comes into contact with

groundwater. This type of failure is not easy to detect, but it can result in the pollution of wells, nearby streams, or other bodies of water. Check with a septic system professional and the local health department if you suspect such a failure.

Stop, look, and smell!

Failure causes

Household toxics

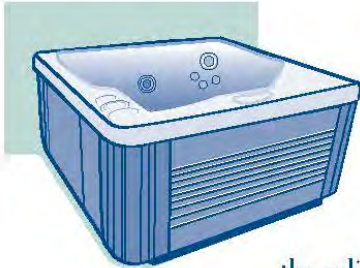
Does someone in your house use the utility sink to clean out paint rollers or flush toxic cleaners? Oil-based paints, solvents, and large volumes of toxic cleaners should not enter your septic system. Even latex paint cleanup waste should be minimized. Squeeze all excess paint and stain from brushes and rollers on several layers of newspaper before rinsing. Leftover paints and wood stains should be taken to your local household hazardous waste collection center. Remember that your septic system contains a living collection of organisms that digest and treat waste.

Household cleaners

For the most part, your septic system's bacteria should recover quickly after small amounts of household cleaning products have entered the system. Of course, some cleaning products are less toxic to your system than others. Labels can help key you into the potential toxicity of various products. The word "Danger" or "Poison" on a label indicates that the product is highly hazardous. "Warning" tells you the product is moderately hazardous. "Caution" means the product is slightly hazardous. ("Nontoxic" and "Septic Safe"



are terms created by advertisers to sell products.) Regardless of the type of product, use it only in the amounts shown on the label instructions and minimize the amount discharged into your septic system.



Hot tubs

Hot tubs are a great way to relax.

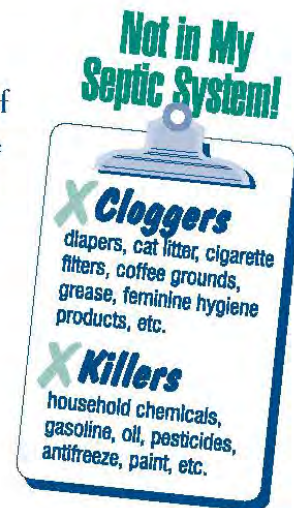
Unfortunately, your septic system was not designed to handle large quantities of water from your hot tub. Emptying hot tub water into your septic system stirs the solids in the tank and pushes them out into the drainfield, causing it to clog and fail. Draining your hot tub into a septic system or over the drainfield can overload the system. Instead, drain cooled hot tub water onto turf or landscaped areas well away from the septic tank and drainfield, and in accordance with local regulations. Use the same caution when draining your swimming pool.

Water Purification Systems

Some freshwater purification systems, including water softeners, unnecessarily pump water into the septic system. This can contribute hundreds of gallons of water to the septic tank, causing agitation of solids and excess flow to the drainfield. Check with your licensed plumbing professional about alternative routing for such freshwater treatment systems.

Garbage disposals

Eliminating the use of a garbage disposal can reduce the amount of grease and solids entering the septic tank and possibly clogging the drainfield. A garbage disposal grinds up kitchen scraps, suspends them in water, and sends the mixture to the septic tank. Once in the septic tank, some of the materials are broken down by bacterial action, but most of the grindings have to be pumped out of the tank. Using a garbage disposal frequently can significantly increase the accumulation of sludge and scum in your septic tank, resulting in the need for more frequent pumping.



Improper design or installation

Some soils provide excellent wastewater treatment; others don't. For this reason, the design of the drainfield of a septic system is based on the results of soil analysis. Homeowners and system designers sometimes underestimate the significance of good soils or believe soils can handle any volume of wastewater applied to them. Many failures can be attributed to having an undersized drainfield or high seasonal groundwater table. Undersized septic tanks—another design failure—allow solids to clog the drainfield and result in system failure.

If a septic tank isn't watertight, water can leak into and out of the system. Usually, water from the environment leaking into the system causes hydraulic overloading, taxing the system beyond its capabilities and causing inadequate treatment and sometimes sewage to flow up to the ground surface. Water leaking out of the septic tank is a significant health hazard because the leaking wastewater has not yet been treated.

Even when systems are properly designed, failures due to poor installation practices can occur. If the drainfield is not properly leveled, wastewater can overload the system. Heavy equipment can damage the drainfield during installation which can lead to soil compaction and reduce the wastewater infiltration rate. And if surface drainage isn't diverted away from the field, it can flow into and saturate the drainfield.

For more information

Local Health Department

EPA Onsite/Decentralized Management Homepage

www.epa.gov/owm/septic

EPA developed this Web site to provide tools for communities investigating and implementing onsite/decentralized management programs. The Web site contains fact sheets, program summaries, case studies, links to design and other manuals, and a list of state health department contacts that can put you in touch with your local health department.

National Small Flows Clearinghouse

www.nesc.wvu.edu

Funded by grants from EPA, the NSFC helps America's small communities and individuals solve their wastewater problems. Its activities include a Web site, online discussion groups, a toll-free assistance line (800-624-8301), informative publications, and a free quarterly newsletter and magazine.

Rural Community Assistance Program

www.rcap.org

RCAP is a resource for community leaders and others looking for technical assistance services and training related to rural drinking water supply and wastewater treatment needs, rural solid waste programs, housing, economic development, comprehensive community assessment and planning, and environmental regulations.

National Onsite Wastewater Recycling Association, Inc.

www.nowra.org

NOWRA is a national professional organization to advance and promote the onsite wastewater industry. The association promotes the need for regular service and educates the public on the need for properly designed and maintained septic systems.

Septic Yellow Pages

www.septicyellowpages.com

The Septic Yellow Pages provides listings by state for professional septic pumpers, installers, inspectors, and tank manufacturers throughout the United States. This Web site is designed to answer simple septic system questions and put homeowners in contact with local septic system professionals.

National Association of Wastewater Transporters

www.nawt.org

NAWT offers a forum for the wastewater industry to exchange ideas and concerns. The NAWT Web site lists state associations and local inspectors and pumpers.



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Septic System Dos and Don'ts

(adapted from National Small Flows Clearinghouse)

Dos

- Check with the local regulatory agency or inspector/pumper if you have a garbage disposal unit to make sure that your septic system can handle this additional waste.
- Check with your local health department before using additives. Commercial septic tank additives do not eliminate the need for periodic pumping and can be harmful to the system.
- Use water efficiently to avoid overloading the septic system. Be sure to repair leaky faucets or toilets. Use high-efficiency fixtures.
- Use commercial bathroom cleaners and laundry detergents in moderation. Many people prefer to clean their toilets, sinks, showers, and tubs with a mild detergent or baking soda.
- Check with your local regulatory agency or inspector/pumper before allowing water softener backwash to enter your septic tank.
- Keep records of repairs, pumpings, inspections, permits issued, and other system maintenance activities.
- Learn the location of your septic system. Keep a sketch of it with your maintenance record for service visits.
- Have your septic system inspected and pumped as necessary by a licensed inspector/contractor.
- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.

Don'ts

- Your septic system is not a trash can. Don't put dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, latex paint, pesticides, or other hazardous chemicals into your system.
- Don't use caustic drain openers for a clogged drain. Instead, use boiling water or a drain snake to open clogs.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.