

SECTION 4

ALTERNATIVE OWTS REQUIREMENTS

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A. INTRODUCTION

1. 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 or a method of wastewater dispersal other than a gravity fed drain field trench for effluent dispersal. By this definition, any OWTS that includes the use of a pump system for effluent treatment and/or dispersal is considered to be an Alternative OWTS.

This Section 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 San Mateo County.

For all Alternative OWTS, a copy of the operation and maintenance guidelines must be kept onsite at all times and must be provided to any new owner upon property transfer.

2. General Pump System Requirements

Effluent pump systems may be considered when they offer a better alternative for the protection of public health and safety or the only safe opportunity for effluent distribution within a parcel. Due to problems inherent in mechanical devices, pump systems are to be considered only after gravity feed options have been explored and shown to be infeasible.

For any treatment or dispersal system using effluent pumps in any way (all considered alternative systems), plans must include specifications and sizing justification for any pump tank and pump (including pump performance curves); must show the elevations of the pump and the distribution or transfer piping at the highest elevation; show the calculations for total dynamic head through any piping and valves.

All systems using effluent pumps shall have an alarm system to alert the occupants of the residence of pump failure. Telemetry alarms to service companies are preferred, but not always required.

For all systems using effluent pumps, the septic tank must be sized as for a conventional system. For treatments system using pumps for recirculation, but gravity flow to distribution (e.g., no distribution pump tank required), there is no requirement for additional storage capacity beyond the septic/treatment unit storage. OWTS using pressure distribution must have a pump chamber consisting of a tank, pump, pump controls and alarm system. The pump chamber can be a separate unit or it can have



common wall construction with the septic tank (or pretreatment unit), as long as the required dosing volume and reserve volume can be achieved as described below.

The pump chamber must have sufficient volume to provide the desired dosing volume, plus a reserve volume. The reserve volume is the volume of the pump chamber between the high water alarm switch and the invert of the inlet pipe. It provides storage during power outages or pump failure.

A reserve volume equal to the estimated daily wastewater flow (150 gallons per room) is required for residential OWTS. This reserve volume may be reduced when an emergency gravity-flow trench of appropriate volume is installed as the reserve volume. As a general rule, the pump chamber volume will be the same as the septic tank volume.

3. Alternative Treatment Systems

Requirements are provided for the following alternative treatment systems:

- Intermittent Sand Filters
- Proprietary Treatment Units

County Ordinance allows for the future addition of other alternative treatment systems, as may be approved by Environmental Health and the appropriate 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, drip dispersal), as specified in this Manual.

4. Alternative Dispersal Systems

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

- Pressure Distribution Trench Systems
- Subsurface Drip Dispersal



County Ordinance allows for the future addition of other alternative dispersal systems, as may be approved by Environmental Health and the appropriate 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 pressure distribution trench systems and subsurface drip dispersal.

5. 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 Environmental Health. Final approval of system installation shall be contingent upon confirmation by Environmental Health that required operation and maintenance guidelines have been provided.

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

- General description of the OWTS, design capacity, and any special permit or operating conditions;
- Brief description of the key components and their function;
- 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;
- General preventative measures for proper use and maintenance of the OWTS (e.g., “Dos and Don’ts”);
- Copy of system plans or “as-built” drawings, as applicable.
- Contact information for the following:
 - Designer
 - Installer
 - Maintenance contractor
 - Environmental Health
- Other information, references or documents, as appropriate.



B. INTERMITTENT SAND FILTER SYSTEMS REQUIREMENTS

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 the County Onsite Systems Manual. Effluent from an ISF designed and operated in accordance with these requirements will be considered to meet the criteria for “supplemental treatment”, not including pathogen removal where applicable.

Siting Criteria

- a. Sand Filter Treatment Unit. All siting criteria for septic tanks, as specified in the County Ordinance Section 4.84.120, shall also apply to intermittent sand filters and associated tanks and pumping units.
- b. 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 3 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.

Design Criteria

- a. 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 3 of this Manual.



b. 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:

- (1) Uniform dosing of effluent over the surface application area of the sand filter distribution bed;
- (2) Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;
- (3) Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;
- (4) Dosing volume set to achieve a minimum of 3 to 5 doses per day at design flow conditions; and
- (5) 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 non-gravity-fed dispersal system, the dosing pump system for the sand filter shall provide emergency storage capacity equal to at least 1.5 times the daily wastewater flow, consistent with requirements for pump systems provided in Section 4 of this Manual.

c. Wastewater Application Rate. The wastewater application rate used for sizing the surface area of the sand filter shall be as follows:

- (1) 1.2 gpd/ft^2 for individual residential OWTS; and
- (2) 1 gpd/ft^2 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.

d. 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: (a) 30 mil plastic; (b) reinforced poured-in-placed concrete; or (c) an equivalent impermeable structure or barrier.

e. 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.



- f. 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.
- g. Multiple Units. The sand filter may be divided into compartments or multiple units.
- h. Sand Filter Media
 - (1) **Sand Specification.** The sand media shall be a medium to coarse sand that meets the gradation specifications in **Table SF-1**.
 - (2) **Sand Depth.** The minimum sand depth below the gravel distribution bed shall be 24 inches.

Table SF-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 Environmental Health staff to verify conformance with the above specifications.

- i. Gravel Distribution Bed
 - (1) Material. The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.



- (2) 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.
- j. 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 underdrain applications. Filter fabric shall be non-woven, be permeable, and shall not act as a wicking agent.
- k. Cover
- (1) Material. A soil cover shall be placed over the distribution bed, consisting of a medium, loamy-textured soil.
- (2) 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.
- l. Underdrain
- (1) Material. The underdrain beneath the sand media shall consist of 3/8" washed pea gravel with 4-inch diameter perforated drain pipe, installed with perforations oriented down.
- (2) Depth. The pea gravel underdrain shall have a minimum depth of 9 inches.
- (3) Grade. The underdrain shall be constructed and the drain pipe set with a minimum grade of 1% toward the outlet point.
- (4) Watertight Outlet "Boot". The sand filter underdrain 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).
- (5) Clean-out Riser. For clean-out and inspection purposes the upslope end of the perforated drain pipe in the underdrain 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.
- m. Air Manifold. An air manifold shall be installed within the pea gravel underdrain 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 underdrain 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.

- n. Inspection Wells. An inspection well shall be installed in the gravel distribution bed of each sand filter compartment. The inspection well 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 wells 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 wells shall be sealed against surface infiltration with a bentonite or concrete annular seal through the soil backfill zone.
- o. 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:
 - (1) pump chamber shall be seated at or below the bottom of the underdrain;
 - (2) pump operating depth shall be entirely within the depth of the underdrain; and,
 - (3) 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 underdrain.

Engineering Plans & Construction

- a. 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:
 - (1) "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended.
 - (2) "Design Manual – Onsite Wastewater Treatment and Disposal Systems", U.S. Environmental Protection Agency, October 1980.
- b. Engineering Plans. Engineering plans for sand filter systems shall include:
 - (1) All relevant elevation data and hydraulic calculations;



- (2) Specific step-by-step construction guidelines and notes for use by the installer;
 - (3) Recommended make and model of all components;
 - (4) Recommended pump system components, with cut-sheet depicting float settings;
 - (5) Control panel programming; and
 - (6) An inspection schedule listing critical control points.
- c. Construction Inspection. At a minimum, inspection of the sand filter system installation should include the items listed below. Joint inspection by the designer, contractor, service provider, and Environmental Health staff may be required.
- (1) Pre-construction inspection where the construction staking or marking of the sand filter is provided and construction procedures discussed;
 - (2) Water tightness of septic tank and dosing (pump) tank;
 - (3) Sand filter dimensions, structure and liner;
 - (4) Underdrain piping and filter rock;
 - (5) Sand quality and placement;
 - (6) Layout and excavation of dispersal trenches and piping;
 - (7) Drain rock material and placement;
 - (8) Piping installation and hydraulic (“squirt”) test of the distribution system;
 - (9) Functioning and setting of all control devices; and
 - (10) Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed; and erosion control has been completed;
 - (11) A letter from the designer that the alternative OWTS has been installed, operating, and tested in conformance with design specifications shall be provided to Environmental Health staff; and
 - (12) A valid, signed maintenance agreement between applicant/property owner and service provider shall be provided to Environmental Health staff.

MANAGEMENT REQUIREMENTS

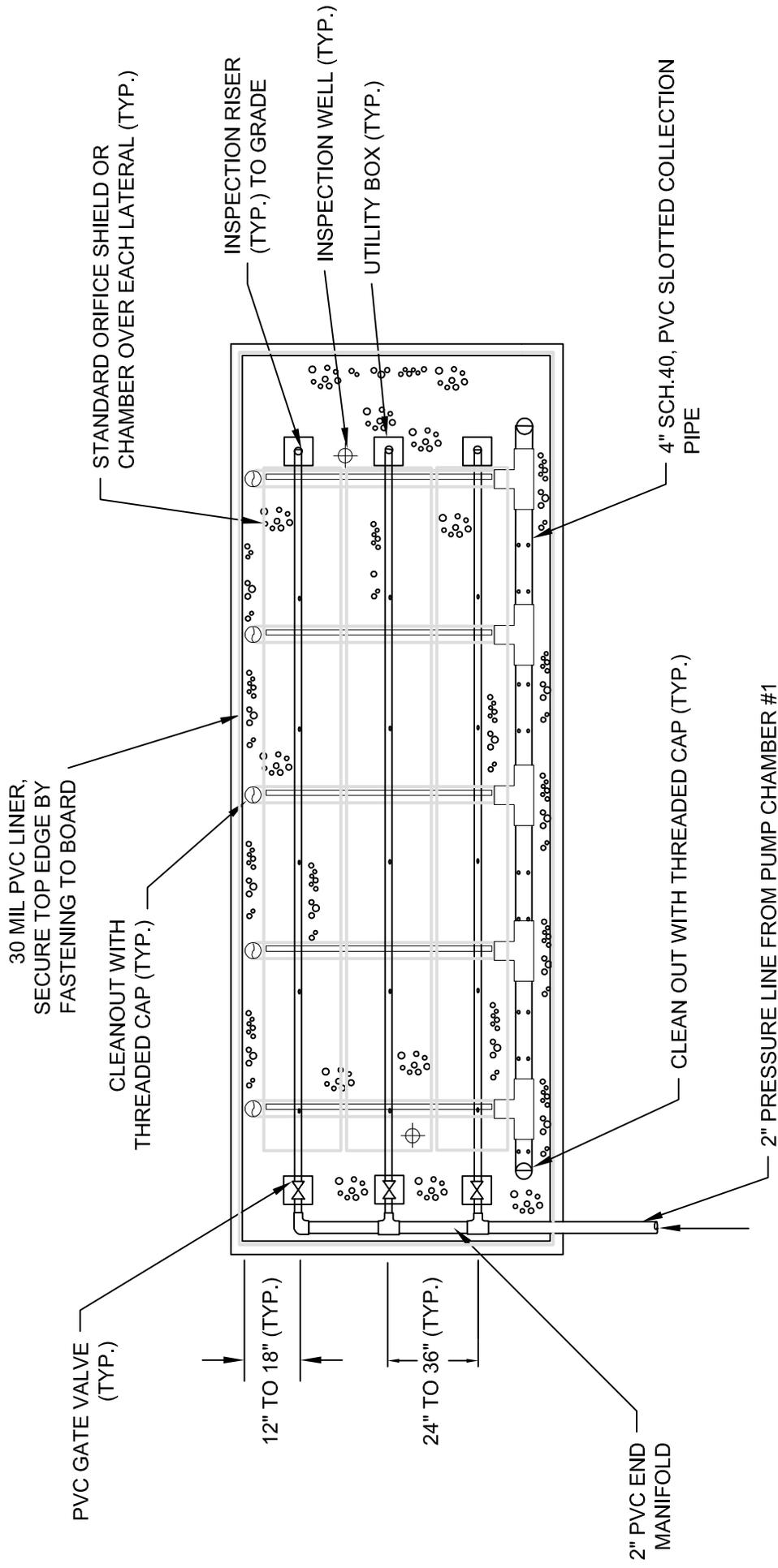
Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for intermittent sand filter systems are included below in Table SF-2.



Table SF-2. Intermittent Sand Filter System Management Requirements

	Work	Minimum Frequency
Inspection	<ul style="list-style-type: none"> • Observe surface conditions on and around filter for effluent leakage, drainage/infiltration, erosion or other problems. • Check/measure water level in inspection wells in filter bed. • Perform all inspection work as recommended by designer or equipment manufacturer. • Perform inspection protocol for pump systems (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). • Record observations. 	<ul style="list-style-type: none"> • According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Maintenance	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history. • Responsive maintenance as necessary.
Water Monitoring & Sampling	<ul style="list-style-type: none"> • Report observation findings and maintenance actions, including notation of problems and corrective actions. • Record dose counter and elapsed time meter readings from control panel. 	<ul style="list-style-type: none"> • According to permit conditions, if applicable.
Reporting	<ul style="list-style-type: none"> • Report findings to Environmental Health per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report emergency or failure conditions to Environmental Health immediately. 	<ul style="list-style-type: none"> • According to permit conditions, typically every year, depending on system size, usage, history, location.

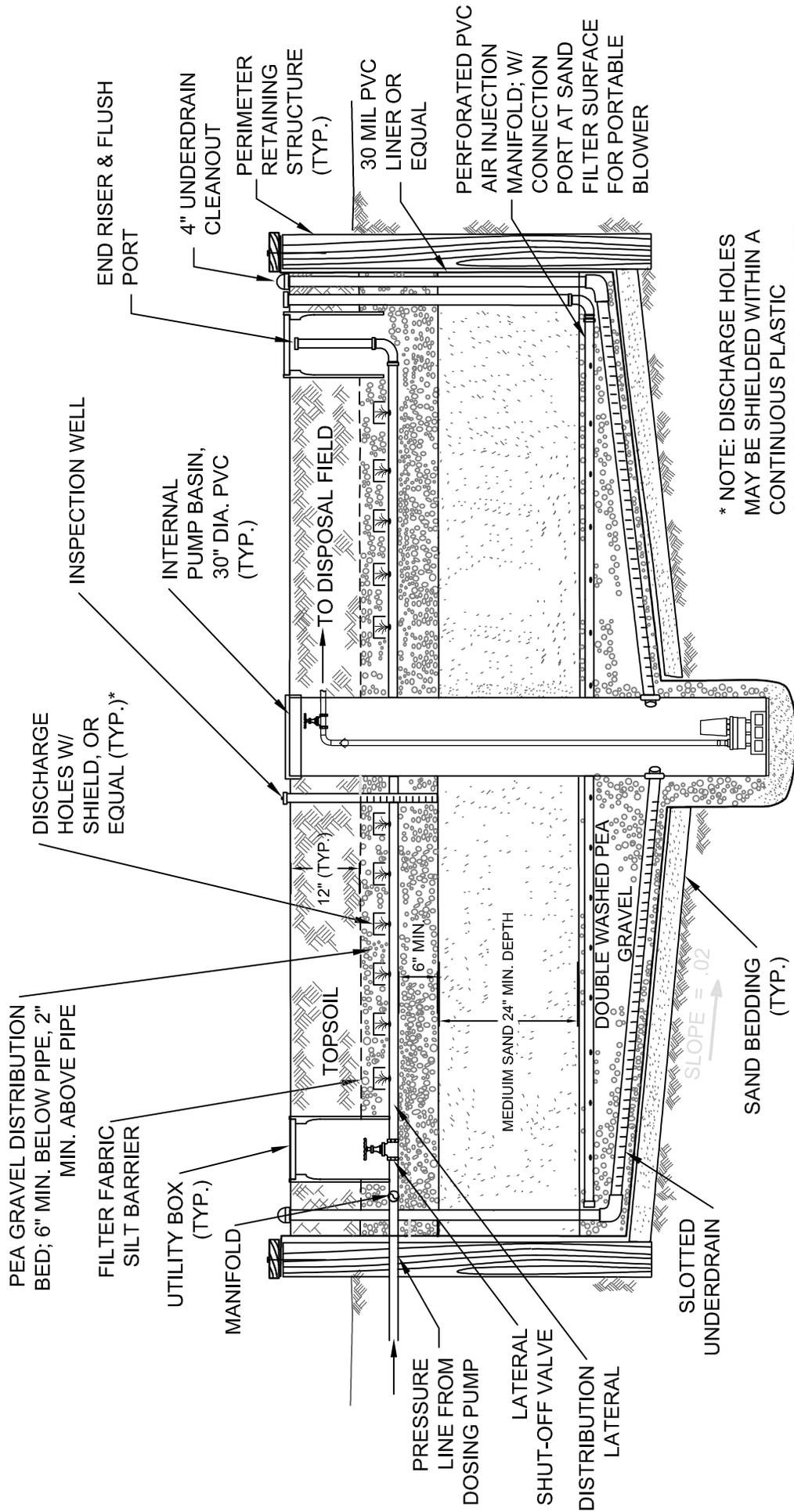




PLAN VIEW

FIGURE
4-1

**INTERMITTENT SAND FILTER
PLAN VIEW**



* NOTE: DISCHARGE HOLES MAY BE SHIELDED WITH A CONTINUOUS PLASTIC CHAMBER, OR THEY MAY BE ORIENTED DOWN WITHOUT THE NEED FOR ANY SHIELD.

FIGURE 4-2

INTERMITTENT SAND FILTER WITH INTERNAL PUMP BASIN

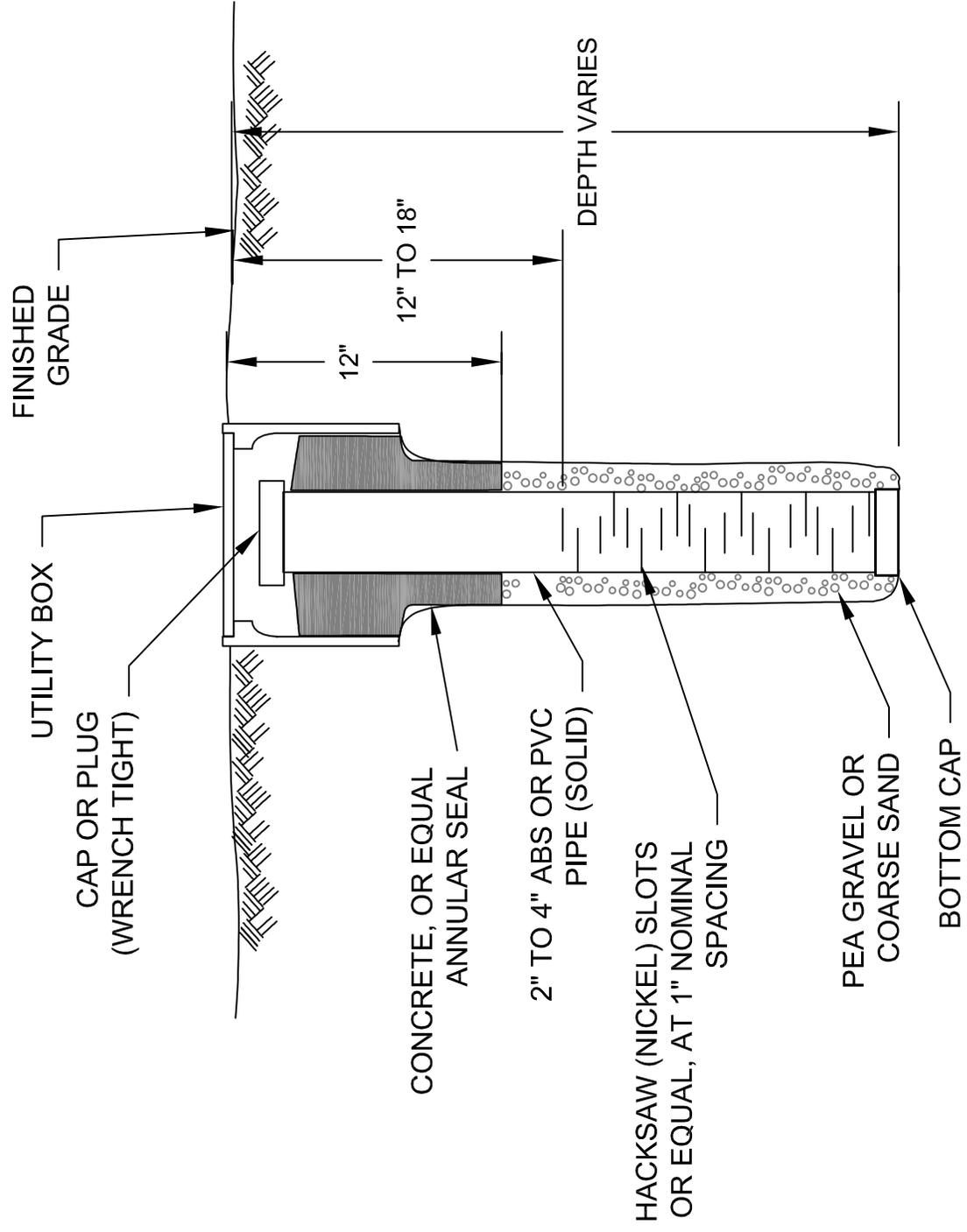


FIGURE 4-3

INSPECTION STANDPIPE (TYPICAL)

C. PROPRIETARY TREATMENT UNITS REQUIREMENTS

1. Description

Proprietary 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.

- a. **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.
- b. **Media Filters.** This includes proprietary designs that function similar to sand filters. In these systems, the sand is replaced with an alternate media (examples, but not limited to: peat, gravel or textile). 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 Onsite Systems Manual. Effluent from proprietary treatment units designed and operated in accordance with these guidelines will be considered to meet the criteria for “supplemental treatment”.

2. Siting Criteria

- a. **Treatment Unit.** All siting criteria for septic tanks, as specified in Part 3 of this Manual and in the County Ordinance Section 4.84.120, shall also apply to proprietary treatment units and associated tanks and pumping units.
- b. **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, increased wastewater application rates or modified slope restrictions. Refer to the part of this Section for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

3. Design and Construction Requirements

- a. 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 certification by a third-party listing agency of equivalent performance.
- b. 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 3 of this Manual.
- c. Tanks. All tanks housing a proprietary treatment unit shall be structurally sound, water-tight and capable of withstanding 1,000 pounds of weight.
- d. 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.
- e. Emergency Storage Provisions. Where a proprietary treatment unit is used in conjunction with a non-gravity-fed dispersal system, the system shall provide emergency storage capacity equal to at least 1.5 times the daily wastewater flow, consistent with requirements for pump systems provided in this Manual. Depending on OWTS configuration, tank free board, pump tank capacity and



available gravity flow trench may be considered, at the discretion of Environmental Health staff.

- f. Compliance with Manufacturer Requirements. The designer and installer shall follow the proprietary manufacturer's design, installation, construction, and operations procedures.
- g. 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.
- h. 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 Environmental Health staff prior to system installation.
- i. 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.
- j. 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, service provider, and Environmental Health staff may be required.
 - (1) Pre-construction inspection where the construction staking or marking of the treatment unit is to be placed and installation procedures are discussed;
 - (2) Testing of the treatment unit:
 - (a) Function and setting of all control devices and alarms.
 - (b) Water-tightness of septic tank, treatment tank(s), and dosing tank, as applicable.
 - (3) Drain Field:
 - (a) Layout and excavation of dispersal trenches and piping.
 - (b) Drain rock and perforated pipe materials and placement.
 - (c) Piping installation and hydraulic ("squirt") test of the distribution system.
 - (4) Final Inspection:



- (a) A letter from the designer that the alternative OWTS has been installed and is operating in conformance with design specifications shall be provided.
- (b) A valid, signed maintenance agreement between the applicant/property owner and service provider shall be provided.

4. Management Requirements

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for proprietary treatment systems are outlined in Table P-1 below.

Table P-1. Proprietary Treatment System Management Requirements

	Work	Minimum Frequency
Inspection	<ul style="list-style-type: none"> • Inspection to be in accordance with manufacturer specifications. 	<ul style="list-style-type: none"> • According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Maintenance	<ul style="list-style-type: none"> • Perform all maintenance as required and in accordance with equipment manufacturer specifications. 	<ul style="list-style-type: none"> • According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Water Monitoring & Sampling	<ul style="list-style-type: none"> • Monitoring to be in accordance with manufacturer specifications. 	<ul style="list-style-type: none"> • If required, according to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Reporting	<ul style="list-style-type: none"> • Report findings to Environmental Health per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report crisis or failure conditions to Environmental Health immediately. 	<ul style="list-style-type: none"> • According to permit conditions, typically every year, depending on system size, usage, history, location.



D. PRESSURE DISTRIBUTION TRENCH SYSTEMS REQUIREMENTS

1. Description

Pressure distribution (PD) systems are a variation of a conventional gravity dispersal system that use a pump and small-diameter pressure piping to achieve broad, uniform distribution of wastewater throughout the dispersal system for improved soil absorption and better treatment of percolating effluent. Pressure distribution can be used in conjunction with regular rock-filled trenches receiving septic tank effluent (PD trench systems), or for shallow/chambered dispersal fields or subsurface drip dispersal with supplemental treatment systems. This Section covers requirements for PD trench systems; shallow/chambered and drip dispersal alternatives are covered in subsequent sections of this Manual.

2. Applications

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

- a. Areas with ground slopes exceeding 35%;
- b. Areas with percolation rates between 1.0 and 0.75 inches per hour (61 to 80 MPI);
- c. To allow reduction of vertical separation to groundwater (below trench bottom) from 5 feet to 3 feet;
- d. For any OWTS where pumping from the septic tank to the drain field is required;
- e. For large flow systems, e.g., with dispersal field lengths (primary) exceeding 500 lineal feet; and
- f. Others as may be determined necessary due to site-specific soil, geology or other conditions.

3. Siting Criteria

- a. **Setbacks.** Horizontal setback requirements for PD trench systems shall be those applicable to conventional dispersal fields, as specified in the County Ordinance Section 4.84.120.
- b. **Vertical Separation Requirements.**



- (1) Depth to Groundwater. Minimum depth to seasonal high groundwater for PD trench systems, as measured from trench bottom, shall be five (5) feet, but may be reduced to three (3) feet for dispersal trench designs utilizing no more than four (4) square feet of effective application area per lineal foot of trench.
 - (2) 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.
- c. Percolation Rate.
- (1) Average percolation rate for PD trench systems shall be within the range of 12 inches per hour to 0.75 inches per hour (5 to 80 minutes per inch, MPI), as determined in accordance with standard percolation requirements for conventional dispersal trenches.
 - (2) Any drain field located in an area demonstrating percolation rates of between three-fourths (0.75) and ninety-nine hundredths (0.99) inches per hour is required to utilize pressure distribution.
- d. Ground Slope.
- (1) Ground slope in areas used for PD trench systems shall be less than 50 percent.
 - (2) Any drain field located on slopes exceeding 35% is required to utilize pressure distribution.
 - (3) Any PD trench system located on slopes greater than 20 percent shall require the completion of a geotechnical report and slope stability analysis as specified in the County Ordinance Section 84.120 and Section 2 of this Manual.
- e. Dual System. Two PD trench 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), intended to allow alternate use of the two fields.

4. Design Criteria

- a. Treatment. The following treatment requirements shall apply in connection with the use of PD trench systems:
 - (1) Primary (septic tank) treatment shall be the minimum level of treatment.



- (2) Supplemental treatment, using an approved alternative treatment system identified in this Manual, may be used and/or required to comply with provisions applicable to OWTS within identified Advanced Protection Management areas in the County or in other circumstances as deemed necessary due to site-specific soil, geologic or other conditions.
 - (3) Screening of effluent ahead of effluent pump system, as applicable.
- b. 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 Section 3 of this Manual.
 - c. 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:
 - (1) Uniform dosing of septic tank effluent throughout the system of PD trenches;
 - (2) Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;
 - (3) Suitable access provisions for inspection, testing and adjustment of the pressure distribution system; and
 - (4) Dosing volume to achieve minimum of 3 to 5 doses per day at design flow conditions.
 - d. Dispersal Trenches. PD trenches shall conform to the same design and construction requirements as conventional trenches, per Section 4 of this Manual, with the exception that the piping system shall consist of pressure piping rather than gravity piping. Both primary and secondary fields must be fed by the pump system.
 - e. Pressure Distribution Piping.
 - (1) Pressure-Rated Pipe Material. All pipe, fittings and valves shall be pressure-rated PVC pipe, minimum 150 psi.
 - (2) Solvent Welded. All joints in the pressure piping system shall be solvent welded.



- (3) 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.
 - (4) Thrust Blocks. Concrete thrust blocks, or equivalent restraint, shall be provided at sharp changes in piping directions.
 - (5) 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.
 - (6) 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.
- f. 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 Section 4 of this Manual.
- g. Trench Sizing.
- (1) Residential OWTS. Trench sizing for drain field areas with percolation rates of one inch per hour (60 MPI) or faster shall be in accordance with requirements for “Drain Field Sizing – Residential”, as specified for Conventional OWTS in Section 4 of this Manual.

Areas with stabilized percolation rates between three-fourths (0.75) and ninety-nine hundredths (0.99) inches per hour shall require:

- (a) Up to three bedrooms – two (2) lines, each of one hundred eighty (180) feet total trench length;
 - (b) Each additional bedroom – add sixty (60) feet total trench length to each line.
 - (c) 100% reserve area equivalent to the proposed drain field.
- (2) Multifamily and Non-Residential. Trench sizing shall be in accordance with requirements for “Drain Field Sizing – Multifamily and Non-



Residential”, as specified for Conventional OWTS in Section 3 of this Manual.

- h. Inspection Standpipes. A minimum of three (3) inspection standpipes shall be installed within and around PD trench systems for the purpose of checking groundwater levels, and may also be used for water quality sampling, as needed. Inspection standpipes shall extend to a depth of at least 5 feet below the bottom of the PD trenches. The inspection standpipes shall be located and constructed as follows:
- (1) One shall be located upslope of the dispersal field, typically 10- to 15-feet away, to serve as a background or control point;
 - (2) One shall be located within the dispersal field, typically between trenches near the center of the field;
 - (3) One shall be located down-slope of the dispersal field, typically 10 to 25 feet horizontally from the lowest trench(es), and positioned to provide a representative point for monitoring the area estimated to be in the probable flow path of percolating wastewater; and
 - (4) Inspection standpipes shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug, and a bottom cap. All standpipes 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 (nickel) slots at nominal 1" spacing, or equivalent commercially-perforated pipe. To prevent surface water infiltration, inspection standpipes shall be sealed/stabilized with a concrete annular seal (or equivalent) to a depth of 12 inches, minimum.

5. Engineering Plans & Construction

- a. 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:
- (1) "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended; and
 - (2) "Design Manual – Onsite Wastewater Treatment and Disposal Systems", U.S. Environmental Protection Agency, October 1980.
- b. Engineering Plans. Engineering plans for PD trench systems shall include:
- (1) All relevant elevation data and hydraulic calculations;



- (2) Specific step-by-step construction guidelines and notes for use by the installer;
 - (3) Erosion control plans for any site over 20% slope;
 - (4) Recommended make and model of all components;
 - (5) Recommended pump system components, with cut-sheet depicting float settings;
 - (6) Control panel programming; and
 - (7) An inspection schedule listing critical control points.
- c. 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, service provider, and Environmental Health may be required.
- (1) Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;
 - (2) Water tightness of septic tank and dosing (pump) tank;
 - (3) Layout and excavation of dispersal trenches and piping;
 - (4) Drain rock material and placement;
 - (5) Piping installation and hydraulic (“squirt”) test of the distribution system;
 - (6) Functioning and setting of all control devices; and
 - (7) Final inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection standpipes are installed; and erosion control has been completed.
 - (8) A letter from the designer that the Alternative OWTS has been installed, operating, and tested in conformance with design specifications shall be provided to Environmental Health staff; and
 - (9) A valid, signed maintenance agreement between applicant/property owner and service provider shall be provided to Environmental Health staff.



6. Management Requirements

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for pressure distribution trench systems are outlined in Table PD-1 above.

Table PD-3. Pressure Distribution Trench System Management Requirements

	Work	Minimum Frequency
Inspection	<ul style="list-style-type: none"> • 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 system O&M manual, and Performance Evaluation Guidelines in Section 5.3 of this Manual). 	<ul style="list-style-type: none"> • Every 6 to 12 months.
Maintenance	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	<ul style="list-style-type: none"> • Measure and record water levels in trench observation wells. • Measure and record water levels in dispersal field monitoring wells, as applicable, per permit requirements. • Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements. 	<ul style="list-style-type: none"> • Measure trench water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	<ul style="list-style-type: none"> • Report findings to Environmental Health per permit requirements. • Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to Environmental Health staff immediately. 	<ul style="list-style-type: none"> • According to permit conditions, typically every year, depending on system size, usage, history, location.



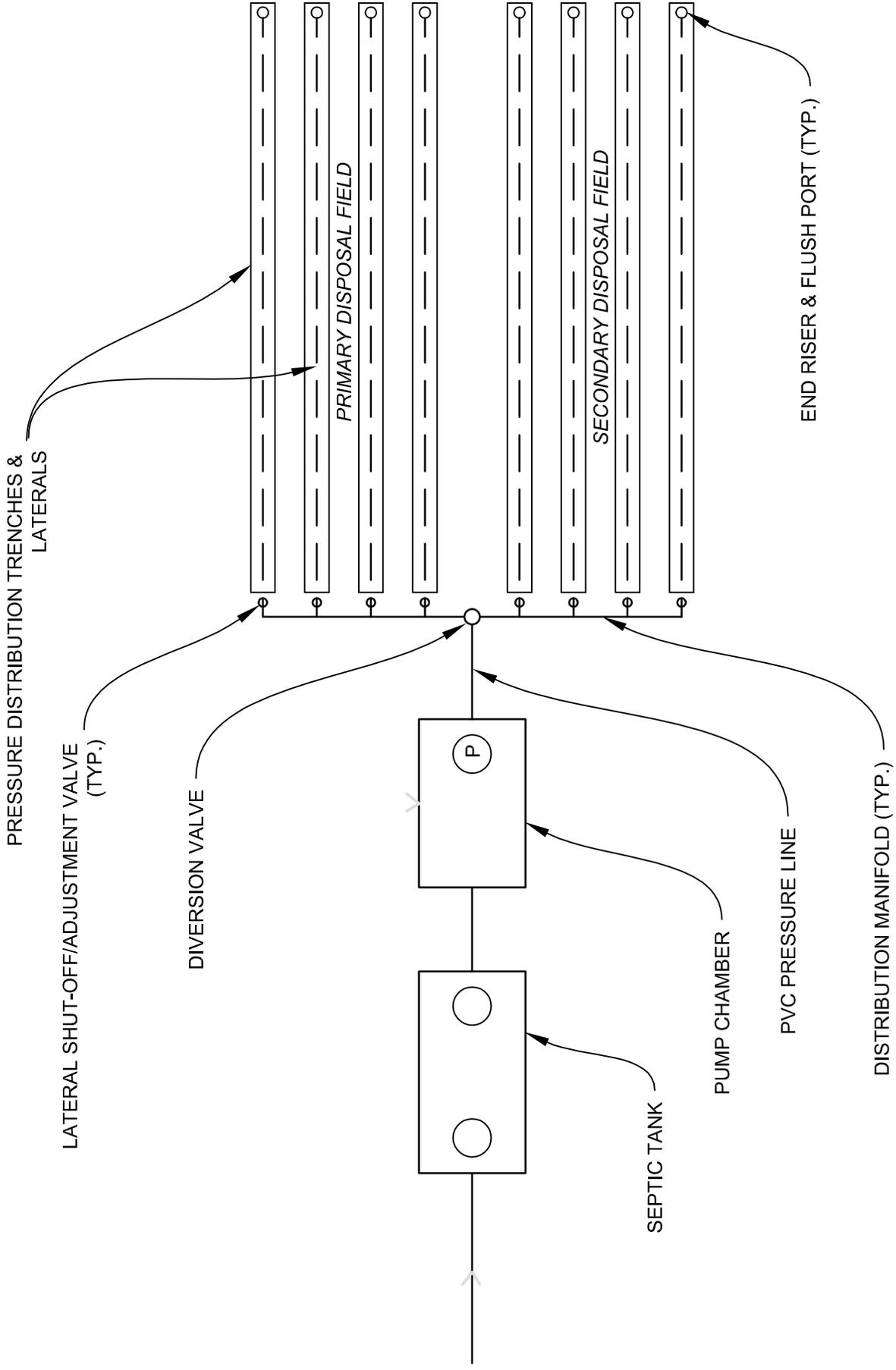
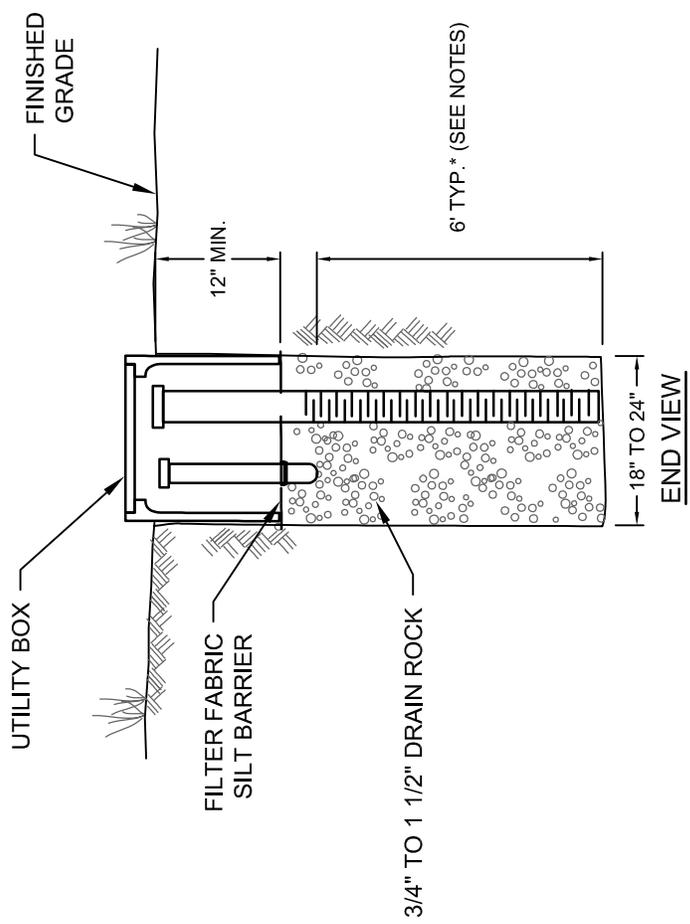
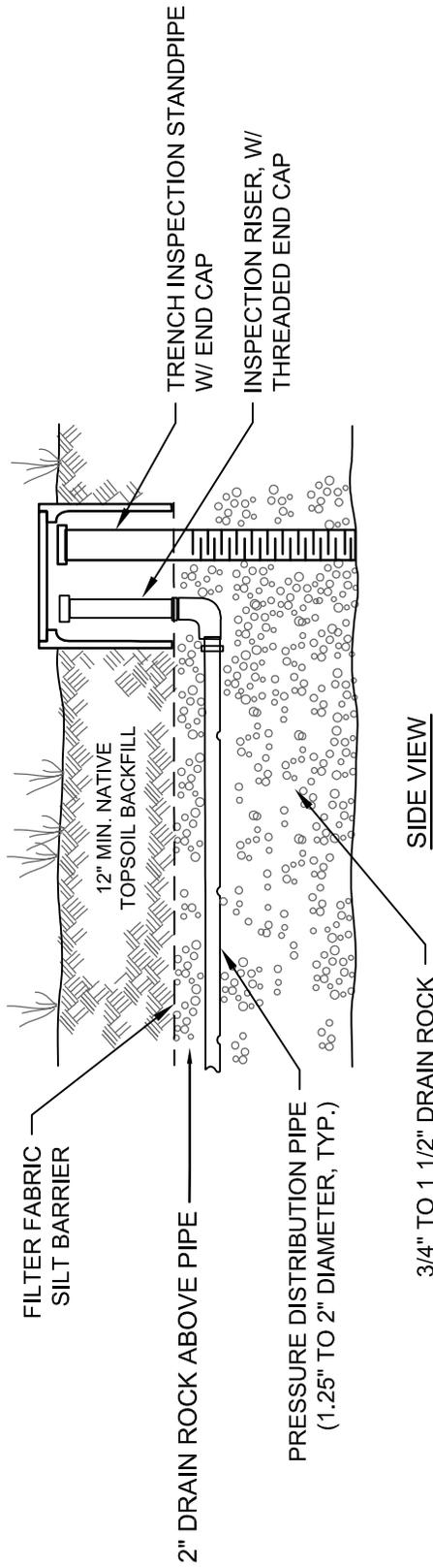


FIGURE 4-4

PRESSURE DISTRIBUTION SYSTEM SCHEMATIC

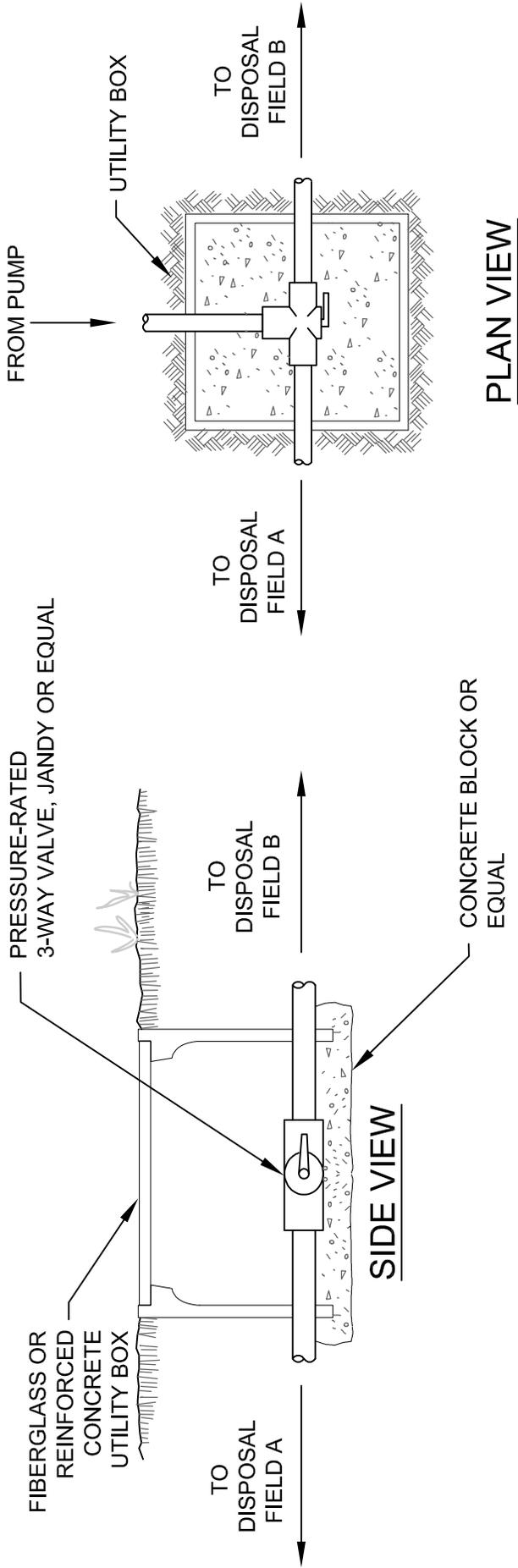


NOTES:

1. FOR RESIDENTIAL OWTS, DRAIN FIELDS OF LESSER DEPTHS (<6 FT. SIDEWALL DEPTH) BUT EQUIVALENT OVERALL SIDEWALL AREA MAY BE PERMITTED SUBJECT TO THE APPROVAL OF ENVIRONMENTAL HEALTH.
2. FOR MULTI-FAMILY AND NON-RESIDENTIAL OWTS:
 - THE "EFFECTIVE INFILTRATIVE AREA" SHALL BE LIMITED TO FOUR (4) SQUARE FEET PER LINEAL FOOT OF TRENCH LENGTH, COUNTING ONLY TRENCH SIDEWALL AREA BELOW THE INVERT OF THE PIPE;
 - UNDER CERTAIN (FAVORABLE) SOIL AND SITE CONDITIONS, THE EFFECTIVE INFILTRATIVE SURFACE MAY BE INCREASED TO UP TO A MAXIMUM OF EIGHT (8) SQUARE FEET PER LINEAL FOOT.

FIGURE 4-5

PRESSURE DISTRIBUTION TRENCH

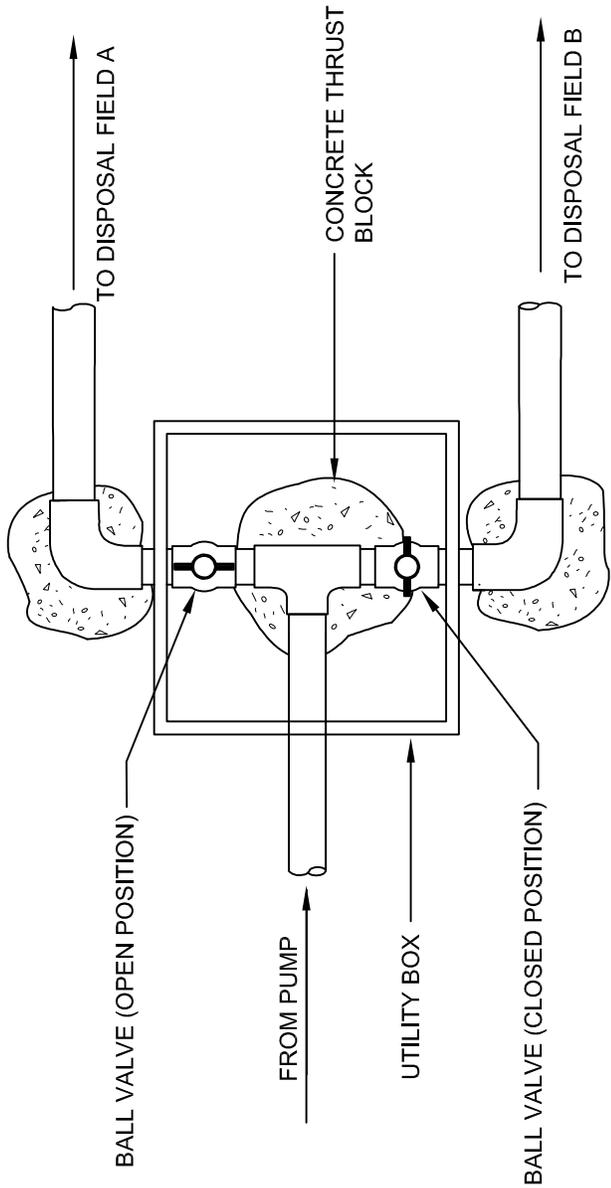


PLAN VIEW

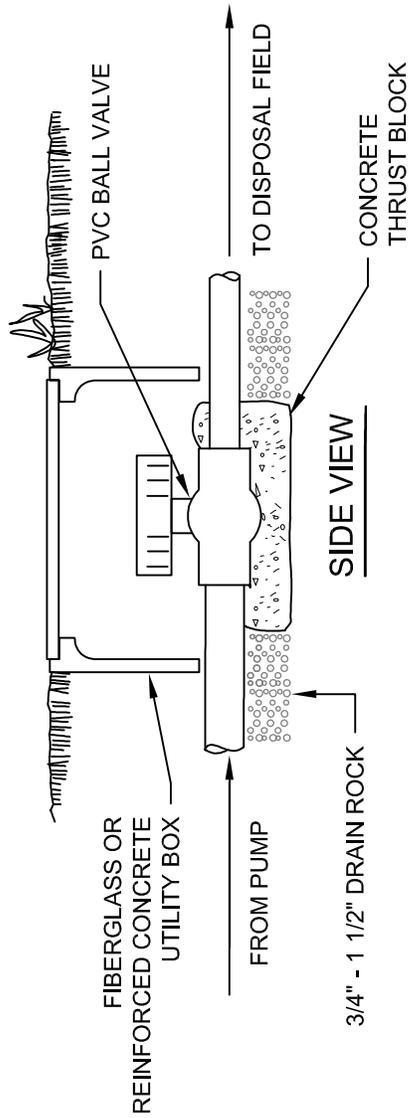
SIDE VIEW

FIGURE 4-6

PRESSURE DISTRIBUTION 3-WAY DIVERSION VALVE



PLAN VIEW



SIDE VIEW

FIGURE

4-7

**PRESSURE DISTRIBUTION DIVERSION VALVE
W/ DUAL BALL VALVES**

E. SUBSURFACE DRIP DISPERSAL REQUIREMENTS

1. 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. See Figure 4-8 for a schematic of typical shallow drip dispersal system elements.

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.

2. Applications

Subsurface drip dispersal systems may be permitted for the following situations:

- a. Areas with ground slopes less than 50%;
- b. Areas with percolation rates between 12.0 and 0.75 inches per hour (5 to 80 MPI);
- c. To allow reduction of vertical separation to groundwater (below trench bottom) from 5 feet to 3 feet;
- d. Where pumping from the septic tank to the drain field is required; and
- e. Others as may be determined appropriate due to site-specific soil, geology or other conditions.

Per County Ordinance Section 4.84.145, subsurface drip dispersal may be permitted by Environmental Health for new construction on any legally-created parcel where: (a) Environmental Health determines such system would provide equal or greater protection to public health and the environment than a conventional or pressure-



dosed trench dispersal field system; (b) a primary and reserve leaching system for a conventional or pressure-dosed trench dispersal system can also be accommodated on the property, if required. The subsurface drip dispersal system may overlap the area reserved for the conventional or pressure-dosed trench dispersal system, as long as the operation of the shallow subsurface drip dispersal system will not affect the potential future function of the trench dispersal system.

3. Siting Criteria

- a. Setbacks. Horizontal setback requirements for subsurface drip dispersal systems shall be those applicable to conventional disposal fields, as specified in the County Ordinance Section 4.84.120.
- b. Vertical Separation Requirements.
 - (1) Depth to Groundwater. Minimum depth to seasonal high groundwater, as measured from the bottom of the dripline shall be 3 feet.
 - (2) Soil Depth. Minimum depth of soil, as measured from the bottom of the dripline to impermeable soil or rock, shall be 3 feet.
- c. Percolation Rate. The average soil percolation rate in the proposed subsurface drip dispersal field area shall not be faster than 12 inches per hour (5 minutes per inch) nor slower than 0.75 inches per hour (80 minutes per inch), determined in accordance with procedures prescribed by in Section 2 of this Manual. Percolation testing for drip dispersal systems shall be conducted at 12 to 24-inch depth.
- d. Ground Slope.
 - (1) Ground slope in areas used for drip dispersal shall be less than 50 percent.
 - (2) Any drip dispersal system located on slopes greater than 20 percent shall require the completion of a geotechnical report and slope stability analysis as specified in the County Ordinance Section 4.84.120 and Section 2 of this Manual.
- e. 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.



4. Design Criteria

- a. Treatment: The following treatment requirements shall apply in connection with the use of subsurface drip dispersal systems:
 - (1) 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.
 - (2) 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.
 - (3) Any additional requirements that may be assigned in connection with criteria for use in Advanced Protection Management Areas.
- b. 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 Section 3 of this Manual.
- c. Wastewater Application Rates: Wastewater application rates used for sizing drip dispersal fields shall be based on soil percolation rates as measured in the field by appropriate percolation testing. Wastewater application rates should be in accordance with the criteria in Table DD-1 below. In applying these criteria, the wastewater application area refers to the ground surface area encompassed by the drip dispersal field.



Table DD-1. Wastewater Application Rates for Subsurface Drip Dispersal Fields

Soil Percolation Rate (minutes per inch)	Soil Percolation Rate (inches per hour)	Wastewater Application Rate (gpd/ft ²)
5-10	12-6	1.2
11-20	5.99-3	1.0
21-30	2.99-2	0.7
31-45	1.99-1.31	0.6
46-60	1.3-1.0	0.4
61-80	0.99-0.75	0.2

d. Dripfield Sizing.

(1) Minimum sizing of the dripfield area shall be equal to the design wastewater flow divided by the applicable wastewater application rate from Table DD-1 above. 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:

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

(2) 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.

(3) 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.

- e. **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:
- (1) Uniform dosing of treated effluent;
 - (2) An adequate dosing volume and pressure per manufacturer's guidelines;
 - (3) 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;
 - (4) A means of automatically flushing the filter and driplines at regular intervals; and
 - (5) 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 Systems in Section 4.3 above shall also apply.

- f. **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 Section 4 of this Manual.
- g. **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.
- h. **Dripfield Layout:** The bottom of each dripline row shall be level and parallel to the slope contour.
- i. **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 Environmental Health on a case-by-case basis.



- j. 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.
- k. 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.
- l. Dual System Operation. Unless exempted by Environmental Health, 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).
- m. Inspection Standpipes. A minimum of three (3) inspection standpipes, 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:
 - (1) One standpipe shall be located within the dripfield area.
 - (2) One standpipe shall be located 10 to 15 feet up-gradient of the dripfield.
 - (3) One standpipe shall be located 10 to 15 feet down-gradient of the dripfield.
 - (4) Inspection standpipes 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.

5. ENGINEERING PLANS AND CONSTRUCTION

- a. Reference Guidelines. Installation of subsurface drip dispersal systems shall be in accordance with applicable manufacturer guidelines and recommendations.



- b. Engineering Plans. Engineering plans for subsurface drip dispersal systems shall include:
- (1) All relevant elevation data and hydraulic calculations;
 - (2) Specific step-by-step construction guidelines and notes for use by the installer;
 - (3) Erosion control plan for any site over 20%;
 - (4) Recommended make and model of all components;
 - (5) Recommended pump system components, with cut-sheet depicting float settings;
 - (6) Control panel programming; and
 - (7) An inspection schedule listing critical control points.
- c. 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 Environmental Health staff may be required.
- (1) 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;
 - (2) Water tightness of effluent dosing (pump) tank;
 - (3) Drip field layout, piping materials and installation, and all associated valves and connections;
 - (4) Hydraulic testing of the drip system;
 - (5) Functioning and setting of all control devices; and
 - (6) Final Inspection to verify that all construction elements are in conformance with the approved plans, specifications, and manufacture recommendations; all inspection standpipes are installed; and erosion control has been completed.
 - (7) A letter from the designer that the Alternative OWTS has been installed and is operating in conformance with design specifications shall be provided.



- (8) A valid, signed maintenance agreement between the applicant/property owner and service provider shall be provided.

F. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for subsurface drip dispersal systems are outlined in Table DD-2 below.



Table DD-2. Drip Dispersal System Management Requirements

	Work	Minimum Frequency
Inspection	<ul style="list-style-type: none"> • 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 system O&M manual, and Performance Evaluation Guidelines, Section 5 of this Manual). • Record observations. 	<ul style="list-style-type: none"> • Every 6 to 12 months.
Maintenance	<ul style="list-style-type: none"> • Manually remove and clean filter. • Clean and check operation of pressure reducing valves. • Clean flush valves and vacuum release valves. 	<ul style="list-style-type: none"> • Clean filter every 6 months. • Other maintenance annually.
Water Monitoring & Sampling	<ul style="list-style-type: none"> • Measure and record water levels in dispersal field monitoring wells, as applicable, per permit requirements. • Obtain and analyze water samples from dispersal field monitoring wells, as applicable, per permit requirements. 	<ul style="list-style-type: none"> • According to permit conditions, if applicable.
Reporting	<ul style="list-style-type: none"> • Report findings to Environmental Health 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 Environmental Health immediately. 	<ul style="list-style-type: none"> • According to permit conditions, typically every year, depending on system size, usage, history, location.



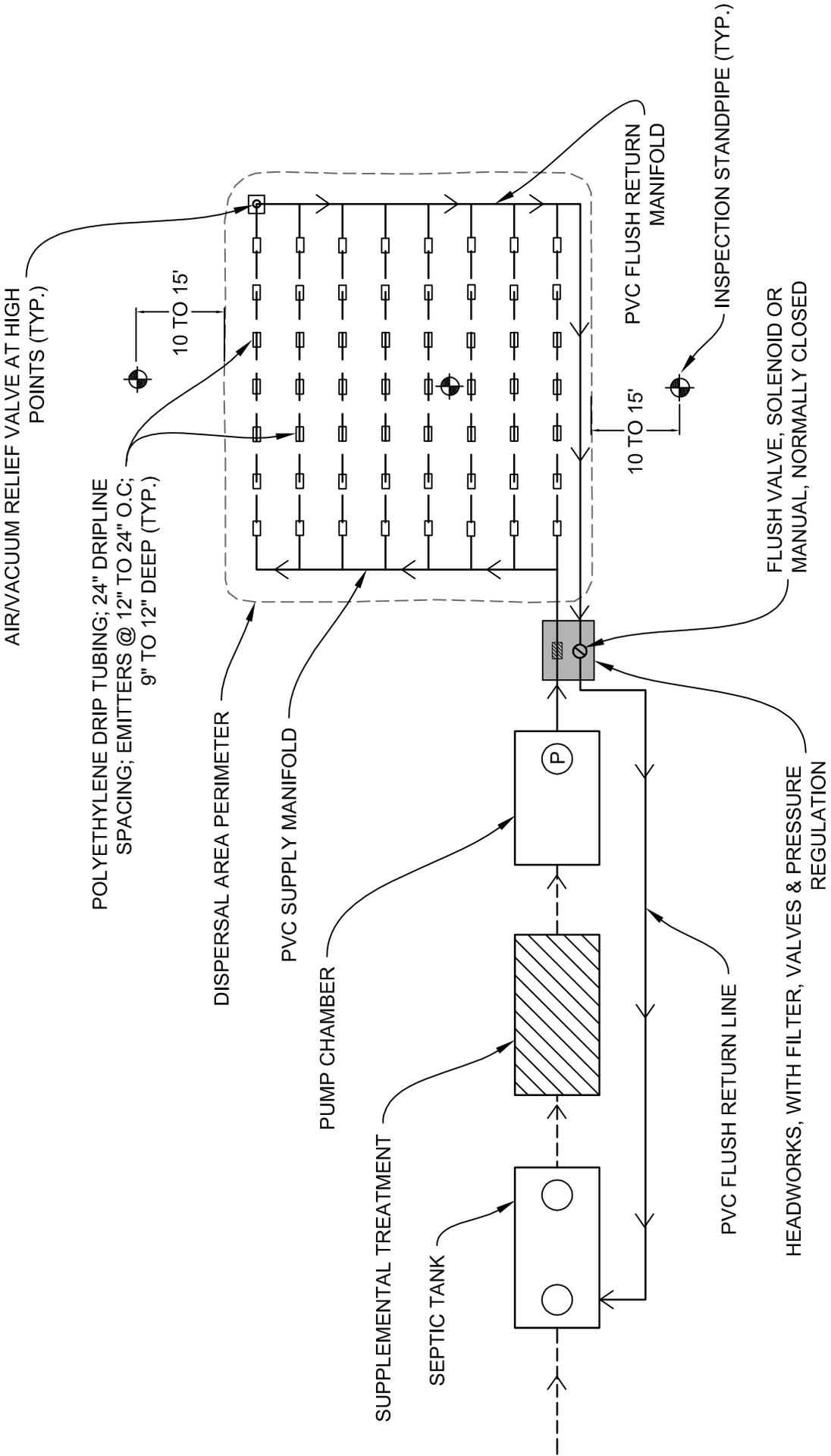


FIGURE 4-8

DRIP DISPERSAL SYSTEM SCHEMATIC