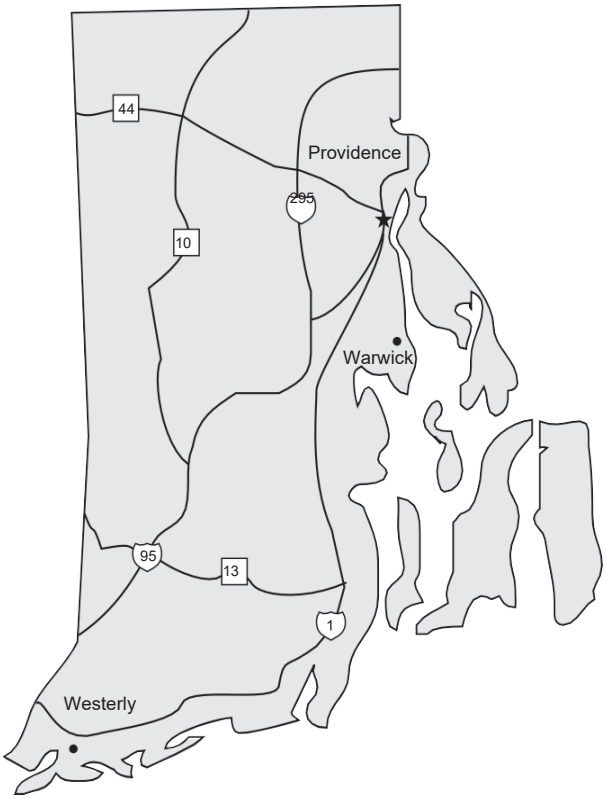
ADVANCED ENVIRO-SEPTIC®

Design and Installation Manual for Advanced Enviro-Septic® (AES) Wastewater System



The purpose of this manual is to provide specific design and installation information pertinent for the use of the Advanced Enviro-Septic product in Rhode Island. This product must be used in conjunction with the standards described by the Rhode Island Department of Environmental Management. This document provides a brief description of the products and their sizing specifications.

For more detailed design and installation information on AES, please contact Infiltrator Water Technologies at (800) 221-4436 or Presby Environmental, Inc. at (800) 473-5298.

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Rhode Island

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December 2022

TREATMENT PROCESS

Advanced Enviro-Septic® (AES)

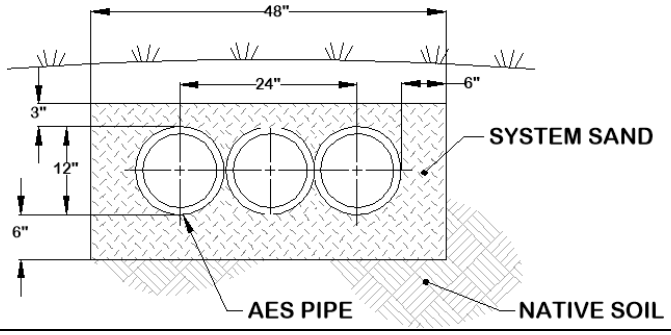
The AES is a patented, proprietary system consisting of five components. Upon entering the AES, septic tank effluent progresses through each component as follows:

- 12-in-diameter pipe;
- Bio-Accelerator fabric;
- Randomized fibers;
- Fine geotextile fabric; and
- 6-inch depth of specified system sand.

AES Tri-Pipe System

- 6-in of system sand on bottom;
- Three proprietary pipe rows centered in the trench with 6-in of system sand on each side;
- 6-in of system sand on each end of the pipe rows (receives credit in trench area calculations);
- 3-in of system sand over pipe rows; and
- When installed in a 4-ft wide trench as shown below is rated at 7 square feet per linear foot (ft^2/lf).
  - Maximum trench length 100 ft.
  - Minimum trench separation 6 ft (measured wall to wall).

Cross Section



The AES system is designed to provide combined treatment and dispersal of wastewater that has received primary treatment in a septic tank. The proprietary pipe product has been tested and certified to NSF/ANSI Standard 40 secondary treatment levels, providing both high levels of treatment and effluent dispersal in a single, reduced footprint.

The AES product uses a combined biological process, both suspended growth and attached growth processes for treatment of the wastewater. Suspended growth is achieved in the wastewater as it is distributed through the rows of pipes. Attached growth is achieved through the multiple layers of media and geotextiles surrounding the pipes and the first millimeters of sand around the pipes. The treatment pipe provides increased surface area for aerobic bacteria to reside, strip and digest suspended solids prior to entering the dispersal area. The Bio-Accelerator at the base of the pipe grows the Biomat to promote even distribution within the AES treatment pipe and throughout the dispersal area and in-situ soils beneath.

The System creates a self-sustaining, self-regulating biological ecosystem which is highly effective at purifying effluent. The bacterial population within the system adjusts as they are exposed to cycling aerobic and anaerobic (wet and dry) conditions, based on what they are “fed” (the waste that is introduced to the system for processing) and the amount of oxygen present in the system. The biomat (a microscopic layer created by the waste-products of anaerobic bacterial activity) is responsible for regulating the rate at which fluid moves through the system. Slowing down the liquid enables the bacteria (both aerobic and anaerobic) the time it needs to digest the waste materials (suspended solids) in the effluent. The aerobic bacteria digest the biomat, enhancing its permeability and preventing it from clogging. So, while anaerobic bacteria (which exist in the part of the pipe that is saturated and oxygen free) are continually building the biomat, the aerobic bacteria are continually eating away at it, creating a natural balance that results in passive, effective, long-term wastewater treatment. The result is a healthy biomat that is not subject to clogging which regulates the passage of fluid so that it is not too fast (which would release untreated wastewater into the environment) nor too slow (which would potentially create a hydraulic overload).

PRODUCT / TERMS AND DEFINITIONS

System Sand

The system sand that surrounds the AES pipes is an essential component of the system. It is critical that the correct type and amount of system sand is used during construction. System sand shall be coarse to very coarse, clean, granular sand, and free of organic matter. It shall be placed a minimum of 3 in above, and 6 in both below and around the outer perimeter of the pipe rows. It shall adhere to all of the percentage and quality restrictions outlined in Table A.

Table A: System Sand Specification

Sieve Size	Percent Retained on Sieve (by weight)
¾ in (19 mm)	0
#10 (2 mm)	0 - 35
335 (0.50 mm)	40 - 90
Note: Not more than 3% allowed to pass the #200 sieve (verified by washing sample per requirements of ASTM C-117)	

System Sand Acceptable Alternative

ASTM C-33 (concrete sand), natural or manufactured sand, with not more than 3% passing the #200 sieve (verified by washing the sample per the requirements of ASTM C-117 as noted in the ASTM C-33 specification) may be used as an acceptable alternate material for use as system sand.

Certification Requirements

Designers and installers who have not previously attended a Presby Environmental, Inc. (PEI) certification course are required to obtain certification before designing or installing an AES system. Certification is obtained by attending a certification course presented by PEI or its sanctioned representative or by viewing tutorial videos on our website and then successfully passing a short assessment test. PEI recommends professionals involved in the inspection or review of AES systems also become PEI certified.

Environmental Standards and Technical Support

All systems shall be designed and installed in compliance with the procedures and specifications detailed in this Manual and in the product's RI DEM Certification. In the event of contradictions between this Manual and state rules, contact PEI for technical assistance at (800) 473-5298.

Applicable Uses

The AES Tri-Pipe system outlined in this Manual is approved for residential applications and commercial applications treating residential strength effluent. If treating non-residential strength effluent, contact PEI for design assistance. Bed configurations are prohibited in Rhode Island.

Terms and Definitions

This Manual contains terminology which is common to the industry and terms that are unique to the proprietary product systems outlined in this Manual. While alternative definitions may exist, this section defines how these terms are used in this Manual.

Butterfly Configuration - A variation of a standard, single trench system with the D-box located in the center, with rows oriented symmetrically on either side, and with each side or section receiving an equal volume of flow from the D-box.

AES Pipe – Conduit used in the AES Tri-Pipe system. Conduit is manufactured in 10 ft lengths but may be cut as needed per design.

Coupling – A plastic fitting that joins two PEI pipe pieces in order to form rows.

Double Offset Adapter – A plastic end cap fitting with two 4-in holes located in the 6 and 12 o'clock position which allows for top and bottom connections in some locations for distribution, equalization, and/or venting if desired.

End Cap – A plastic fitting with no 4-in hole that is installed on the ends of AES rows.

Offset Adapter - A plastic end cap fitting with a 4 in hole installed at the end of each row segment in the 6 or 12 o'clock position which allows connections for distribution, equalization, or venting if desired.

Raking - Refers to methods of preparing the native soil that will be covered with system sand, creating a transitional layer between the sand and the soil.

Smearing - The mechanical sealing of soil air spaces along an excavated, tilled or compressed surface. This is also referred to as "compacting." In all installations, it is critical to avoid smearing or compacting the soils under and around the field.

Surface Diversion - A natural or manmade barrier that changes the course of water flow around an onsite system's soil absorption field.

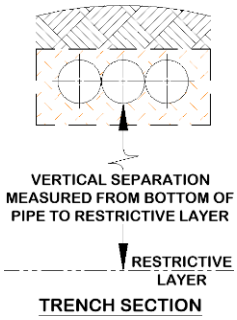
SYSTEM SIZING/DESIGN

Trench Lengths

- Maximum trench length 100 ft.
- Minimum trench spacing is 6 ft.
- Minimum crossover connection length is 5 ft plus 1 ft for sand on each end.

Separation Distance to Limiting Conditions

Vertical separation is measured from the bottom of the AES pipe to the limiting condition. The separation distance to seasonal high groundwater table is a minimum 3 feet per OWTS Rule 6.33H. In Critical Resource Areas the minimum required separation to SHWT shall be 4 feet. Separation distance to a restrictive layer or bedrock is 5 feet per OWTS Rule 6.33I.



Depth of Cover

Minimum depth of cover must be equal to 7 inches measured from the top of the AES pipe. Maximum depth of cover shall be 30 inches per OWTS Rule 6.33N. Cover material must have a minimum of three inches of system sand above the pipe and a minimum of 4 inches of soil capable of sustaining plant life.

Venting

Venting is required when soil cover over the distribution pipe exceeds 18 inches; or when pumping to the trench(es), which requires only a low vent on the far end(s) of the trenches (see Venting Requirements page 14).

Distribution Box (D-box)

A distribution box is required for all systems with more than one distribution point.

Table B: Soil Loading Rates

		Minimum Leaching Area (sf)					
Soil Category (*See Note Below)	**Soil loading rate (gpd/sf)**	**1 Bedroom (115 gpd)**	**2 Bedrooms (230 gpd)**	**3 Bedrooms (345 gpd)**	**4 Bedrooms (460 gpd)**	**5 Bedrooms (575 gpd)**	**Commercial Per 100 gpd**
1 – Repair	.93	124	248	371	495	619	108
1,3,4m,6m	.70	164	329	493	658	822	143
1m,2,4,6,7m	.61	189	377	566	755	943	164
5,7	.52	221	442	664	885	1,106	192
8	.46	250	500	750	1,000	1,250	217
8m	.48	240	480	719	959	1,198	208
9	.40	288	575	863	1,150	1,438	250
9m	.43	268	535	803	1,070	1,338	233

Note: m denotes soils with coarse fragment modifiers.
Note: Table B represents soil category and soil loading rate data extracted from RI DEM OWTS Rules section 6.33C.

Trench Design Procedure:

Step 1: Determine Minimum Leaching Area Required.

From Table B, determine the minimum leaching area required based upon the site's assigned soil category/soil loading rate and the daily design flow (number of bedrooms).

Step 2: Determine the Minimum AES Tri-Pipe Trench Length Required (in linear feet).

Divide the minimum leaching area required from Step 1 by 7 ft^2 per lf.

Step 3: Determine the Number of Trenches and Individual Trench Lengths.

Select a design configuration that best fits the site. AES pipes come in 10-foot segments. Using the *Minimum AES Tri-Pipe Trench Length Required* from Step 2, determine the number of trenches in the design based upon site considerations and constraints.

Note: If using the Crossover Trench Configuration, subtract the length of the crossover trench for each cross-connection portion of the trench design from Step 2 to establish the remaining Tri-Pipe trench length needed for design of the primary trenches. Primary Tri-Pipe segments cannot exceed 25 ft without a crossover. Reference section "System Configurations" on pages 8-12.

Step 4: Make Adjustments for System Sand Area to Determine Pipe Segment Lengths.

Calculate the pipe segment lengths needed to meet design requirements of selected layout configuration. Decrease the *Minimum AES Tri-Pipe Trench Length Required* from Step 2 by subtracting 1 ft for the perimeter sand on the exposed ends of all segments in the primary trench(es) and for each crossover connection area.

Adjust trench lengths as needed. Please note that AES pipe may be cut to any desired length.

Step 5: Calculate the Total AES Pipe Required for the Design.

Total pipe required is calculated by adding the length of each pipe segment and adding the length of the cross-connection segment(s) (if using the cross-connection configuration).

Step 6: Calculate the Effective Leaching Area Provided.

The effective leaching area provided is calculated by multiplying the total length of AES Tri-Pipe System provided (in feet) by 7 ft^2/linear foot. As defined on page 2 of this manual, the effective leaching area provided in the AES Tri-Pipe system may include the six (6) inches of sand area on each end of the pipe rows.

Design Example #1: Three-bedroom residence (345 GPD), Type 2 soil, level site. Choose to design using crossover configuration due to site constraints with a 10-ft crossover section and 11 ft trench separation.

Step 1: Determine Minimum Leaching Area Required.

From Table B, the minimum leaching area required for a three-bedroom residence in Type 2 soil is 566 ft^2.

Step 2: Determine the Minimum AES Tri-Pipe Trench Length Required (in linear feet).

566 ft^2 ÷ 7 ft^2 per lf = 80.86 ft.

Step 3: Determine the Number of Trenches and Individual Trench Lengths.

By selecting a crossover trench configuration, subtract 10 ft for one crossover segment from the *Minimum AES Tri-Pipe Trench Length Required* as determined in Step 2.

Total trench length of 80.86 ft – 10 ft = 70.86 ft.
Individual trench lengths = 70.86 ft ÷ 2 trenches = 35.43 ft minimum.

Step 4: Make Adjustments for System Sand Area to Determine Pipe Segment Lengths.

Decrease the *Minimum AES Tri-Pipe Trench Length Required* from Step 2 (80.86 ft) by subtracting 1 ft for the perimeter sand on the exposed ends of all segments in the primary trenches (2 segments x 2 trenches = 4 ft) and for each crossover connection area (1 crossover segment x 1 ft = 1 ft). 4 ft + 1 ft = 5 ft.

80.86 ft – 5 ft = 75.86 ft. Round up to 76 ft.

Subtract 10 ft for the single crossover. 76 ft – 10 ft = 66 ft.

Determine pipe segment lengths: 66 ft ÷ 4 segments = 16.5 ft of AES Tri-Pipe in each segment.

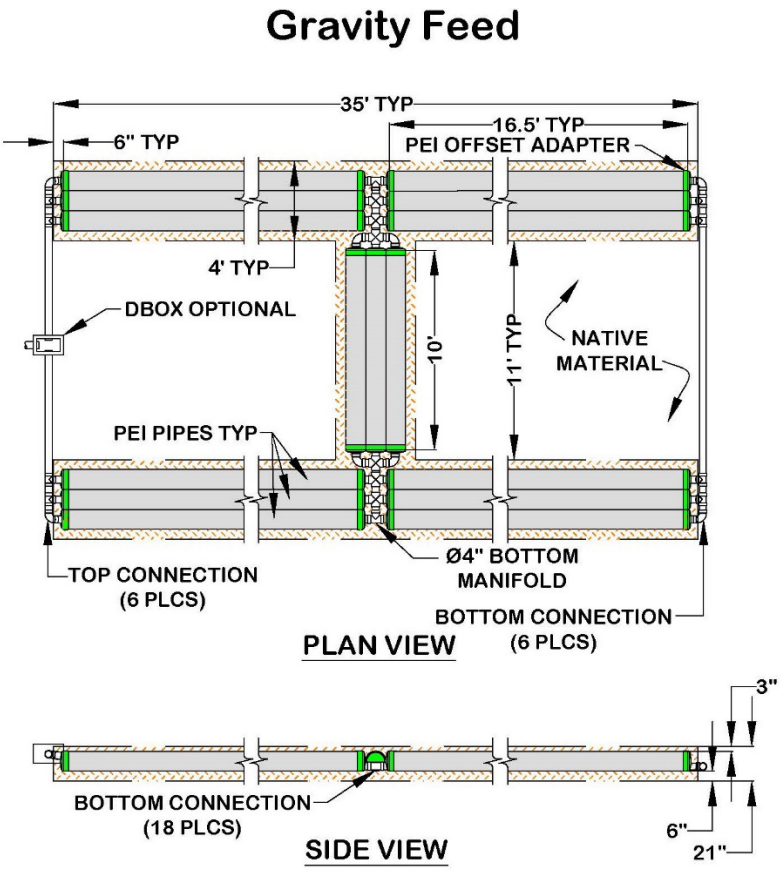
Step 5: Calculate the Total AES Pipe Required for the Design.

Pipe required: 10 ft crossover x 3 pipes = 30 ft.
16.5 ft segments x 4 segments x 3 pipes = 198 ft.
30 ft + 198 ft = 228 total ft of AES pipe required.

Step 6: Calculate the Effective Leaching Area Provided.

The total effective leaching area provided is calculated as follows:
Each 16.5 ft-long segment provides 17.5 ft of effective leaching area.
The 10 ft-long crossover section provides 11 ft of effective leaching area.
17.5 x 4 segments = 70 ft + 11 ft = 81 ft. 81 ft x 7 ft^2 per lf = 567 ft^2. 567 ft^2 exceeds the 566 ft^2 minimum leaching area required from Step 1.

Illustration of Example #1 design when gravity feeding, level site:



Design Example #2: Four-Bedroom Residence (460 GPD), Type 4m soil following the contour of the driveway on a level site using gravity feed. Choose to design using crossover configuration due to site constraints with a 6-ft trench separation.

Step 1: Determine Minimum Leaching Area Required.

From Table B, the minimum leaching area required for a four-bedroom residence in Type 4m soil is 658 ft^2.

Step 2: Determine the Minimum AES Tri-Pipe Trench Length Required (in linear feet).

658 ft^2 ÷ 7 ft^2 per lf = 94 ft.

Step 3: Determine the Number of Trenches and Individual Trench Lengths.

By selecting a crossover trench configuration, subtract 5 ft for one crossover segment from the *Minimum AES Tri-Pipe Trench Length Required* as determined in Step 2.

Total trench length of 94 ft – 5 ft cross-connection = 89 ft.
Individual Tri-Pipe trench length = 89 ft ÷ 2 trenches = 44.5 ft minimum.

Step 4: Make Adjustments for System Sand Area to Determine Pipe Segment Lengths.

Decrease the *Minimum AES Tri-Pipe Trench Length Required* from Step 2 (94 ft) by subtracting 1 ft for the perimeter sand on the exposed ends of all segments in the primary trenches (2 segments x 2 trenches = 4 ft) and for each crossover connection area (1 crossover segment x 1 ft = 1 ft). 4 ft + 1 ft = 5 ft.

94 ft – 5 ft = 89 ft.

Subtract 5 ft for the single crossover. 89 ft – 5 ft = 84 ft.

Determine pipe segment lengths: 84 ft ÷ 4 segments = 21 ft of AES Tri-Pipe in each segment.

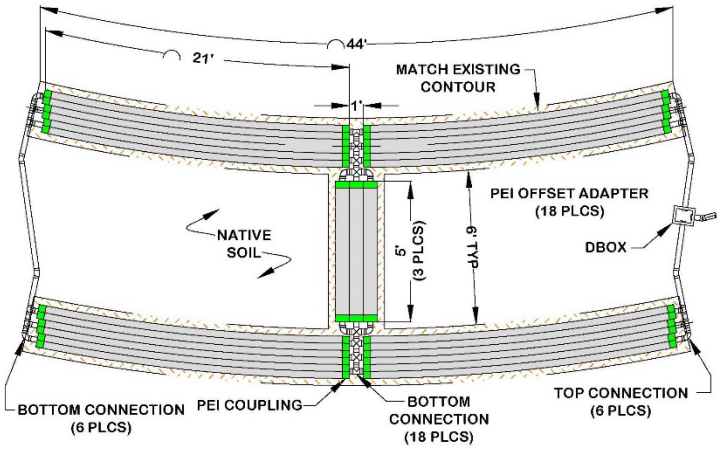
Step 5: Calculate the Total AES Pipe Required for the Design.

Pipe required: 5 ft crossover x 3 pipes = 15 ft.
21 ft segments x 4 segments x 3 pipes = 252 ft.
15 ft + 252 ft = 267 total ft of AES pipe required.

Step 6: Calculate the Effective Leaching Area Provided.

The total effective leaching area provided is calculated as follows:
Each 21 ft-long segment provides 22 ft of effective leaching area.
The 5 ft-long crossover section provides 6 ft of effective leaching area.
22 x 4 segments = 88 ft + 6 ft = 94 ft. 94 ft x 7 ft^2 per lf = 658 ft^2. 658 ft^2 meets the 658 ft^2 minimum leaching area required from Step 1.

Illustration of Example #2 system (following driveway contour, gravity feed, level site):



PLAN VIEW
(LEVEL TRENCHES)

Design Example #3: Non-Residential system treating residential strength effluent 700 gpd, Type 1 soils level site. Choose to design using crossover configuration due to site constraints with a 10-ft crossover section(s) and 11 ft trench separation.

Step 1: Determine Minimum Leaching Area Required.

From Table B, the minimum leaching area required for commercial applications in Type 1 soils is 143 ft^2 per 100 gpd of flow. At 700 gpd the minimum leaching area will be 143 ft^2 x 7 = 1,001 ft^2.

Step 2: Determine the Minimum AES Tri-Pipe Trench Length Required (in linear feet).

1,001 ft^2 ÷ 7 ft^2/lf = 143 ft.

Step 3: Determine the Number of Trenches and Individual Trench Lengths.

Given that the *Minimum AES Trench Length Required* from Step 2 is 143 ft, if the system is being designed with two primary trenches, multiple cross-connections will be required to meet 25 ft maximum distance between cross connections. By selecting a crossover trench configuration, subtract 10 ft for each crossover segment from the *Minimum AES Tri-Pipe Trench Length Required* as determined in Step 2.

Total trench length of 143 ft – 20 ft = 123 ft.
Individual trench lengths = 123 ft ÷ 2 trenches = 61.5 ft minimum.

Step 4: Make Adjustments for System Sand Area to Determine Pipe Segment Lengths.

Decrease the *Minimum AES Tri-Pipe Trench Length Required* from Step 2 (143 ft) by subtracting 1 ft for the perimeter sand on the exposed ends of all segments in the primary trenches (3 segments x 2 trenches = 6 ft) and for each crossover connection area (2 crossover segment x 1 ft = 2 ft). 6 ft + 2 ft = 8 ft.

143 ft – 8 ft = 135 ft.

Subtract 20 ft for the two crossovers. 135 ft – 20 ft = 115 ft.

Determine pipe segment lengths: 115 ft ÷ 6 segments = 19.17 ft of AES Tri-Pipe in each segment. Round up to 20 ft. to eliminate cutting.

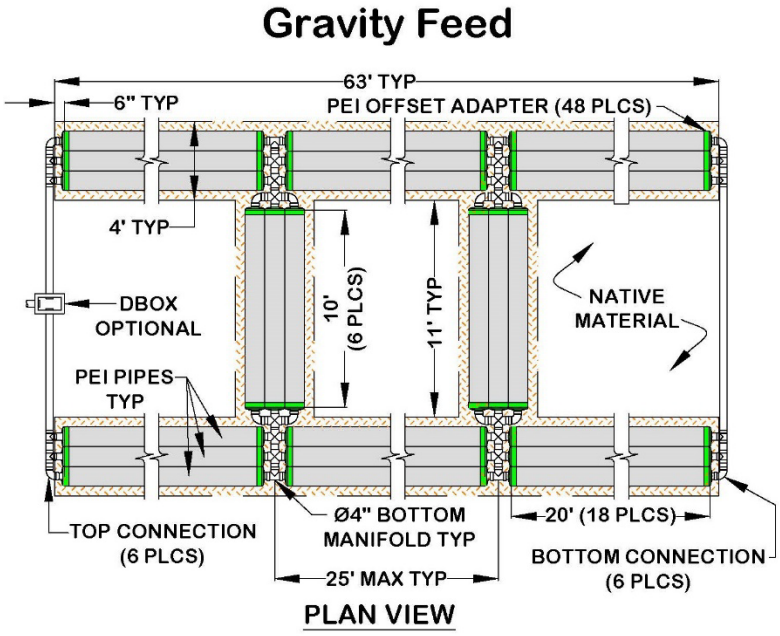
Step 5: Calculate the Total AES Pipe Required for the Design.

Pipe required: 10 ft crossover x 2 crossovers x 3 pipes = 60 ft
20 ft segments x 6 segments x 3 pipes = 360 ft
60 ft + 360 ft = 420 total AES pipe required.

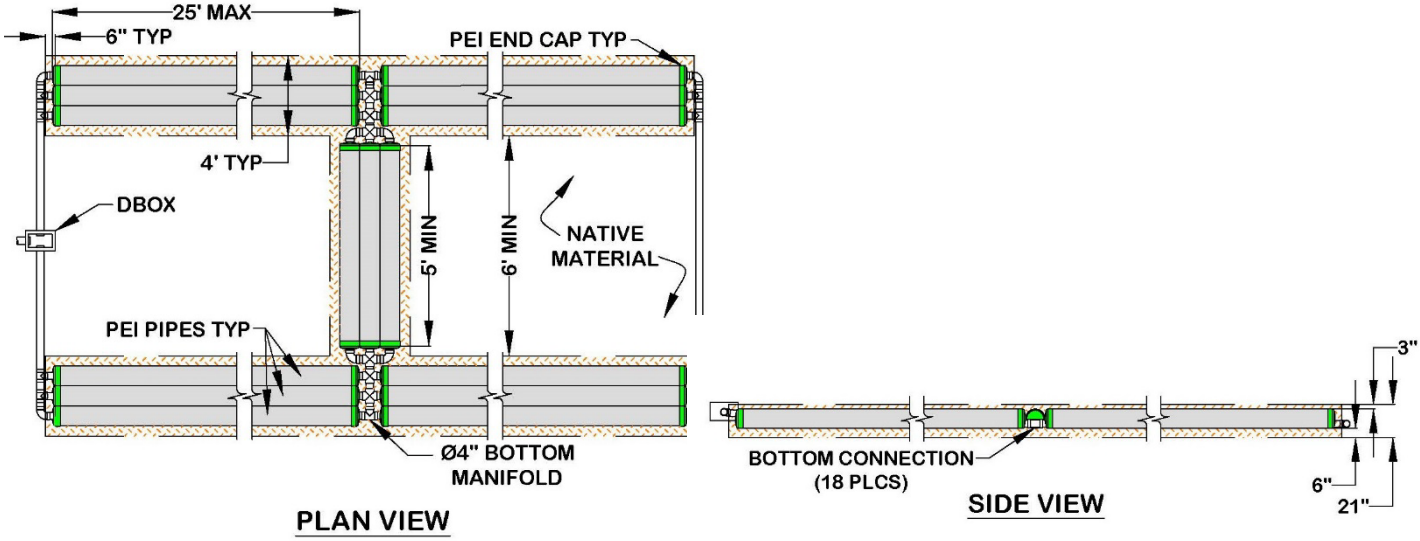
Step 6: Calculate the Effective Leaching Area Provided.

The total effective leaching area provided is calculated as follows:
Each 20 ft-long segment provides 21 ft of effective leaching area.
The two 10 ft-long crossover section provides 11 ft of effective leaching area each for 22 ft of effective leaching area.
21 x 6 segments = 126 ft + 22 ft = 148 ft. 148 ft x 7 ft^2 per lf = 1,036 ft^2. 1,036 ft^2 exceeds the 1,001 ft^2 minimum leaching area required from Step 1.

Illustration of Example #3 using gravity feed:



Crossover Trench Configurations

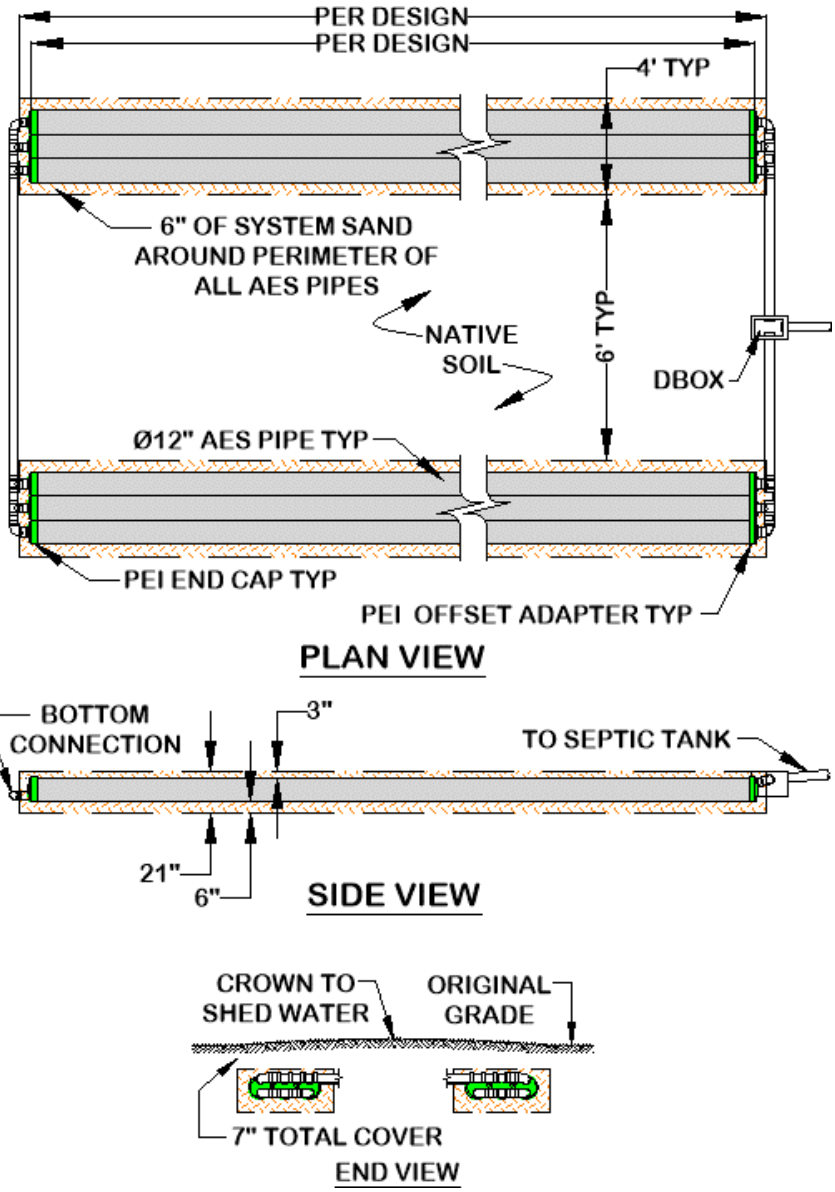


NOTES:

1. This system configuration may also be installed in elevated or shallow placement systems.
2. Trench separation shall be a minimum of 6 ft measured edge to edge.
3. AES pipe trench length may use up to 1 ft on each end of pipe rows and a minimum of 1 ft and up to 4 ft in cross connection areas.
4. Equalization pipe required for trenches at every 25 ft or centered in the trench if less than 50 ft total.
5. Per Rule 33.2.3 the maximum length of a disposal trench shall be as follows:

(a) without dosing - fifty feet
(b) with a tipping distribution box – seventy-five feet
(c) with a pump - one hundred feet

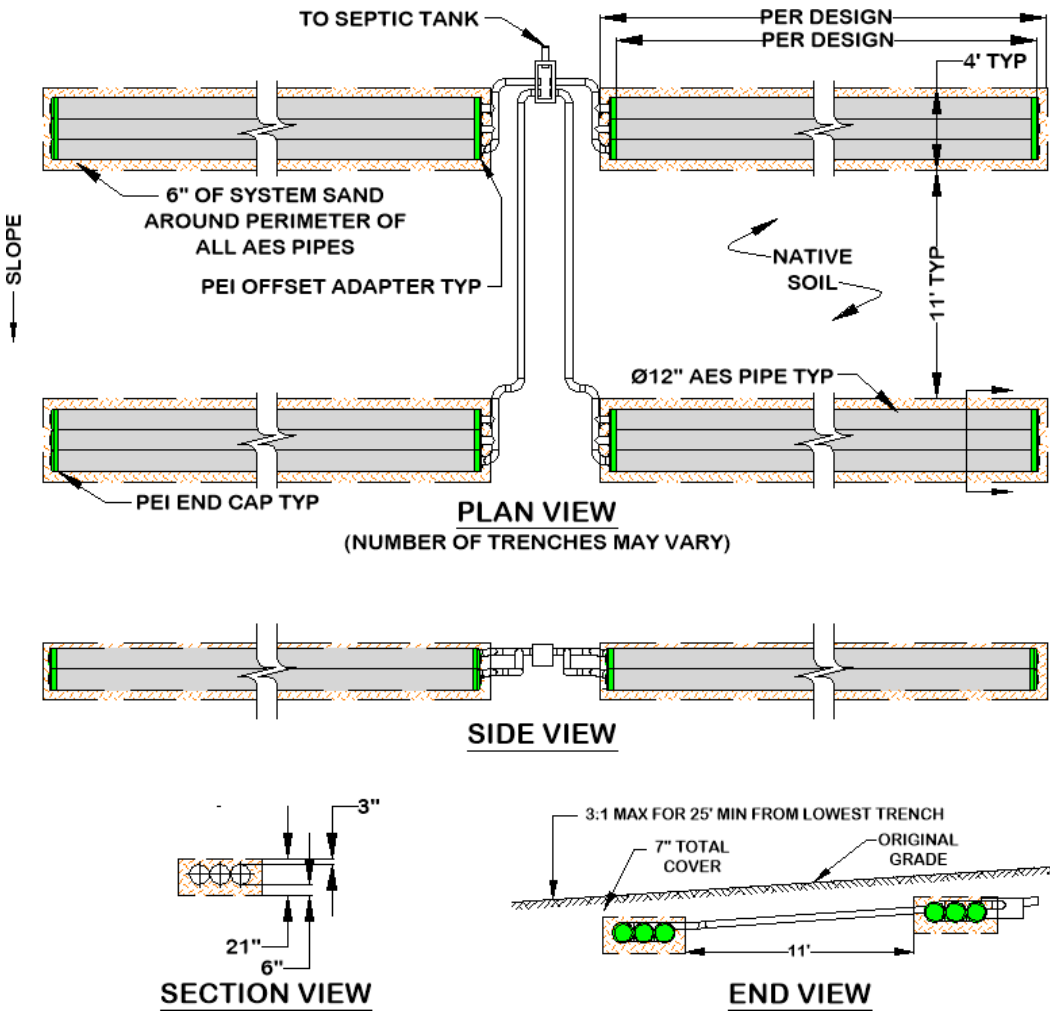
Trench Configurations Level Site



NOTES:

1. Effluent shall be applied to trenches at least every 25 feet. This can be accomplished by butterflying the system at the mid-point with a D-box or installing a cross-over pipe or trench at the midpoint of the system.
2. Trench separation shall be a minimum of 6 ft measured edge to edge.
3. The distal ends of the distribution lines shall be connected by a relief line using SDR 35 PVC or better.
4. This design layout may also be installed in elevated or shallow placement systems.
5. Per Rule 33.2.3 the maximum length of a disposal trench shall be as follows:
   (a) without dosing - fifty feet
   (b) with a tipping distribution box – seventy-five feet
   (c) with a pump - one hundred feet

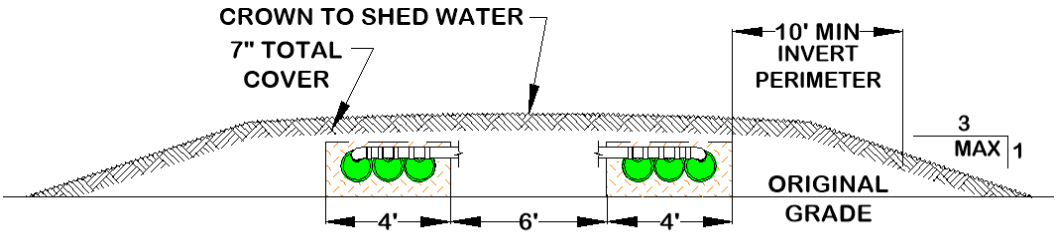
Trench Configurations Sloping Site



NOTES:

1. For sloping sites, a tipping D-box or pump shall be used. Each dispersal trench must meet the adjacent side slope requirements of the rule.
2. System may also be end fed.
3. Effluent shall be applied to trenches at least every 25 feet. This can be accomplished by butterflying the system at the mid-point with a tipping D-box or installing a cross-over pipe or trench at the midpoint of the system.
4. Per Rule 33.2.3 the maximum length of a disposal trench shall be as follows:
   (a) without dosing - fifty feet
   (b) with a tipping distribution box – seventy-five feet
   (c) with a pump - one hundred feet

Trench Configurations – Elevated Trench



END VIEW

(NUMBER OF TRENCHES MAY VARY)

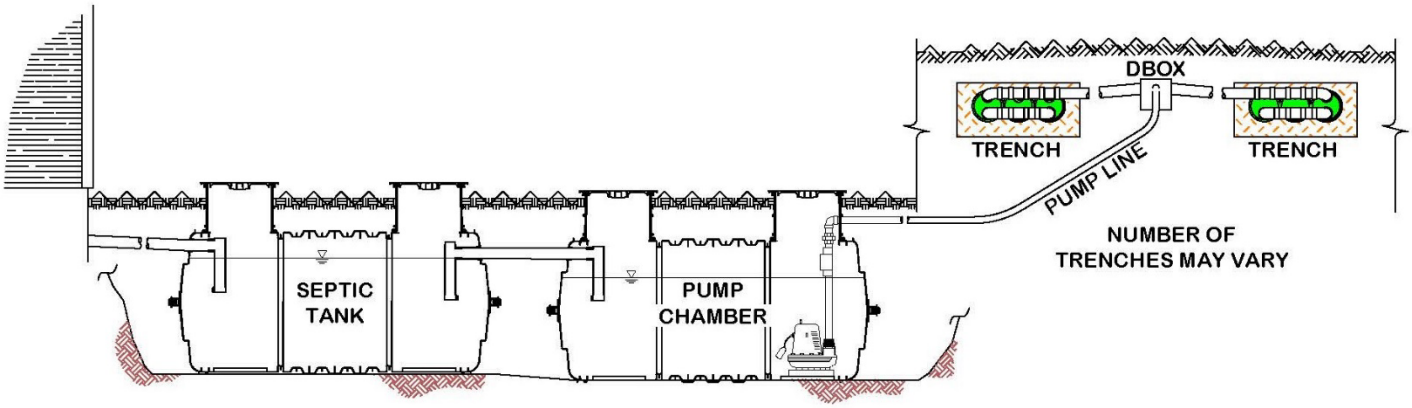
NOTES:

1. Elevated trench system may be pump dosed.
2. Trench separation shall be a minimum of 6 ft measured edge to edge.
3. The distal ends of the distribution lines shall be connected by a relief line using SDR 35 PVC or better.
4. Minimum fill perimeter of 10 ft is required.
5. Per Rule 33.2.3 the maximum length of a disposal trench shall be as follows:
   (a) without dosing - fifty feet
   (b) with a tipping distribution box – seventy-five feet
   (c) with a pump - one hundred feet

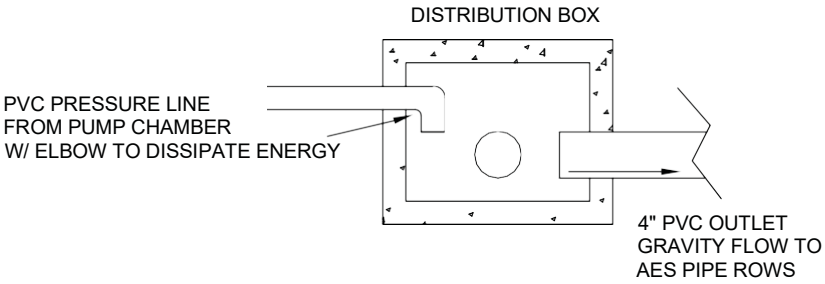
Pump to Gravity Systems

In a pump to gravity system, the effluent is pumped to a distribution box which receives a predetermined dosing volume of effluent. It is then gravity fed to the leaching area and distributed to the rows or trenches within the leachfield. In a pump to gravity system, the effluent is gravity fed as shown below.

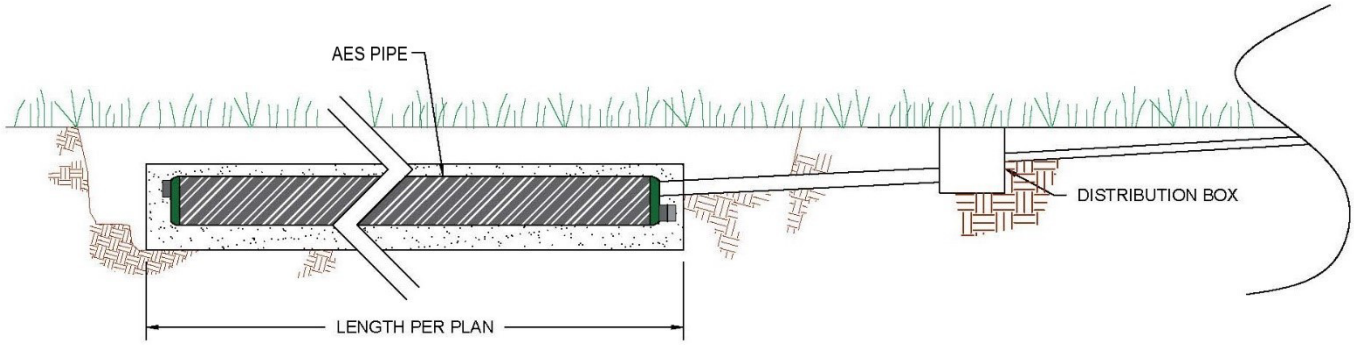
NOTE: It is recommended that the system be designed so that the system receives a minimum of six doses per day.



SECTION VIEW
(VENTS NOT SHOWN)



TYPICAL SIDE VIEW
(not to scale)



Before You Begin

This section provides installation information for AES pipe products in trench systems. These systems may only be installed according to State and/or local regulations. If unsure of the installation requirements for a particular site, contact the local health department.

Like conventional systems, the soil and site conditions must be approved prior to installation. Conduct a thorough site evaluation to determine the proper sizing and siting of the system before installation.

Materials and Equipment Needed

☐	AES Pipe	☐	Laser, transit or level
☐	System Sand	☐	Shovel and rake
☐	Couplings	☐	Backhoe
☐	Endcaps / Offset Adapters / Double Offset Adapters	☐	Tape measure
☐	PVC pipe and couplings	☐	4 in inspection port and cap (if required)

These guidelines for construction machinery must be followed during installation.	
✓	avoid soil compaction on the infiltrative surface area, including all areas downslope of a sloped system;
✓	use a tracked vehicle for material installation; Only drive across the trenches when necessary. Never drive down the length of the trenches.
✓	to avoid additional soil compaction, never drive heavy vehicles over the completed system;
✓	avoid installation during wet periods; and
✓	install the pipe and system sand on the same day that the system footprint is excavated/exposed.

Excavating and Preparing the Site

NOTE: As is the case with conventional systems, do not install the systems in wet conditions or in overly moist soils, as this causes machinery to smear the soil.

1. Stake out the locations of tank(s), pipes, AES pipe rows, and corners of the system to be tilled/excavated, per design. Set the elevations as shown on the approved plan. [Note: The proper elevation of solid PVC header line going to each AES pipe row should be determined to ensure compliance with the required system bottom depth as shown on the approved permit. This height may vary dependent on system height and configuration used.

2. Install sedimentation and erosion control measures.

NOTE: The installation of temporary drainage swales/berms (surface diversions) may be necessary to protect the site during rainfall events.

3. Excavate and level 4-foot-wide trenches with proper center-to-center separation.

4. Rake the trench bottom and sides (when applicable) if smearing has occurred during excavation. Remove large stones and protruding roots.

NOTE: Smearing does not occur in sandy soils, so raking is not necessary. In fine textured soils (silts and clays), avoid walking on the excavation bottom to prevent compaction and loss of soil structure.

5. Verify that each trench is at the proper elevation, and slope from side-to-side and from end-to-end using a level, transit, or laser.

Installing the System

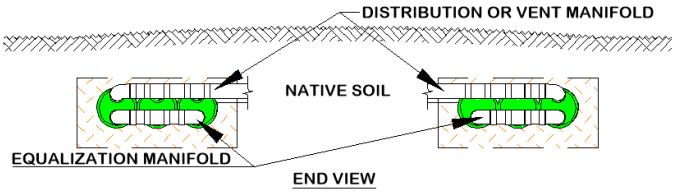
1. Install the initial layer of 6” system sand per design. System sand should be leveled and stabilized prior to placement of the AES pipe. **Installer** should retain records verifying that system sand meets system sand specifications.

2. Place AES pipe on the surface of the system sand with the sewn seam in the 12 o’clock position, arranged in the configuration shown on the system design. Using the pipe couplings, connect the pipe segments end-to-end to create rows of the required length. The AES pipe shall be installed level within +/- ½ in. A laser level or transit is recommended to ensure proper grade.

3. AES pipe rows shall be:
- installed on a level plane with one another;
- be installed parallel to any contours; trenches may be installed at differing elevations to match the terrain slope.

4. Install distribution piping per plan.

Distribution and vent manifolds are tipped up such that the top of the manifold is level with the top of the AES pipe. Insert the manifold into the offset adapters in the 12 o’clock position, minimum 2 in, maximum 4 in. Equalization manifolds are installed level into offset adapters in the 6 o’clock position.



5. Install an endcap on the end of each pipe row that is not connected with piping.

6. Once the pipe is placed on the surface of the system sand and distribution piping is connected to the pipe rows per design, additional system sand shall be ladled around the perimeter of the pipe rows.

Covering the System

NOTE: Before backfilling, the system shall be inspected and approved by a representative of the local health department in compliance with state and local ordinances and procedures. Prepare accurate as-built plans.

1. Spread system sand to a minimum of 3 in over the pipe and a minimum of 6 in on all four sides of the trench beyond the AES pipes.

2. Spread a minimum of 4 in of suitable earth cover (topsoil or loam) free of organics, stones over 3 in and building debris, having a texture similar to the soil at the site, without causing compaction.

NOTE: Minimum depth of cover over the AES system is 7 in measured from the top of the AES pipe. 3 in of the cover must be system sand and 4 in must be suitable earth cover. Additional cover may be added as needed using any combination of system sand or suitable earth as needed to a maximum of 30 inches.

3. Backfill the trench by pushing material over the system. **It is best to mound several extra inches of soil over the finish grade to allow for settling.** This also ensures that runoff is diverted away from the system.

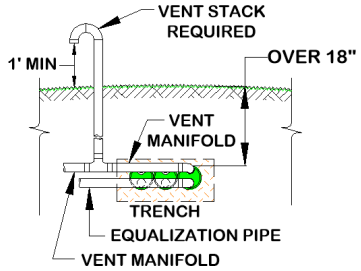
NOTE: Do not drive over the system while backfilling. The maximum depth of cover over the system is 18 inches without venting (measured from the top of the AES pipe), 2.5 feet if vented. Contact PEI technical assistance for venting options.

NOTE: If the system is for new home construction, it is important to leave marking stakes along the boundary of the system. This will notify contractors of the system location so they will not cross it with equipment or vehicles.

4. To prevent erosion, soil cover above the system shall be planted with native, shallow-rooted vegetation such as grass, wildflowers and certain perennials or ground covers. No trees or shrubs should be located within 10 ft of the system perimeter to prevent roots from growing into and damaging the system.

Venting Requirements

Venting is required when soil cover over the distribution pipe exceeds 18 inches or when pumping to the trench(es), which requires only a low vent on the far end(s) of the trenches. The designer is free to use ventin g even when it is not required.



General Rules

- Remote venting may be utilized to minimize the visibility of vent stacks.
- When venting is required, multiple trenches may be manifolded together and taken to a single vent stack.

Vent Manifolds

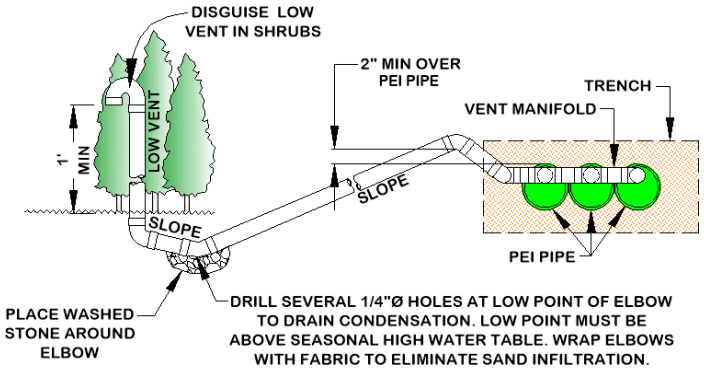
Venting is achieved with the use of vent manifolds at the distal ends of all trenches. Vent manifolds are tipped up such that the top of the manifold is level with the top of the AES pipe.

Insert the vent manifold into the offset adapters in the 12 o'clock position, minimum 2 in, maximum 4 in.

Remote Venting

If site conditions do not allow the vent pipe to slope toward the system, or the owner chooses to utilize remote venting for aesthetic reasons (causing the vent pipe not to slope toward the system), the low point of the vent line must be drilled creating several ¼ in holes to allow drainage of condensation. This procedure may only be used if the vent pipe connecting to the system has:

- A high point that is above the highest point of all AES pipes or the D-box (2 in min. for each); and,
- A low point opened for drainage which is above the SHWT (see diagram below).



Proper Use

The AES system has no specific operating instructions. Proper use of the system as noted below is the primary operating concern.

System Abuse Conditions

The following conditions constitute system abuse:

- Liquid in high volume (excessive number of occupants and use of water in a short period of time, leaking fixtures, whirlpool tubs, hot tubs, water softening equipment or additional water discharging fixtures if not specified in system design).
- Solids in high volume (excessive number of occupants, paper products, personal hygiene products, garbage disposals or water softening equipment if not specified in system design).
- Antibiotics and medicines in high concentrations.
- Cleaning products in high concentrations.
- Fertilizers or other caustic chemicals in any amount.
- Petroleum products in any amount.
- Latex and oil paints.
- System suffocation (compacted soils, barrier materials, etc.) without proper venting.
- The system is intended for use in non-traffic applications.

Note: The use of septic system additives is not recommended.

System Maintenance/Pumping of the Septic Tank

- Inspect the septic tank at least once every two years under normal usage.
- Pump the tank when surface scum and bottom sludge occupy one-fourth or more of the liquid depth of the tank.
- If a garbage disposal is used, the septic tank will likely require more frequent pumping.
- After pumping, inspect the septic tank for integrity to ensure that no groundwater is entering it. Also check the integrity of the tank inlet and outlet baffles and repair if needed.
- Inspect the system to ensure that vents are in place and free of obstructions.
- Effluent filters require ongoing maintenance due to their tendency to clog and cut off oxygen to the system. Follow filter manufacturer's maintenance instructions and inspect filters frequently.

Site Maintenance

It is important that the system site remain free of shrubs, trees, and other woody vegetation, including the entire dispersal area, and areas impacted by side slope tapering and perimeter drains (if used). Roots can infiltrate and cause damage or clogging of system components. If a perimeter drain is used, it is important to make sure that the outfall pipes are screened to prevent animal activity. Also check outfall pipes regularly to ensure that they are not obstructed in any way.

System Start-up

There are no specific requirements for placing the System into service. The property owner should, after use has been initiated, test the alarm to ensure it is functional if one is included in the system.

Intermittent Use

The System is designed for intermittent use and requires no special attention if it is to be placed out of use for extended periods of time.

Trouble Shooting

In the event that any of the following indicators arise, contact a licensed system professional or contact our technical support department for recommendations.

- Wastewater back-up into the dwelling
- Persistent septic odor
- Unusually wet area atop and/or around the system
- "Ponding" or "Breakout" of effluent on the lawn

Repair

A licensed onsite wastewater system professional shall be contacted when there are indications of malfunction with the system. When visiting the site, the licensed onsite wastewater system professional should, at a minimum, review the following:

- Assess the present condition of the system and the surrounding area (surface drainage, ground cover, etc.)
- Research the history of use, including:
  - Water volume use
  - Contaminants
- Evaluate the site for groundwater or surface water intrusion, check system sand specification
- Inspect the septic tank, pump tank (in installed), distribution box
- Inspect the AES system pipe rows
- Check faucet and toilet function

Upon completion of the site visit, the licensed onsite wastewater system professional should contact the local regulator and PEI's Technical Department with the report.

PRESBY ENVIRONMENTAL INC.
STANDARD LIMITED WARRANTY

(a) The structural integrity of each unit, endcap and other accessory manufactured by Presby Environmental Inc. (collectively referred to as "Units"), when installed and operated in an onsite wastewater system in accordance with Presby Environmental's installation instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date upon which a septic permit is issued for the septic system containing the Units; provided, however, that if a septic permit is not required for the septic system by applicable law, the one (1) year warranty period will begin upon the date that installation of the septic system commences. In order to exercise its warranty rights, Holder must notify Presby Environmental in writing at its corporate headquarters in Whitefield, New Hampshire within fifteen (15) days of the alleged defect. Presby Environmental will supply replacement Units for those Units determined by Presby Environmental to be defective and covered by this Limited Warranty. Presby Environmental's liability specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(c) This Limited Warranty shall be void if any part of the Presby Environmental system (unit, endcap or other accessory) is manufactured by anyone other than Presby Environmental. The Limited Warranty does not extend to incidental, consequential, special or indirect damages. Presby Environmental shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; the placement of improper materials into the system containing the Units; failure of the Units or the septic system due to improper siting or improper sizing, excessive water usage, improper grease disposal, or improper operation; or any other event not caused by Presby Environmental. This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty.

Further, in no event shall Presby Environmental be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party. For this Limited Warranty to apply, the Units must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Presby Environmental's installation instructions.

(d) No representative of Presby Environmental has the authority to change this Limited Warranty in any manner whatsoever, or to extend this Limited Warranty. No warranty applies to any party other than the original Holder.

The above represents the standard Limited Warranty offered by Presby Environmental. A limited number of states and counties have different warranty requirements. Any purchaser of Units should contact Presby Environmental's corporate headquarters in Whitefield, New Hampshire, prior to such purchase, to obtain a copy of the applicable warranty, and should carefully read that warranty prior to the purchase of Units.

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Presby Environmental, Inc.
An Infiltrator Water Technologies Company

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Contact PEI's Technical Services Department for assistance at 1-800-473-5298