ENVIROSEPTIC® SYSTEM

# AUTHORIZED DESIGNER & INSTALLERS MANUAL

**Presented by**

DBO EXPERT

**&**

FRP MANUFACTURING (2010) INC.

**For Use in BRITISH COLUMBIA**
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PEI

7th Edition

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# 1.0 INTRODUCTION

## 1.1 ADVANCED ENVIRO))SEPTIC® System

ADVANCED ENVIRO))SEPTIC® system meets or exceeds the BC Sewerage System Regulation and the current edition of the BC Standard Practice Manual.

ADVANCED ENVIRO))SEPTIC® is patented by Presby Environmental Inc. of New Hampshire, USA and has been in use since 1989. DBO Expert Inc. of Quebec, Canada is the master distributor world-wide excluding the USA.

The ADVANCED ENVIRO))SEPTIC® system is for the treatment and dispersal of sewage wastewater pursuant to applicable regulations, codes, bylaws and this manual.

The ADVANCED ENVIRO))SEPTIC® system is designed to treat residential strength sewage wastewater that is generally accepted as being defined as:

Biochemical Oxygen Demand (BOD5) of 350 mg/l
Total Suspended Solids (TSS) of 350 mg/l
pH level of 6.5 – 7.5
Fats, Oils & Greases of 35 mg/l

For sewage wastewater flows that have higher values as stated above (a.k.a. High Strength Wastewater), contact DBO Expert Inc. for pre-treatment systems to bring the higher values down to the above stated requirements.

## 1.2 PERFORMANCE & CERTIFICATIONS

ADVANCED ENVIRO))SEPTIC® system has been tested by 2 nationally recognized standard setting agencies that are themselves recognized by the Standards Council of Canada.

The Standards Council of Canada recognizes BNQ and NSF as standards setting and testing agencies for onsite sewage treatment systems. The Advanced ENVIRO))SEPTIC® system is listed by the BNQ and NSF as meeting the respective standards for performance.

The Bureau of Normalization de Quebec (BNQ) tested the ENVIRO))SEPTIC® system for 12 months to cover the 4 seasons in the harsh Canadian climate. The BNQ certifies and lists the Advanced ENVIRO))SEPTIC® system as meeting advance treatment levels.

Test report results identify that when installed in accordance with this manual, the Advanced ENVIRO))SEPTIC® system consistently and constantly treats and evenly distributes residential sewage wastewater to an effluent quality of:

Biochemical Oxygen Demand (BOD5) of < 10 mg/l,
Total Suspended Solids (TSS) of < 10 mg/l

## 1.3 TECHNICAL SUPPORT

DBO Expert Inc. (DBO) provides the following product technical support with trained and qualified personnel based in British Columbia:

(a) Installer Training Sessions
(b) Onsite in-field design and installation advice and guidance
(c) Review and provide a written report of site-specific on-paper designs, drawings and specifications to support permit application process. (a.k.a. paper review)
(d) Provide, as needed, site specific materials & parts listing
(e) During construction review as determined by DBO authorized personnel
(f) After-Installation maintenance by DBO Authorized Maintenance Provider

**For Site-specific conditions not covered in this manual, the Authorized Installer shall request from DBO additional technical support to provide written special designs, specifications and approvals to satisfy the regulations and the site conditions.**

**Any such DBO published special designs are to be considered as addendums or amendments to this manual and are to be considered as a new part or section of this manual.**

## 1.4 USE OF THIS MANUAL

This manual is for the exclusive use of designers and /or installers who:

(a) are licensed or authorized to conduct this type of work in accordance with laws, regulations, code or bylaws issued by the appropriate authorities, or
(b) hold a Certificate of Authorization issued by DBO that states that the person has completed training in the design and installation of the ADVANCED ENVIRO))SEPTIC® system.

This manual is not designed or intended to be used by persons who do not meet either of the above stated conditions.

It is the responsibility of the Authorized Installer to follow the Provincial laws and regulations that apply to the work being conducted.

## 1.5 TYPE 2 AND TYPE 3 TREATMENT METHOD (British Columbia)

**Type 2 (DESIGN OPTION 1) Treatment Method** requires that the designer use the loading rate per *Advanced ENVIRO))SEPTIC® pipe* of 126 litres and that there be a minimum of 6” (152mm) of sand under the pipe for water dispersal into the receiving soil.

- Use of this design option requires that the system utilizes timed dosing.
- The wastewater strength leaving the pre-tank must meet the requirements of Residential Strength Wastewater as noted on Page 5, Section 1.0 of this document.
- It is highly recommended that a Sampling Device be installed for systems using 126L/Pipe with 6” of System Sand. It is also recommended that when testing samples, a sample of both the effluent from the dose chamber/tank be tested as well as a sample from the Sampling Device below the System Sand.

**Type 2 (DESIGN OPTION 2) Treatment Method** requires that the designer use the loading rate per *Advanced ENVIRO))SEPTIC® pipe* of 126 litres and that there be a minimum of 12" (305mm) of sand under the pipe for water dispersal into the receiving soil.

- Use of this design option allows both demand or timed dosing.
- The wastewater strength leaving the pre-tank must meet the requirements of Residential Strength Wastewater, as noted on Page 5, Section 1.0 of this Design Document.

**Type 3 Treatment Method** requires that the designer use the loading rate per *Advanced ENVIRO))SEPTIC® pipe* of 126 litres and that there be a minimum of 12" (305 mm) of sand under the pipe for water dispersal into the receiving soil.

- Use of this design option requires that the system utilizes timed dosing, to ensure constant, consistent dosing.
- The wastewater strength leaving the pre-tank must meet the requirements of Residential Strength Wastewater, as noted on Page 5, Section 1.0 of this Design Document.
- It is highly recommended that a Sampling Device be installed for Type 3 Systems. It is also recommended that when testing samples, a sample of both the effluent from the dose chamber/tank be tested as well as a sample from the Sampling Device below the System Sand.

## 1.6 SURROUND AIR TECHNOLOGY

The Surround Air Technology employs the combination of (1) air passing through the pipes from one end to the other, (2) sand placed all around the AES pipes and (3) air vent holes placed on the complete circumference and length of the AES pipe

## 2.0 DEFINITIONS & COMPONENT SPECIFICATIONS

*Above Ground Drain Field* means that all or part of the Advanced ENVIRO))SEPTIC® System is above the natural grade of the land.

*Coupling/Coupler* means the plastic flexible fitting, as distributed through DBO Environmental Technologies and its authorized dealer, to connect together 2 of the Advanced *ENVIRO))SEPTIC® Pipes*.

*Coupling* shall be snapped into place to join 2 of Advanced *ENVIRO))SEPTIC® Pipes* by pulling back the fabric and material at the ends of the Advanced *ENVIRO))SEPTIC® Pipes* at least 2 corrugated positions. Once snapped into place insert the tongue through the opening to secure. Pull back into place the fabric and material over the coupling.

*Daily Design Flow Rate* means the estimated volume of *residential sewage* to be generated during one 24-hour day.

*Distribution Box* means a device designed to receive influent in one 100 mm (4”) opening and evenly distribute the effluent into various 100 mm (4”) openings where each opening receives and seals watertight the 100 mm (4”) diameter *PVC Drain Line*, and, shall have a removable insulated cover and be manufactured from sulphur resistant concrete, fibreglass or plastic.

*Effluent Sample Port* means the sewer drain PVC pipe works assembly placed under and transverse to all of the rows of Advanced *ENVIRO))SEPTIC® Pipes* at the interface of the bottom of the *system sand* and the infiltrative surface.

*Advanced ENVIRO))SEPTIC® Pipe* means the patented sewage wastewater treatment pipe manufactured by Presby Environmental Inc. of New Hampshire, USA and as distributed through DBO Expert Inc. or its authorized dealers and having a volumetric capacity of 220 litres, a total length of 30.5 m (10’), outside dimension of 300 mm (12”) in diameter and a treatment capacity of 126 litres per day of *residential sewage* for Type 2 and 126 litres per day for Type 3.

*End Cap* means the 2 of 4" hole plastic 12" diameter cap, as distributed through DBO Expert Inc. or its authorized dealers, that is placed at the end of each row of Advanced *ENVIRO))SEPTIC® Pipe* and has the 2 holes positioned at the 12 and 6 o'clock position.

*End Cap* (2 hole) shall be snapped into place onto the last Advanced *ENVIRO))SEPTIC® Pipe* at the end of each row of Advanced *ENVIRO))SEPTIC® Pipe* by pulling back the fabric and material at the ends of the Advanced *ENVIRO))SEPTIC® Pipes* at least 2 corrugated positions. The two (2) holes are to be positioned at the 12 and 6 o'clock position. Once it is snapped into place pull back into place the fabric and material over the *End Cap*

*Advanced ENVIRO))SEPTIC® System* means the combination of the *Advanced ENVIRO))SEPTIC® pipes, Inlet Caps, End Caps, Couplings, System Sand, Vent Manifold, Liquid Level Inspection Ports, Distribution Box, Equalizers®, Pump Pressure Line, Pump Pressure Reducer, Pump Chamber, Pump and Pre-Tank* as assembled and installed.

*Equalizer* means a device to equalize the flow out of the *Distribution Box* and is as distributed through DBO Expert Inc. or its authorized dealers to fit into the opening of *PVC Drain Line* non-bell end inside the *D Box*.

*Inlet Cap* means the 1 of 4" hole plastic 12" diameter cap, as distributed through DBO Expert Inc. or its authorized dealers, that is placed at the beginning of each row where the *Pre- Tank* effluent enters a row of *Advanced ENVIRO))SEPTIC® Pipe* and has the 1 hole positioned at the 12 o'clock position.

*Inlet Cap* shall be snapped into place onto the first *Advanced ENVIRO))SEPTIC® pipe* at the start of each row *of Advanced ENVIRO))SEPTIC® pipes* by pulling back the fabric and material at the ends of the *Advanced ENVIRO))SEPTIC® Pipes* at least 2 corrugated positions. With the 1 hole that is offset from the centre of the cap to be positioned at the 12 o'clock position. Once it is snapped into place pull back into place the fabric and material over the *inlet cap*.

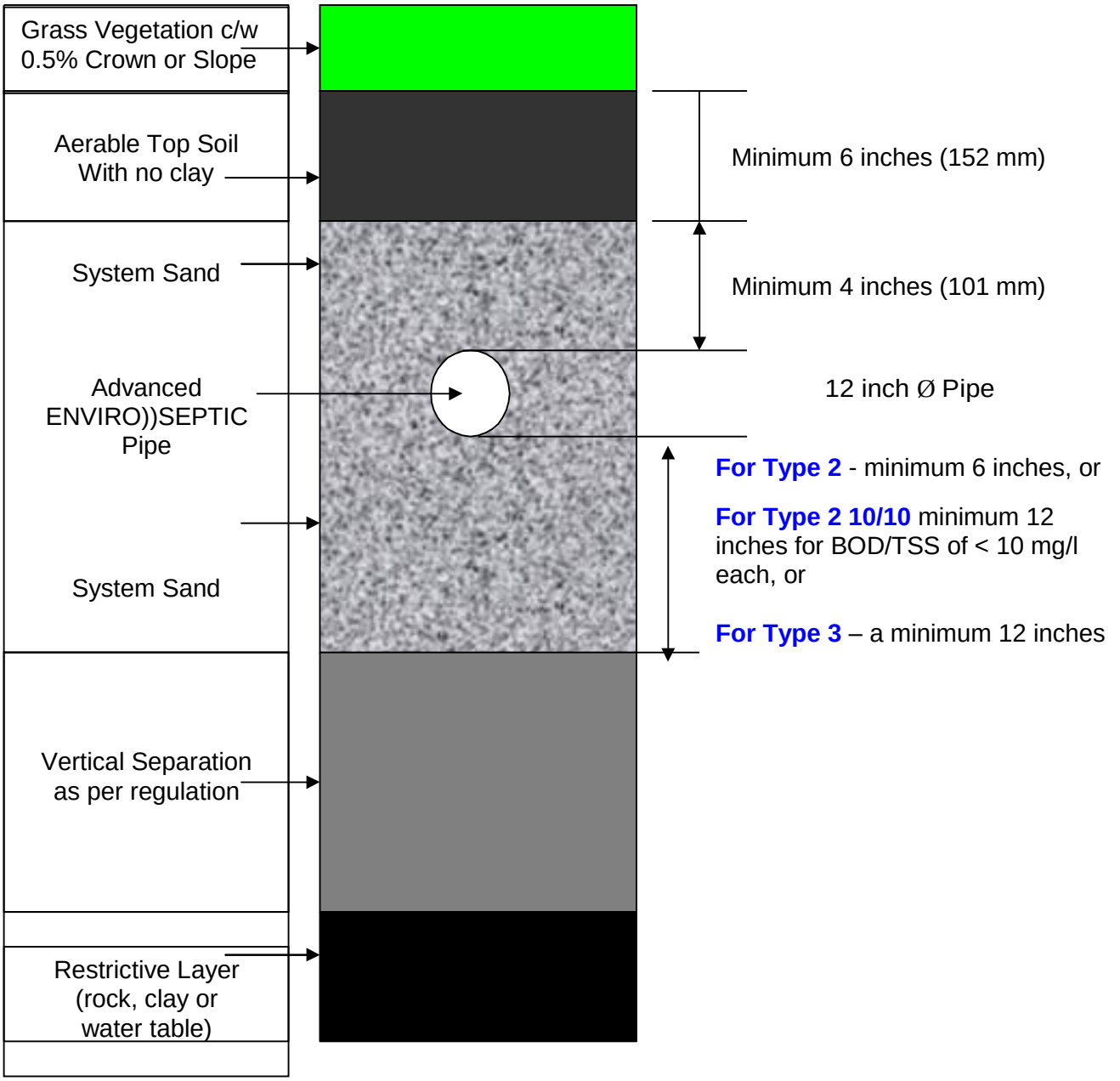
*Liquid Level Inspection Port* means 100 mm (4") diameter PVC Drain Line pipe is attached to each of the *End Cap*'s 100 mm (4") opening at the 6 o'clock position and brought to grade with 100 mm (4") diameter drain line elbow and pipe and topped with a drain line clean out fitting c/w threaded cap.

| | |
|---|---|
| *Pre-Tank* | means a single 2-compartment tank or 2 separate tanks manufactured from concrete, fibreglass or polyethylene having a minimum working volume not including the effluent dosing or *pump chamber* of 1.5 days of the *daily design sewage flow rate*, and, shall be configured internally similar to a septic tank and shall be manufactured to meet or exceed the current CSA – B66 Standard for structural integrity and water tightness. |
| *Pump Chamber* | means the chamber within the *Pre-Tank* or a separate tank/chamber having a working volume as required by the appropriate regulation and shall be manufactured from concrete, fibreglass or polyethylene, and, shall be manufactured to meet or exceed the current CSA – B66 Standard for structural integrity and water tightness; and, will discharge *Pre-tank* effluent to flood the *Distribution Box* for a minimum of one (1) minute. |
| *Pump Pressure Line* | means a minimum of 32 mm (1 ¼”) diameter underground pressure line having a minimum 75 psi rating and maybe either rigid or flexible and not subject to “kinking” or collapse from being buried in ground, and shall extend as required to connect to the *Pump Pressure Reducer*. |
| *Pump Pressure Reducer* | means a 100 mm (4”) diameter *PVC Drain Line* pipe having a minimum length of 3.05 m (10’) connected to the inlet of the *Distribution Box* with a 100 mm to a minimum 32 mm (4” to 1 1/4”) *PVC Drain Line* reducing bushing. |
| *PVC Drain Line* | means a PVC solid non-pressure rated pipe used for sub-surface installation for the carrying by gravity wastewater and may be utility grade non-CSA, or as acceptable by regulation. |
| *Residential Sewage* | means, if not defined by the appropriate regulation, water carrying human excreta, waste from laundry, dishwashing, bathing, showering and food preparation in a residence having a maximum mass loading of BOD5 and TSS of 350 mg/l each, pH of 6.5 – 7.5 and fats, oils and grease content < 35 mg/l. |
| *Siphon Chamber* | means a tank or vessel that holds an arrangement of pipes and fittings that create a siphon, or, a pre-manufactured siphon arrangement that will discharge *Pre-tank* effluent to flood the *Distribution Box* for one (1) minute. |

*System Sand* means the sand that meets either the characteristics as set down in the graph below (FIGURE 2) or as selected, approved and listed by DBO Expert Inc. from time-to-time and is placed under the rows of *Advanced ENVIRO))SEPTIC® Pipes* 300 mm (12") thick and in between the rows and 100 mm (4") thick on top of the rows, and the sand shall have:

- an Effective diameter of between 0,25 and 0,5 mm
- an Coefficient of uniformity less than or equal to 4,5
- Less than 3 % of the particles have a diameter of < 0.08 mm
- Less than 20 % of the particles have a diameter > 2.5 mm.

FIGURE 1 – Gradation of Layers



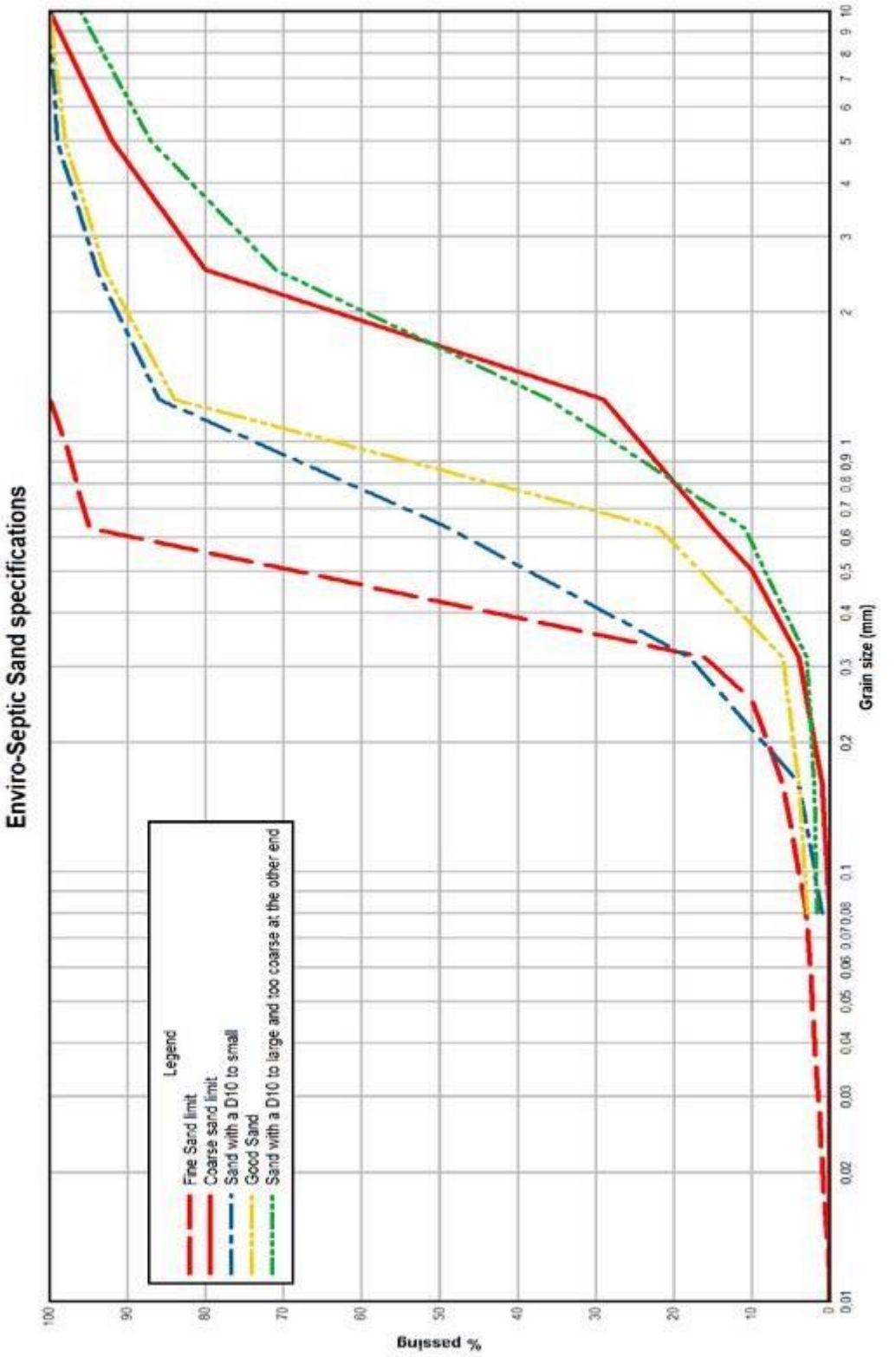



FIGURE 2 – SYSTEM SAND

*Vent Manifold* means that at the end of each row of *Advanced ENVIRO))SEPTIC® Pipes* the *End Cap* 4” hole at the 12 o’clock position are joined together through a 4” diameter *PVC Drain Line* pipe, elbows and Tees as required to create a single line that is located at about the centre (+/- 3.05 m 1 ft either way) creating a single stack rising above grade with a gooseneck fitting attached.

*Venting System* means a series of 100 mm (4”) diameter *PVC Drain Line* connected to the end of the rows of the *Advanced ENVIRO))SEPTIC® Pipes* with 1 of 4” gooseneck and *vent manifold* for every 1,200 lineal feet of *Advanced ENVIRO))SEPTIC® Pipes* that allows fresh air to pass through unrestricted to vent out through the opposite end of the *ENVIRO))SEPTIC® system* through the plumbing vent stack of the residence or a vent stack located between the residence building and the start of the *ENVIRO))SEPTIC® rows.*

## 3.0 TYPICAL GENERAL ARRANGEMENT – GRAVITY FLOW

Gravity systems' (a.k.a. trickle based systems) general arrangement are as shown below.

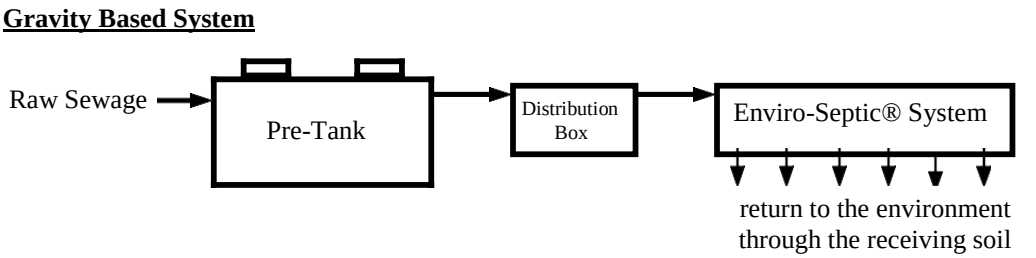



FIGURE 3

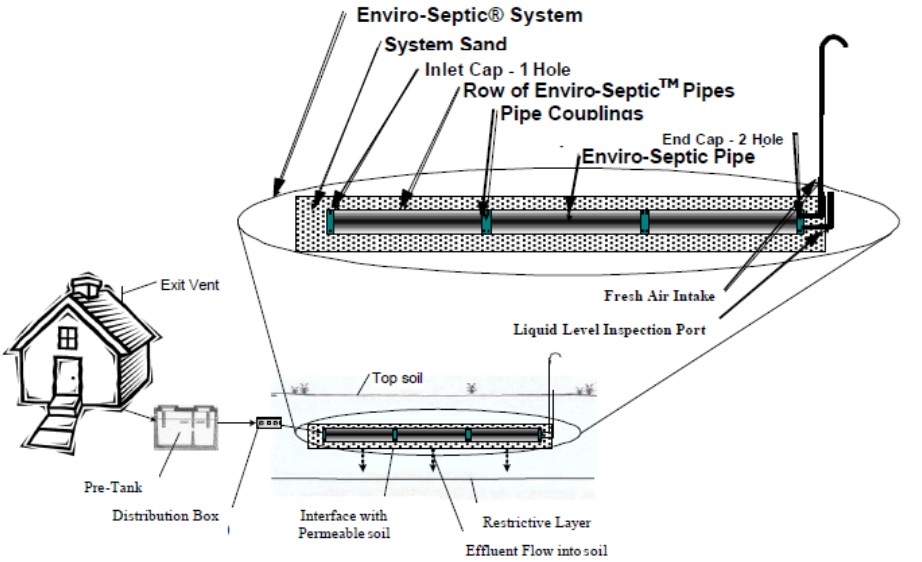
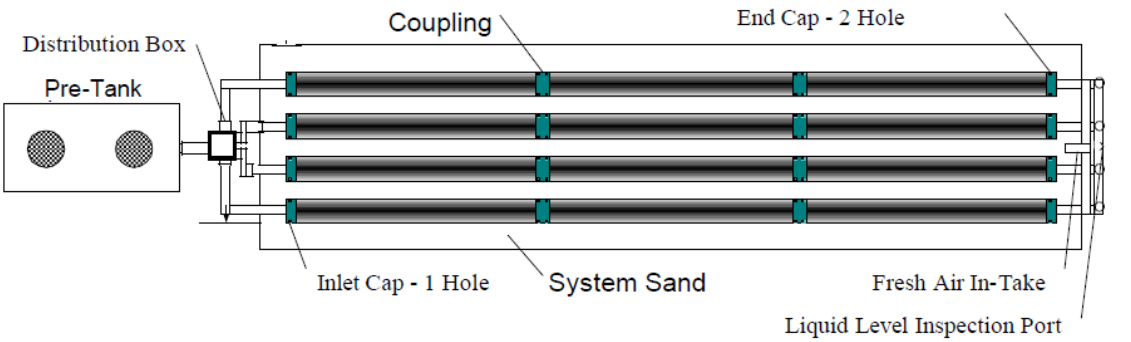
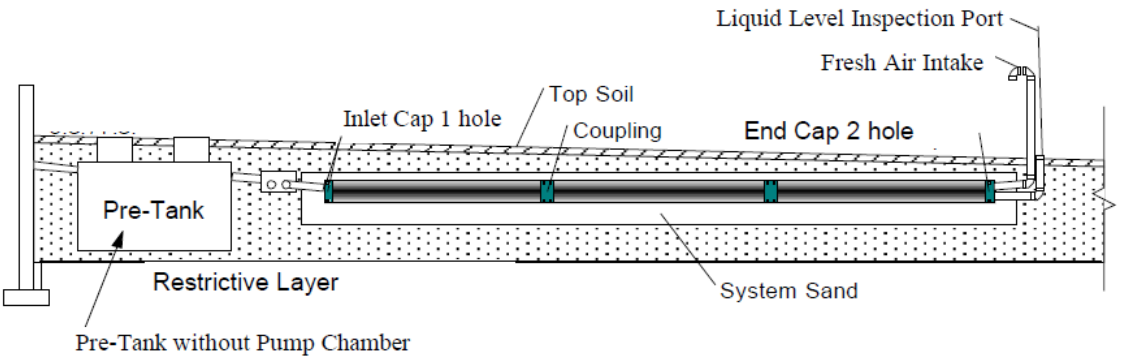



FIGURE 4 - Gravity




PLAN VIEW




SIDE VIEW

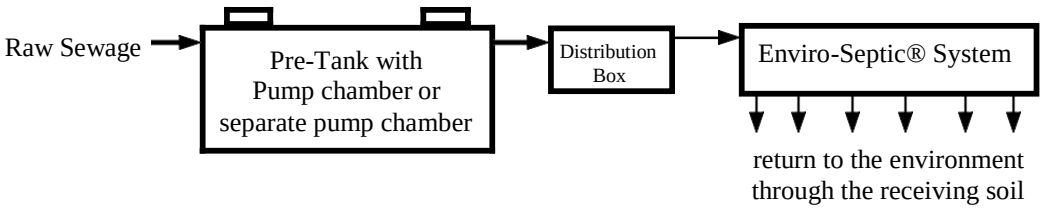
FIGURE 5 – GRAVITY

## 3.1 TYPICAL GENERAL ARRANGEMENT – SIPHON-TO / PUMP-TO DISTRIBUTION BOX

Siphon-To and Pump-to-Distribution Box systems' general arrangement are as shown below.

**Siphon-To and Pump-To Distribution Box are acceptable replacements of pressure distribution method where the Standard Practice Manual requires pressure distribution.**

**Pump-To Distribution Box**




**Siphon-To Distribution Box**

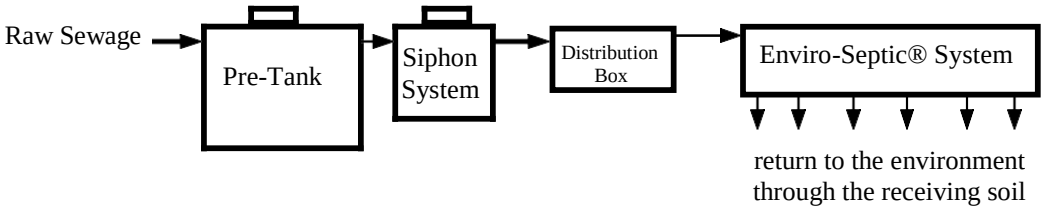



FIGURE 6

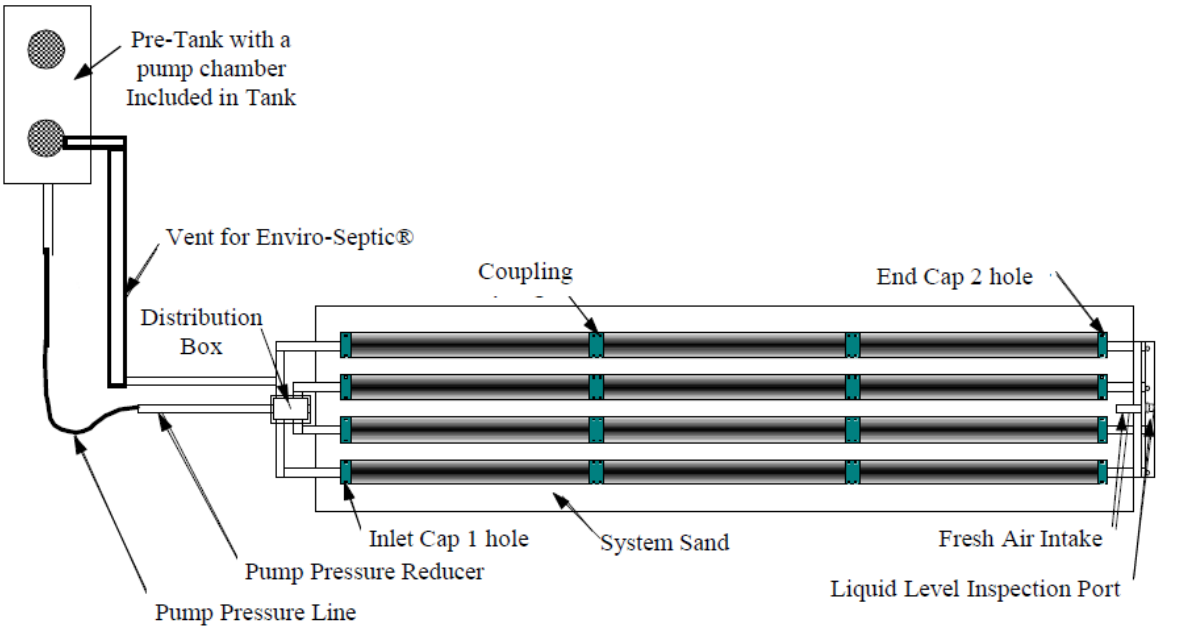



FIGURE 7 – PUMP-TO-DISTRIBITION BOX

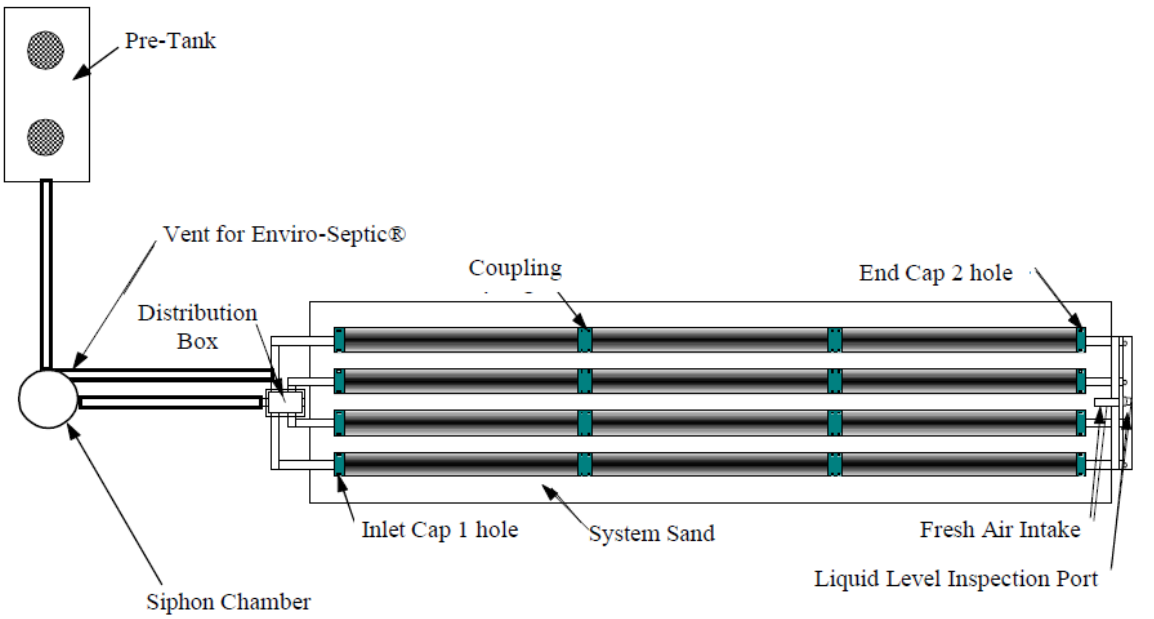



FIGURE 8 – SIPHON-TO DISTRIBUTION BOX

## 4.0 INSTALLATION - GENERAL NOTES

**4.1** Maximum & Minimum Length of Rows

The maximum length of each *Advanced ENVIRO))SEPTIC®* row as measured from the *inlet cap* is 6 *Advanced* ENVIRO))SEPTIC® Pipes i.e. 18.3 m (60'). Minimum length of rows is *2 Advanced ENVIRO))SEPTIC® pipes.*

**4.2** Slope of Land

Systems placed on a slope up to 10% shall have the *system sand* area extend a minimum of 0.3 m (1') beyond the outside edge of the *Advanced ENVIRO))SEPTIC® Pipe*'s side and ends.

For systems placed on a slope between 10% and 30% slope shall have the *system sand* area extend a minimum of 0.3 m (1') on three (3) sides beyond the outside edge of the *Advanced ENVIRO))SEPTIC® Pipe*'s side and ends and 1.2 m (4') beyond the down slope side of the *Advanced ENVIRO))SEPTIC®* row of pipes.

***4.3*** Slope of *ENVIRO))SEPTIC® Pipe*

*Advanced ENVIRO))SEPTIC® Pipes* are to be placed on top of the minimum 0.3 m (12") of *system sand* nominally level.

**4.4** Top Soil Layer

The final topsoil layer shall be aerable topsoil with no clay and shall be placed with a minimum 0.5% crown / slope to encourage snow melt, rainfall and water to flow towards the edges of the *Advanced ENVIRO))SEPTIC® System*.

**4.5** Slope & Elevation of Pipe Works

All PVC Drain Line pipes carrying wastewater shall have a minimum 1% slope.

The outlet of the *Pre-Tank* and the *Distribution Box* shall be at least 50 mm (2") above the highest elevation of the *inlet cap* of the *Advanced ENVIRO))SEPTIC®* rows.

The *PVC Drain Line* pipes carrying air shall be sloped into the *End Cap* of the *Advanced ENVIRO))SEPTIC® Pipes* to allow for any condensation to flow back into the rows.

**4.6** PVC Primer & Glue

All PVC Drain Line pipes and fittings shall have primer and glue applied.

**4.7** Pump Specifications

The maximum pump volume per cycle shall not exceed 40 litres per 3.05 m (10') of Advanced ENVIRO))SEPTIC® Pipes.

The pump shall have a maximum litre per minute of 75 litres per row of *ENVIRO))SEPTIC® pipe*.

### *4.8* *Venting System*

**The *venting system* shall have a minimum differential between the inlet and exhaust of 3.05 m (10') at all times. There shall be a *venting system* for every 1,200 lineal feet of *Advanced ENVIRO))SEPTIC® Pipes*.**

Venting System options are:
For gravity based system, from the fresh air intake, through the *Advanced ENVIRO))SEPTIC® Pipes* through the *Distribution Box* through the *Pre-Tank* and out the residence's plumbing vent stack.

For pump-to-*Distribution Box* based systems, from fresh air intake, through the *Advanced ENVIRO))SEPTIC® Pipes* bypass the *Distribution Box*, and enter the pump chamber that shall be vented through the *Pre-Tank* and out the residence's plumbing vent stack or after bypass the pump chamber and vent into the *Pre-Tank.*

For either gravity or pump based systems, from fresh air intake, through the *Advanced ENVIRO))SEPTIC® Pipes* through the *Distribution Box* that has its own vent stack. Ensure that the differential between fresh air intake and exhaust is 3.05 m (10').

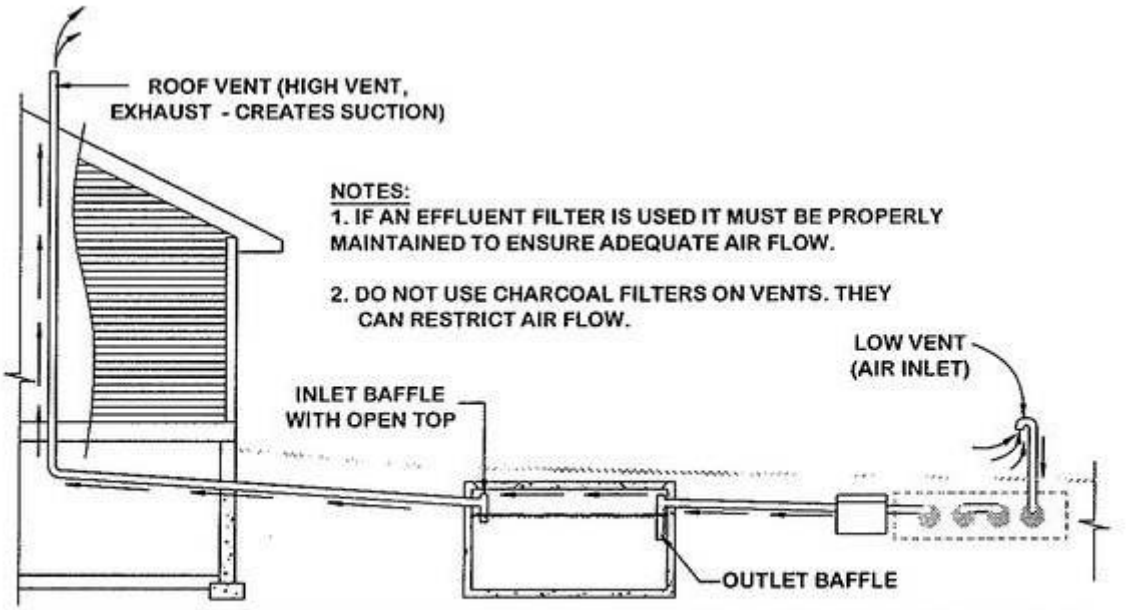



FIGURE 9 – Options for Venting.

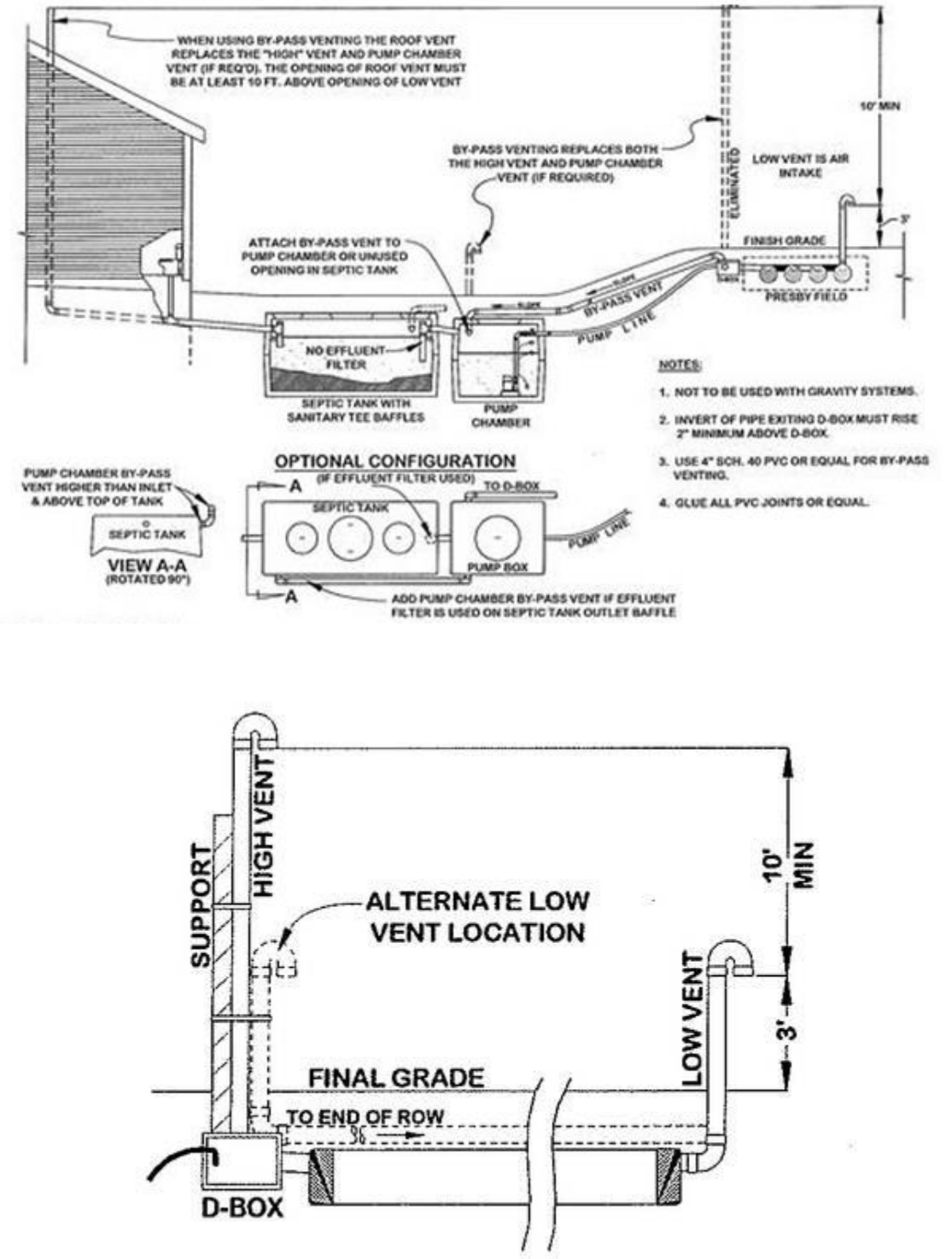



FIGURE 9 – Options for Venting.

(a) Contact DBO Expert Inc. for alternate venting methods

***Venting System*** **is critical to the proper operation and performance of the *ENVIRO))SEPTIC*® system. Installer MUST ensure that there is air flowing freely**

**through the *vent system*. Ensure that the lower air vent is not subject to snow cover.**

## *4.9* *Liquid Level Inspection Port*

At the end of each row of *Advanced ENVIRO))SEPTIC® Pipes*, the *End Cap*'s 6 o'clock open position is to have a 100 mm (4") diameter *Drain Line* pipe inserted into the *End Cap* not less than 50 mm (2").

At the end of this drain line pipe place a 90$^{o}$ elbow fitting facing upwards toward grade. Place into the elbow, pipe to grade topped with a 100 mm (4") diameter drain line cleanout assembly c/w threaded cap. Tighten cap with hand tool.

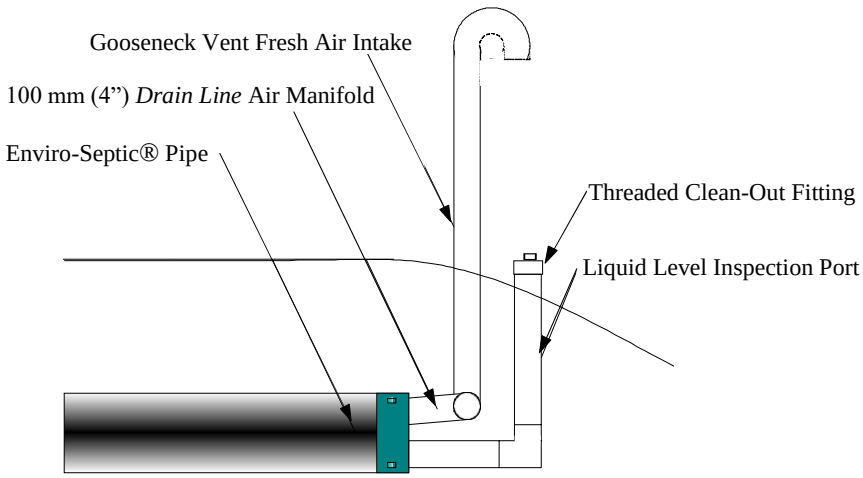



FIGURE 10

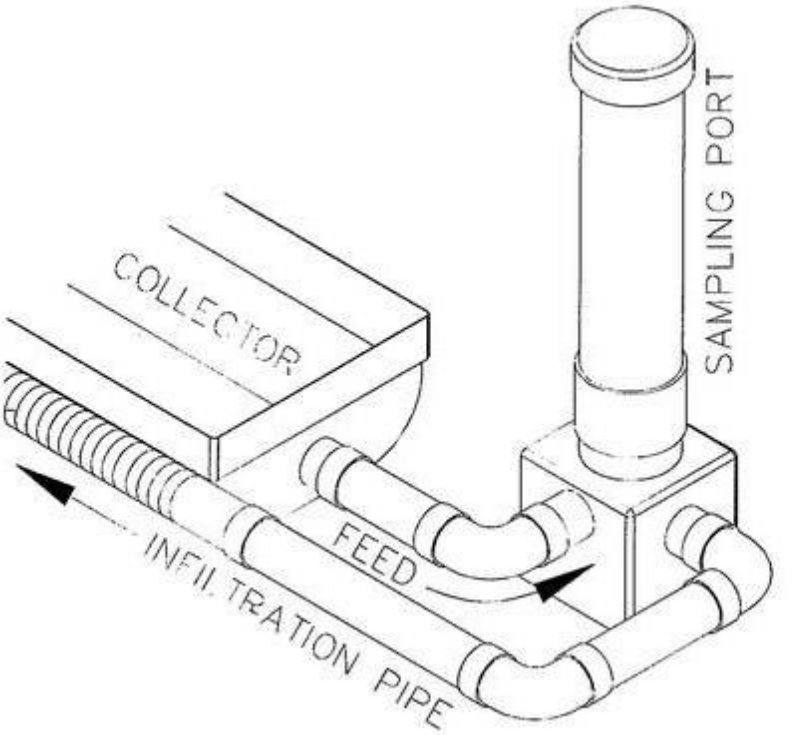
## *4.10* *Effluent Sample Port*

The project or onsite system designer may wish to have installed an *effluent sample port* as means for the maintenance provider to conduct a diagnostic approach to source whether the system is being properly used by the occupier of the facility being served by the *Advanced ENVIRO))SEPTIC® System*.

An effluent sample confirms that the *Advanced ENVIRO))SEPTIC®* is being operated and maintained in accordance with Owner's Operation & Maintenance Manual.

It is strongly recommended that the *Effluent Sample Port* be installed in Type 3 Treatment Method applications.

Refer to FIGURE 11 for the installation of the *effluent sample port*.



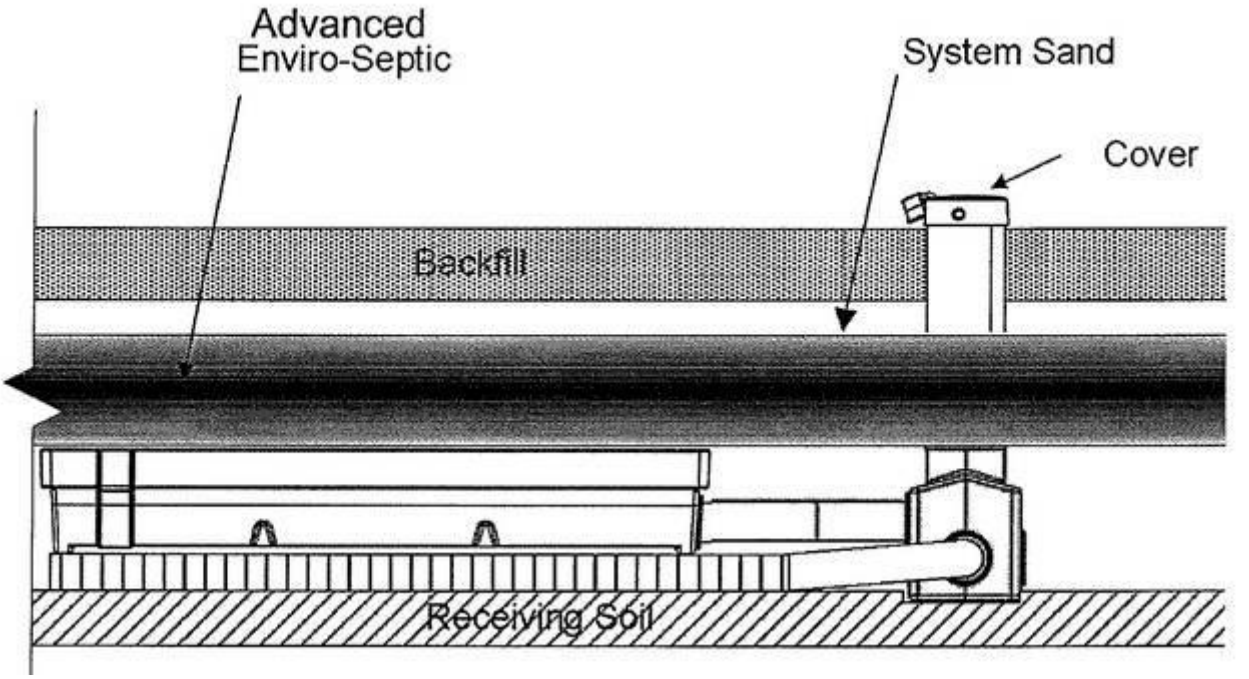
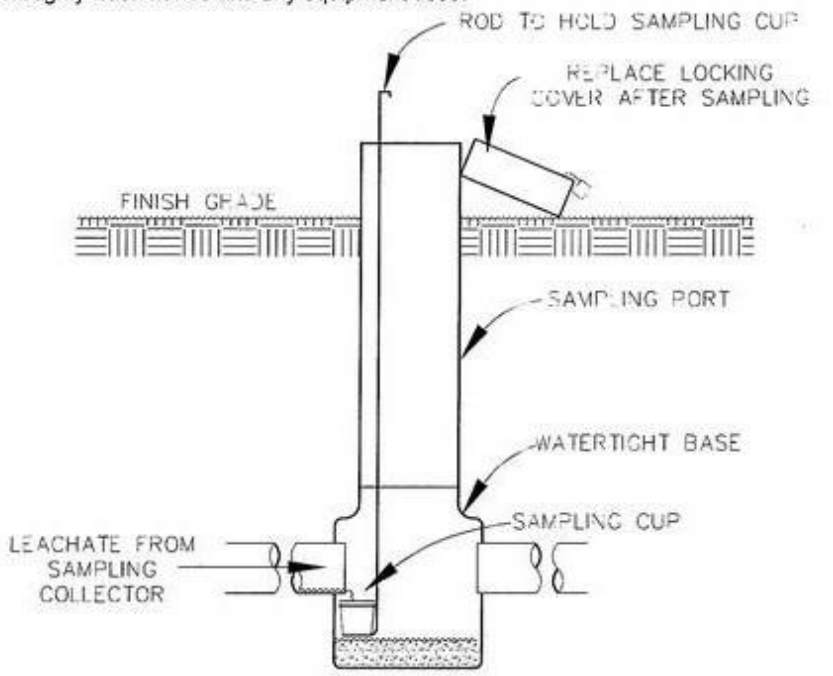



**FIGURE 11**

## 4.11 Effluent Sampling Procedures

**Sampling Procedure**

a) These procedures are to be performed only by a trained technician.
b) Use proper safety equipment, including gloves and eye protection.
c) Remove padlock and locking cover from riser of Sampling Port.
d) Pump out water in base of Sampling Port.
e) Insert the sampling rod with attached cup and lower it to the level of the inlet in the base of the watertight sampling port (where the PVC pipe connects from the Collector into the base of the Sampling Port. Refer to illustration below.)
f) Leave in place until a sufficient amount of treated effluent has been obtained.
g) When obtaining samples, use care not to touch collection cup against the side walls or bottom of the sampling port to prevent contamination.
h) Immediately perform visual and olfactory assessment of collected sample.
i) Reinstall cap, re-seal and re-lock.
j) Thoroughly wash hands and any equipment used.



## 5.0 TYPICAL RECOMMENDED INSTALLATION PROCEDURES

**NOTE: This section starts with the installation of the *Advanced ENVIRO))SEPTIC® Pipes.* Installation may start by installing the Pre-Tank, Distribution Box, Pump Chamber first.**

**5.1** Scarify the receiving soil area, if required. Install *effluent sample port*, if required.

**5.2** Place the layer of *system sand* as needed for the Treatment Method Type required evenly over the entire receiving soil area.

**5.3** At the short ends of the area, compact the system sand to support the *Drain Line* pipes and fittings to and from the rows of *Advanced ENVIRO))SEPTIC® pipes*.

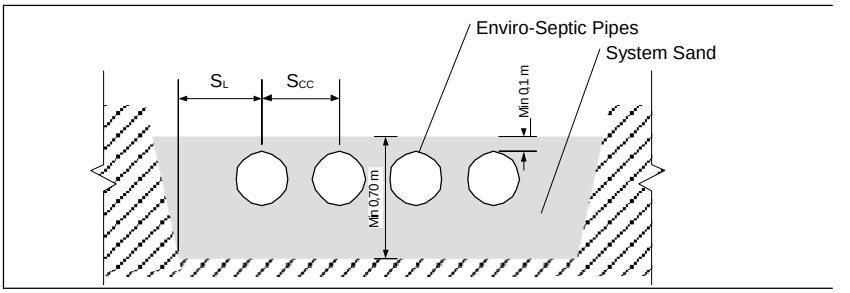



FIGURE 12

**5.4** Place the *Advanced ENVIRO))SEPTIC® Pipes* spaced as required (refer to work sheet) onto the *system sand* layer **with seam side at the 12 o'clock position**, and the **white fabric at the 6 o'clock position.**

***5.5*** Join the *Advanced ENVIRO))SEPTIC® Pipes* in the row together using the *Couplings* provided.

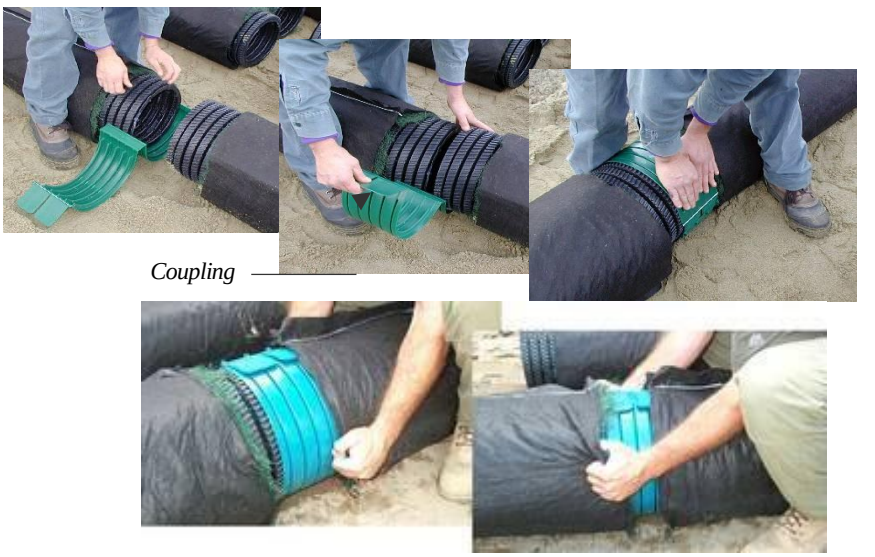



FIGURE 13

**5.6** Nominally level the rows of *Advanced ENVIRO))SEPTIC® Pipes* from end to end.

**5.7** Install the *Inlet Cap* – 1 Hole.

FIGURE 14

**5.8** Install the *End Cap* – 2 Hole.

FIGURE 15

**5.9** Gently place *system sand,* using the bucket ladle technique, over the *Couplings* on all rows to stabilize the rows before for the next backfilling step.

Figure 16

**5.10** Place the *system sand* over top of all of the rows of *Advanced ENVIRO))SEPTIC® Pipes* up to about 100 mm (4”) from the top of the *Advanced ENVIRO))SEPTIC® Pipes*. Then by straddling the pipes, walk along the rows foot tamping the *system sand* to aid in having sand under the lower underside of the pipe. **Do not cover the inlet caps or end caps but leave about 300 mm at each end at this time.**

FIGURE 17

**5.11** At the *End Caps*, install the *Liquid Level Inspection Ports* and set in compacted *system sand*. Insert *Drain Line* pipe at least 100 mm (4’) into the *End Caps*. Refer to section 4.12 above. Ensure 1% slope back into *Advanced ENVIRO))SEPTIC® Pipes.* Backfill to cover and to support *Vent Manifold*. See FIGURE 18 & 19.

FIGURE 18

***5.12*** At the *End Caps*, install the *Vent Manifold* and support in compacted *system sand*. Insert *Drain Line* pipe at least 100 mm (4”) into the *End Caps*. Ensure 1% slope back into *Advanced ENVIRO))SEPTIC® Pipes.*

FIGURE 19

**5.13** Place *Distribution Box* level in the required location. Insert *Drain Line* pipes into *Distribution Box* and with the necessary fittings join the pipes to the *Inlet Caps* and insert a minimum of 100 mm (4”).

Ensure a 1% slope from *Distribution Box* to the top of the *Inlet Cap*. Minimum *Drain Line* pipe length from *Distribution Box* to *Inlet Cap* is 200 mm (8”).


FIGURE 20 – Concrete or Plastic

**Recommendation: It is recommended that the Distribution Box have at least 2” thick rigid Styrofoam placed over it to aid in frost protection.**

**Or, use an insulated cover/lid for the Distribution Box**

**5.14** Install *Equalizers*® into pipes in the *Distribution Box* and test with fresh water for equal water level and entry into the distribution pipes. Adjust as required.

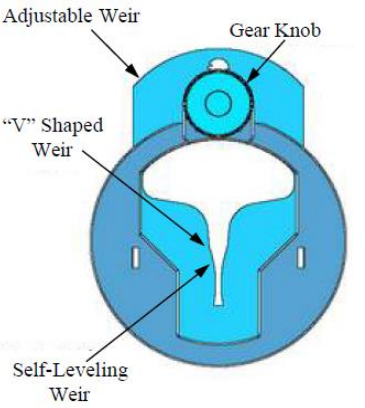



FIGURE 21

**5.15** Complete backfilling of *Advanced ENVIRO))SEPTIC® Pipes* by covering the *Advanced ENVIRO))SEPTIC® pipes* with a minimum of 100 mm (4") *system sand.* Cover with aerable topsoil with no clay as outlined below in this section. The ends of the rows to have the system sand extend a minimum of 300 mm at each end. The long side of the outside edge of the row to have the system sand extend a minimum of 150 mm on each long side.

**5.16** If pumping into *Distribution Box,* place into the *Distribution Box* inlet the *Pump Pressure Reducer Pipe*.

Install the pump system and *pump pressure line*.

For pump specifications refer to section 4.7 of this manual.

**5.17** Install *Pre-Tank* in accordance with generally accepted industry standards and/or applicable regulations. Handle, place, install and backfill in accordance with the tank manufacturer's requirements and/or recommendations.

**Recommendation: When bringing the service accesses to grade, to use a insulated cover/lid for the *Pre-Tank*'s risers' cover.**

**5.18** Backfill *Pre-Tank* and *Distribution Box*. *System sand* is not required for backfilling tanks and/or *Distribution Box*.

**5.19** Complete backfill cover of the *Advanced ENVIRO))SEPTIC® Pipes* as outlined below.

**5.20** On top of the final minimum 100 mm (4”) of system sand place aerable topsoil with no clay a minimum of 150 mm (6”). In cold climate conditions, the aerable topsoil layer may be increased up to 500 mm (20”).

**5.21** There shall be a minimum of 0.5% slope as set down in section 4.4 above.

**5.22** Grass vegetation shall be placed on top of the final topsoil layer. Grass sod maybe used. Grass seeding maybe used if the grass can grow to its first cut length prior to cold weather.

**5.23** In the event that the grass vegetation is not established and cold climate is starting, the 0.5% grade shall be maintained with the topsoil and consideration shall be given to covering the area with 4 - 6 ml clear or white plastic sheeting weighted down on all sides.

**5.24** In the case of an *Above Ground Drain Field*, grass vegetation is important to retain soil and deflect precipitation and snow melt away from the *Advanced ENVIRO))SEPTIC® system*.

**5.25** An *Above Ground Drain Field* shall be protected with a grass vegetation cover. If the grass cover cannot be in place and established for the first cold season, place a clear or white 4 – 6 ml polyethylene tarp weighted down on all fours sides to cover the entire *ENVIRO))SEPTIC® Pipe* system.

**5.26** In the event that the Property Owner wishes to have others complete the final topsoil layer and/or the grass vegetation cover, there shall be a written acknowledgement by the Property Owner that they shall be responsible to undertake the work in accordance with the requirements in this manual and shall not hold the Authorized Installation Contractor liable for any consequential damages resulting from there from.

**5.27** If *effluent sample port* is installed, place the cap (slip-on or screw-on) on the *effluent sample port* at grade.

## 6.0 IN GROUND DRAIN FIELD – BED STYLE

**6.1** An In-ground drain field using the "bed" style is used where the native soil meets the Regulatory requirements. This typically means the receiving soil layer is below the native grade and that the vertical separation is greater than 600 mm (24") in depth.

**6.2** Refer to FIGURE 3, 4 & 5 for the In-Ground Drain Field – Bed Style of installation.

## 7.0 IN-GROUND DRAIN FIELD - TRENCH STYLE

**7.1** An In-ground drain field using the trench style is used where the native soil meets the regulatory requirements for trenches. Typically the trenches are spaced apart in accordance with the appropriate regulation. The basal areas of the trenches are to be added together to meet the regulations application area (a.k.a. infiltrative area).

**7.2** The minimum spacing between trenches for the ENVIRO))SEPTIC® System is 600 mm (24").

**7.3** The trench basal area shall not be greater than 1,200 mm (48") and not less than 900 mm (36")

**7.4** Trench depth shall allow for 300 mm (12") of *system sand* on top of the native receiving soil, 300 mm (12") for the *Advanced ENVIRO))SEPTIC® Pipes*, 100 mm (4") of system on top of the ENVIRO))SEPTIC® pipes and a minimum of 200 mm (8") of aerable topsoil with no clay with a 5% slope, and grass vegetation cover.

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## 8.0 ABOVE GROUND DRAIN FIELD – PARTIAL OR FULLY

**8.1** An above-ground drain field is used where the soil conditions require that the Advanced ENVIRO))SEPTIC® System be placed partially or fully above the native receiving soil due to the restrictive layer being very close to grade. The above-ground drain fields shall use the same design requirements as stated in this manual plus requirements to build up the drain field in accordance to the appropriate regulation and this manual.

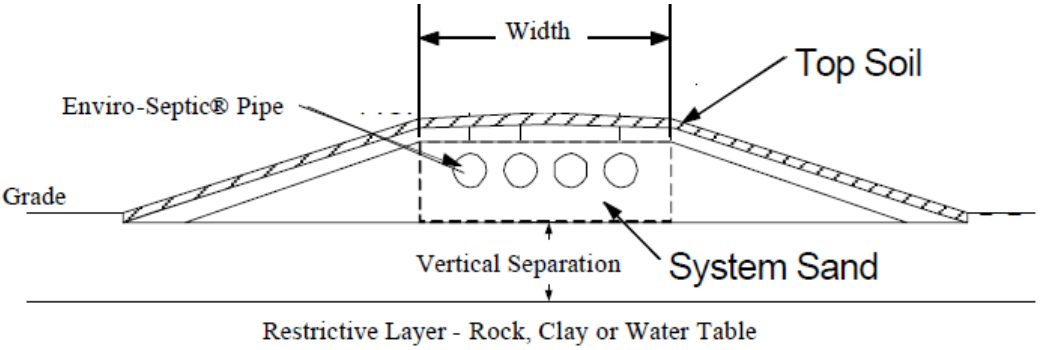


FIGURE 22 – CROSS VIEW – ABOVE GROUND DRAIN FIELD

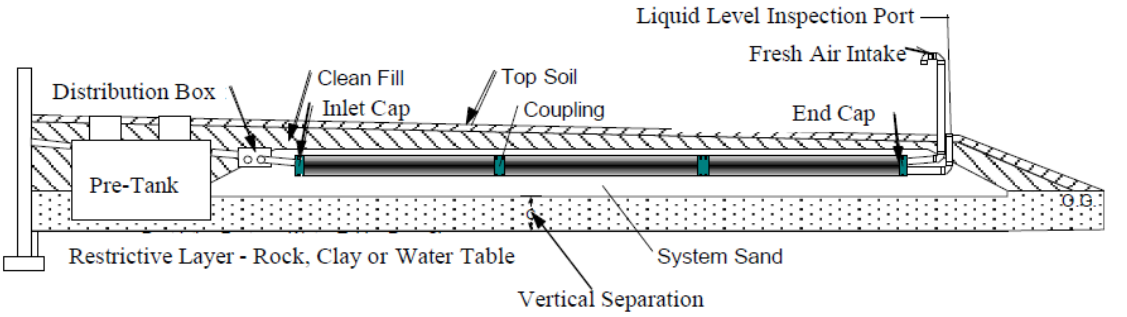


FIGURE 23 – SIDE VIEW – ABOVE GROUND DRAIN FIELD

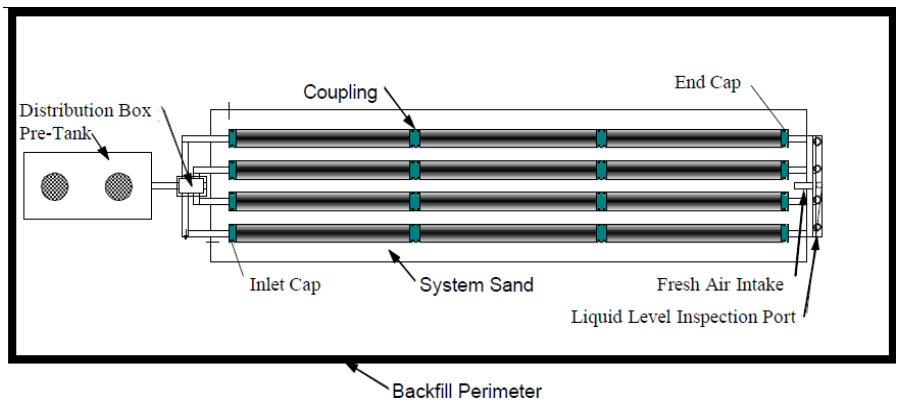


FIGURE 24 – TOP VIEW – ABOVE GROUND DRAIN FIELD

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## 9.0 ABOVE GROUND DRAIN FIELD – FULLY – NATIVE SOIL 80% + CLAY CONTENT

The following shall be used for an above-ground drain field where the native soil has a clay content greater than 80% as described in the regulation.

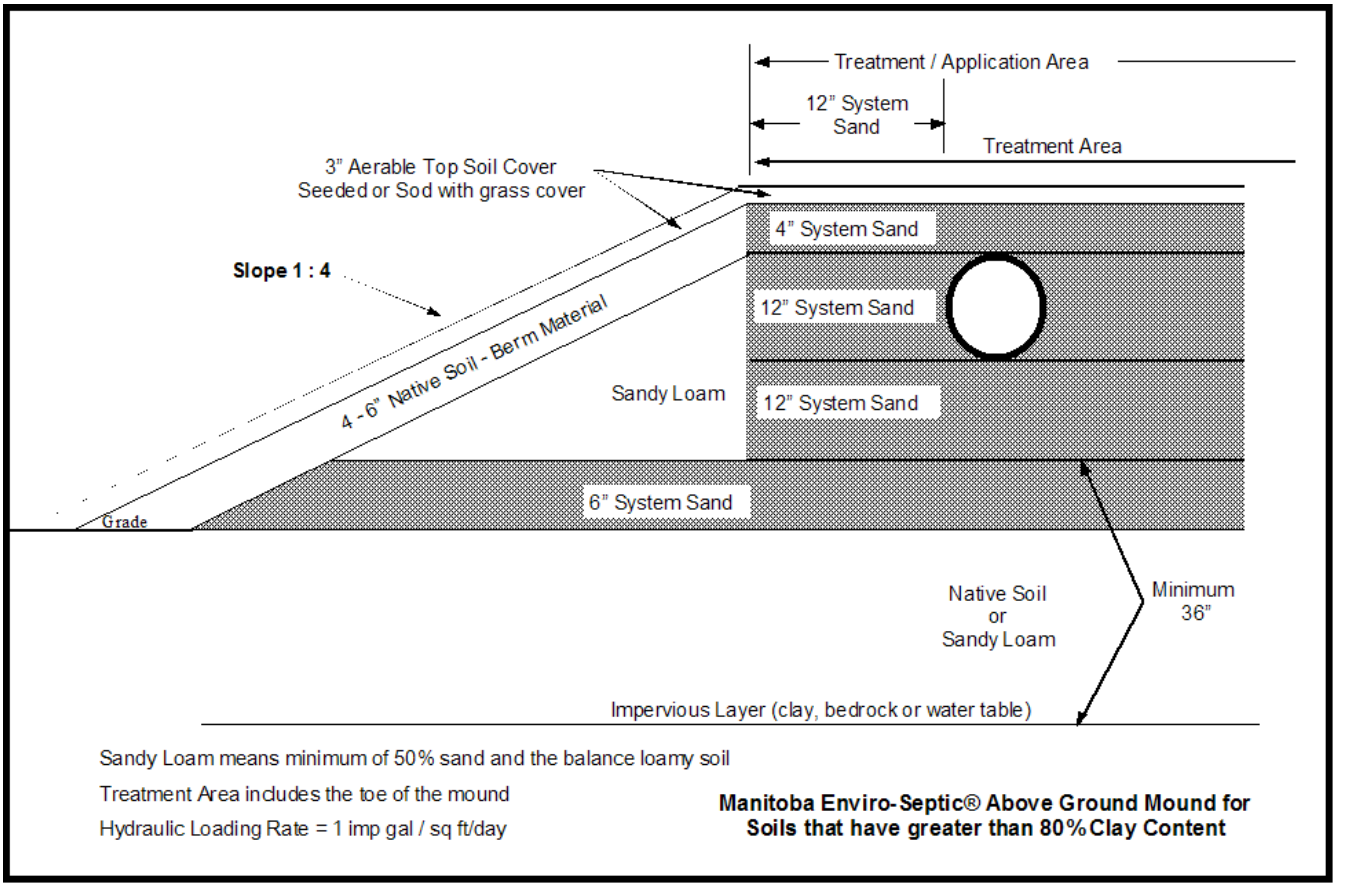



FIGURE 25

**9.1 For Site-specific conditions not covered in this manual, the Authorized Installer shall request from DBO additional technical support to provide written special designs, specifications and approvals to satisfy the regulations and the site conditions.**

**Any such DBO published special designs are to be considered as addendums or amendments to this manual and are to be considered as a new part or section of this manual.**

## 10.0 OTHER ARRANGEMENTS FOR SITE SPECIFIC ISSUES

The following are optional placement arrangements for *ENVIRO))SEPTIC® Pipes and System.* **Each row of Advanced ENVIRO))SEPTIC® Pipes MUST be the same length regardless of arrangement, unless approved by DBO Expert Inc..**

### 10.1 $90^{o}$ Curve Arrangement

A $90^{o}$ curve configuration may include one or more angles by bending the *Advanced ENVIRO))SEPTIC® pipe.* The shortest acceptable curve radius is achieved by bending one of the 3.05 m (10') pipes at a right angle as shown below.

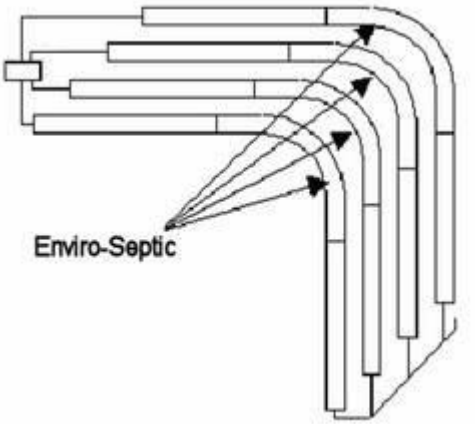



FIGURE 26

### 10.2 Curving Arrangement

Allows for setback distance to follow other curving structures such as, but not limited to, Driveways, foundations, slopes, natural occurring waterways.

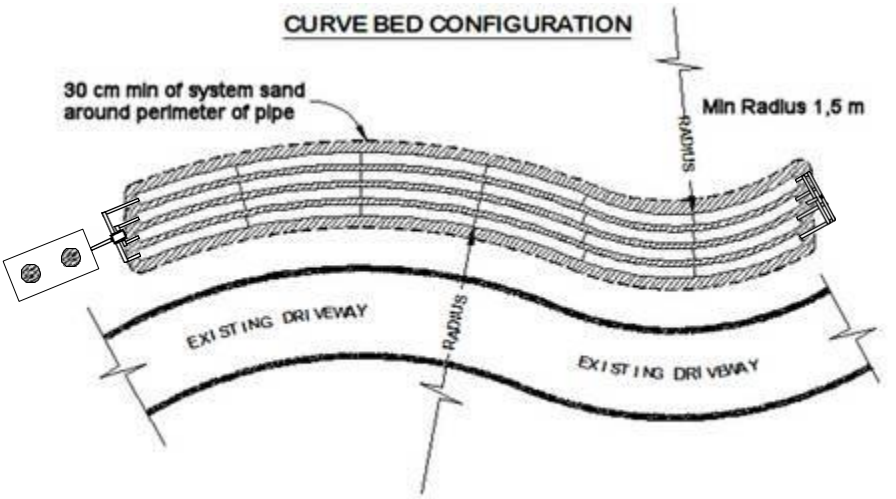



FIGURE 27

**10.3** Other Arrangements

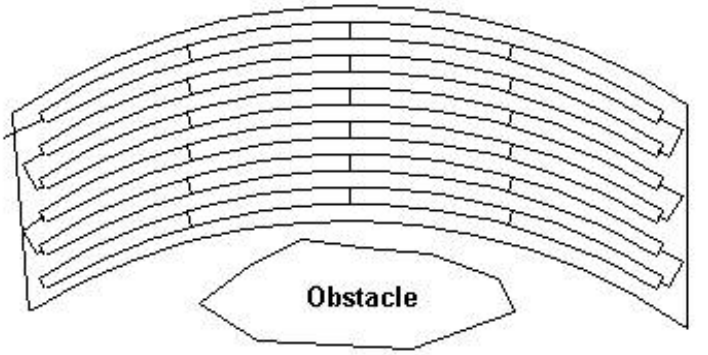



FIGURE 28

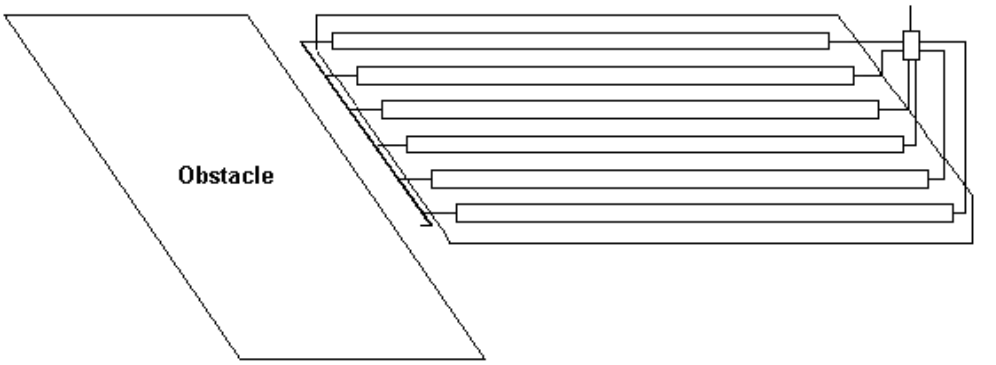



FIGURE 29

## 11.0 Seasonal Use

The *Advanced ENVIRO))SEPTIC® System* may be used for intermittent or seasonal use residences, cottages or cabins with there being no change to the treatment performance.

## 12.0 INSTALLER'S CHECK LIST

The Installer's Check List may be completed and provided to the project designer of record. The Installer's Check List is as published from time to time by DBO Expert Inc..

## 13.0 PRESSURE DISTRIBUTION EQUIVALENCY

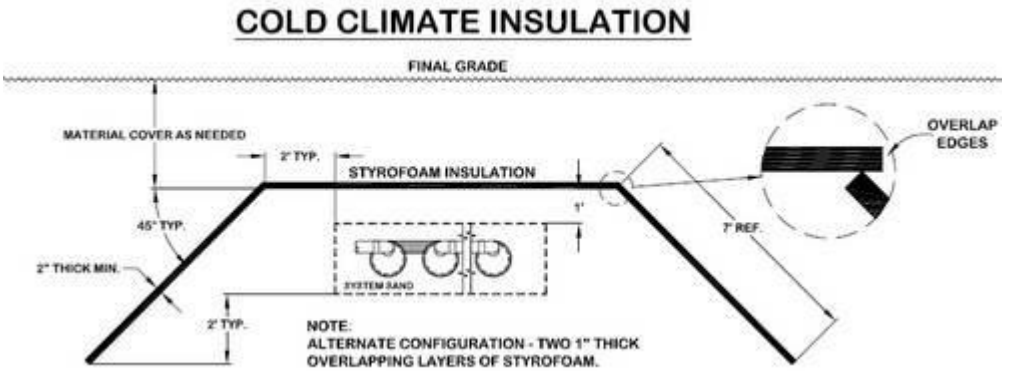
Installing a separate pump, siphon or flout chamber between the pre-tank and the *Advanced ENVIRO))SEPTIC®* field area is a method of attaining a pressure distribution equivalent to conventional pressure distribution.

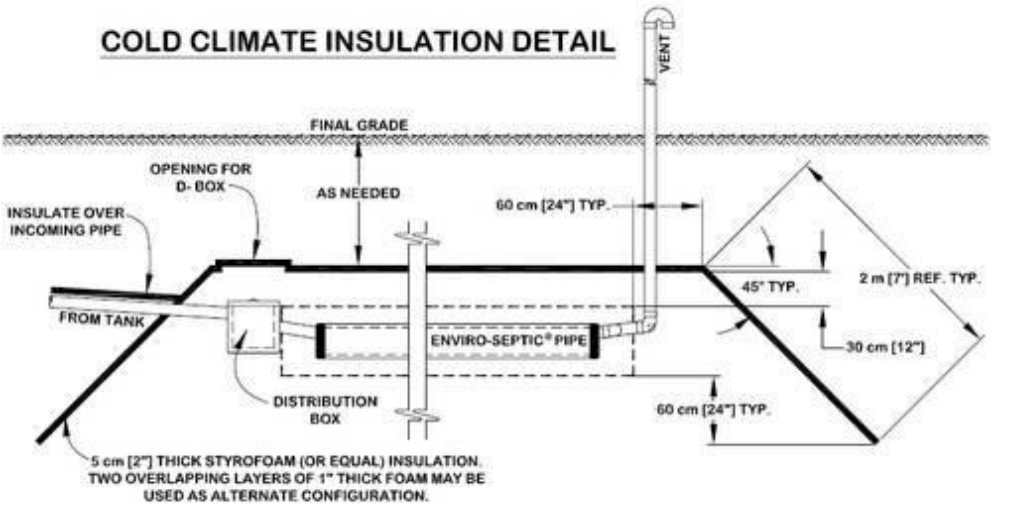
The dose volume from the pump, siphon or flout should be set to deliver periodic small doses of effluent to a conventional distribution box fitted with flow equalization mechanism for distribution into the ENVIRO))SEPTIC® dispersal field laterals.

The small doses of effluent is to be enough to flood the distribution box for at least one minute periodically to the *Advanced ENVIRO))SEPTIC® pipes*.

The dosing device should be installed, tested and maintained as per the manufacturer's recommendations. The dosing device is to be installed to allow for easy access from grade for cleaning and maintenance.

## 14.0 Cold Climate Frost Protection Measures



## 15.0 Vehicle Loading

### H10 – Vehicle Loading

The *Advanced ENVIRO))SEPTIC® pipes* when installed in accordance to this manual shall not collapse or fail to treat sewage wastewater in the event that a light weight vehicle rated up to H10 loading inadvertently crosses over or rides on top of the *Advanced ENVIRO))SEPTIC® pipes.*

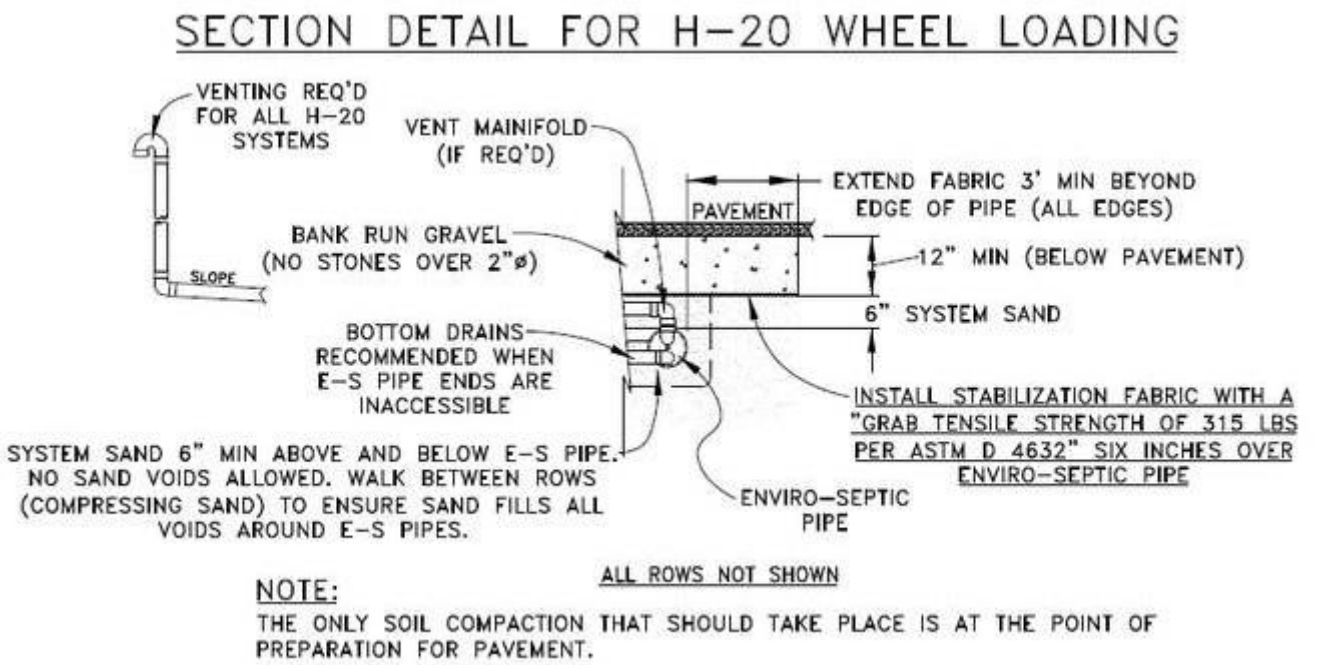
In order to aid in the prevention of sand and soil compaction, a qualified designer should consider additional measures if the site is intended to receive high frequency H10 vehicle traffic loading for activities such as, but not limited to, golf course buggies. Without additional design measures to prevent soil and sand compaction in a drain field or ENVIRO))SEPTIC® based system, no vehicle traffic should be permitted at any time.

Light weight items such as garden tractors are acceptable.

---

### H20 - Vehicle Loading

For site conditions wherein a portion or all of the *Advanced ENVIRO))SEPTIC® system* is placed to accommodate H20 vehicle loading, the *Advanced ENVIRO))SEPTIC® system* shall be installed in accordance with the following drawing detail and as confirmed by a qualified engineer:




"Pavement" as noted above shall be either of

1. A minimum of 150 mm (6") thick reinforced concrete, or
2. A minimum of 200 mm (8") thick of non-reinforced concrete or asphalt, or
3. A minimum of 250 mm (10") thick of compacted clean, washed crushed angular stone / material with a particle size of not less than 3 mm and not more than 13 mm diameter.

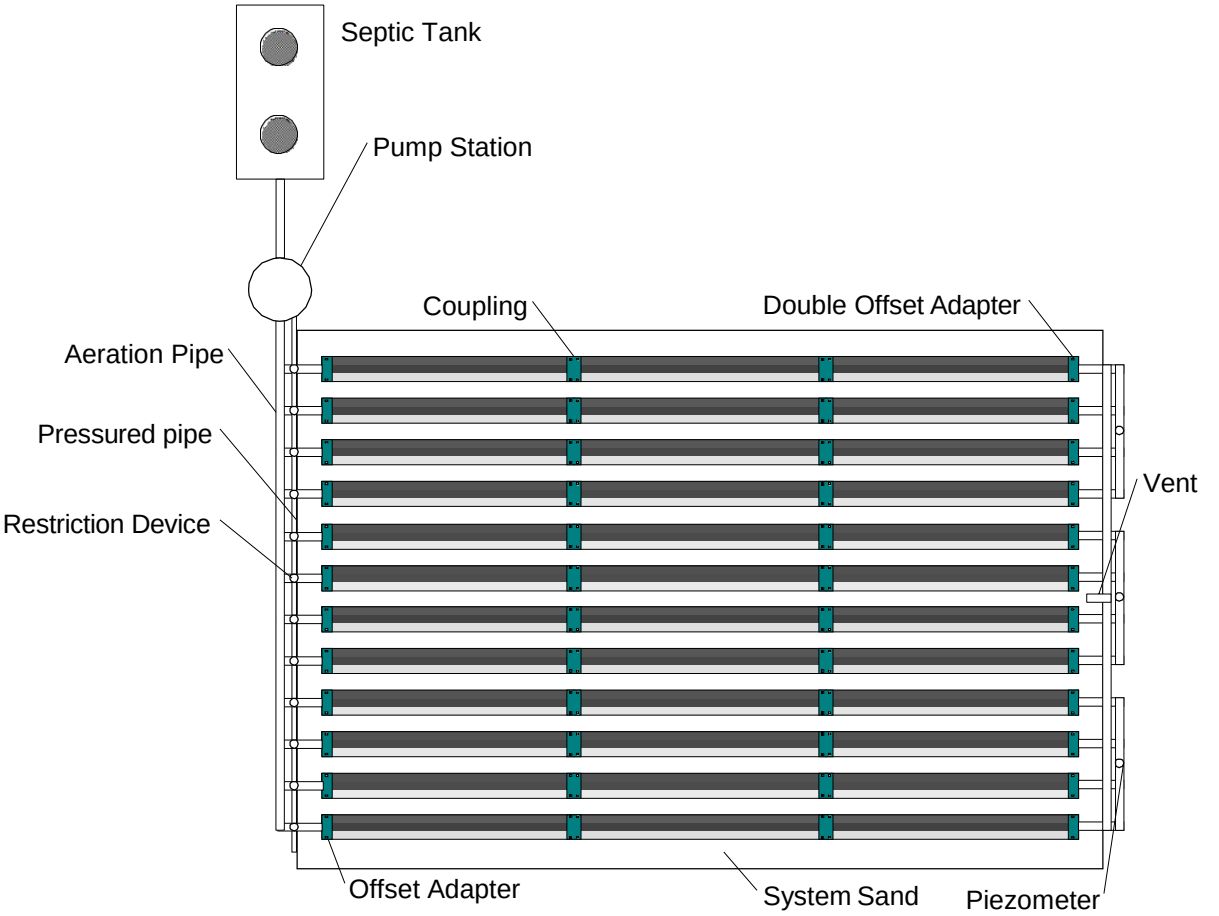
## 16.0 Low Pressure Distribution Method

It is recommended that this method of distribution be considered by the project designer when the daily sewage flow is > 10,000 litres.

This system uses a low pressure distribution proprietary device to feed directly into each row of *Advanced ENVIRO))SEPTIC®* rows.

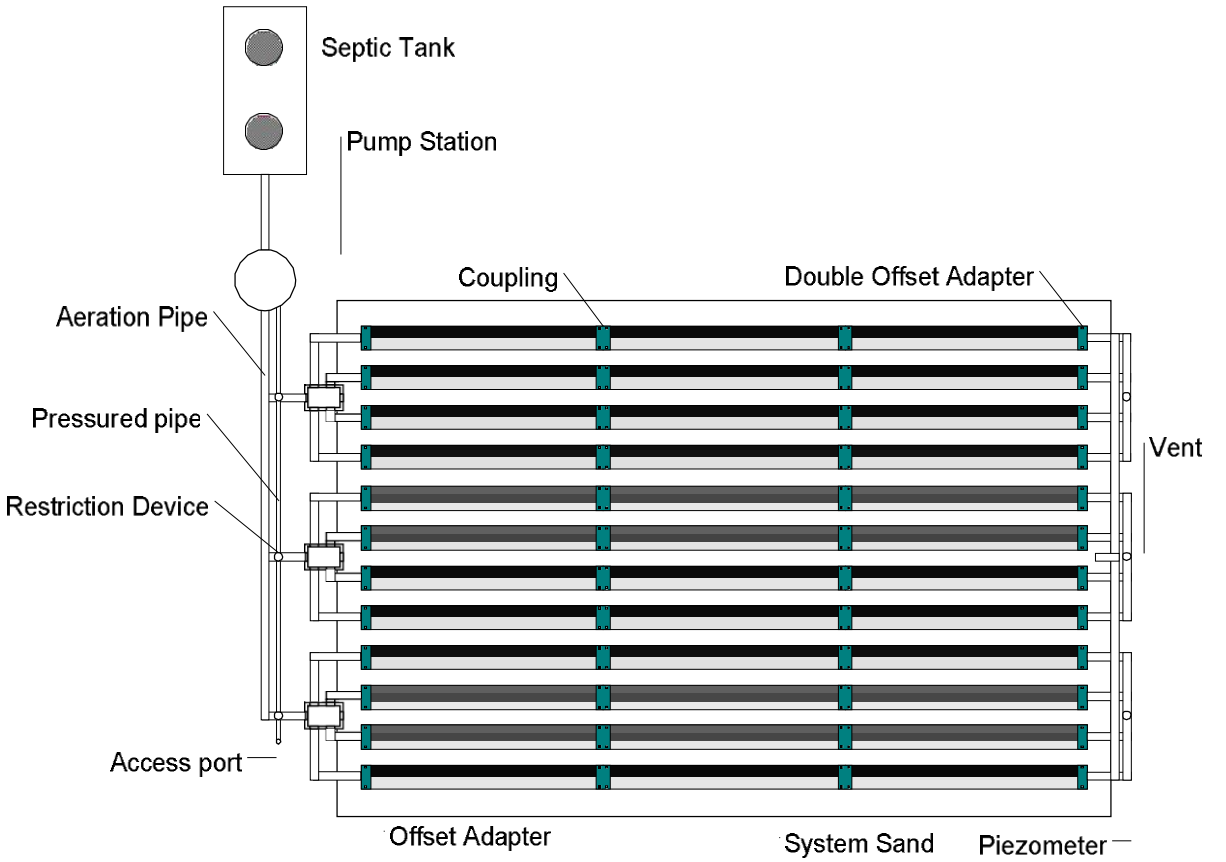
The pump system is combined with proprietary restriction device on the distribution pipe in each row. This allows for even distribution among the rows of pipes.

This technique is used mainly when the number of rows is more important. A shunt pipe or a high vent must then be used to permit air circulation in the system.



## 17.0 Zoned Low Pressure Distribution

For systems with a very larger daily flows using zones for distribution, the Project Designer could consider the low pressure distribution system divided into zones. The wastewater volume between several feed pipes. The volume passing through these pipes is then directed among the zones of rows of pipes via a distribution box.



# ADVANCED ENVIRO-SEPTIC® Installer's Check List
# For a System Under 10,000 litres / day

1.0 Installation Company's Name: _____

1.1 Lead Personnel Onsite During Construction Name: _____

1.2 Provincial License (ROWP) Number of Lead Personnel Onsite _____

1.3 Contact Phone No. Office (____)_____Mobile No. (_____) _____

1.4 Mailing Address: _____

_____

Property Owner's Name: _____ Mailing Address _____
(if different)

Site Address _____ _____

_____ _____

Owner's Phone: _____ Email: _____

Treatment Method Type ☐ 2 ☐ 3

Daily Design Flow Rate:_____litres per day

Drain Field Type: ☐ In-Ground Bed ☐ Above Ground Bed ☐ Trench

Date of Installation: _____ Date of Start-Up or In-use: _____

Placing of Grass Vegetation ☐ by Authorized Installation Contractor ☐ by Property Owner

Placing of Grass Vegetation completion Date: _____

Pre-Tank Volumetric Capacity _____ litres & state tank manufacturer _____

Gravity or Pump-to-Distribution Box _____

Distribution Box Type (concrete or plastic) _____ State Brand: _____

If pump, state brand, model and voltage of pump _____

Number of Advanced Enviro-Septic® pipes per row _____ Number of Rows of Advanced Enviro-SepticÄ _____

| | YES | NO | Remarks / Notes |
|---|---|---|---|
| Pump Pressure Reducer Installed | | | |
| Distribution Box Level | | | |
| Distribution Box flow out is equal per pipe | | | |
| System is Venting freely (use smoke test) | | | |
| There is a 10 ft air vent differential | | | |
| Lower Vent is protected from snow cover | | | |
| Foam Insulation applied to Distribution Box | | | |
| Foam Insulation applied to Pre-Tank and Pre-Tank Risers | | | |
| Approved and Listed System Sand was used | | | |
| Enviro-Septic® Rows are nominally level | | | |
| Aerable Topsoil with no clay installed | | | |
| Effluent Sample Port Install (optional) | | | |
| 5% slope or crown installed with topsoil | | | |
| Grass Vegetation is in place and growing | | | |
| Maintenance Inspection Agreement Given to Owner | | | |
| This Check List submitted to DBO Expert Inc. | | | |