

KITSAP COUNTY BOARD OF HEALTH ORDINANCE 2008-01

ONSITE SEWAGE SYSTEM AND GENERAL SEWAGE SANITATION REGULATIONS

**Policy #31: Construction Standards for Sand Lined Trench Systems**

**Effective Date: December 1<sup>st</sup>, 2011, revised 3/7/16**

**Purpose:** The purpose of this policy is to establish specific construction standards for Sand Lined Trench Systems intended, or required, to protect onsite sewage systems.

**Application Standards**

**1.1. Location Requirements**

- 1.1.1. The minimum setback requirements for sand lined trench systems are the same as dispersal components.
- 1.1.2. On sloping sites, the bottomless sand filter must be aligned with its longest dimension parallel to the contours so as not to concentrate the effluent into a small area as it moves laterally down slope.
- 1.1.3. The bottomless sand filter must not be aligned, by design or construction, perpendicular to the contours.
- 1.1.4. On all sites the bottomless sand filter must be as long and narrow as possible to limit the linear loading rate of effluent to assure that all effluent infiltrates into the natural soil before it reaches the toe of the filter media.
- 1.1.5. If the site does not permit the design of a “long and narrow” bottomless sand filter along the contours of the site, other onsite sewage treatment and disposal technology must be selected. Bottomless sand filter systems are only suitable for sites where all of the design and site criteria can be satisfactorily met.
- 1.1.6. When a bed is permitted, two or more bottomless sand filters on the same downhill plane are not permitted, unless the distance between beds is so great that a curtain drain meeting all the required setbacks can be properly installed between the farthest extensions of the two beds.

## 1.2. Installation Issues

- 1.2.1. Check the moisture content of the soil at 7-8 inches deep. If it is too wet, smearing and compaction will result, reducing the infiltration capacity of the soil.
- 1.2.2. In order to prevent differential settling when the sand lined trench system is put into service, the filter media must have a uniform density throughout.
- 1.2.3. A geotextile filter fabric must be placed on the gravel bed. The cover soil must be capable of maintaining vegetative growth while not impeding the passage of air.
- 1.2.4. Both the top surface of the filter media and the bottom of the excavation must be level within  $\pm 0.5$  inch. However, the surface should be broken up with the backhoe teeth to minimize the formation of a distinct layer between the sand and the original, undisturbed soil.

## Design Standards

### 1.3. Filter Bed

#### 1.3.1. Coarse Sand Media Specification

The filter media must meet items a, b, and c, below:

- a. Particle size distribution

Sieve	Particle Size	Percent Passing
3/8 in	9.50 mm	100
No. 4	4.75 mm	95 to 100
No. 8	2.36 mm	80 to 100
No. 16	1.18 mm	45 to 85
No. 30	0.6 mm	15 to 60
No. 50	0.3 mm	3 to 15
No. 100	0.15 mm	0 to 4

- b. Effective Particle Size (D10) > 0.3 mm.
- c. Uniformity Coefficient (D60/ D10) < 4.0

### **1.3.2. Filter Bed Sizing**

2.1.2.1 Sizing the Infiltrative Surface – The minimum required infiltrative surface area must be determined by dividing the design flow estimate by the loading rate of the receiving soils.

2.1.2.2 Depth of Media – The depth of filter media is dependent up the treatment level required of a given site. There must always be a minimum depth of 12 inches of filter media regardless of the level of pretreatment.

2.1.2.2.1 In order to be expected to produce effluent meeting Treatment Level B, a minimum depth of 24 inches of filter media is required regardless of the level of pretreatment. This means that a sand lined trench system with a minimum of 24 inches of media preceded by a treatment technology identified on the List of Registered On-site Treatment and Distribution Products as meeting Treatment Level B can be expected to produce effluent meeting Treatment Level A.

**1.3.3. Excavation Depth** – The infiltrative surface at the bottom of the filter media must be installed at least 6 inches in to original, undisturbed soil, except where the original soil is Soil Type 1. The maximum excavation depth for the filter media placement shall not exceed ten feet from finish grade.

**1.3.4. Absorption beds** are allowed if the receiving soil is Soil Type 1, 2, 3 or fine sand. The maximum bed width must be no greater than 10 feet.

**1.3.5. Filter bed containment:** The bottomless sand filter containment vessel must be designed and constructed to conform to the containment standards set forth in Section 1.7.

## **1.4. Wastewater Distribution**

**1.4.1. Pressure distribution:** Pressure distribution is required and must comply with the pressure distribution standards and guidance. This requirement applies to all pressure distribution related components.

- 1.4.2. A minimum of one orifice per 6 ft<sup>2</sup> of infiltrative surface area, evenly distributed, is required.
- 1.4.3. Wastewater application to the filter bed: The wastewater must be applied to the layer of drain rock atop the filter media, or sprayed upward against the top of gravelless chambers.

## 1.5. Air Coil

An Air Coil may be called for as a requirement by the designer. When required it is to be installed between the native ground surface and the sand interface.

## 1.6. Monitoring Ports

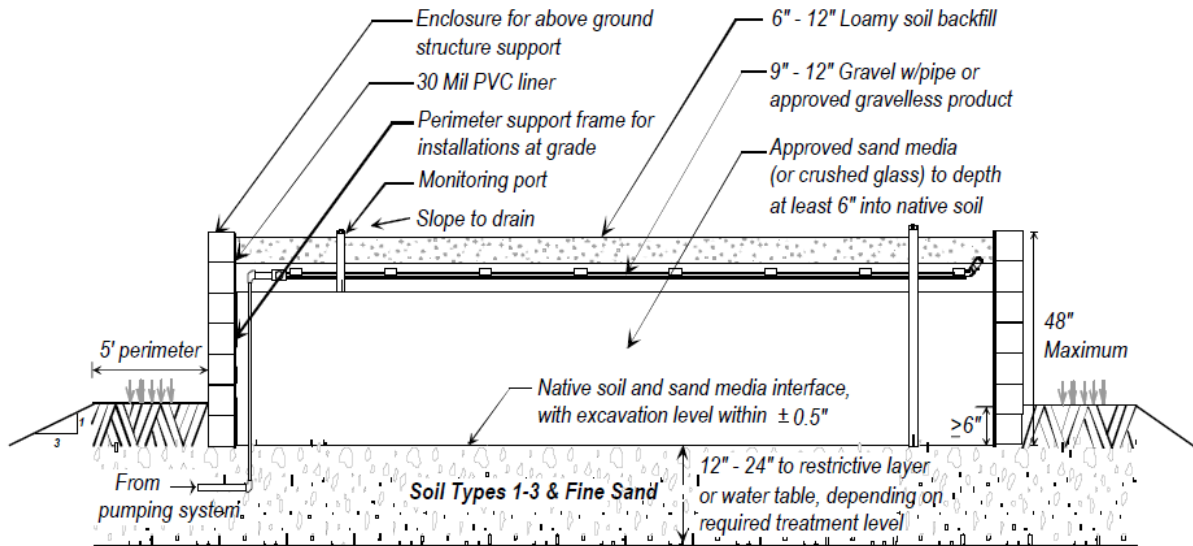
2 monitoring ports are required. 1 installed to the native soil at the bottom of the dispersal trench and the other to be installed at the sand/gravel/chamber interface.

1.7. **Containment Vessel:** All bottomless sand filter enclosures with containment walls over four feet in height measured from the bottom of the footing to top of the walls must be designed by a professional engineer. Unique site conditions may exist that require an engineer to design a containment vessel for walls less than 4 feet in height. Contact the local building department for any additional local requirements. Bottomless sand filter enclosures must meet the following minimum requirements:

- a. Containment walls must be watertight and lined with a 30 mil PVC liner with all boots, patches, repairs, and seams having the same physical properties as the liner material.
- b. Any penetration through the PVC lined wall shall be done with a PVC boot attachment glued to the liner with the appropriate vinyl sealer. Check with liner manufacturer for a compatible sealer.
- c. Support walls are needed to prevent caving of the filter walls during construction. These walls shall be rigid and made of plywood (or equivalent) and support boards.
- d. A permanent top frame structure consisting of decay resistant material must be provided on any portion of the enclosure that is installed above grade. The perimeter of the enclosure may be bermed with native soil or other material such as decorative block or other non-degrading materials.

1.8. Figures

**Figure – Example of Bottomless Sand Filter Enclosure (filter bed containment walls above grade)**



**Figure – Example of Bottomless Sand Filter Enclosure (distribution system containment walls above grade)**

