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| Title: Subsurface Drip Systems | Page 1 of 6 |
| Number: [Administrative] Policy OSS-19 | Effective Date: January 13, 2021 |
| Applies To: Construction Standards for Subsurface Drip | Supersedes: 06/09/2015 |
| Approved: John Kiess, Division Director | Next Review: As Needed |

A. Purpose

The purpose of this policy is to establish specific construction standards for subsurface drip intended, or required, to protect onsite sewage systems.

B. Policy Statement

The following policy and procedures shall be followed when designing, reviewing, and installing any subsurface drip design.

C. Implementing Procedures

1. Component Requirements

- a. Filters (disk or fine-mesh screen type) in accordance with dripline manufacturer's specifications.
- b. Designers must specify the filter that is recommended by the manufacturer of the dripline used.
- c. The manufacturer must warrant filters for use with wastewater (resistant to corrosion).
- d. All filters must be sized to operate at a flow rate at least equal to the maximum design discharge rate of the system. Filter backwash must be included in calculating the maximum discharge rate (where applicable).
- e. Filters may require backwashing in accordance with manufacturer's recommendations or may be the continuously self-cleaning type.
 1. System flush volume and velocity must be in accordance with filter specifications.
 2. The flushing method must be specified by the designer/engineer.

3. Configurations utilizing continuous flush require the installation of a return flow meter.
- f. Air/Vacuum Relief Valve(s) must be installed at the high point of each distribution sector. All valves must be installed in a valve box with access to grade and include a gravel sump.
- g. Supply and Return Manifolds to distribute effluent to dripline and to collect filter backwash and line-flushing debris:
 1. Must return to the pump tank when utilizing continuous flush; or
 2. May return to the trash tank when advanced treatment is used. The designer must ensure that the returned flow will not exceed the daily approved maximum capacity of the advanced treatment unit, and that the returned flush debris minimizes disruption of settled solids.
- h. A wastewater flow meter must be installed in a readily accessible location for reading and servicing.
- i. Select drip line to comply with Table 2.

2. Layout / Configuration

- a. For systems with 1000 emitters or more or for any system installed in Type 6 soil, at least 2 separate distribution sectors (zones) are required. Dosing must be automatically alternated between each sector.
- b. A ground cover (turf or other appropriate landscaping) must be planted over the dripfield after installation to prevent erosion of the drip field area.
- c. Dripline
 1. In soil types 4, 5, and 6 dripline installation should only occur when the soils are dry, in order to prevent compaction and smearing. Compaction and smearing significantly reduce the infiltrative capacity of the soil. If the soil is wet enough to form a wire when rolled between the hands, then it is too wet for dripline installation. The installer must verify moisture content at the depth specified for dripline installation during construction. If the site is too wet, the installation should not proceed until conditions are suitable, as determined by the designer.
 2. Dripline must be installed only by hand trenching, vibratory plow, tracked trenching machine, or a proprietary dripline insertion tool.
 3. Must be installed level and parallel to contours on sloped sites.
 4. Dripline manifold and loop ends must be constructed of non-perforated piping.
 5. Minimum emitter spacing is 12 inches for all soil types (6 inches in type 1 and 2 soils with pretreatment meeting Treatment Level B – see Table 1).

6. Minimum dripline spacing depends on soil type (see Table 1). Dripline spacing must be increased by one foot from the values in Table 1 where slopes are > 20% (see footnote number 3 below Table 1).
7. The minimum number of emitters is listed in Table 1.
8. Maximum daily discharge per emitter depends on soil type (see Table 2).
9. Minimum dosing is 12 times per day.
10. Maximum length of each dripline run (lateral) must be in accordance with manufacturer's recommendations to ensure equal distribution (maximum allowable flow variance between any two emitters in a distribution zone is 10%).
11. When turbulent flow emitters are used, maximum elevation difference between any two emitters in the same distribution field is 5 feet.
12. SDS on sloped sites must be designed and installed to prevent low-level drainage to lower dripline or other lower-level components such as tanks, valve boxes, etc.
13. Both supply and return manifolds are required on all systems.

3. Additional Design Requirements

The septic design is to provide specifics of how to install the system and materials to be used, per Kitsap County Board of Health Ordinance 2008A-01, Section 10. Additional requirements include:

a. Headworks Detail

1. A flow gauge or Schrader Valve (each) post filter and on the return line to ensure a means of measuring pressure post filter and return. Gauges /valves must be located in the headworks riser box.
2. Wastewater flow meter with readout in gallons.
3. Spin/Micron Filter

b. Dispersal Detail

1. Drip line layout must be shown in detail on the site plan, showing both the supply and return manifolds
2. Area for the primary and reserve must be shown based on Table 1.
3. All trees larger than 12" in diameter must be shown. If any trees are to be removed the method of removal must be indicated.
4. Identify the location of the air/vacuum relief valves to be installed.

5. A minimum of 12 inches of cover material will be placed over the dripline.
- c. Pre-Treatment Requirements
1. When the dripline dispersal component can be installed maintaining at 12-24 inches of vertical separation, dripline irrigation dispersal components shall be preceded by an Advanced Treatment component or vessel that has been approved to meet Treatment Level B or better.
 2. When the dripline dispersal component can be installed, maintaining at minimum 24 inches of vertical and no reduced horizontal setbacks, the add-on disinfection device requirements for Advanced Treatment may not be required. When Advanced Treatment is not used, the following shall be required:
 - i. An effluent filter with 1/8-inch mesh or finer is required to be installed at the outlet of the septic tank.
 - ii. Automatic flushing is required to forward flush dripline and filters with each dose cycle.
 - iii. Flush debris must be returned to the septic tank or a settling basin in a manner that minimizes disruption of settled solids.

Table 1: Drip Design Parameters:

| Select Option | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Soil Type | 1¹ | 2 | 3 | 4 | 5 | 6 | | | |
| Bedrooms | Minimum number emitters required | | | | | | | | |
| 2 | 240 | 240 | 300 | 450 | 300 | 450 | 480 | 720 | 960 |
| 3 | 360 | 360 | 450 | 675 | 450 | 675 | 720 | 1080 | 1440 |
| 4 | 480 | 480 | 600 | 900 | 600 | 900 | 960 | 1440 | 1920 |
| 5 | 600 | 600 | 750 | 1125 | 750 | 1125 | 1200 | 1800 | 2400 |
| Bedrooms | Dripline required at minimum emitter spacing (ft²) | | | | | | | | |
| 2 | 240 | 240 | 300 | 450 | 300 | 450 | 480 | 720 | 960 |
| 3 | 360 | 360 | 450 | 675 | 450 | 675 | 720 | 1080 | 1440 |
| 4 | 480 | 480 | 600 | 900 | 600 | 900 | 960 | 1440 | 1920 |
| 5 | 600 | 600 | 750 | 1125 | 750 | 1125 | 1200 | 1800 | 2400 |
| | Minimum emitter spacing (ft) | | | | | | | | |
| | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Minimum dripline spacing (ft)^{2,3} | | | | | | | | |
| | 1 | 1 | 1.5 | 1 | 2 | 1.5 | 2 | 1.5 | 2 |
| Bedrooms | Minimum dripfield area (ft²) | | | | | | | | |
| 2 | 240 | 240 | 450 | 600 | 960 | 1920 | | | |
| 3 | 360 | 360 | 675 | 900 | 1440 | 2880 | | | |
| 4 | 480 | 480 | 900 | 1200 | 1920 | 3840 | | | |
| 5 | 600 | 600 | 1125 | 1500 | 2400 | 4800 | | | |
| | Minimum number of distribution zones | | | | | | | | |
| | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |

1 Drip trenches/beds in "Type 1 soils must be filled with a minimum 2 feet of coarse sand below the dripline and 6 inches (8-10 inches if frost is a concern) above the dripline. Minimum sand depth may be reduced to 1 foot below dripline if pretreatment meets Treatment Level A.

2 For soil types 3-5, reduced dripline spacing may be specified by the designer/engineer on the Building Site Application, however additional dripline must be installed, utilizing 100% of the required dispersal area per Table 1.

3 Where slopes are > 20% dripline spacing to be increased by one foot from the values outlined in this table.

Table 2. Maximum Emitter Discharge Rates by Soil Type (gallons per hour)

| Soil Type | 1,2 | 3 | 4 | 5 | 6 |
|---|------------|----------|-----------------|----------|----------|
| Geoflow Dripline with PC emitters | 1.02 | 1.02 | 0.53 | 0.53 | 0.53 |
| Geoflow "Classic" Dripline (<i>non PC emitters</i>) | 1.33 | 1.33 | Not recommended | | |
| Netafim Dripline | 0.92 | 0.92 | 0.62 | 0.62 | 0.42 |