

# ON-SITE SEWAGE CONSTRUCTION MANUAL FOR STANDARD SYSTEMS



## KLICKITAT COUNTY

Minimum standards and recommendations expected for the construction of on-site wastewater treatment and disposal systems in Klickitat County.

The intent of this packet is to provide as much information for installers and homeowners regarding proper procedures for installing a gravity flow on-site sewage disposal system.

**Washington State Administrative Code 246-272A** requires a detailed design prior to issuance of a septic permit. Klickitat County allows the homeowner to both design and install a standard gravity system if not adjacent to a marine shoreline.

**WAC 246-272A** requires all other treatment levels to be designed by a licensed on-site designer or a professional engineer; all other treatment types must also be installed by a licensed septic installer.

You are required to have the approved design and signed permit on hand during construction of the OSS. It is important to keep an open line of communication between the Health Department, the installer, the designer, and the homeowner.

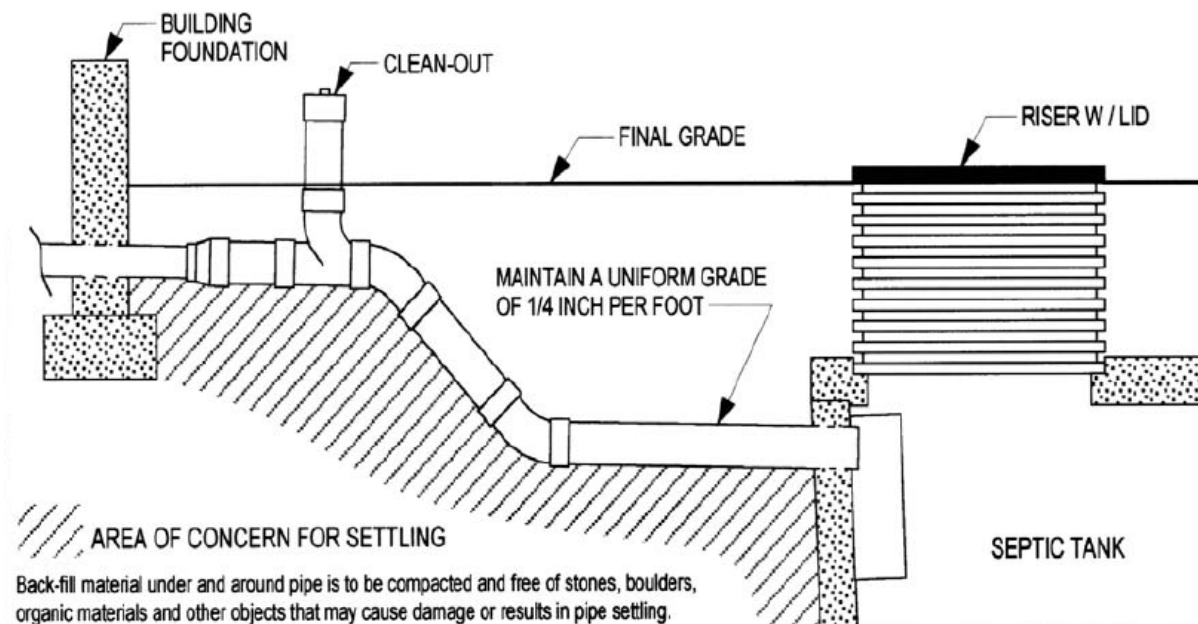
The installer must notify the designer and Health Department when the installation is ready for a final inspection. When conditions on the site are different than those noted on the design, the installer is obligated to inform both the Health Department and the designer, or if they plan to change or deviate from the original design.

**ENSURE YOU HAVE COMPLETED THE SITE AND SOIL EVALUATION BEFORE SUBMITTING YOUR ON-SITE SEWAGE DESIGN**

## SECTION 1

### BUILDING SEWER REQUIREMENTS

- Building sewer line out can be three or four inches in diameter and must be a minimum of ASTM 3034.
- The grade on all parts of the building sewer line must be 1/4 inch **MAXIMUM** fall per foot with a **MINIMUM** of 1/8 inch fall per foot. All transport line or sewer lines should be bedded to prevent sagging. Ensure to remove all stones, wood, organic debris, or objects that may cause damage.
- At least one sewer clean-out must be installed prior to the septic tank and/or 2 feet from the foundation or skirting of the structure. Clean-outs must be installed at 50 foot intervals.
- If elbows or bends are necessary, they cannot be greater than a 45 degree angle, unless it is a soft or long sweeping 90 degree bend. When a vertical drop and/or a change of direction of the building sewer is necessary, use a long sweeping 90. Clean-outs are recommended at angles of 45 or greater.
- Any pipe crossing under a driveway, parking area, or vehicular encroachment area must be buried 36 inches in the ground or bedded, and encased in 5 inch or 6 inch schedule 40 PVC.
- All lines must be constructed to be watertight, cleanly glued and/or gasketed, and be the uniform grade of 1/4 inch per foot.
- The sewer out line from the building shall be bedded in a manner that assures it is;
  - Free from stones, boulders, or other objects that may cause damage
  - Free of organic material (wood, sod, etc.) that may decompose
  - EVENLY supported along its entire length; and
  - Unlikely to settle
- By minimizing high and low spots while digging will reduce the potential for settling, sagging, or broken fittings.
- When connecting the sewer line to the tank, ensure an adequate watertight seal is made and the pipe is bedded to relieve some inevitable settling.



## SECTION 2

### SEPTIC TANK REQUIREMENTS

- All sewage tanks must be installed and bedded in a manner that assures they are;
  - Level
  - Free of stones or boulders
  - Free of organic material
  - Evenly supported throughout the entire area beneath the tank
  - Installed in accordance with manufacturers specification
  - Unlikely to settle
- Single family residences with 1- 4 bedrooms are required to have a minimum of a 1,000 gallon septic tank. For each additional room, add 250 gallons.
- The septic tank must be set on undisturbed soil or by the manufacture's standards and have a minimum of 6 inches of cover.
- All pipes connecting to the tank must be water-tight with the proper slope.
- Access to the tank for inspection and maintenance at finished grade is required. **Risers must bring access to the tank to grade. All lids must be secure.**
- **Installation of an effluent filter is strongly encouraged.**
- All pipe entering and exiting the tank should be bedded and construction practices must prevent the pipes from "sagging" after cover.
- All septic tanks must be from the approved list provided by the Washington State Department of Health.
- Tanks installed in areas with known high groundwater levels that may be affected by buoyancy must be secured from flotation. This can be accomplished by utilizing anti-flotation rings from the manufacturer or by filling the tank with water. It is important to 'tamp' and grade the top soil around the tank to allow run-off to move away from the tank.

### TRANSPORT LINES

- The transport line from septic tank to d-box must have a minimum grade of 1 inch of fall per 100 feet and be water tight.
- Absorption areas significantly lower in elevation are required to have a splash box to reduce excessive effluent flows to the d-box. You may also install a 90 degree sweep pointing in the 6 o'clock position to reduce flow into the d-box.
- Crossing domestic or irrigation water lines is to be avoided. If this is not possible, contact the Health Department concerning standard practices.

### DISTRIBUTION BOX (D-BOX)

- All unused outlets in a d-box must be water tight.
- A method must be utilized to ensure the inlet flow is divided equally to all outlets. This can be done by using "flow meters or speed levelers," or installing a 90 degree sweep faced down toward the bottom of the d-box.
- The d-box must be set on undisturbed soil and 5 feet minimum from the beginning of the lateral trenches.

## SECTION 3

### INITIAL AND REPLACEMENT ABSORPTION AREA REQUIREMENTS

- A minimum of 36 inches of undisturbed, native soil, is required between the bottom of the trench and the restrictive layer. Vertical separation is measured from the top of the slope while trench depth is measured from the bottom of the slope.
- Rigid, four inch perforated pipe meeting ASTM 2729 is required. Each lateral must be laid level with a cap glued to the end. The perforations must be in the 5 and 7 o'clock position.
- Gravel absorption beds must be covered with a non-woven geotextile filter fabric before covering. A minimum of 6 inches of drainrock is required under the perforated pipe.
- **The system replacement area will accommodate 100% of the required square footage with NO reductions.**
- Absorption areas shall not be subject to vehicular traffic, shall not be encroached upon by buildings or structures, or be covered by impervious surfaces; including but not limited to asphalt, concrete, and swimming pools.
- **Absorption areas shall not be located or installed on slopes in excess of 25%.** Systems installed on sites with 25-33% slope, will be required to show 5 feet of vertical separation.
- Absorption areas shall not be located in areas where storm-water, drainage, or surface water accumulates. Storm-water drainage will be directed away from the dispersal area.
- Absorption trenches must run perpendicular to the slope of the land, and may need to curve around complicated areas.
- Gravelless product must meet manufacturer's installation requirements. Gravelless domes products are required to install 20 gauge, galvanized mesh screen below the product. The screen must cover 100% of the square footage used in the laterals or bed, and must also be ½ inch to 1 inch in size with hexagonal or square shape.
- The final absorption trench must be covered with a minimum of 6 inches of top soil and maximum of 24 inches. The bottom of absorption trenches need to be level, plus or minus ½ an inch.
- The length of an individual trench for gravity flow must not exceed 100 feet.
- The standard trench absorption width is 36 inches.
- Equal distribution to each lateral is required for all systems. Serial distribution requires sign-off by Klickitat County Health Department.

**Continue to the next page.**

## MINIMUM HORIZONTAL SETBACKS

Items Requiring Setback	From edge of soil dispersal component and reserve area	From sewage tank and distribution box	From building sewer and non-perforated distribution pipe
Well or suction line	100 ft.	50 ft.	50 ft.
Public drinking water well	100 ft.	100 ft.	100 ft.
Public drinking water spring measured from the ordinary high-water mark	200 ft.	200 ft.	100 ft.
Spring or surface water used as drinking water source measured from the ordinary high-water mark	100 ft.	50 ft.	50 ft.
Pressurized water supply line	10 ft.	10 ft.	10 ft.
Decommissioned well (decommissioned in accordance with chapter 173-160 WAC)	10 ft.	N/A	N/A
Surface water measured from the ordinary high- water mark	100 ft.	50 ft.	10 ft.
Building foundation/in-ground swimming pool	10 ft.	5 ft.	2 ft.
Property or easement line	5 ft.	5 ft.	N/A
Interceptor/curtain drains/foundation drains/drainage ditches			
Down-gradient*:	30 ft.	5 ft.	N/A
Up-gradient*:	10 ft.	N/A	N/A
<b>Other site features that may allow effluent to surface</b>			
Down-gradient*:	30 ft.	5 ft.	N/A
Up-gradient*:	10 ft.	N/A	N/A
Down-gradient cuts or banks with at least 5 ft. of original undisturbed soil above a restrictive layer due to a structural or textural change	25 ft.	N/A	N/A
Down-gradient cuts or banks with less than 5 ft. of original undisturbed soil above a restrictive layer due to a structural or textural change	50 ft.	N/A	N/A
Other adjacent soil dispersal components/subsurface storm water infiltration systems	10 ft.	N/A	N/A

\*The item is down-gradient when the liquid will flow toward it upon encountering a water table or restrictive layer. The item is up-gradient when the liquid will flow away from it upon entering a water table or restrictive layer.

## HOMEOWNER DESIGN APPLICATION

### PLEASE READ

**WAC 246-272A** requires individuals to obtain an on-site sewage permit prior to construction. This includes any person proposing the installation, repair, modification, connection to, or expansion of an on-site sewage system. This permit is applicable to residential sources of sewage producing less than 3500 gallons per day. This chapter can also be applied to nonresidential sources of sewage if treatment, siting, design, installation, and operation and maintenance measures provide effluent dispersal required of residential sources. In Klickitat County proof of adequate wastewater disposal is required prior to issuing a building permit.

The system owner is responsible for operating, monitoring, and maintaining the system to minimize the risk of failure. This includes securing the correct permits prior to construction or repairs and performing system evaluations. During the removal of solids, the homeowner should only employ approved pumpers within Klickitat County. **System owners are also responsible for protecting the tank, SSAS, and the reserve area from; impervious materials, surface drainage, soil compaction, soil removal, and ensure the flow of sewage does not exceed capacity.**

The installer of the septic system is required to; follow the approved design, have the approved design in possession during the installation, make no changes to the approved design without authorization of the local health officer, only install septic tanks approved by the State Department of Health, be on site at ALL times during the excavation and construction of the OSS, install the OSS to be watertight (except the dispersal components), cover the installation ONLY after the local health officer has given approval to cover, and backfill with 6 to 24 inches of cover material and grade the site to prevent surface water accumulation or any OSS component.

## HOMEOWNER DESIGN APPLICATION

### APPLICANT INFORMATION

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Site Address: \_\_\_\_\_

Parcel Number: \_\_\_\_\_

- |   |  |
|---|--|
| <input type="checkbox"/> Standard Gravity (\$400)             | <input type="checkbox"/> SSAS Replacement w/o Soil Log (\$300)       |
| <input type="checkbox"/> Alternative System (\$500)           | <input type="checkbox"/> System Expansion w/ Soil Log (\$150)        |
| <input type="checkbox"/> Systems $\geq$ 1000 GPD (\$1250)     | <input type="checkbox"/> System Expansion w/o Soil Log (\$300)       |
| <input type="checkbox"/> Tank Replacement (\$50)              | <input type="checkbox"/> Permit Renewal (\$110)                      |
| <input type="checkbox"/> SSAS Replacement w/ Soil Log (\$150) | <input type="checkbox"/> Connection to LOSS/Community System (\$100) |

**Continue to the calculations and site plan pages.**

## System Calculations (note: you will need your site evaluation for this part)

**NOTE:** These calculations only apply to single family residences. Please contact the Health Department regarding alternative projects. The system design flow is determined by the **number of bedrooms multiplied by 120 gallons. The minimum design flow for any on-site sewage system is 240 gpd.**

**Step 1.** # of bedrooms: \_\_\_\_\_ X 120 = \_\_\_\_\_ gallons per day (design flow)

- For a home serving 4 bedrooms or fewer, the minimum septic tank size is 1000 gallons. For homes with more than 4 bedrooms, an additional 250 gallons per bedroom is required.

**Step 2.** # of bedrooms \_\_\_\_\_ = \_\_\_\_\_ minimum tank size

- Refer to your soil log or site evaluation report to calculate the maximum trench depth. For standard gravity systems there must be 36" of vertical separation from the restrictive layer.

**Step 3.** Depth of test pit or restrictive layer: \_\_\_\_\_ - 36" = \_\_\_\_\_ **maximum** trench depth

- Refer to the site evaluation report to determine the square footage necessary to treat sewage. The application rate will be listed. To determine the square footage, divide the design flow by the application rate.

**Step 4.** Design flow \_\_\_\_\_ / \_\_\_\_\_ application rate = \_\_\_\_\_ total square footage

- Typical trenches are 3 feet wide, divide the total square footage by 3 to get the total linear length of drainfield.

**Step 5.** Total square footage \_\_\_\_\_ / 3 = \_\_\_\_\_ total linear feet of **gravel** drainfield

**If you plan to use gravelless product**, like EZ Flo or Infiltrator domes, you will need to reduce the total square footage by a percent based on soil type. For soils types 3 through 6, there is a 40% reduction. In soil type 2, there is a 20% reduction. Soil type 1 has no reduction. **For example; if you receive a 40% reduction you multiply your total sq footage by .6 to get the remaining 60%.**

**Step 6.** Total square footage \_\_\_\_\_ X \_\_\_\_\_ % after reduction = \_\_\_\_\_ new total square footage

New total square footage \_\_\_\_\_ / 3 = \_\_\_\_\_ total linear feet of **gravelless** drainfield

### FINAL SYSTEM PARAMETERS

**Design Flow:** \_\_\_\_\_

**Septic Tank Size:** \_\_\_\_\_

**Soil Type:** \_\_\_\_\_

**Application Rate:** \_\_\_\_\_

**Trench Width:** \_\_\_\_\_

**Total Linear Feet:** \_\_\_\_\_

**Max. Trench Depth:** \_\_\_\_\_

**Pump Tank Size:** \_\_\_\_\_

**Installer:** \_\_\_\_\_

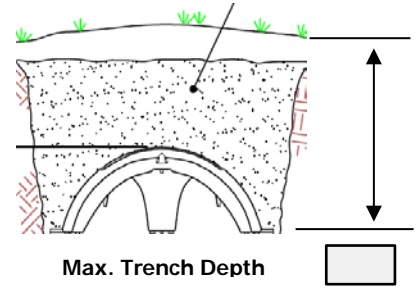
# Detailed Site Plan and Design Checklist (Ensure to include these on your drafted design.)


**Detailed site plan:**

- Show property lines and dimensions
- General topography (direction of slope and percentage)
- Show buildings (existing and planned)
- Show roads, driveways, and parking
- Setbacks to surface water, season streams, creeks
- Location of drinking water source
- Location of pressurized water lines
- Location of septic tank
- Location of d-box
- Location of initial and reserve drainfield areas
- Locations of test pits

**System layout:**

- Length of building sewer out
- Length of all transport lines
- Show lines encased or buried under roads
- Location of observation/inspection ports
- Location of clean outs
- Length of each lateral
- Distinguish type of drainfield material
- Location of any risers
- Location of other trenched utilities
- List piping material used and diameter
- Show width of drainfield laterals



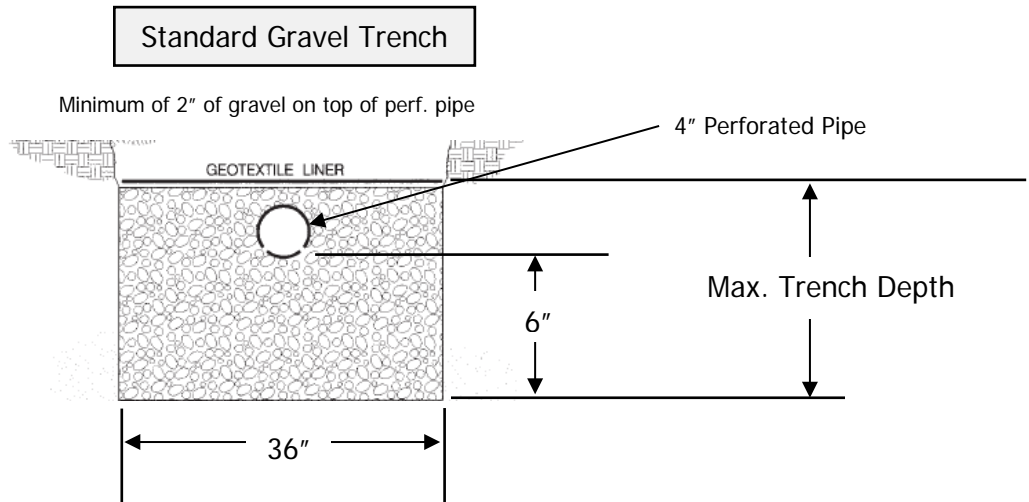
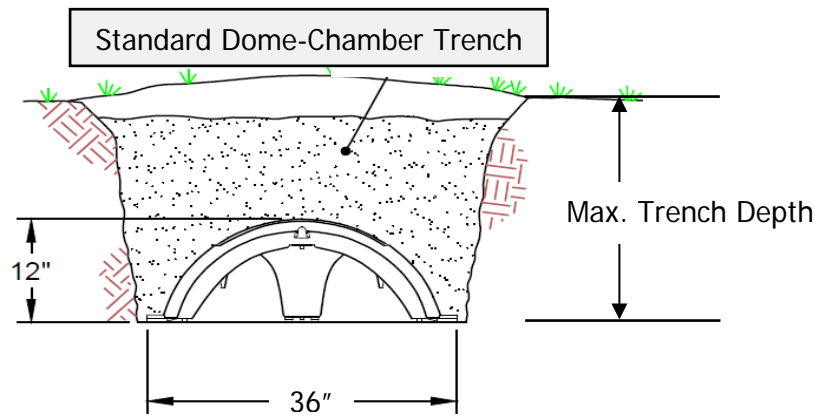
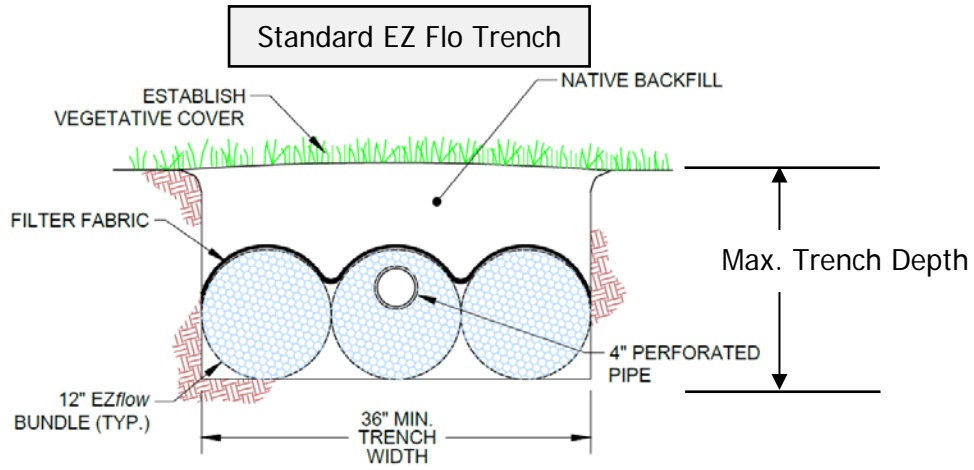
	
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**Homeowner Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_



# TYPICAL TRENCH CROSS SECTIONS EXAMPLES



# EXAMPLE DESIGN

