

Homeowner OSS Design and Construction Guide



Klickitat County

On-Site Sewage System

Construction Manual

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.

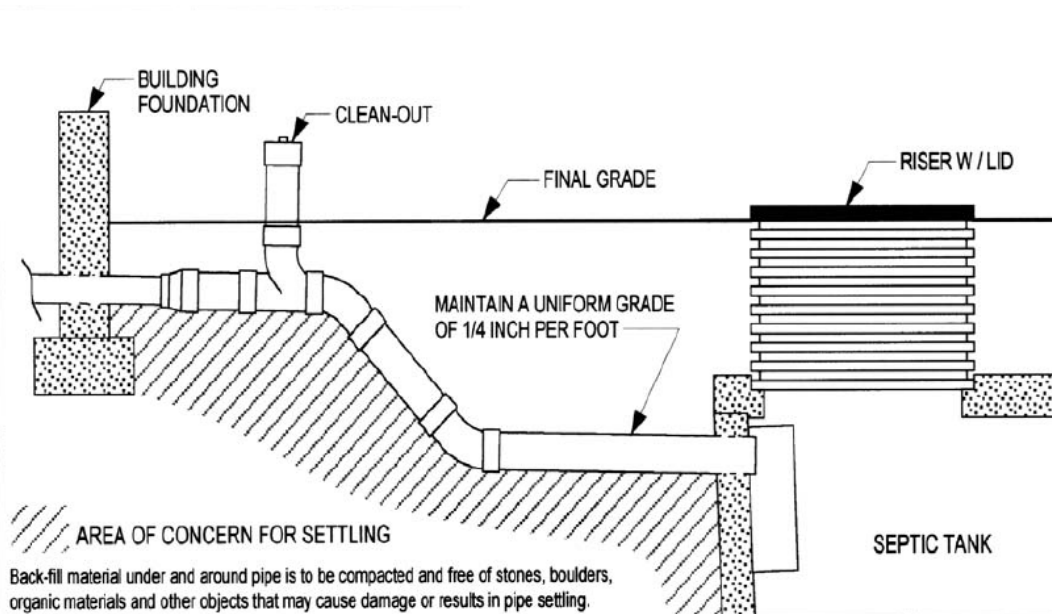
The installer must notify the designer and Health Department when the installation is ready for a final inspection. When conditions on the site are different than those noted on the design, the installer is obligated to inform both the Health Department and the designer, or if they plan to change or 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 must be 4 inches in diameter and must be a minimum of ASTM 3034.
- The grade on all parts of the building sewer must be 1/8 inch **MINIMUM** fall per foot, and the last 10 feet of pipe can be 1/4 inch **MAXIMUM** per foot.
- At least one sewer clean-out must be installed prior to the septic tank. 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 sweeping 90 degree bend. A 90 degree bend must be accompanied by a clean-out.
- 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 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 a vertical drop or change of direction is necessary, long sweeping 90 degree fittings are acceptable. Long sweeping 90 degree fittings are preferred to multiple 45 degree bends.
- 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.

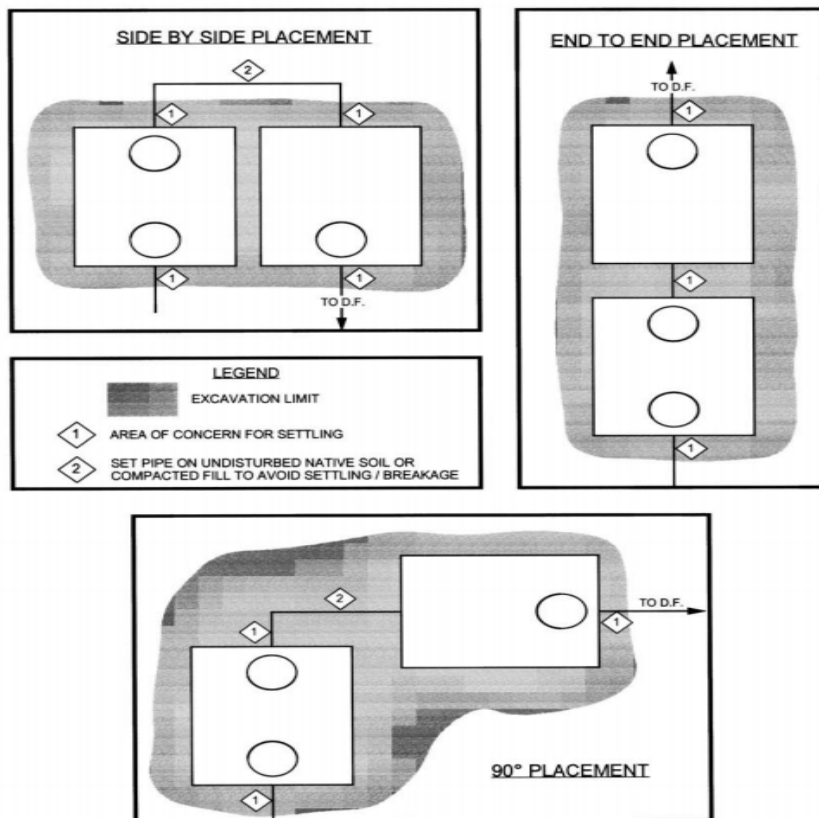


SECTION 2

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 affect 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.

TANK PLACEMENT



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 and 'max trench depth' is measured from the 'toe' 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 40%. Systems installed on sites with 30-40% 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 or down slope from the disposal 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 1/2 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.

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
Other site features that may allow effluent to surface			
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

WAC 246-272A requires individuals to obtain a 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.

Applicant Information

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Site Address: _____

City: _____ State: _____ Zip: _____

Parcel Number: _____

System Type

- | | | |
|---|--|---|
| <input type="checkbox"/> New System (<1000 gpd) \$350 | <input type="checkbox"/> Drainfield Replacement \$100 | <input type="checkbox"/> Waterless Toilet \$30 |
| <input type="checkbox"/> New System (>1000 gpd) \$1250 | <input type="checkbox"/> Tank Replacement \$50 | <input type="checkbox"/> Holding Tank \$50 |

Source of Sewage

- Residential Multi-Family Commercial Food Service
- Other: _____

Water Supply

- Private Public, system name: _____
- Well
 Spring
 Shared Well

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.

Step 6. Total square footage _____ X _____ reduction factor = _____ new total square footage
 New total square footage _____ / 3 = _____ total linear feet of **gravelless** drainfield

Final System Calculations (write n/a if there is no pump chamber)

Design Flow: _____

Septic Tank Size: _____

Soil Type: _____

Application Rate: _____

Trench Width: _____

Total Linear Feet: _____

Max. Trench Depth: _____

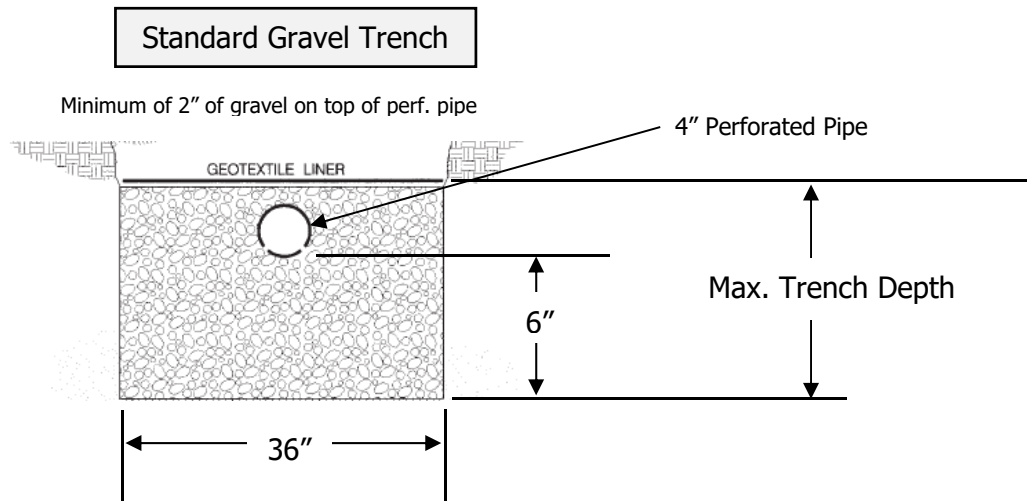
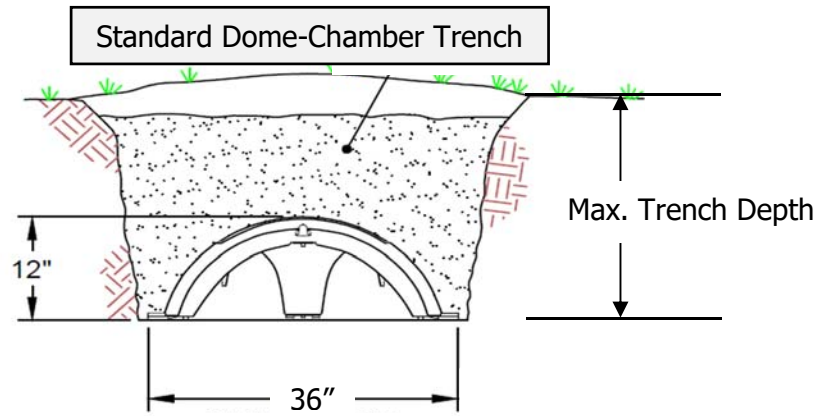
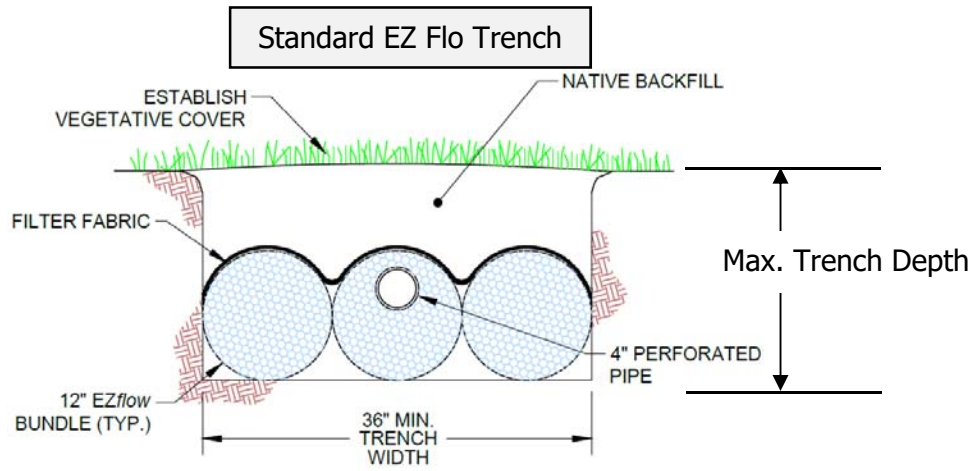
Pump Chamber Size: _____

On-Site Sewage Installer

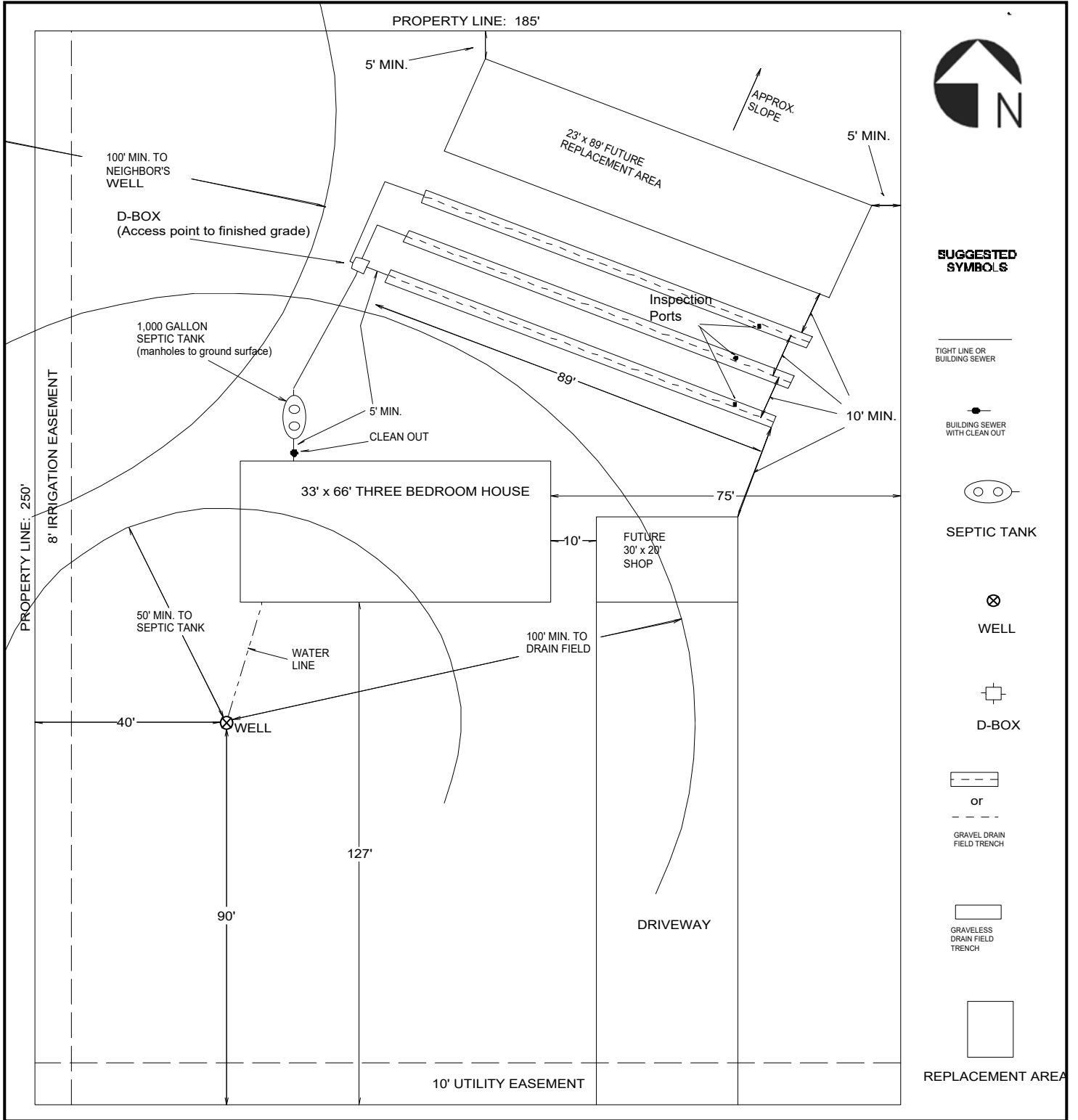
Name: _____

Phone: _____

TYPICAL TRENCH CROSS SECTIONS EXAMPLES



EXAMPLE DESIGN



SUGGESTED SYMBOLS

TIGHT LINE OR BUILDING SEWER



SEPTIC TANK



WELL



D-BOX



or



GRAVEL DRAIN FIELD TRENCH



GRAVELESS DRAIN FIELD TRENCH



REPLACEMENT AREA