

# OKANOGAN COUNTY PUBLIC HEALTH

## Design & Construction Standards for On-Site Sewage Systems

In Okanogan County, resident homeowners may design and install their own gravity-flow septic systems. All other installations must be performed by an on-site sewage system installer licensed in Okanogan County. A list of licensed installers can be obtained from Okanogan County Public Health (OCPH) upon request. This document provides guidelines for components and construction methods that will be required in order to receive permit approval from OCPH. Construction may not begin until a design has been submitted, approved, and a permit has been issued. If you have any questions about the following instructions, do not proceed with construction until you have resolved them with our staff. To speak with an on-site sewage inspector, please call our office at (509) 422-7140.

### **SECTION ONE: SITE PLAN AND DESIGN REQUIREMENTS**

- Test hole location
- System components and installation depths
- Reserve (future replacement) area
- Property lines
- Existing & proposed structures
- Well and/or water lines (including nearby neighboring wells)
- Setbacks from all pertinent elements (well, surface water, structures, property lines, etc.)
- Underground and overhead utilities
- Driveways or other traffic areas
- Location of ordinary high water levels for all surface water
- Site topography and drainage
- Encumbrances affecting system placement (easements, rights-of-way, etc.)
- North arrow

### **SECTION TWO: MATERIALS**

#### **Septic Tank**

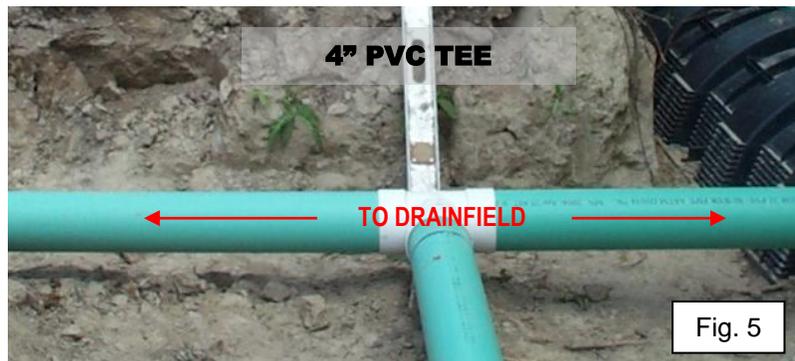
- Install only a Washington State Department of Health approved two-compartment septic tank.
- Minimum tank volume is based on the number of bedrooms in the home, as follows:

<b>Number of Bedrooms</b>	<b>Tank Volume (gallons)</b>
1 to 4	1000
More than 4	Add 250 per bedroom

- For installations serving other than single-family residential use, septic tank volume will be determined by OCPH.
- A separate tank is required for each residential structure.
- Gas-tight risers and lids are required on each tank to allow at-grade access. Septic tanks require two risers; pump chambers require one riser.
- Outlet baffle effluent filters are highly recommended.

## Tightline

- Use 4-inch PVC with a rating of ASTM D3033 or D3034 (Fig. 1) or equivalent. This pipe typically has rubber gaskets in the bell ends.
- Do **NOT** use ASTM D2729 PVC pipe (Fig. 2) or ABS pipe (Fig. 3).
- If sleeves are necessary, use 6-inch PVC (ASTM D3033 or D3034) or equivalent (Fig. 4). Call OCPH to ensure that alternative sleeving materials are acceptable.



## Distribution Box (D-box) or Tee

- PVC tee may be used on level sites, where only two drainfield laterals are needed (Fig. 5).
- Use concrete or plastic D-box (Fig. 6) to distribute flow to more than two laterals, or on sites where laterals are at different elevations.
- Do **NOT** use plastic drop boxes (Fig. 7) as distribution boxes.



## Chambers (Gravelless System)

- Approved gravelless system chambers may be used where authorized by OCPH.
- Gravelless chambers require endplates, observation ports, and splash plates (varies by model).

## Gravel Substitute (Gravelless System)



- Approved gravel substitute media (polystyrene pellets, Fig. 8) may be used where authorized by OCPH.
- Gravel substitute requires endcaps, couplers, and observation ports.

### Drainrock (Gravel System)

- Use approved material from ¾-inch to 2 ½ inches in diameter.
- Use only clean, washed material (free from sand, silt, or clay).

### Perforated Pipe (Gravel System)

- Use 4-inch PVC pipe with crush strength of 1,000 pounds or equivalent (ASTM 2729).
- Gravel systems require endcaps and observation ports.

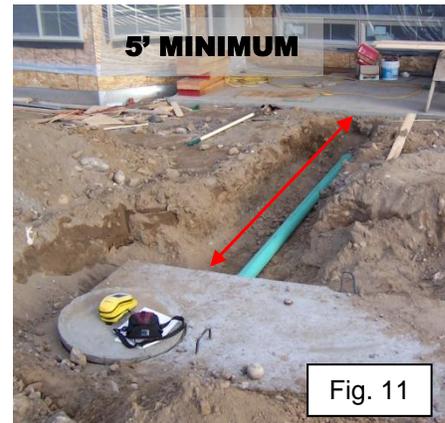
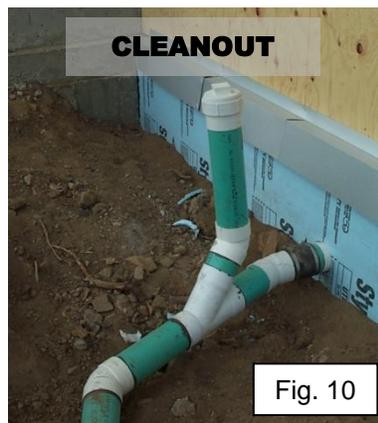
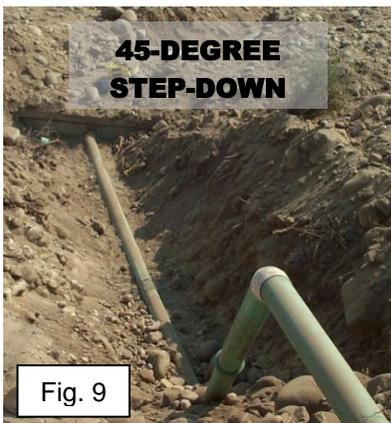
### Barrier Material (Gravel and Gravel Substitute Systems)

- Drainrock or gravel substitute must be separated from backfill material with approved filter fabric.
- Do **NOT** use other products such as untreated building paper, cardboard, newspaper, landscape cloth, or straw as barrier material.

## SECTION THREE: TANK AND SEWER TIGHTLINE CONSTRUCTION

### Tightline from House

- Maintain ¼-inch minimum drop per foot, except, last ten feet prior to tank shall be no more than ¼-inch drop per foot.
- Avoid steep drops (step-downs) unless absolutely necessary.
- When step-down is necessary, locate as close to house as possible to reduce turbulence in septic tank.
- Use two 45-degree fittings (Fig. 9) and a cleanout when a step-down is necessary.
- Use sleeves to protect tightline under roads or driveways, when crossing waterways, or within ten feet of pressurized water and irrigation lines.
- Use a cleanout where the tightline exits the structure foundation line (Fig. 10), and every 50 feet thereafter.



### Septic Tank

- Locate tank close to house to minimize need for step-downs and/or cleanouts.
- Do **NOT** install tank closer than five feet from structure footings (Fig. 11).
- Install access risers and lids to finished grade over both compartments (Fig. 12).

- Install PVC tank baffles (Fig. 13) on the inlet and outlet tightlines, even when concrete baffles are pre-cast into the tank. Concrete baffles can corrode and become ineffective.
- Extend tightline into tank so that baffles can be accessed through the tank lids (Fig. 14).



Fig. 12



Fig. 13



Fig. 14

### Tightline from Septic Tank

- Maintain minimum slope of ¼-inch drop per foot.
- Use sleeves to protect tightline under roads or driveways.
- Cover tightlines with a minimum of six inches of soil.

### Distribution Box (D-box) or Tee

- Locate D-box or tee at or above elevation of the uppermost trench to divide flow equally.
- Install D-box or tee on undisturbed or compacted soil. Do **NOT** use plastic drop boxes, which are taller than d-boxes.
- **NOTE:** D-box inlet is slightly higher than outlets.
- Level D-box or tee using a bubble level (Fig. 15).
- After installing tightline from D-box to drainfield laterals, complete final leveling with water inside the box. Install outlet levelers and rotate until all outlets flow evenly (Fig. 16).
- Consider pouring concrete around the outside base of the D-box for added stability, especially where frost heave may be a problem (recommended).
- Cover D-box or tee with a minimum of six inches of soil.
- Mark D-box location with a permanent at-grade marker acceptable to OCPH.



Fig. 15



Fig. 16

## SECTION FOUR: TRENCH PREPARATION AND DRAIN LINE CONSTRUCTION

### Trench Dimensions

- Trenches must be located in original, undisturbed soil only; **no fill**.
- Excavate bottom of trench **NO DEEPER THAN SPECIFIED ON PERMIT** at any point. In most cases, trenches should be excavated two feet deep. (Contact OCPH immediately when conditions necessitate a trench deeper than specified. Such situations will be considered on a case-by-case basis.)
- Trenches must be three feet wide, measured at the bottom of the trench.
- Rake trench bottom and sides as necessary to improve porosity of the soil.
- Trench bottom must be perfectly level for proper distribution. Follow ground contours, curving trenches if necessary, to maintain trenches at a **constant depth** as measured from original grade.

- Install a minimum of two trenches of equal length, as specified by OCPH on the permit. Trenches cannot exceed 100 feet in length under any circumstances.
- Separate trenches by a minimum of 4 ½ feet of original, undisturbed soil. A separation of ten feet is recommended.

### Pipe-and-Gravel Lateral Systems

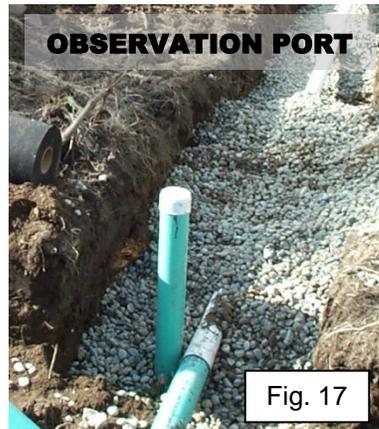


Fig. 17

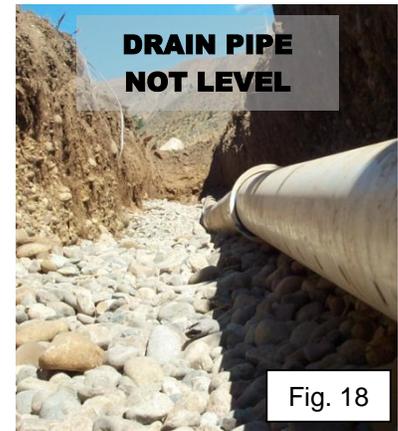


Fig. 18

- Set observation ports (consisting of a 90-degree fitting and a length of solid 4-inch pipe) upright in the trench, with the elbow fitting at the bottom, and the pipe extending above the level of final grade (Fig. 17). Place one port at both ends of each trench, next to the perforated drain pipe, about three to five feet from the ends. Cover ports with threaded or slip caps.
- Place a minimum of six inches of drainrock in the bottom of the trench, and surrounding the ports.
- Install perforated pipe laterals to proper dimensions.
- Do **NOT** install perforated pipe within five feet of D-box or tee.
- Ensure that pipe is perfectly level, or does not exceed a 6-inch drop per 100 feet (Fig. 18). Orient pipe so that drain holes are located in the 5 o'clock and 7 o'clock positions.
- Install caps on the ends of the laterals.
- Cover pipe with a minimum of two inches of drainrock. (Total drainrock depth will be at least twelve inches.)
- Separate drainrock and backfill material with approved filter fabric.
- Do **NOT** cover or backfill any portion of the system prior to final inspection by OCPH, without express written or verbal permission.
- After final inspection and approval by OCPH, cover trenches with a minimum of six inches of soil.

### Gravelless or Chamber Lateral Systems

- Assemble chambers together according to manufacturer's specifications in the bottom of the trench. (Some chambers are designed to allow for gradual curves if terrain requires.)
- Angled or adjustable sections are available to allow tighter bends.
- Use of screws to secure chambers together is recommended.
- Do **NOT** install chambers within five feet of D-box or tee.
- Use screws to attach endcaps to the first and last chambers (Fig. 19), to prevent possible collapse during backfill. (Not required on all models; check with OCPH for specific requirements.)
- Install splash plates below inlet pipe to prevent erosion of the trench bottom. A flat rock or paving stone six to ten inches across may be substituted. (Some newer endcap designs eliminate the need for splash plates; follow manufacturer's recommendations.)
- Screw inlet pipe to endcap to avoid shifting during backfill (Fig. 19). Ensure that screws do not pull inlet pipe above a level position.
- Install observation ports in the first and last chamber of each lateral (Fig. 20) to allow inspection of the drainfield.
- Observation ports must extend above final grade, and must be capped. Ports may be recessed within sprinkler-type valve boxes for mowing purposes, if desired.

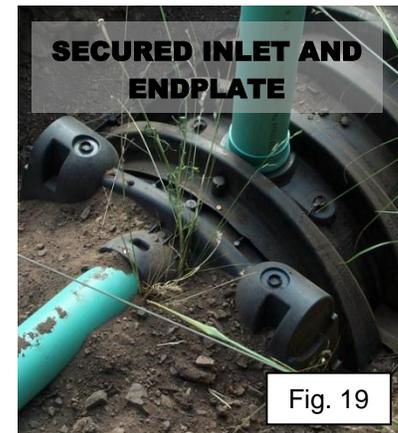


Fig. 19

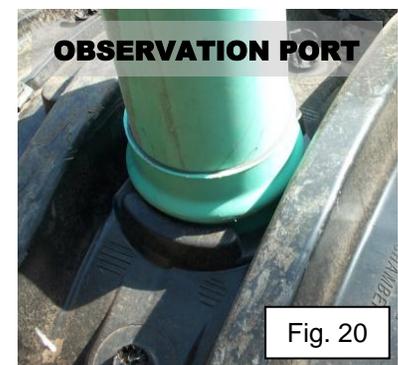
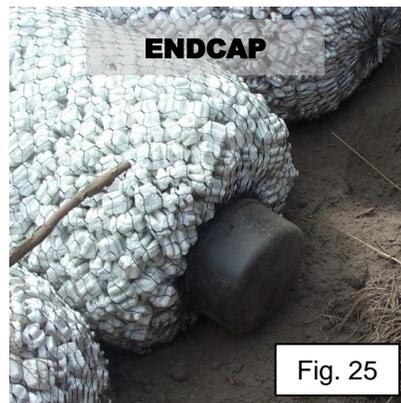
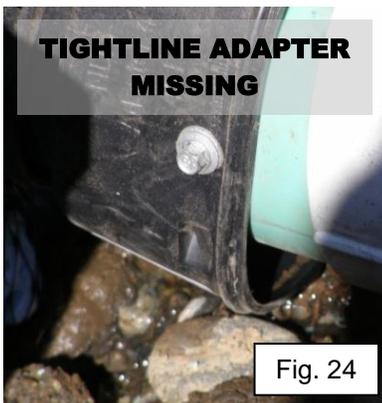


Fig. 20

- Use screws or PVC couplers (preferred) to hold observation ports in place on chambers.
- **Do NOT cover or backfill any portion of the system prior to final inspection by OCPH, without express written or verbal permission.**
- After final inspection and approval by OCPH, cover chambers with a minimum of six inches of soil.



### Gravel Substitute Systems

- Assemble center sections containing 4-inch flexible pipe according to manufacturer's specifications.
- **NOTE:** Drain pipes are offset in pellet bags; be sure to orient bags so that drain pipe is at the top.
- Manufacturer-supplied couplers must be used (Fig. 22).
- Place outer sections (without 4-inch flexible pipe) on either side of center sections (Fig. 21).
- Do **NOT** install sections within five feet of D-box or tee.
- Use manufacturer-supplied adapters to connect center sections to 4-inch PVC tightline (Fig. 23 and Fig. 24). Screw adapter to PVC to ensure a slip-free connection.
- Install manufacturer-supplied endcaps on last sections (Fig. 25).
- Install observation ports between the center and outer sections of gravel substitute media. Place the ports five feet from the beginning and end of each drain line (two ports per line).
- Observation ports must extend to the bottom of the trench, with a 90-degree fitting at the bottom.
- Observation ports must extend above final grade, and must be capped. Ports may be recessed within sprinkler-type valve boxes for mowing purposes, if desired.
- Cover gravel substitute sections with approved filter fabric. A 4-foot wide fabric roll is recommended for better coverage. Slit the fabric to allow observation ports to extend through to final grade.
- Drill holes in each observation port **above** the filter fabric, and insert a one- to two-foot section of rebar through the holes to anchor the port when backfill material is applied (Fig. 26).

- Do **NOT** cover or backfill any portion of the system prior to final inspection by OCPH, without express written or verbal permission.
- After final inspection and approval by OCPH, cover laterals with a minimum of six inches of soil.

**SECTION FIVE: CONSTRUCTION RECORD REQUIREMENTS**

Submit a construction record (“as-built” drawing) of the system **within 15 days** after receiving approval to backfill the system. The following information is required:

- Dimensional plan view drawing showing all components and dimensions.
- Dimensioned reserve area indicated.
- Triangulated measurement to tank inlet lid and at least one cleanout.
- Completed as-built information form, available from OCPH.

**SECTION SIX: MINIMUM HORIZONTAL SEPARATIONS (SET-BACKS)**

Items Requiring Set-backs	Distance From System Component (In Feet) <sup>1</sup>		
	Drainfield	Septic Tank	Tightline
Well or Suction Line	100	50	50
Pressurized Water Supply Line <sup>2</sup>	10	10	10
Surface Water <sup>3</sup>	100	50	10
Building Foundation	10	5	2
Property/Easement Lines	5	5	--
Interceptor or Curtain Drains			
Upgradient from Component	10	--	--
Downgradient from Component	30	5	--
Cuts or Banks			
Five or more feet of soil <sup>4</sup>	25	--	--
Less than five feet of soil <sup>4</sup>	50	--	--

<sup>1</sup>Contact OCPH in any cases where site constraints necessitate the reduction of set-back distances. Such situations will be considered on a case-by-case basis.

<sup>2</sup>When a sewer tightline must cross or come within ten feet of a pressurized drinking water or irrigation supply line, or a body of water such as a streambed, a sleeve must be constructed around either the sewer line or the water line for that portion of line that is nearer than the ten-foot minimum distance.

<sup>3</sup>This set-back is measured from the ordinary high-water mark, and may be increased by OCPH in cases where there is greater potential for ground or surface water contamination.

<sup>4</sup>Soil depth is based on an original, undisturbed soil (excluding fill) above a restrictive layer due to a textural or structural change.