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**Thurston County
On-Site Wastewater System
Pumper Manual**

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Thurston County On-site Wastewater System Pumper Manual: Minimum Standards and Recommendations for the Pumping and Inspections of On-Site Wastewater Systems

Table of Contents

Introduction _____ 5

SECTION 1 – General criteria _____ 6

SECTION 2 – Septic Terminology _____ 7

 2.1 Acronyms

 2.2 Glossary

SECTION 3 - Basics Concepts in On-Site Sewage Systems _____ 21

 3.1 Septic Tank

 3.2 Septic Lids

 3.3 Baffles

 3.4 Pump Tank

 3.5 Pumps and Siphons

 3.6 Disposal Component

 3.7 Soils

SECTION 4 - Types of On-Site Sewage Systems _____ 24

 4.1 Conventional

 4.2 Pressure

 4.3 Mound or Fill Systems

 4.4 Alternative Treatment Systems

 4.5 Sand Filters

 4.6 Older Systems

SECTION 5 - Safety During Septic work _____ 27

 5.1 Microorganisms Commonly Found in Sewage

 5.2 Personal Protection Equipment

 5.3 Working in Confined Spaces

 5.4 Fall Protection

 5.5 Large Equipment

 5.6 Working with Electrical

SECTION 6 - Minimum requirements for inspection _____ 30

 6.1 Locating the Septic Tank

 6.2 When to Pump a Septic Tank

 6.3 When to Pump a Pump Tank or Basin

 6.4 How to Pump

 6.5 Assessing the Septic Tank Condition

 6.6 Tank Repairs

 6.7 Inspecting Components Inside the Tank

 6.8 Inspecting Pump Components in Pump Tank or Basin

- 6.9 Inspecting Proprietary Components
- 6.10 Inspecting Disposal Components

SECTION 7 – General Septic Basics – How to Use _____ 34

- 7.1 What Not to Flush
- 7.2 Additives
- 7.3 Repairs Non-Certified People Can Complete
- 7.4 Repairs Certified Professionals Must Complete

SECTION 8 – Resources _____ 36

- 8.1 Industry Resources
- 8.2 Advice for the Septic User
- 8.3 Resources for the Homeowner or Client

Appendix A: Troubleshooting Common Septic Problems

Appendix B: Common Causes of Failures

Introduction

Purpose

The purpose of this manual is to provide general education for all septic professionals working in Thurston County. The goal is basic understanding of the minimum requirements in Thurston County for septic pumping and inspections.

All septic professionals:

- shall have a basic understanding of the operation of on-site sewage systems.
- shall perform maintenance tasks in a manner that will promote long-term operation of on-site sewage systems.
- are consistent in the performance of maintenance tasks for on-site sewage systems.
- use safe and hygienic methods when working in or around on-site sewage systems components.
- advise clients or occupants in the use and maintenance for proper functioning and longevity of on-site sewage systems.

SECTION 1 – General Criteria

The pumping, inspection and operation & maintenance of on-site sewage systems must conform to:

1. *WAC 246-272.*
2. *Article IV of the Thurston County Sanitary Code “Rules and Regulations of the Thurston County Board of Health Governing Disposal of Sewage” (Article IV)*
3. *The Recommended Standards and Guidelines developed for statewide application*
4. *Industry standards and guidelines*

SECTION 2 – Septic Terminology

As used in this Pumper Manual, the terms defined in this section shall have the meanings indicated unless the context clearly indicates otherwise. These definitions are a combination of those contained in Thurston County Sanitary Code Article IV, WAC 246-272A, and Recommended Standards & Guidance Documents Glossary. In the event of a conflict, Article IV supersedes the definitions in WAC 246-272A and Recommended Standards & Guidance Documents Glossary unless the provisions of WAC 246-272A are more stringent.

2.1 Acronyms

"ASTM"	American Society for Testing Materials
"BOD"	Biochemical oxygen demand, typically expressed in mg/L.
"CBOD ₅ "	Carbonaceous biochemical oxygen demand, typically expressed in mg/L
"COSS"	Community On-Site Septic System
"ETM"	Elapsed Time Meter
"FC"	Fecal coliform, typically expressed in number of colonies/100 ml.
"LOSS"	A large on-site sewage system (see Chapter 246-272B WAC).
"O&G"	(Formerly named FOG) Oil and grease, a component of sewage typically originating from food stuffs (animal fats or vegetable oils) or consisting of compounds of alcohol or glycerol with fatty acids and lotions. Typically expressed in mg/L.
"OPC"	Operational Certificate
"OSS"	On-site sewage system
"PPE"	Personal Protective Equipment
"RS&G"	Recommended standards and guidance
"SSAS"	Subsurface Soil Absorption System
"UPC"	Uniform Plumbing Code (http://apps.leg.wa.gov/WAC/default.aspx?cite=51-56)

2.2 Glossary

"**Accessible**" when applied to a fixture, connection, appliance, or equipment, means having access to, but may require the removal of an access panel, door, or similar obstructions. Readily accessible means direct access without the necessity of removing any panel, door, or similar obstruction. ¹

"**Additive**" means a commercial product added to an on-site sewage system intended to affect the performance or aesthetics of an on-site sewage system. ¹

"Aeration" means the process of bringing air in contact with wastewater by using a compressor or blower and a diffuser for the purpose of promoting biological degradation.¹

"Air vacuum relief valve" means a device that allows air release when the system is being pressurized and air entry into the system to avoid debris getting sucked into the system. This must be installed in the highest elevation in each distribution zone.¹

"Alternative system" means an OSS other than a conventional gravity OSS or conventional pressure distribution.

"Approved" means a written statement of acceptability issued by the Health Officer.

"Backwash" means the process of flow reversal to clean a filter and to restore it to the normal clean condition for filtering with a minimum resistance to flow through the media or screen.¹

"Backwater valve" means a type of check valve installed in a drainage system to prevent reverse flow.¹

"Baffle" means a device placed in a sewage tank for multiple functions, including dissipating energy, directing solids, retaining solids, and drawing liquid off at a specific depth. A baffle is not an intercompartmental wall.¹

"Basal area" means the effective surface area available to transmit the treated effluent from the filter media into the original receiving soils.¹

"Bed" means a soil dispersal component consisting of an excavation with a width greater than three feet and not exceeding ten feet.

"Biodegradability" the word biodegradable means that a complex chemical is broken down into simpler components through biological action. Do not be confused by the word biodegradable, which often is used to imply environmentally safe. Harmful chemicals as well as beneficial ones may be biodegradable.¹

"Blackwater" means water that is flushed from toilets and urinals that contains human waste.¹

"Building Sewer" means that part of the horizontal piping of a drainage system extending from the building drain, which collects sewage from all the drainage pipes inside a building, to an on-site sewage system. It begins two feet outside the building wall and conveys sewage from the building drain to the remaining portions of the on-site sewage system.

"Cesspool" means a pit or excavation receiving untreated sewage and allowing the liquid to seep into the surrounding soil or rock.

"Community On-site Sewage System (COSS)" means any OSS:

1. Designed to serve more than two residential units; or
2. With a design flow, at any common point, more than one thousand (1,000) gallons per day and less than or equal to three thousand five hundred (3,500) gallons per day; or

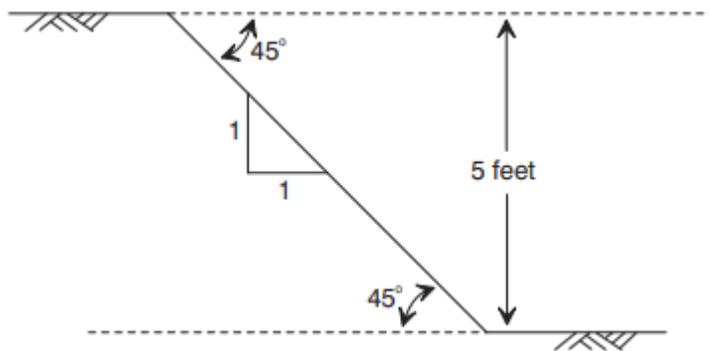
3. Within the city limits of Lacey, Olympia or Tumwater or their Urban Growth Areas with a design flow, at any common point, more than six hundred (600) gallons per day and less than or equal to three thousand five hundred (3,500) gallons per day.

"Conforming system" means any OSS, except an experimental OSS, that is in full conformance with an Operational Certificate, where required, and meets any of the following criteria:

1. The OSS is in full compliance with all requirements for new construction as specified in Article IV, including the provision of a reserve area; or
2. The OSS is an existing OSS approved, installed, and operated under a previous edition of Article VI; or
3. The OSS is a repair OSS that was permitted to meet the requirements of Article IV to the maximum extent permitted by the site; or
4. The OSS or repair was permitted through the waiver process; or
5. The OSS was in existence prior to 1979, is not in failure, and its use is consistent with its size and design.

"Cover" or "Cover material" means soil placed over a soil dispersal component composed predominately of mineral material with no greater than ten percent organic content. Cover material may contain an organic surface layer for establishing a vegetative landscape to reduce soil erosion.

"Cut or bank" means any naturally occurring or artificially formed slope greater than one hundred percent (forty-five degrees) and extending vertically at least five feet from the toe of the slope to the top of the slope as follows:



1

"Designer" means a person who matches site and soil characteristics with appropriate on-site sewage technology. Throughout this manual this term applies to both on-site sewage treatment system designers licensed under chapter 18.210 RCW and professional engineers licensed under chapter 18.43 RCW.

"Design flow" means the maximum volume of sewage a residence, structure, or other facility is estimated to generate in a twenty-four-hour period. It incorporates both an operating capacity and a surge capacity for the OSS during periodic heavy use events. The sizing and design of the OSS components are based on the design flow.

"Development" means the creation of a residence, structure, facility, mobile home park, subdivision, planned unit development, site, area, or any activity resulting in the production of sewage.

"Disk filter" means a type of filter that utilizes a series of grooved rings that overlay each other to form a network of very small openings to trap contaminants.¹

"Disinfection" means the process of destroying pathogenic microorganisms in sewage through the application of ultraviolet light, chlorination, or ozonation.¹

"Dispersal component" means a subsurface absorption system (SSAS) or other soil absorption system receiving sewage tank or other pretreatment device effluent and transmitting it into original, undisturbed soil.

"Disposal component" means any component meant for final disposal of the sewage into the ground, installed in the ground or above grade.

"Distributing valve" means a valve that distributes flow to multiple drainfield laterals, zones, or locations by automatically rotating upon each pump cycle.¹

"Distribution technology" means any arrangement of equipment and/or materials that distributes sewage within an OSS.

"Diversion valve" means a valve that diverts flow exclusively to one disposal component providing a long-term drying period of another disposal component.¹

"Dosing" means the application of wastewater to a treatment or disposal system in discreet amounts over a definite time period, as opposed to an unregulated flow.¹

"Down-gradient" means the direction, toward an object, of liquid flow on the surface of the ground or upon encountering a water table or a restrictive layer.

"Drainback" means the effluent that flows back into a pump tank after the dosing event.¹

"Drainfield" see subsurface soil absorption system (SSAS) and soil dispersal component.

"Drainrock" means clean washed gravel or crushed rock ranging in size from three-quarters inch to two and one-half inches, and containing no more than two percent by weight passing a US No. 8 sieve and no more than one percent by weight passing a US No. 200 sieve.

"Dripline" means flexible small diameter polyethylene tubing containing small diameter openings called emitters.¹

"Effluent" means liquid discharged from a sewage tank or other OSS component.

"Elapsed time meter" (ETM) means a meter that measures and records the total length of time a component has been in the operating mode.¹

"Electric solenoid" means an electric valve actuated by a solenoid, used for controlling the flow of liquid in pipes.¹

"Emitters" means a small diameter openings in dripline that can dissipate pressure and allow a slow, controlled discharge (rated in gallons per hour).¹

"Engineer" means a person who is licensed and in good standing under chapter 18.43 RCW.

"Expanding clay" means a clay soil with the mineralogy of clay particles, such as those found in the Montmorillonite/Smectite Group, which causes the clay particles to expand when they absorb water, closing the soil pores, and contract when they dry out.

"Expansion" means a change in a residence, facility, site, or use that:

1. Results in an increase in the strength of the sewage or in the flow of sewage that may cause an OSS to exceed its existing treatment or dispersal capability. Examples include, but are not limited to, an increase in the number of bedrooms in a residence, or a change in use from an office to a restaurant or from a residential use to a commercial use; or
2. Reduces the treatment or dispersal capability of the existing OSS or the reserve area, for example, when a building is placed over existing OSS components or a reserve area.

"Experimental system" means any alternative OSS that was installed under previous versions of this Article:

1. Without design guidelines developed by the Washington State Department of Health; or
2. A proprietary device or method, which had not yet been evaluated and approved by the Washington State Department of Health.

"Extremely gravelly" means soil with sixty percent or more, but less than ninety percent rock fragments by volume.

"Failure" means a condition of an OSS or component that threatens the public health by inadequately treating sewage or by creating a potential for direct or indirect contact between sewage and the public. Examples of failure include:

1. Sewage on the surface of the ground.
2. Sewage discharged directly to surface water or upon the surface of the ground unless the discharge is under permit from the Washington State Department of Ecology. This does not apply to septage or sewage sludge handled under a valid permit issued in accordance with Thurston County Code Article V.
3. Sewage backing up into a structure caused by slow soil absorption of sewage tank effluent.
4. Sewage leaking from a sewage tank or collection system.
5. Inadequately treated effluent contaminating ground water or surface water. This may be demonstrated upon testing by currently adopted dye test procedures, where the following occur:
 - (1) positive dye test results and
 - (2) a fecal coliform bacteria sample result of at least 200 organisms per 100 milliliters or above established background concentrations collected within six months of the dye test and collected at the same location as the dye-positive site.
6. Surface or ground water intrusion into a sewage tank or collection system.
7. Cesspools.

8. Seepage pits where evidence of ground or surface water quality degradation exists.
9. Metal sewage tanks that have any rusted through, perforated or damaged parts.
10. Noncompliance with standards stipulated on the permit or design.

"Fecal coliform" means bacteria common to the digestive systems of warm-blooded animals that are cultured in standard tests. Counts of these organisms are typically used to indicate potential contamination from sewage or to describe a level of needed disinfection. Generally expressed as colonies per 100 milliliters.

"Filter" means a device or structure for removing suspended solid or colloidal material from wastewater. Also, a sewage treatment component which contains a specified filter media which is used to treat sewage physically, chemically, and biologically.¹

"Filtrate" means a liquid that has passed through a filter.¹

"Flushing" means the process where drip lines are hydraulically cleansed to prevent emitter clogging by increasing the velocity of water flow through the drip lines to scour and transport solid material that may have accumulated inside the drip lines.¹

"Geomembrane" means an essentially impermeable membrane used with foundation, soil, rock, earth, or any other geotechnical engineering-related material as an integral part of a human-made project, structure, or system.¹

"Geotextile" means any geotechnical engineering-related permeable textile used with foundations, soil, rock, earth, an integral part of a human-made project, structure, or system, and which serves to lessen the movement of fine soil particles.¹

"Gravelly" means soils with fifteen percent or more, but less than thirty-five percent rock fragments by volume.

"Gravity system" means an OSS consisting of a sewage tank and a subsurface soil absorption system with gravity distribution of the effluent.

"Gray water" or "Greywater"¹ means influent from bathtubs, showers, bathroom sinks, washing machines, dishwashers, and kitchen sinks. It includes water from any source in a residence or structure that has not come into contact with toilet wastes.

"Grease Trap" or "Grease Interceptor" means a device which is used on commercial systems that have wastewater containing a large volume of fats, oils, greases, or milk. It is designed to separate and store the oils and grease from the wastewater before it goes to the treatment or disposal components.

"Ground water" means subsurface water occupying the zone of saturated soil, permanently, seasonally, or as the result of the tides. Indications of ground water may include:

1. Water seeping into or standing in an open excavation from the soil surrounding the excavation or monitoring ports; or

2. Spots or blotches of different color or shades of color interspersed with a dominant color in soil, caused by reduction and oxidation of iron. These color patterns are redoximorphic features, commonly referred to as mottling. Redoximorphic features often indicate the intermittent presence of ground water and may indicate poor aeration and impeded drainage. Also see "Water table".

"Holding tank sewage system" means an OSS which incorporates a sewage tank without a discharge outlet, the services of a sewage pumper/hauler, and the off-site treatment and disposal for the sewage generated.

"Hydraulic loading rate" means the amount of effluent applied to a given treatment step, in this Article expressed as gallons per square foot per day (gal/sq. ft./day).

"Industrial wastewater" means the water or liquid waste from an industrial process. These wastes may result from any process or activity of industry, manufacture, trade, or business, from the development of any natural resource, or from animal operations such as feedlots, poultry houses, or dairies. The term includes contaminated storm water and leachate from solid waste facilities.

"Infiltrative surface" means the surface within a treatment component or soil dispersal component to which effluent is applied and through which effluent moves into original, undisturbed soil or other porous treatment media. In drainfields, this is the drain rock-original soil interface at the bottom of the trench; in mound systems, this is the gravel-mound sand and the sand-original soil interfaces; in sand-lined trenches/beds (sand filter), this is the gravel-sand interface and the sand-original soil interface at the bottom of the trench of bed. ¹

"Influent" means the wastewater, partially or completely treated, or in its natural state (raw wastewater), flowing into a reservoir, tank, treatment component, or soil dispersal component. ¹

"Large on-site sewage system (LOSS)" means any OSS with design flows, at any common point, greater than 3,500 gallons per day. LOSS systems are regulated by Department of Health.

"Local health officer" means the health officer of the city, county, or city-county health department or district within the state of Washington, or a representative authorized by and under the direct supervision of the local health officer, as defined in chapter 70.05 RCW.

"Maintenance" means the actions necessary to keep the OSS components functioning as designed.

"Management Plan" means the Thurston County On-site Sewage System Management Plan adopted pursuant to WAC 246-272A-0015.

"Marine recovery area" means an area of definite boundaries where the health officer or board of health has determined that additional requirements for existing on-site sewage disposal systems may be necessary to reduce potential failing systems or minimize negative impacts of on-site sewage disposal systems.

"May" means discretionary, permissive, or allowed.

"Minor repair" means the repair or replacement of any of the following OSS components: tightline pipe between a structure and a sewage tank; tightline between a sewage tank and the dispersal component; a pump; an interceptor drain; sewage tank pumps; pump control floats; effluent filters; pipes connecting multiple sewage tanks; OSS inspection boxes and ports where a sewage tank, treatment component, or soil dispersal component does not need to be replaced; and the replacement of a small section ten (10) feet or less of the SSAS damaged as the result of digging into it as part of an OSS evaluation.

"Monitoring" means periodic or continuous checking of an OSS, which is performed by observations and measurements, to determine if the OSS is functioning as intended and if OSS maintenance is needed. Monitoring also includes maintaining accurate records that document monitoring activities.

"Monitoring firm" means a firm certified by the Health Officer to operate, maintain, and/or monitor an OSS.

"Monitoring specialist" means an OSS professional who performs monitoring and maintenance on OSS as specified in Article IV Section 23.

"Non-conforming system" means an OSS which is:

1. Not in compliance with the conditions specified on the approved On-site Sewage System Application, approved permit, approved design, or accepted as-built or record drawing; or
2. Not being operated consistent with its size and design; or
3. Not in compliance with an Operational Certificate where one is required; or
4. Failing, or
5. Not in conformance with Article IV Section 16.

"On-site sewage system (OSS)" means an integrated system of components located on or nearby the property it serves, that conveys, stores, treats, and/or provides subsurface soil treatment and dispersal of sewage. It consists of a collection system, a treatment component or treatment sequence, and a soil dispersal component. An OSS also refers to a holding tank sewage system or other system that does not have a soil dispersal component.

"Operating capacity" means the average daily volume of sewage an OSS can treat and disperse on a sustained basis. The operating capacity, which is lower than the design flow, is an integral part of the design and is used as an index in OSS monitoring.

"Operational Certificate" means a certificate issued for a specified period by the Health Officer for the operation and/or use of an OSS as specified in Section 16. The Operational Certificate shall contain conditions for the operation, maintenance, sampling, and monitoring of the subject OSS.

"OSS firm" means a person certified by the Health Officer to perform specified work on OSS

"OSS professional" means an individual certified by the Health Officer under section 23 to perform specified work on OSS in accordance with his or her certificate, or the designated representative of the Health Officer.

"Percolation" means the flow or trickling of a liquid downward through a contact or filtering medium. The liquid may or may not fill the pores of the medium.¹

"Performance standard" means the standard used to judge whether predetermined requirements have been met, such as the necessary level of treatment for waste stream, after the completion or initiation of operation. Performance standards generally are in the form of a pre-determined level or concentration of a particular compound or constituent that is allowed in a waste effluent.¹

"Permeable soil" means soil with a textural classification of loams or coarser, according to the U.S. Department of Agriculture Soil Conservation Service classification system. Soils will be considered excessively permeable when they are coarser than coarse sand.¹

"Person" means any individual, corporation, company, association, society, firm, partnership, joint stock company, or any governmental agency, or the authorized agents of any such entities.

"Pipe volume" means the amount of effluent needed to refill the supply lines and distribution system that have drained after a dose cycle. Generally, for pressure distribution systems seven (7) times the pipe volume should be included in the design flow and five (5) times the pipe volume should be included in the design flow for drip systems.¹

"Pit toilet" means an on-site sewage disposal unit consisting of a structure overlying an excavation not exceeding five feet in depth in which human excrement (human feces and urine) is directly deposited for permanent placement in the ground. Pit toilets, due to site and soil considerations, have very limited application.¹

"Pressure compensating emitters" means drip emitters that allow a constant discharge over a wide range of applied pressures. A pressure regulator is not needed with this type of emitter when system pressure is maintained (determined by pump selection) within the range recommended by the manufacturer.¹

"Pressure distribution" means a system of small diameter pipes equally distributing effluent throughout a SSAS, as described in the RS&G for Pressure Distribution Systems by the Washington State Department of Health as updated. A subsurface drip system may be used wherever this Article requires pressure distribution.

"Pressure distribution system" means an OSS consisting of a sewage tank and a subsurface soil absorption system with pressure distribution of the effluent. The acceptable design, operation and maintenance, and performance monitoring requirements are described in the current *Recommended Standards and Guidance for Pressure Distribution Systems* published by the Washington State Department of Health.

"Pressure regulator" means a device used to regulate and maintain pressure within a specified range in a piping system. Required to control discharge with turbulent flow emitters.¹

"Proprietary product" means a sewage treatment and distribution technology, method, or material subject to a patent or trademark.

"Public domain technology" means a sewage treatment and distribution technology, method, or material not subject to a patent or trademark.

"Public sewer system" means a sewerage system:

1. Owned or operated by a city, town, municipal corporation, county, or other approved ownership consisting of a collection system and necessary trunks, pumping facilities and a means of final treatment and disposal; and
2. Approved by or under permit from the Washington State Department of Ecology, the Washington State Department of Health and/or the Health Officer.

"Puddling" means an act of destroying soil structure, usually by disturbing or compacting the soil at high water content, thereby reducing porosity and permeability.¹

"Pumper" means an OSS professional who removes and transports sewage from OSS and performs limited maintenance as specified in Thurston County Article IV Section 23.

"Pumping firm" means an OSS firm certified by the Health Officer to remove and transport sewage or septage from OSS.

"Raw wastewater" means wastewater before it receives any treatment.

"Readily accessible" means having direct access to a plumbing fixture, connection, appliance, or equipment without the necessity of removing any panel, door, or similar obstruction.

"Record drawing" means an accurate graphic and written record of the location and features of the OSS that are needed to properly monitor, operate, and maintain that OSS. The record drawing is often referred to as the "as-built."

"Registered list" means the List of Registered On-site Treatment and Distribution Products; developed and maintained by the Department of Health and containing a list of treatment and distribution products that meets the requirements for product registration in WAC 246-272A.¹

"Remediation" means the use of proprietary methods or products short of a repair intended for dispersal component restoration, such as methodologies to reduce the sewage quantity, reduce organic load, rest a drain field, or other means to remove or reduce a biomat clog at the infiltrative surface in order to increase the flow of effluent into the soil.

"Repair" means restoration, by reconstruction, addition to, or replacement of an existing OSS or component of the OSS due to failure or damage.

"Reserve area" means an area of land approved for the installation of a conforming OSS and dedicated for replacement of the OSS upon its failure.

"Residential sewage" means sewage having the consistency and strength typical of wastewater from domestic households.

"Restrictive layer" means a stratum impeding the vertical movement of water, air, or growth of plant roots, such as hardpan, claypan, fragipan, caliche, some compacted soils, bedrock, and unstructured clay soils. This also includes a water table.

"Return manifold" means the piping that returns liquid and debris to the primary treatment tank during system flushes.¹

"Routine servicing" means servicing all system components as needed, including product manufacturer's requirements / recommendations for service.¹

"RS&G" means on-site treatment systems *Recommended Standards and Guidance* documents published and updated by Washington State Department of Health.

"Seepage pit" means an excavation more than three feet deep where the sidewall of the excavation is designed to dispose of sewage tank effluent. Seepage pits may also be called "dry wells".

"Septage" means the mixture of solid wastes, scum, sludge, and liquids pumped from within sewage tanks and other OSS components.

"Septic tank" means a sewage tank that is a watertight treatment receptacle receiving the discharge of sewage from a building sewer or sewers, designed and constructed to permit separation of settleable and floating solids from the liquid, detention and anaerobic digestion of the organic matter, referred to as primary treatment, prior to discharge of the liquid.

"Service interval" means the time period between planned site visits to perform various system monitoring functions such as checking equipment, renewing depleted disinfectant chemical supply, collecting samples. The service intervals may be specified by contracts, operation plans, or local health jurisdiction permits.¹

"Sewage" means any urine, feces, and the water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places. For the purposes of this manual, "sewage" is generally synonymous with domestic wastewater. Also see "residential sewage."

"Sewage quality" means contents in sewage that include:

1. CBOD5, TSS, and O&G;
2. Other parameters that can adversely affect treatment. Examples include pH, temperature, and dissolved oxygen;
3. Other constituents that create concerns due to specific site sensitivity. Examples include fecal coliform and nitrogen.

"Sewage tank" means a prefabricated or cast-in-place septic tank, pump tank/dosing chamber, holding tank, grease interceptor, recirculating filter tank or any other tanks as they relate to OSS including tanks for use with proprietary products.

"Sewage tank" means any prefabricated or cast-in-place septic tank, pump tank/dosing chamber, holding tank, grease interceptor, recirculating filter tank or any other tanks as they relate to OSS including tanks for use with proprietary products.

"Shall" means mandatory.

"Slope stability" means the resistance of an inclined surface to failure by sliding or collapsing.¹

"Soil compaction" means increasing the soil bulk density, along with decreasing the soil porosity, by the application of mechanical forces to the soil. Results in a soil that retains less water and resists root penetration. Soils with high clay content are more easily compacted than sandy soils.¹

"Soil dispersal component" means a technology that releases effluent from a treatment component into the soil for dispersal, final treatment, and recycling.

"Subsurface soil absorption system" means a soil dispersal component of trenches three feet or less in width or beds between three and ten feet in width, containing either a distribution pipe within a layer of drainrock covered with a geotextile, or an approved gravelless distribution technology, designed and installed in original, undisturbed unsaturated soil providing at least minimal vertical separation as established in this manual, with either gravity or pressure distribution of the treatment component effluent, for the purpose of receiving effluent and transmitting it into the soil.

"Subsurface drip system" means an efficient pressurized sewage distribution system that can deliver small, precise doses of effluent to soil surrounding the drip distribution piping (called dripline) as described in *the Washington State Department of Health RS&G for Subsurface Drip Systems*.

"Supply manifold" means the piping that delivers effluent to dripline segments (laterals).¹

"Surface water" means any body of water, whether fresh or marine, flowing or contained in natural or artificial unlined depressions continuously for at least four consecutive months, including natural and artificial lakes, ponds, springs, rivers, streams, swamps, marshes, irrigation canals, ditches, and tidal waters.

"Telemetry system" means a device that transmits system performance information measured by sensors to a remote location by means of wires or electromagnetic waves.¹

"Timed dosing" means delivery of discrete volumes of sewage at prescribed time intervals.

"Timer-controlled system" means a pressure distribution system where the pump on and off times are preset at discrete time periods.¹

"Total Suspended Solids" means a measure of all suspended solids in a liquid, typically expressed in mg/L.

"Treatment standard 1" used in previous versions of Thurston County Sanitary Code, means a thirty-day average of less than 10 milligrams per liter of biochemical oxygen demand (5 day BOD₅), 10

milligrams per liter of total suspended solids (TSS), and a thirty-day geometric mean of less than 200 fecal coliform per 100 milliliters.

"Treatment standard 2" used in previous versions of Thurston County Sanitary Code means a thirty-day average of less than 10 milligrams per liter of biochemical oxygen demand (5 day BOD5), 10 milligrams per liter of total suspended solids (TSS), and a thirty-day geometric mean of less than 800 fecal coliform per 100 milliliters.

"Treatment component" means a technology that treats sewage in preparation for further treatment and/or dispersal into the soil environment. Some treatment components, such as mound systems, incorporate a soil dispersal component in lieu of separate treatment and soil dispersal components.

"Treatment level" means one of six levels (A, B, C, D, E, & N) used in Thurston County Article IV to:

1. Identify treatment component performance demonstrated through requirements specified in WAC 246-272A-0110; and
2. Match site conditions of vertical separation and soil type with treatment components. Treatment levels used in this Article are not intended to be applied as field compliance standards. Their intended use is for establishing treatment product performance in a product testing setting under established protocols by qualified testing entities.

"Treatment sequence" means any series of treatment components that discharges treated sewage to the soil dispersal component.

"Trench" means a soil dispersal component consisting of an excavation with a width of three feet or less.

"Turbulent flow emitters" means drip emitters that allow a varying discharge depending on the pressure applied (flow rate increases as system pressure increases). A pressure regulator recommended by the dripline manufacturer is required with this type of emitter to ensure discharge is in accordance with design.¹

"Uniform distribution" means a method of distribution that results in equal distribution of the effluent throughout the distribution network. This will help assure a vertical unsaturated flow regime. Procedures are explained in detail in the Recommended Standards and Guidance for Pressure Distribution Systems.¹

"Unit volume of sewage" means:

1. Flow from a single-family residence;
2. Flow from mobile home site in a mobile home park; or
3. 450 gallons of sewage per day where the development is not single-family residences or a mobile home park.

"Unknown system" means an OSS that exists without Thurston County sewage system records.

"Up-gradient" means the direction, away from an object, of liquid flow on the surface of the ground or upon encountering a water table or a restrictive layer.

"Vault toilet" means an on-site sewage system that incorporates:

- (a) a structure enclosing a toilet above a water-tight storage chamber for human waste;
- (b) the services of a sewage pumper/hauler; and
- (c) the off-site treatment and disposal for the sewage generated. Portable chemical toilets are not included in this category.¹

"Wastewater treatment unit" means a unit designed, constructed, and installed to stabilize liquid waste by biochemical and physical action.¹

"Water table" means the upper surface of the ground water, whether permanent or seasonal. Also see "ground water."

"Well" means any excavation that is constructed when the intended use of the well is for the location, diversion, artificial recharge, observation, monitoring, dewatering or withdrawal of ground water for agricultural, municipal, industrial, domestic, or commercial use. Excluded are temporary observation or monitoring wells used to determine the depth to a water table for locating an OSS; observation or monitoring wells used to measure the effect of an OSS on a water table; and interceptor or curtain drains constructed to lower a water table.

¹ *Recommended Standards & Guidance Documents Glossary Effective Date: September 2012*

SECTION 3 – Basic Concepts in On-site Sewage Systems

An On-site Sewage System (OSS) is designed to treat all the wastewater produced by the residence or business; including but not limited to wastewater from the kitchen, bathroom, and laundry. When properly maintained and operated, the OSS will treat and dispose of the wastewater without causing hazard to public health and the environment.

A malfunctioning septic system can pollute groundwater, pollute surface water, and put the health of the public at risk.

3.1 The Septic Tank

The septic tank is the first component in most on-site sewage systems. It should always be watertight with no leaks. *Influent* flows from the building sewer line into the septic tank.

The purpose of the septic tank is to provide initial treatment and separate the solids. The heavier solids such as feces and food residues settle to the bottom and are commonly called *sludge*. The lighter materials such as grease, oils and soaps, float to the top and are commonly called *scum*. The clear liquid formed in between sludge and scum layers is called *liquor*. The sludge, scum and liquor layers are removed by routine pumping. If not pumped, sludge and scum can accumulate and leave the tank, clogging the down-stream components and causing the septic system to fail.

A typical septic tank has one or two compartments, depending on the age of the system. Most tanks are made of concrete, fiberglass, or plastic. The septic tank should be watertight, and fitted with baffles at the inlet, interior walls, and outlet.

In a conventional septic system, effluent flows from the septic tank through the outlet baffle to the disposal component for final treatment and disposal. In other more complex septic systems, the effluent might flow from septic tank to pump tank and/or pretreatment unit before it reaches the drainfield for final treatment and disposal.

Currently, any tank permitted to be installed in Thurston County must be on the *Department of Health's List of Registered Sewage tanks*.

3.2 Septic Lids

For this section the term lid refers to: the riser lid, and the cover for the opening in the top of a cement tank, regardless of construction. This section is not regarding the technical LID of the tank, which is the top of the formed tank above the gasket seal.

The septic lid must prevent access from people and pets. The owner is required to ensure the lid is accessible for maintenance according to Article IV. Unsafe lids pose a serious safety threat to people and pets who may fall into the tank. When a septic lid loses integrity, it must be replaced. A permit is not required to replace the septic lids, repair risers, replace risers, or install risers.

A cement lid should be in good condition without any crumbling, cracking or chunks missing. If the cement is in good condition the lid does not have to be replaced. Lids which are crumbling, cracked, or with chunks missing must be replaced.

A plastic lid must be replaced when visual cracks appear or if the lid cannot be securely attached to the riser. The septic riser and lid must be watertight. The lid must have at least two screws to secure the lid, positioned across from each other. Weight is not an adequate method for securing a plastic lid.

3.3 Baffles

Properly working baffles keep solids from down-stream components that are costly to repair. Some alternative systems do not contain an outlet baffle. Review the septic design to determine if a baffle is required.

The inlet baffle stops solids from backing up in the house sewer line. It also directs the waste from the building into the clear zone for solid separation. The redirection of the influent stops 'short circuiting' of sewage. 'Short circuiting' is when sewage flows directly from the inlet to the outlet of the tank without time for solids to settle.

If the tank has two compartments, the separating wall may have a wall baffle. This baffle allows clear liquid to flow to the second compartment, keeping most the scum and sludge in the first compartment.

A properly working outlet baffle keeps the scum and sludge layers in the tank, allowing the clear liquor to flow to the pump chamber or disposal component.

Older tanks may have a 'curtain baffle' which is concrete and is built as part of the tank. Curtain baffles keep sludge and scum in the tank, and installation of an effluent filter may be challenging.

3.4 Pump Tank

The pump tank is a sewage tank also called a pump chamber, or pump basin. It can be made of concrete or plastic and is usually one compartment. The pump tank contains the pump component or siphon which transport the effluent to the disposal or treatment component. It may contain other electric components used to control the pump, such as floats or junction boxes.

3.5 Pumps and Siphons

The pump or siphon is located inside a pump tank or basin but may be found in the second compartment of a septic tank.

The pump is activated by floats connected to a float tree, which is a vertically standing pipe in the pump tank typically made of PVC material. Most systems will contain three floats: ON/OFF float, low-water alarm float, and high-water alarm float. The floats activate when they change position from hanging to floating. When the ON/OFF float is activated, the pump is turned on or off. This ON/OFF function may be also controlled by a control panel or the pump may run on demand. Safety note: some floats use mercury and require special handling and disposal at a hazardous waste collection facility.

When the pump is controlled on demand by the floats, it will run for as long as the ON/OFF float is activated in the ON position. Some older on-demand systems do not have a control panel and will pump whenever the ON/OFF float is activated and will pump until the ON/OFF float deactivates- regardless of how much liquid gets pumped. This system will usually have a high-water alarm with a visual or audible alarm.

It is common for pressurized systems to have a control panel. If the pump has a control panel, it will regulate the floats. The control panel is programmed to run the pump for a certain amount of time at specific intervals. These times were calculated by the designer to match the system size and daily flow. The panel will pump a specific dose and will stop when the dose has been pumped. If the OFF float is activated the panel will stop the pumping before the full dose is pumped. If the panel completes its dose and the ON/OFF float is still in the ON position, it will pump again at its next scheduled interval. If the building occupants use more water than the control panel is dosed to pump, the high-water alarm will be activated.

The low-water float will activate the alarm if the liquid level in the tank drops so the low water float is hanging. This float protects the pump from running when there is no liquid in the tank. If a pump runs when the tank is dry the pump can heat up and break.

A siphon does not use floats. It is a mechanical device that uses natural water pressure to start a suction. When the liquid is high enough in the tank the mechanical suction device will start. The suction will draw off the clear liquor until the lack of water stops the mechanical suction. The device stops when the liquid level is low enough to cause an air gap and break the suction.

3.6 Disposal Components

Most disposal components will contain a series of perforated pipes surrounded by gravel. Wastewater leaves the perforated pipes, travels through the gravel and into the soil for final treatment. The disposal component can be fed by gravity or pressure. The size and type of disposal component depend on the daily water usage, and soil conditions.

Some disposal components contain proprietary devices such as *Glendon Biofilter*, *Oscar* or *Subsurface Drip Irrigation*.

Every new disposal component is required to have a dedicated replacement area, called a reserve. It must be protected and maintained for the replacement of the OSS upon failure. Most newer systems will include inspection ports in the disposal component to monitor for ponding at the soil interface.

3.7 Soil

Native, undisturbed soil provides the final treatment and disposal for effluent. Soil removes microorganisms such as viruses and bacteria which can harm public health and the environment. The microorganisms move with the effluent through the soil pores, stick to the soil walls and are removed by chemical and biological processes. The soil works best when it is dry, absorbent, and has plenty of oxygen. Saturated soils have limited ability to remove microorganisms. Bacteria and viruses may be transported a long distance in the ground or surface water. Saturated soils can be caused by seasonal high ground water tables, proximity to surface water, topography, or other site factors.

SECTION 4 - Types of On-Site Sewage Systems

4.1 Conventional Drainfields

In a conventional gravity OSS, for every one gallon of wastewater that enters the septic tank from the building, one gallon leaves the tank to the drainfield. The drainfield is a network of large perforated pipes buried in drainrock filled trenches. The pipes are usually made of PVC or concrete and are often four inches diameter.

Trenches are usually two to three feet wide, and usually one to three feet deep. The drainrock is clean gravel or crushed rock, ranging in size from 3/4 inch to 2.5 inches. The drainrock provides void space for air and effluent retention. Some modern gravity systems contain gravelless chambers that do not contain drainrock. A gravelless chamber is a plastic half-circle that provides the same amount of void space provided by drainrock. These types of systems come in many shapes and are often built to fit the slope of the land.

Conventional gravity OSS cannot distribute effluent evenly through the entire drainfield. These systems may be installed with a distribution box, step-downs, or in the shape of a level loop box. Older systems may have one drain line leaving the tank and no distribution method.

- A distribution box, also called a D-Box, can evenly separate effluent between several drainfield lines. And can also distribute flow to many lines at the same time. Devices can be placed on the receiving pipes to maintain even flow, or to limit flow going to an overly saturated drain line.
- Step-down distribution, or “in series,” allows the first drainfield line to receive all the effluent. Once the first drain line is saturated an elevated opening in the pipe allows sewage to flow to the next drainfield line.
- A level loop box system will have a tee at the beginning of the drainfield to direct flow. They are often box or square shaped without an end.

4.2 Pressure Distribution

Pressure distribution uses a pump or siphon to pressurize and distribute effluent evenly through the entire disposal component which allows for better treatment by the soil. A pressure OSS is a network of small diameter pipes often buried in gravel filled trenches or beds. Pressure systems that use *Subsurface Drip Irrigation (Dripline)* do not use gravel trenches or beds, instead, the Dripline is installed directly into the soil or sand fill.

Pressure systems using PVC have orifices of a specific size and are placed at specific intervals along the pipe. Driplines use emitters that allow a specific amount of effluent to leave the pipe once it is pressurized.

Pressure trenches are usually two to three feet wide and one to three feet deep. A pressure bed is typically no more than 10 feet wide. Trenches and beds are often filled with clean drain rock ranging in size from 3/4 inch to 2.5 inches. Some modern pressure systems contain gravelless chambers that do not contain drainrock. A gravelless chamber is a plastic half-circle which provides the same amount of void space provided by drainrock. A pressure system may be placed over a sand fill to obtain more treatment before final disposal into the native soil.

A manifold is one pipe that separates pressurized flow to multiple pipes called zones. A manifold is used to equally distribute the flow to each zone of the disposal component. It uses devices to adjust the amount of effluent that goes to each zone. In a pressure system without Dripline, residual head is used to tell if each zone is getting even flow. Residual head is also called “squirt height,” and is how high the sewage squirts out of the end cap orifices when the pump runs. Dripline may have multiple zones, but does not have residual head, extra effluent is recirculated back to the tanks.

4.3 Mound or Fill Systems

A mound or fill system is often installed in areas of high groundwater. A mound is a pressurized drainfield installed above the natural soil in a specifically shaped mound of sand. The sand must be certified as construction grade or *ASTM C-33 sand*. A network of small diameter pipes is located within a gravel bed placed inside the mound of sand. The effluent leaves the pipes and trickles downward through the gravel, the sand, and into the natural soil. The sand provides additional treatment for the effluent before it reaches the native soil.

4.4 Alternative Treatment Systems or Proprietary Treatment Systems

Alternative or Proprietary Treatment systems are installed where limited area, soil depth, or conditions require additional treatment of the sewage before it is discharged to the soil. Alternative Treatment Systems often contain Proprietary Treatment Products. These Proprietary Products are held under patent or trademark by the manufacturer. To work on a Proprietary Treatment Product, contact the manufacturer for certification.

Only Certified Monitoring Specialists are allowed to work on Proprietary Treatment systems in Thurston County according to Article IV of the Sanitary Code.

4.5 Sandfilters

A sandfilter is not a proprietary product but is the most common type of alternative system in Thurston County. Pumpers must complete operation and maintenance training specific to sandfilters to be certified to inspect and maintain sandfilters.

A typical sand filter is a concrete box or PVC lined box filled with sand and gravel filter media. Concrete box style filters are rare in Thurston County, and 30 mL liner containment vessel, or bag, is usually used in this region. Effluent is pumped through a network of small diameter pipes near the top of the sand layer. The effluent filters through the sand to a gravel under-drain. To provide treatment the sand-filter needs unsaturated flow through the filter media. The under-drain collects wastewater in a small pump basin with a pump. The effluent is pumped to the disposal component.

Sandfilters are used in areas of shallow soil conditions where additional treatment is needed before the sewage is discharged to the soil, or in areas of reduced vertical separation between the disposal component and the ground water table. During building expansions or remodels sandfilters have been added to existing gravity systems between the tanks and drainfield component. New systems must use a control panel to provide regular dosing from a pump tank to the sandfilter. Older systems may be dosed on demand to the sandfilter. The type of dosing will be specified on the record drawing.

4.6 Older Systems

In a Seepage pit sewage first goes to a septic tank and then the effluent flows to the seepage pit. A seepage pit is an excavation more than three feet deep where the sidewall and/or bottom of the excavation is designed to dispose of sewage tank effluent. A typical seepage pit is made of cinderblocks. A seepage pit is used for subsurface disposal only. The excavations are sometimes filled with drain rock and receive sewage through a 4-inch pipe located in the upper portion of the pit. Other seepage pits are septic tanks with perforated side walls and floor. A seepage pit may also be constructed of concrete blocks. Most local health departments don't allow the installation of seepage pits.

In a **Cesspool** there is no septic tank and sewage goes directly into a pit or excavation which receives untreated sewage and allows the liquid to seep into the surrounding soil or rock. A cesspool can be a bottomless tank or an open lagoon or pond which receives the untreated sewage. There is no lid or containment for an open system. No effective treatment of the effluent occurs when using a cesspool.

A cesspool poses serious health concerns to public and the environment. Cesspools are defined in Thurston County Article IV as a septic failure. Cesspools are not permitted for use in Thurston County and must be reported immediately to Thurston County Environmental Health upon discovery.

Concrete tiles were used as the drain lines before PVC pipes. The "tiles" are concrete cylinders approximately one foot long and placed in a gravel trench. They are laid in a line with a small gap between each tile. The gap acts as the orifice does in a traditional PVC drain line. Concrete tile systems are often subject to collapse as the concrete loses integrity.

Outdated tank construction methods include poured in place tanks, concrete block tanks, metal tanks, wooden tanks, or a variety of non-standard construction methods. Some poured in place concrete tanks may still have the wooden forms, or wooden imprints and may appear to be made of wood. If a poured in place tank is watertight it can continue to be used. Concrete block and metal tanks must be certified as watertight for continued use. Leaking concrete block, wooden, metal tanks, and leaking tanks under 900 gallons cannot be repaired and must be replaced. A repair permit is required to replace a tank in Thurston County.

Outhouse is a small building with a toilet seat placed over a pit which holds the fecal waste. No water is used for this type of disposal system. Outhouses are not permitted in Thurston County and must be decommissioned when found.

Greywater systems are often found in older houses where the effluent was separated into blackwater and greywater for treatment and disposal. Greywater systems usually take the effluent from laundry rooms and kitchen and are usually connected to a small tank and small drainfield. They are often discovered as direct discharge without connection to a tank or drainfield. In cases of a direct greywater discharge, it should be reported as a failure and the wastewater directed to the inlet of the septic tank.

SECTION 5 - Safety During Septic work

5.1 Microorganisms

Microorganisms are living organisms that are too small to be seen except through a microscope. These organisms include bacteria, viruses, protozoans, nematodes (small worms) and fungi. The organisms most commonly found in sewage are: E. Coli O157-H7, Salmonella, Shigella, Giardia and Hepatitis A. Any public surface where sewage has spilled should be treated or sanitized. Powdered lime can be applied where sewage has spilled onto the ground. Bleach can also be used to sanitize hard surfaces, mix a 1:10 ratio with water, one-part bleach to nine parts water.

For example: 1 cup bleach to 9 cups water

The microorganisms in sewage can make you and your family, client, and pets very sick if not properly handled. We recommend pumpers and their families talk to their medical provider about vaccinations against common microorganisms found in sewage, especially: Tetanus- Diphtheria for adults, Tetanus-Diphtheria-Pertussis for children under 7, and Polio.

Some symptoms of illness from microorganisms found in sewage are:

- Vomiting or nausea,
- Diarrhea including severe, persistent, or bloody diarrhea
- Fever,
- Stomach cramps,
- Headache,
- Severe muscle spasms, neurological symptoms.

Microorganisms can be contracted through:

Respiratory Tract: breathe in microorganisms with air

Gastrointestinal Tract: ingest microorganisms on contaminated food, drink, or hands

Skin and Surface Membranes: microorganisms may infect or penetrate skin

Parenteral (blood): puncture or injection can allow infection from microorganisms

If you have had direct contact with sewage, contact your medical provider immediately.

5.2 Personal Protective Equipment

Harmful microorganisms can be contracted and spread through handling of equipment during normal operations. Using the proper personal protective equipment can protect you and your family, client, and pets. Ensure the personal protective equipment is properly fitted and easy to use to enhance the willingness of employees to use gloves, goggles, dust masks, and protective clothing.

Gloves

We recommend everyone use disposable gloves while working with sewage. The gloves should be waterproof and designed to protect against microorganisms. Hands should be washed with soap and water after taking off and disposing of the gloves. If soap and water is not available, a hand sanitizer with over 60% alcohol may be used.

Gloves should be changed as often as needed. Gloves should be removed properly, do not get sewage on skin during glove removal. To properly remove gloves:

1. Use one hand to grab the other glove near the base of the thumb.
2. Pull the glove off while turning it inside out.
3. The removed glove will be in your gloved hand. Carefully ball it up in your palm.
4. Use your glove-free hand to insert two fingers inside the glove at the wrist.
5. Use the inserted fingers to pull the glove off, turning it inside out with the balled-up glove inside.
6. Discard.

Goggles and Dust Masks

Goggles and dust masks should be worn if you are working with any power or cutting tools. When working around sewage, we recommend wearing eye goggles and dust masks to help prevent microorganisms from entering the respiratory tract, eyes, or skin.

Protective Clothing and Shoes

Wear protective clothing at your discretion. When working around sewage, we recommend waterproof washable boots. Always wear disposable boot covers when entering a client's business or residence.

Clothing and shoes should be changed at the end of your shift to prevent taking harmful microorganisms' home to family or pets. We recommend a dedicated location at your business or home for removal and cleaning of contaminated clothing. We discourage the use of family-shared laundry for cleaning sewage contaminated clothes.

Wash Hands

Avoid any hand to face contact during performance of work, especially activities such as eating, drinking, or smoking. Wash hands after removing gloves. Always wash hands thoroughly after performance of work and after handling any equipment that was exposed to sewage. If soap and water are not available, hand sanitizer with over 60% alcohol may be used. Consider including a jug of wash water and soap in your vehicle.

5.3 Working in confined spaces

A septic tank is considered a confined space and must be treated with extreme caution. Workers entering a confined space should read and understand OSHA, (www.osha.gov) and Washington Department of Labor and Industries (www.lni.wa.gov) confined spaces regulations. These can be found on their websites

People working in confined spaces face life-threatening hazards such as asphyxiation or contact with microorganisms. The presence of sewage in confined spaces can produce hydrogen sulfide gas which can be fatal if inhaled. Do not enter any septic tank, pump chamber, sewer manhole, or any confined space where sewage has been present without first ventilating the space and using proper safety equipment.

Always have a worker onsite and outside the tank when an employee is entering a tank. Always use ventilation or a breathing apparatus when entering a sewage tank. A common practice used by pumpers for tank ventilation during entry is to ventilate the tank using their pump truck hose.

5.4 Fall protection

Some Thurston County properties contain steep slopes, and their septic components may be near or on the steep slopes. You may need to use staircases or steps to reach the septic components. Watch for slippery conditions on wooden staircases or decks.

According to OSHA, falling is among the most common cause for workplace injury and deaths. When working around extreme slopes, cliffs, or decks, review the OSHA guidelines for fall protection at www.osha.gov/SLTC/fallprotection.

5.5 Large equipment

According to the Bureau of Labor Statistics, over 70 workers died from back over incidents in 2011. These kinds of incidents can occur in different ways but are preventable. Use spotters to help back or maneuver pump trucks or large equipment. Train employees on how to review blind spots or obtain technology which can detect obstacles in blind spots. Put non-driver employees in the driver's seat to let them experience the blind spots the driver sees. This gives a better understanding and appreciation for ground crews working around large equipment operators.

Information about how to stay safe while working around equipment can be found on www.osha.gov.

5.6 Working with Electrical Components

Check with the Washington State Department of Labor and Industries to see what tasks must be done by a licensed electrician. Before servicing or repairing any electrical equipment, disconnect the electrical power source and test the circuit to make sure it is off.

SECTION 6 - Minimum Requirements for Inspection

6.1 Locating the Septic Tank

Locating the septic tank is a vital step to pumping or inspecting the system but is sometimes a challenge. Below are ways of finding the tank:

- Find the record drawing, formerly called "as built." A copy can be obtained from OnlineRME or Thurston County website: <https://www.co.thurston.wa.us/permitting/>.
- Look for cleanouts next to the foundation. The tank may be in the direction of the cleanout pipe.
- Building applications may show general septic location.
- Contractor's drawings.
- Look for visual signs. Sometimes the riser lid or the entire tank will have dead grass over it due to lack of cover material.
- Probe for the tank; this works well with shallow tanks. Use a piece of rebar or metal to probe the ground for the tank.
- Look in the crawlspace for where the sewer line leaves the building.
- Roof vents and other internal plumbing are usually near the building sewer outlet.
- Ask the client if they know where the tank is located. The client may have additional records.
- A metal detector may be able to locate the metal handles on older tanks.
- Locating Technology may be a last resort as it is often expensive for the client.

6.2 When to Pump a Septic Tank

A septic tank must be pumped when the accumulation of sludge and scum levels is greater than one-third (1/3) of the working depth of the septic tank, or when pumping is required by Thurston County Sanitary Code, Article IV. When pumping is required, all compartments of the tank must be pumped.

When the sludge and scum equal one-third or more of the working depth, the tank needs to be pumped. Step by step instructions are included in the Thurston County brochure "Inspecting Your Septic Tank."

How to determine when to pump:

1. Measure the working depth, the total depth of the liquid level in the tank.
2. Measure the scum and sludge layers. The brochure includes directions for making a scum & sludge stick, or commercial products can be used.
3. Divide the working depth by 3.
4. Add the sludge and scum amount together.
5. Pump the tank if the working volume divided by 3 is the same or higher than the combined sludge and scum.
6. *For example: Working depth is 48"/3 = 16"
Sludge 10" + Scum 9" = 19 inches
19" is higher than 16" so the tank needs to be pumped.*

6.3 When to Pump a Pump Tank or Basin

If the sludge is high enough to reach the intake of the pump, the tank must be pumped. The only exception is for grinder pumps designed to pump solid materials.

Use your sludge measuring tools to determine the level of the sludge compared to the level of the pump inlet. The design may show the height of the pump block.

6.4 How to pump

Before pumping sewage from a tank, be sure you know what you are pumping. Loads with excess heat, chemicals, or grease may be denied at the disposal site. Contact your disposal site if you have questions.

To pump a tank:

1. Pump the liquid level down below the level of the outlet baffle.
2. Break up the scum layer by raking or stirring. Do not backflush to break up the scum layer.
3. Wash any components off into the tank opening.
4. Pump the entire contents of all compartments.
5. Pump through the lids, never pump through the baffles.
6. Do not leave sludge in the bottom of the tank as a starter.

If you are pumping a proprietary device contact the manufacturer or a Certified Monitoring Specialist for pumping requirements.

Shallow or polyethylene tanks can float out of the ground if the sewage is pumped during a high-water table. Never leave a tank completely empty when it is in a high-water table. To avoid floating a tank, you may fill the tank with water immediately after pumping. If there is evidence the tank may float, and pumping is required, tell your client to schedule the pumping during the summer dry season. Add comments to the inspection or pumping report about the tank floating concern.

6.5 Assessing the Septic and Pump Tank Condition

All tanks must be watertight. Before pumping the tanks, observe the liquid levels. The septic tank should always have liquid and the liquid should always be at the bottom of the outlet pipe. Check the undersides of the lids for black slime, indicating sewage has risen against the lid. This is a sign of elevated liquid levels due to flooding. If the liquid level is above the bottom of the outlet pipe, the liquid level is too high. This is an indication of a possible failure in a downstream component. If the liquid level is below the bottom of the outlet pipe, this is an indication of a crack or leak in the tank. Staining and etching on the tank walls below the outlet baffle is another indication of leaking.

Pump tank levels will be variable depending on when the pump last ran and how much water is used in the house.

After pumping the septic tank or pump tank, listen and look for water running back into the tank. If water is running into the tank from the outlet, there may be problems with the down-stream components. If water is entering from the home and no water is being used, there may be a leaking fixture which can overwhelm the system.

Rinse the sides of the tank with fresh water and look for visual cracks, holes, staining or air bubbles in the tank walls. The bubbles may indicate a crack. Do not wash the tank with any cleansers or disinfectants.

6.6 Tank Repairs

A certified pumper, certified monitoring specialist or certified installer can repair cracks or holes in a septic tank. Cracked tanks under 900 gallons in size cannot be repaired and must be replaced. If the tank is 900 gallons or over, the repair must be completed by a certified professional. The professional who completes the repair must perform a 24-hour leak test to certify the tank is watertight.

To perform a 24-hour leak test: fill the tank with water to the working volume. Check the level of the liquid in the tank after 24-hours. If the level of the liquid in the tank maintained the same, the repair worked. If the level dropped, the repair did not work.

A repair may be attempted multiple times. If the tank cannot be repaired, and cannot pass the 24-hour leak test, the tank must be replaced. A permit from Thurston County is required before replacing or installing a sewage tank or basin, and a permit is needed to abandon an old tank. A Certified Installer must install the new tank and abandon the old tank. To abandon the old tank: pump, fill with inert material, and crush or remove the top.

6.7 Inspecting Components Inside the Tank

Baffles

Check to see that the inlet and outlet baffles are in place and intact. Perform a visual check for cracks or holes. Baffles with holes, cracks, or crumbling concrete must be replaced. The inlet and outlet baffles can be installed or replaced without a permit.

Cement curtain baffles are adequate for continued use if they are in good condition. Look to see the integrity of the cement is sound, without crumbling or holes. These baffles do not have filters. Some older tanks can be retrofitted with new baffles and an effluent filter, but, some older tanks were built with the outlet pipe placed high in the tank so there is not enough room to install a modern baffle.

Before replacing a baffle, determine the working volume and use the criteria outlined in WAC 246-272C:

Inlet baffle requirements:

- (a) The inlet sanitary tee or baffle extends at least eight inches downward below the liquid level;
- (b) The inlet sanitary tee or baffle extends above the liquid surface at least to the crown of the inlet pipe; and
- (c) The invert of the inlet pipe is a minimum of two inches above the invert of the tank outlet.

Outlet baffle requirements:

- (a) The outlet sanitary tee or baffle extends below the liquid level at least thirty percent, but not more than forty percent of the liquid depth for tanks with straight vertical sides;
- (b) The outlet sanitary tee or baffle extends below the liquid level at least twenty-five percent, but not more than thirty-five percent of the liquid depth in horizontal cylindrical tanks; and
- (c) The outlet sanitary tee extends sufficiently to allow scum storage and venting, and to a point not less than one inch from the underside of the top of the tank. The outlet tee may extend into the riser for venting.

Effluent Filter

The only baffle which may have a filter is the outlet baffle. If the outlet baffle has a filter, remove, and rinse the filter with water over the open tank lid. Do not rinse off the filter over the grass or into the landscaping. Inspect the baffle for shape integrity, holes, or breaks. If the filter has holes, breaks, or is collapsed and cannot maintain its shape it must be replaced. No permit is required to replace the filter.

6.8 Inspecting Pump Components in Pump Tank or Basin

Pump Chambers

Verify the pump components are working by filling the pump tank with clean water. The pump should turn on when the water activates the ON/OFF float. If the pump does not turn on, further investigation is needed.

The high-water alarm should turn on when the float is lifted by the water. You should hear the audible alarm and see the visual alarm working. If the alarms do not turn on, further investigation is needed.

It is not recommended to check the floats by lifting them with a hoe or stick. Float clips may break. If a float clip breaks, it must be replaced. We recommend only using septic supplies for septic repairs and don't recommend the use of "zip-ties" for float clips. If there are obvious problems, notify the owner to have further investigation done. Pump installations and repairs should be done by a licensed septic system installer.

6.9 Inspecting Proprietary or Pre-Treatment Components

Only Certified Monitoring Specialists are allowed to inspect or maintain proprietary devices. To ensure proper functioning, proprietary treatment products should be maintained according to the product manufacturer's recommendations.

Only companies who are certified by WOSSA for sandfilters may inspect or work on sandfilters. Sand-filters are a common pretreatment component. If you are going to be working on sand filter systems, we recommend reading, *Recommended Standards and Guidelines for Intermittent Sand Filter Treatment Systems*.

According to the *Recommended Standards and Guidelines for Intermittent Sand Filter Treatment Systems*, sand-filter treatment systems should be inspected yearly. Inspect by looking at the surface of the sand-filter for signs of settling, or lush grass which may indicate a problem. A properly working sand-filter should not produce odors. Look for ponding inside the components. Review the water level in the basin and check, that the pump is working properly. Check all electrical connections. Pump the sludge from the pump basin if the sludge accumulation is high enough to reach the inlet of the pump or whenever the septic tank is pumped.

A Thurston County permit is required to rebuild or replace proprietary or pre-treatment components.

6.10 Inspecting Disposal Components

The disposal component inspection will often be limited to walking over the area and reviewing for signs of failure. If the system has monitoring ports, you must check them for ponding during your inspection. Estimate the amount or depth of ponding observed. If the system contains a pump, run the pump while standing at or on the disposal component to look for surfacing sewage.

SECTION 7 – General Septic Basics – Advice for Owners & Residents on How to Use the System

7.1 What Not to Flush

Do not dispose of solid materials into the tank such as wipes, plastics, cigarettes, tampons, disposable diapers, newspapers, or any other materials that are difficult to break down. These will likely cause a physical clog and sewage to backup into the structure.

Do not flush pet waste into the septic. Dog and cat feces should be bagged and thrown in the garbage. Cat and dog feces contain more bacteria than human waste and will damage the bio-chemical balance of the septic system.

Do not flush oils, greases, fats, or any food waste down the sink or in the toilet. Do not heat up solid fats into a liquid form to pour down the sink, these will become solid when they cool in the pipes. Oils and fats build up and create layers, which can lead to clogged drain lines and increased need to pump the tank.

If there is a garbage disposal, the recommendation is to use it as little as possible, if at all. Never flush more chemicals down the drain than used for cleaning. Never flush paints or waste chemicals down the drain. Always follow the instructions for household cleaners and only mix concentrated chemicals to the appropriate ratio. Bleach used for cleaning should never be stronger than 1:10 (1-part bleach to 9-parts water.)

Septic systems are not designed to remove chemicals or medications from the effluent. The addition of excessive chemicals can disrupt the biochemical processes within the septic system. Septic systems work best when the PH is around 7.2. Excessive chemical use can change the PH of the sewage, making it more acidic or basic. Medicines can be safely disposed through Safe Medication Return sites: www.thustonmedicationtakeback.org.

7.2 Additives

Septic tank additives are not recommended or required. The bacteria and organisms that are needed to treat sewage are naturally present in domestic wastes. Adding things like miracle septic tank cleaners, yeast, hamburger, or cabbage are not needed. The addition of these items may cause harm to the on-site sewage system.

In 1993 concerns arose that septic tank additives marketed to the public could pass through the septic system and harm the environment. The Department of Health now publishes a List of Approved On-Site Sewage System Additives, tested by State of Washington standards to ensure they do not harm the system or the environment. Products are not evaluated for effectiveness.

Septic tank additives are often sold in the hardware store and are marketed to reduce the need for routine maintenance or pumping of septic systems. These additives are not needed or recommended for use in septic systems. Watch out for products labeled with “septic safe,” which is an advertising term and has no industry meaning. Additives are often expensive and require monthly application. The money spent on these products would be better saved for the next routine septic inspection or pumping.

7.3 Advice for the septic user

The following guidelines should be discussed with the clients or occupants:

1. After pumping, a septic tank will fill up in two to four days with normal use.
2. Do not overuse bleach and household cleansers.
3. Do not dispose of chemicals, paint, solvents, oil, or grease into the tank.
4. If the home has a garbage disposal, it should be removed or used as little as possible. Some garbage disposals will be listed as "septic safe;" this is an advertising term and has no industry meaning. A garbage disposal will decrease the amount of time between pumping and may cost a client additional money over the life of the system.
5. Do not dispose of solid materials into the tank such as wipes, plastics, cigarettes, tampons, disposable diapers, newspapers, or any other materials that are difficult to break down.
6. Avoid flushing large amounts of toilet paper. Never flush RV paper, paper towels, or wet wipes.
7. Never use septic tank additives or cleaners or any type of "home remedy" to assist the tank's functioning. The human waste provides all the microbes the septic needs to perform properly.
8. Spread out loads of laundry through the week. Use liquid detergent. Limit the use of detergent in each load to the minimum needed.
9. Never drain a hot tub or spa into the septic system. Dechlorinate the water and slowly drain it onto the landscape. Avoid storm water ditches or storm drains.

7.4 Repairs Non-Certified People Can Complete

Some repairs may be completed by a non-certified person. If the client wishes to make the repair, your inspection report will be marked deficient for the items you did not repair. Make a comment on your report about which items the client will repair.

Advise the client on the proper equipment, supplies, tools, and techniques for the repair. If the client is willing to have you review their work after the repair, submit a follow-up report to www.onlinerme.com. If the client refuses a follow-up inspection, ask the client to save all receipts for the work and take photos of their repair. Thurston County may follow-up for verification the repair was completed.

If the client states they will make a repair that requires a certified professional or permit, tell them the repair requires a certified professional or permit. Write the clients intent in the comment section of your inspection report. Call the Pumper Program staff members immediately.

The following components CAN be repaired or replaced by a non-certified person (homeowner, maintenance staff, contractor):

- Baffles.
- Effluent filters.
- Risers.
- Lids.
- Tightline between the house and tank.
- Tightline between two tanks.
- Tightline between the tank and disposal component.
- Pumps.
- Interceptor drain.
- Pump control floats.
- Inspection boxes.

- Remove vegetation from disposal component.
- Jetting a disposal component or pipe.

7.5 Septic Activities That Certified Professionals Must Complete

The following work must be completed by a certified septic professional or requires a permit (Pumper, Monitoring Specialist, Installer, or Designer)

- Pumping sewage from septic tanks, pump tanks or pump basins (Pumpers Only)
- Installation of additional drain lines in the disposal component (Installers Only; permit required)
- Replacement of over 10 ft of perforated pipe in the disposal component (Installers Only; Permit required)
- Replacement up to 10 ft of perforated disposal pipe with non-perforated pipe to bypass a clogged or crushed area.
- Installation of a sewage tank, pump tank or basin (Installers Only; Permit Required)
- Decommissioning of a sewage tank, pump tank or basin (Permit required)
- Moving the disposal component to a new location on the property. (Permit required)
- Repair, replacement, or alterations of combinations of multiple septic components, such as replacing pipe and gravel, distribution box replacement.
- Any repair or replacement activity that disturbs, destroys, or may affect the soil at or near the soil absorption interface of a septic system or other dispersal component.
- Rebuilding the sand in a mound, sand-filter or Glendon.
- Repair or replacement of Proprietary Device parts.

SECTION 8 – Resources

8.1 Industry Resources

Thurston County Article IV Sanitary Code

www.co.thurston.wa.us/health/ehadm/pdf/Article_IV_Int.pdf

Thurston County Fees, Forms and Permits

www.co.thurston.wa.us/health/ehadm/fees_permits.html

DOH – Wastewater Forms and Publications

www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/FormsPublications

OSHA

www.osha.gov/SLTC/text_index.html

WOSSA

www.wossa.org

8.3 Resources for the homeowner or client

Septic Systems (DOH)

www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/SepticSystem

Understanding and Caring for your Septic System (DOH)

<https://www.doh.wa.gov/Portals/1/Documents/Pubs/337-086.pdf>

Understanding and Caring for your Pressure Distribution System (DOH)

<https://www.doh.wa.gov/Portals/1/Documents/Pubs/337-087.pdf>

Understanding and Caring for your Sand Filter System (DOH)

<https://www.doh.wa.gov/Portals/1/Documents/Pubs/337-089.pdf>

Understanding and Caring for your Mound (DOH)

<https://www.doh.wa.gov/Portals/1/Documents/Pubs/337-088.pdf>

Septic Sense, Scents, Cents (WSG)

<https://wsg.washington.edu/wordpress/wp-content/uploads/outreach/Septic-sense.pdf>