

WHATCOM COUNTY

Homeowner Online Septic Training (HOST)

STUDY GUIDE



Whatcom County Health Department (WCHD)
509 Girard Street
Bellingham, WA 98225

Overview

After reviewing this document and the homeowner training presentation, a homeowner may evaluate his or her on-site sewage system (OSS) for the life of that system. If you own multiple properties with OSS or septic systems you may also evaluate all of them. The following system types **cannot** be evaluated by a homeowner: **Glendon Biofilters, Aerobic Treatment Units, and Community drainfields**. The only requirements for evaluating your OSS are that you are the property owner and you have reviewed the homeowner training presentation. If at any time during the evaluation process you have questions, do not hesitate to call WCHD staff for assistance at (360) 778-6000 or e-mail Health_EH_Parcel@whatcomcounty.us.

Regular evaluation of your OSS is now required both in State (WAC 246-272A) and local (WCC 24.05) Health regulations.

Properly operating and maintaining your system is required by State and local regulations to ensure that our wastes are not creating a source of pollution. OSS evaluations must be performed and filed with the WCHD at least once every three years for all systems consisting solely of a septic tank and gravity drainfield, and annually for all other system types.

Failing septic systems can leak into nearby ditches or streams where the sewage eventually ends up on our beaches where we swim, boat, and fish. Shellfish that grow in marine waters are harvested from our beaches and can become contaminated by failing septic systems. If shellfish filter polluted water, they can become unsafe for humans to eat. Flies, rats, and other vectors can encounter sewage from a failing septic system and subsequently pass the diseases found in sewage to humans or infect other animals at locations far from the failing system.

Whatcom County's Homeowner Online Septic Training (HOST) program and this companion study guide are designed to help property owners maintain and use their septic system, as well as conduct regular evaluations of their OSS.

While the HOST program provides the basic information necessary to operate and maintain most gravity and pressurized septic systems, it cannot address every condition and situation that may be encountered.

The HOST evaluation is not as thorough of an evaluation as you would have if you were to hire a licensed Operation and Maintenance (O&M) Specialist. An O&M Specialist is going to conduct items such as a flow test, a drawdown to verify that timer settings are correct, and a pressure test if applicable. It should be noted that at the time of a property transfer, a licensed O&M Specialist must conduct the inspection.

Many older systems may vary in their configuration and construction. A system where there is no record drawing, no access, or whose location is difficult to determine, may require a homeowner to hire a licensed O&M Specialist to assist them. In the past there were no standards for septic systems and permits were not required. There are a number of older homes where "something" was installed years ago that makes the water "go away" but where it goes and how it functions is unknown. This does not mean that such a system is illegal or failed; it just means that a homeowner may have trouble conducting the evaluation. These cases may require the help of a licensed O&M Specialist.

There may be circumstances where it will be difficult, dangerous, or even impossible for a homeowner to properly evaluate and maintain their OSS by themselves. In these cases, the owner will find it easier to utilize the services of a licensed O&M Specialist.

System Types

The best way to determine your system type is to review your septic permit. The system type will be noted in multiple places within the permit. The descriptions below may also help you determine your system type.

A **Conventional Gravity system** will likely have all of the following major components, each of which should be thoroughly inspected: plumbing; septic tank(s); and a drainfield.

A typical conventional gravity system will not have any mechanical devices to convey water or material; gravity will do all of the required work.

In gravity plumbing, liquids will carry solid materials out of your dwelling towards downstream components. The septic tank will provide room for the solids to settle out and begin to decompose.

Only the liquid sewage without solids called effluent should flow out of your septic tank; this effluent will again be conveyed by gravity to the drainfield.

Conventional Gravity System



Due to differences in elevations, on some occasions, a pump is needed to get the sewage to the drainfield. Once the sewage is at the drainfield, it is dispersed via gravity within the drainfield. Examples of these types of systems would be a **Pump to Gravity Distribution** or a **Non-Pressurized Mound** (Gravity Mound).

The drainfield is the final and the most “downstream” component in your septic system. The drainfield is where effluent is discharged into the environment. The final treatment occurs in the soil that surrounds your drainfield.

A **Pressure Distribution system** will likely have all of the following major components, each of which should be thoroughly inspected: plumbing; septic tank(s); pump tank; and a drainfield.

In the plumbing, liquids will carry solid materials out of your dwelling towards downstream components. The septic tank will provide room for the solids to settle out and begin to decompose.

Pressure distribution systems are similar to conventional gravity systems, except that only the effluent should flow out of your septic tank and into your pump tank. The pump tank will store the effluent until it is conveyed to a drainfield.

The effluent is distributed via pressure throughout the drainfield by utilizing small diameter pipes with small holes to distribute the liquid throughout the drainfield.

Pressure Distribution System



If the pump tank is pumping the sewage to an above ground sand mound, then the system type is a **Pressure Mound**. A pressure mound has all the same components as a pressure distribution system except for the drainfield.

Pressure Mound System



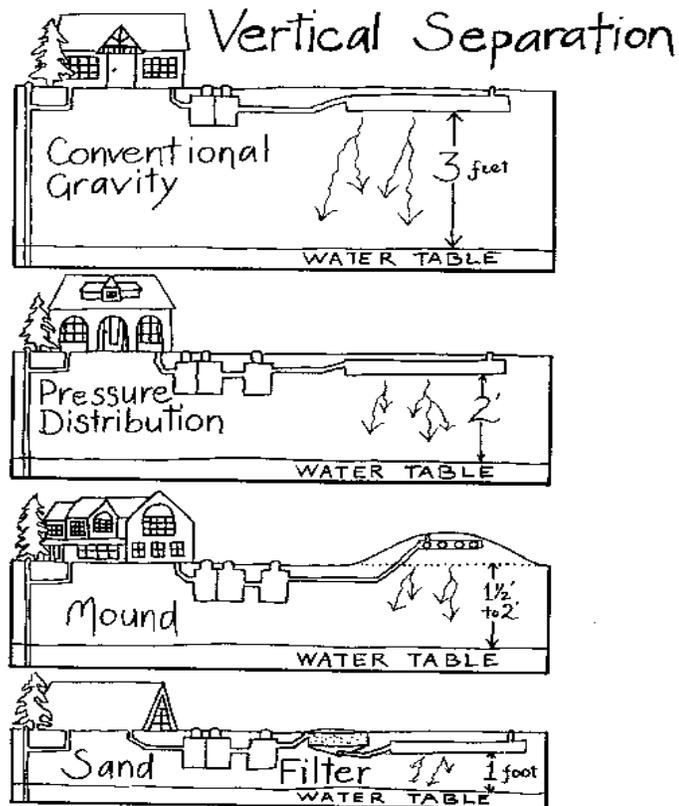
Sometimes prior to the drainfield (gravity or pressure), the sewage may pass through a **Sand Filter**. A sand filter can be constructed of either a flexible membrane or a concrete vessel. In a sand filter, the sewage is distributed evenly throughout the vessel and then it passes through several feet of sand and gravel, providing additional treatment of the waste. The sewage is then captured after the sand filter and distributed to a drainfield.

Sand Filter



What determines the type of system I have?

One of the main site characteristics that determines the type of system you have is the depth of unsaturated soil beneath the drainfield and above a water table or other restrictive layer. This term is called vertical separation, and you can see in the figure below how the vertical separation determines the type of system needed for a specific site.



Safety

Evaluating and maintaining an OSS can be dangerous. Homeowners who choose to maintain and evaluate their own septic system can be exposed to disease causing agents found in human waste, hazardous gases found in septic systems, and at times, electricity. It is therefore imperative that you take all necessary precautions to minimize the risk of becoming sick or injured when conducting your inspection.

If at any time you do not feel comfortable or confident in your ability to evaluate and maintain your septic system without the risk of becoming ill or injured, you should hire a licensed O&M Specialist to perform the work for you. The WCHD licenses these professionals, and publishes a list with their contact information at <http://www.whatcomcounty.us/DocumentCenter/View/5185>. Local phone and service directories also contain useful contacts.

General Hygiene

Evaluating, maintaining, or troubleshooting your septic system can expose you to the many pathogens or disease causing organisms found in human waste. Hygienic practices mentioned here will help you protect yourself. Proper hygienic practices *minimize* the risk of exposure to disease causing agents that are found in sewage. It is up to you to use whatever techniques you feel necessary to adequately protect yourself from exposure to raw sewage, and to seek medical assistance if you are exposed, but we recommend the following:

Clothing

Protective clothing should be worn whenever you maintain your septic system. You may get splashed or sprayed with raw sewage. You could and probably will, get raw sewage, dirt, and other grime smeared on your hands and clothing.

Coveralls, rain gear, or other old clothing that can be discarded or dedicated to this work are recommended. Clothing that covers as much skin as possible, including the hands and face, should be worn at all times.

Covering the eyes, mouth, and any open cuts is particularly important. These areas provide a transmission corridor for viruses and bacteria to enter the body. Exposing these areas to sewage increases a person's risk of contracting an illness.

Gloves are the first line of defense for the average do-it-yourselfer. Maintaining your system will require the use of your hands to do many things including lifting lids, operating sludge judges, lifting floats, pulling filters, and adjusting valves. Using gloves will minimize your exposure risk.

Face shields or goggles are recommended. They protect your eyes and mouth from the liquids in your septic system. Splashing or spraying can and will occur. Protecting your face, eyes, and mouth will minimize your risk of illness. After completing your inspection and related maintenance, you should shower or bathe, even if you don't feel like you've been exposed to sewage. At a minimum, wash your hands using soap and hot water.



Tools

Tools can be used to further minimize your exposure to the sewage contained in your septic system. Rakes, shovels, and poles can be used to reach components that are well below ground or out of reach. Rakes can be used to lift floats and screens. Shovels can be used to evaluate the depth of the scum and sludge found in your septic tank.



A hose with a nozzle can be used to pre-clean risers, plumbing, and inspection ports. While troubleshooting, water can be used to simulate normal water flow through the septic system.

Spraying down portions of your septic system may result in exposure to sewage.

SAFETY REMINDER: Using hoses can create another risk; improper use of a hose can cause a cross connection, a situation where sewage and potable water become mixed. Under certain situations, waste water may backflow into the freshwater system via the hose; this can occur whenever the hose outlet is fully immersed in the wastewater. Never immerse the hose in any wastewater.

Decontamination

Proper decontamination of equipment is an important task that will minimize your risk of becoming ill. While exposure to raw sewage is readily evident, exposure to *residues* from contaminated equipment or clothing may not be apparent, yet can still result in exposure and subsequent illness. For this reason, equipment, clothing, and tools that have been splashed with or immersed in effluent or sewage, must be decontaminated.

Care must be taken to properly clean electronic tools such as drills or screw drivers. Clean these tools in accordance with the manufacturer's instructions.

Decontamination of equipment or tools should include a four-step process. In the area near your drainfield, arrange products and tools where you can:

1. **Rinse**
2. **Wash**
3. **Rinse**
4. **Sanitize**



Assemble the following items when decontaminating your equipment and tools:

- Garden Hose for rinsing equipment
- 5 Gallon Buckets
- Soap or detergents
- Brush for cleaning grime and grit from tools with hard to reach places
- 5 Gallon bucket containing water with a good splash of bleach, ammonia or other sanitizer
- Plastic cup for rinsing large tools with the sanitizer



1st - RINSE

Start by rinsing the equipment and tools with water from your garden hose. Remove gross contamination from your equipment. This process may require the use of a stiff bristled brush to remove all contaminants.

2nd - WASH

Next, immerse the equipment into the 5 gallon bucket containing a soap and water mixture. Use a brush to clean the hard to reach portions of the tools. Let the equipment soak as needed. Larger tools may require the use of a brush and a small rinse cup to completely clean areas that cannot be immersed in the bucket.



3rd - RINSE

Remove the equipment and tools from the soap and water mixture. Again, using the garden hose, rinse the soap from the equipment; this will ensure the soaps do not bind with the sanitizer.

4th - SANITIZE

After thoroughly rinsing the tools, immerse the equipment in a sanitizer. Store bought bleach is a very effective sanitizer for killing bacteria and viruses. Others products, including iodine or ammonia are effective too. Fully immerse the tools and equipment as much as you can. The longer the equipment stays in contact with the sanitizer, the more likely it is that any bacteria and viruses will be killed.

When tools are too large to be fully immersed in the solution, filling a plastic cup or similar container with sanitizer, can be used to rinse the tools. Special care should be taken to sanitize areas where later hand contact is likely to occur.

Pinch Points

Septic systems contain a number of potential “pinch-points”. These are areas where heavy lids or awkward doors may pinch or crush fingers or limbs.

Septic tank lids are heavy and awkward. Lids can slip or slide across surfaces, pinching or crushing limbs or fingers. Valve box lids often have awkward releases that, when opened, can also pinch or crush fingers. A homeowner maintaining their OSS should always evaluate their surroundings and take all measures needed to minimize the risk of injury.

Electricity

Septic systems that contain a pump will have an electrical element to them. These can pose a risk of being electrocuted. A homeowner maintaining a pump system should minimize electrical hazards where appropriate.

Electrical connections are typically buried and run underground from the dwelling to the pump tank. You may find junction boxes, wires, or other electrical connections in the pump chamber. Ideally these connections, when found in the pump tank, will be located in a junction box that keeps wire connections protected from breakage, while keeping the wires organized. Electrical connections should need very little maintenance if your pump controls and alarms are functioning as designed. If electrical problems are identified, a homeowner should contact a licensed Electrician. Electrical rules and requirements are governed by the Washington State Department of Labor and Industries.



Discontinue Power

Most pumps are wired directly into your dwelling or fuse box. Power can usually be disconnected at your home’s circuit breaker. If there is a need to discontinue power, there are a number of ways you can confirm that power is no longer serving the pump. Lift the floats that control the pump, and if power has been interrupted, the pump will not be triggered. If there is a control panel controlling the pump, no lights (often very small) will be lit if the power has been interrupted. Often times, the high level alarm will not function.

Gases

Septic systems produce gases that can be explosive or are capable of displacing oxygen. For these reasons, a person should do everything possible to minimize risk of exposure to gas. Prior to using any electrical device (screwdrivers, drills, flashlights, etc.), all septic system parts should be vented

thoroughly. A person should never, for any reason, enter the confines of a septic system, especially tanks.

Methane gas is produced by decomposition of organic materials. It is likely that methane will also be found in your septic system. A properly functioning septic system will allow for the proper venting of these gases, either through a dwelling's plumbing system or through vent pipes located near your septic system.

Some gases found in properly functioning septic systems have different densities. These gases can sink or rise, displacing oxygen that you need to breathe. While leaning over the system, be sure to recognize that gases may have accumulated around where you are breathing. These gases can be odorless and may deprive you of oxygen.

Proper Operation/Conservation

Operation and maintenance of your home septic system begins with your actions inside the home. What you flush, how much you flush, and how much water you run down the drain will affect the function and performance of your septic system.

Water Use

Water usage is likely the biggest contributor to a failed septic system. Every drip, drop, sprinkle, or spray of water that goes down a shower, sink, toilet, or drain will end up being processed by your septic system. Reducing water use will limit the demand you place on your septic system. **Faucets and toilets should be free of any leakage.** Most people perceive a slow dripping faucet as nothing more than a nuisance. A septic system will be burdened by this nuisance.



A slow dripping faucet, although a nuisance to fix, can and will lead to premature failure of your septic system. It is easy to think about this in terms that describe a real situation: The slow drip (one every five seconds), drips 12 times per minute, for 60 minutes, 24 hours a day, 365 days of the year. These slow drips will accumulate over time into thousands of gallons of water. Your septic system is now faced with processing and disposing of these thousands of gallons of clean water unnecessarily.

Install flow restrictors on all or select faucets. Flow restrictors are an easy and effective means to reduce water consumption. Flow restrictors on showers and other high volume water fixtures can dramatically reduce your consumption of water. Many flow restrictors have no mechanical parts while others reduce flow based upon pressure. They can be purchased at your local hardware store and are fairly easy to install in a typical faucet.

If you have a water meter on your property, you can easily figure out how much water you and your family are using. If your water meter has a counter, all you need to do is write the number down, along with the time and date and a few days later, look at the meter again. Subtract the smaller number from the larger; the difference is the amount of water you used since the previous time you read the meter.

Figuring out how many gallons of water per day that you have consumed, will allow you to evaluate if you are abusing your septic system. Be aware that your meter readings will typically represent all of the water used, including irrigation. If you have been watering lawns and other landscaping on your property, your readings may not accurately reflect all of the water processed by your septic system.

Check Household Plumbing

Some plumbing (like toilets) can leak so slowly that it is difficult to hear or see signs of a leak. There are a number of things you can do to check for leaks.

One way that you can identify a very slow leak is by shutting all faucets off and keeping them off for a period of time. Read the meter once all faucets are off, and then wait a few hours and check the meter again. If the meter has moved, yet you have used no water during that time, you may have a very slow leak.

Individual faucets can be evaluated for leaks by placing a dry bowl or plate under each faucet. Place the dry bowl directly under the faucet. Do not use the faucet for as long as possible. After several hours, check the bowl for any signs of water. If there is water in the bowl, your plumbing fixture is leaking and it should be repaired.

You can check for leaks in your toilet too. Open the lid to your toilet tank and pour a good amount of food coloring into the tank water. If there is a slow leak, the food coloring will show up in the toilet bowl. This is a cheap and easy way of assessing your toilet for leaks, which may otherwise be difficult to detect visually.

Harsh Chemicals

Harsh chemicals including acids, bases, pesticides, herbicides, oils, paints, and varnishes should never be drained into your septic system. The chemicals can alter the natural biological conditions found in your septic system. Altering the biological balance may discourage the natural proliferation and growth of bacteria found in your system. Alteration of the biology found in your system will not allow for normal and productive decomposition of the wastes you put into your septic system.



Some chemicals, like those found in pesticides, herbicides, and oils are persistent and cannot be processed by your septic system. These chemicals can pass right through your septic system with little or no treatment. The chemicals can last for days or even years in your septic system.

These pollutants contaminate ground and surface waters. Most household wastes, such as harsh chemicals, paints, and oils can be disposed of at your local transfer station or solid waste facility.

Disposal of Toxics - 3505 Airport Drive, Bellingham, WA 98225

Other Waste Products



Everything you put down your drain or into the toilet will end up in your septic system. Your septic system is not capable of handling many wastes that you may generate in your home. Cat litter, pet poop, tampons, sanitary napkins, disposable diapers, paper towels, facial tissue, hand wipes, cigarette butts, and coffee grounds are only some of the items people flush into their septic systems, but shouldn't. Many of these products can clog your plumbing and septic system. These materials do not decompose or breakdown easily, if at all. Flushing them will increase the need to pump, maintain and repair your system.

Grease is a common household waste product that many people flush or rinse down the drain. Greases can congeal anywhere in your plumbing or septic system. Once these products congeal, they can cause blockages in your system. Materials that are flushed may get caught up on this congealed ooze and the blockage worsens. Grease can also clog the pores in your soil, damaging your drainfield and may lead to system failure.

Here's an easy and simple way to dispose of household grease: If still warm and in liquid form, the grease can be poured off easily into a water-tight container such as a coffee can and disposed of in the trash. Another way to dispose of grease is to let the grease cool in the pan, where it can be scraped off using a paper towel. The grease laden paper towel can then be disposed of in your trash.

Some household products are advertised as “septic safe”. While they may not have a negative effect on your system, they do fill your septic system with wastes that require removal through pumping. Additives and old “cures” such as using cabbage, hamburger, yeast, etc., have no beneficial effect on your septic system, but will lead to more frequent pumping of your septic system.

Garbage disposals are frequently installed in new homes. Using a garbage disposal on a septic system is not recommended. A garbage disposal adds more solid material to your septic system. In addition, some garbage disposals are capable of grinding or shredding material to a very fine size. These small bits of ground-up material are often difficult to settle out and these unsettled particles can pass through your septic tank, eventually damaging pumps or clogging the soil beneath your drainfield.

Outdoor Maintenance

Proper care and maintenance of your septic system also occurs around the area where your system is installed. Many things you do in your yard or on your property can affect the system’s function and performance.

Drainage

Directing surface water away from your tanks and drainfield will help your drainfield function as well as possible. Water coming from roof drains, driveways or other surfaces should be directed away from your septic system. Remember, the soil where your drainfield is located, is capable of disposing of only so much liquid. Additional water, clean or not, taxes your soil’s ability to accept all of the liquids landing on the soil.

French drains, curtain drains, or shallow diversion ditches can help move water out and around your septic system. Septic systems that have a curtain drain installed around them, often are dependent on a functioning curtain drain. Curtain drains may require some maintenance themselves. Keeping drains free from blockage ensures that surface water is being moved properly around your septic system.

Plantings

Landscaping in and around your septic system is important. Poor landscaping can cause septic system problems, including premature failure of your septic system. The rule of thumb for planting is to use only shallow-rooted plants such as grasses. Probably one of the most important considerations related to plantings around your septic system is the planting of plants that do not like or want water. A willow or cedar planted near a septic system will seek the water found in the tanks and pipes. Drainfield pipes have been completely closed by willow tree roots, resulting in complete failure of the septic system. Roots can grow through cracks around septic tank lids, causing failure or an inability to access and maintain the system.

Local landscapers or nurseries can help you select plants that are appropriate for the areas around your septic system. Make sure the nursery understands you need plants that do not seek water (not deep-rooted), nor do they require frequent or substantial watering.

Locating Records and Preparing to Inspect Your System

The first step in maintaining your septic system is obtaining your septic permit. Your septic permit will include an “as-built” or “record drawing”; this is a drawing that shows where your septic system is located and what parts or components make up your septic system.

Old homes may not have a septic permit or the as-built may be unreliable. In these cases, it may be increasingly difficult to maintain your septic system without a significant amount of effort.

As-Builts or Record Drawings

As-builts are drawings that often times are drawn to scale or otherwise help describe the location of your septic system. Scaling, like on a map, allows you to find things accurately. The scale should be described on your as-built. The scale is typically depicted in inches to feet. For example, a scale of 1" = 20' means that every inch on the paper is equal to 20 feet in your yard. If the as-built is accurate, this will allow you to find plumbing stubs, tank lids, distribution boxes, drainfield lines and observation ports.

As-built drawings can be obtained at the Whatcom County Health Department located at 509 Girard Street in Bellingham for \$0.15 per page, or on our website

<http://documents.whatcomcounty.us/weblink8/CustomSearch.aspx?SearchName=OSSSearch>.

There is No As-Built or Record Drawing

If the Health Department does not have a record for your septic system, it does not mean that you do not have a septic system or that it is failed or illegal. It probably means that your system was installed a long time ago, prior to any requirement to create an as-built.

If you have no record or as-built, you face additional challenges. You must locate your septic tank or tanks, drainfield, and other components based upon educated guesses, digging and probing.

Start by asking neighbors, contacting the previous owner, and even local service providers. These people may know something about your property and/or system. They may be able to save you valuable time and effort.

If no one knows anything about your septic system, you can use the plumbing in your house to get an idea of where your tanks might be located and how deep they are buried. Your tanks might be located on the same side of your house as where your plumbing leaves your dwelling. The tank will be buried at least as deep as the plumbing leaving your house (it can be much deeper). If you have a plumbed basement, it may be worthwhile to contact a professional. It is possible that your tank is buried very, very deep in the ground.

Green grass or depressions in your yard may be indications of where your tank is located. Oftentimes, when tanks are installed, the dirt used to cover them has a different texture than the surrounding area. Grass may grow greener in these disturbed areas. In addition, the dirt used to cover the tank will settle over time, creating a shallow depression.

Probe suspected tank locations first, rather than digging up the soil only to find nothing. A long piece of rebar can be pounded into the ground to look for a tank. Simply take the rebar and pound it into the ground with a mallet. If you hear a hollow thud and the rebar stops going deeper, you may have found a tank. The probe can be used to identify the size and orientation of the tank (rectangle vs. round, 4' X 8' foot, etc).

Lids will likely be located near both ends of the tank. The next step required to maintain your system is to dig up and remove your septic tank lids. You must be able to observe the inlet and outlet of your septic tank.

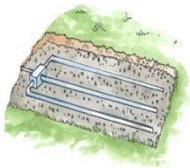


Lids are heavy and may be difficult to remove. Tank lids come in different shapes and sizes. Lids may be square, round or rectangular, and are typically large enough to allow for the tank to be pumped out. Some tanks have smaller lids on each end of the tank to allow for inspection of inlet and outlet baffles.

Concrete lids may become cemented into place due to the shrinking and swelling of concrete. Often times, the metal handle used to remove the lid may become rotted, and will not support the weight of the lid, nor be useable for “popping off” the lid. If you cannot remove the lid, contact a licensed O&M Specialist.

If you successfully locate your septic tank and remove its lids, the next step is to locate your drainfield. This will be located downhill from the septic tank (unless there is a pump).

Your “as-built” or record drawing should describe the location of your drainfield.



If it does not, look for green grass or extremely dry lines running through your yard. Often times the grass over the drain field is either very green or very brown in the summer. Typically these stripes of green or brown grass will be in a straight line along the slope. Strips will be about the same width as a lawn mower.

Green or dry or grass may be an indication of a drain field’s location. However, green grass is not a sure sign of a drainfield.

Someone who can locate underground water or pipes (sometimes called “witching”) may be able to help find a drainfield.

Reporting

The final step to evaluating your system is completing the one page Whatcom County Health Department On-Site Sewage System (OSS) Homeowner Report of System Status (HROSS) Checklist. The HROSS Checklist may be obtained at 509 Girard Street in Bellingham or click on the following link: <http://www.whatcomcounty.us/DocumentCenter/Home/View/2062>. The top section of the form asks for basic information such as date of inspection, site address, and your name. This section also requests your tax parcel number. Tax parcel numbers can be found on your tax statements or by going to the Whatcom County Assessor’s website for property information access: <http://property.whatcomcounty.us/>.

The most important section is the OPERATIONAL STATUS section. If during your inspection you found no issues, you would mark Satisfactory. You would want to mark Maintenance Needed if during your inspection you found some type of maintenance that needed to be addressed and you were not able to correct the maintenance needed item prior to submitting the report to the Health Department. Some of the most common maintenance needed items are pumping the septic tank, replacing a float, repairing a leaking riser, or replacing a baffle. If you addressed the maintenance needed item, you will want to mark Maintenance Performed. Examples of Failure are: sewage surfacing on the ground, sewage backing up into your house due to a saturated drainfield, or sewage leaking from your septic tank or pump chamber.

Site Sketch

If there is no permit available for your system, we are requesting that you submit an OSS drawing (site sketch). We are requesting that you draw a basic site plan illustrating the location of the OSS

components (tanks and drainfield) in relationship to your house. The drawing should be done on 8.5" x 11" paper and include a north arrow, building location, and location of OSS components. .

You are now ready to complete the HOST presentation.