

Beachwood Inspection Services

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Septic System Operation and Maintenance

The modern septic system has three components: the household waste, the septic tank, where partial treatment takes place; and the leaching facility, which provides for treatment and final disposal.

Household Wastewater

Household wastewater is a combination of wastewater from several sources, including sinks, toilets, showers, washing machines, garbage grinders, and dishwashers. As shown below, the largest source of household sewage is the toilet. The actual quantity and composition of household sewage may vary depending upon the number of residents and water-using appliances within the home. Actual total volume of wastewater is about 50 gallons per person per day, but to ensure satisfactory performance of the system throughout its lifetime (15-20 years), a safe design rate of 110 gallons per day per bedroom is assumed for dwellings.

The Septic Tank

Untreated household sewage will quickly clog all but the most porous gravel, if applied directly to the soil. The function of the septic tank is to condition the sewage so that it can percolate into the ground without clogging the soil. Within the tank, three important processes take place:

1. The heavier, solid particles in the sewage settle to the bottom of the tank, forming a layer of sludge. Lighter materials, including fat and grease, float to the surface, forming a scum layer.
2. Bacteria living in the septic tank break down some of the organic solids into liquid components, helping to reduce the build-up of sludge in the tank.
3. Sludge and scum are stored within the septic tank rather than being allowed to flow out into the leaching system where they would quickly clog the soil.

The volume of sludge and scum gradually increases and must be pumped out periodically to ensure that solids will not plug up the septic tank or overflow into the leach field. This may result in back up of the sewage into the house. Pumping will not affect the biological activity in the tank as all the necessary bacteria occur naturally in the incoming sewage. Pumping should be performed, depending on the resident's water usage pattern, generally every two years.

The septic tank interior is accessed through various openings above the inlet and outlet as well as via the center hole through which the actual sludge pumping takes place. The precise location of the access covers varies with the size and brand of the individual tank. When landscaping your property, be sure to keep the covers to your septic tank easily accessible.

The Leaching Facility: Bed, Trench or Pit

After being conditioned in the septic tank, the effluent flows into the leaching facility where it runs out through perforations to crushed stone and into the surround soil. The leaching system usually consists of either a network or perforated pipes laid in graded, stone-filled beds or trenches, or of a perforated concrete chamber placed in a graded, stone-lined pit. Although other types of leaching systems, such as mounds and chamber systems, are used in particular cases, these systems all perform the function of discharging wastewater into the soil.

The size of the leaching area depends on the permeability of underlying soil and the volume of domestic wastewater discharged. Garbage grinders add significant amounts of waste material to the sewage, which increases the size of the septic tank and leach field needed. Installation of garbage grinders in older homes,

without corresponding alterations in the septic tank system, is not recommended. Frequency of septic tank pumping should be increased to at least once every year in such a situation.

Suspended solids in the sewage tend to accumulate in an organic layer at the interface between the leaching area and soil. This layer decreases in the infiltration rate, increases residence time of wastewater in the soil and improves purification. Amounts of phosphorus, suspended solids and the number of pathogenic bacteria and viruses are drastically reduced while the wastewater filters through the soil. If solids overflow from the septic tank to the leaching facility, the organic layer becomes clogged and the system will fail. This is evident from sewage back up into the house, foul odor, surfacing of wastewater, polluted road and drainage ditches or contaminated wells.

Once such a failure occurs, the system can be renovated by a prolonged rest period or by complete replacement of the leaching area. The first treatment only helps to remove the organic clogging layer but does not provide a cure for the actual problem. The cure may vary from just pumping the septic tank more frequently to enlarging the entire septic system to accommodate installation of garbage grinders or additions to the house. Replacement costs for a new leaching facility range from \$5,000-\$20,000. Proper maintenance, therefore, can save the homeowner considerable trouble and expense.

A variety of products that are currently on the market claim to improve septic system performance or even to renovate failing systems. Research indicates that most of these products do little to improve a system's performance. Some of these cleaners are not biodegradable, and a few contain environmentally harmful chemicals.

Septic System Maintenance

Finding Your Septic System

In order to take proper care of a septic system, the homeowner must know where it is located. If the access manholes are at ground level, there is no problem. Unfortunately, the manholes are often buried somewhere under the lawn. To locate the tank, go into the basement and find where, and in what direction, the sewer pipe goes out through the basement wall. Check the lawn in that area for places where the grass won't grow or for areas that are slightly depressed or mounded. In the winter, look for an area in the lawn where there is a depression in the snow. In the spring, the snow may melt first over the septic tank and leaching system. Any likely spot can be probed with a thin metal rod to determine the actual location of the system components.

If this doesn't work, ask someone who may have seen the tank installed or pumped- a neighbor, the builder, or the previous owner. When purchasing a home, sketch showing the tank and leaching system location should be requested from the realtor or previous owner. For recently installed or repaired systems, the Board of Health or health officer should have a plan that shows the location of the system and access manholes. If all else fails, turn the problem over to your local septic tank pumper. Once you find your septic system, be sure to make a map. You may also want to have the manhole extended up to just below ground level, and marked permanently with a stake, a bird feeder or a birdbath.

Septic Tank Pumping

Do not wait until your system shows signs of failure to have your septic tank pumped out. Waiting can mean complete clogging and an expensive repair bill. Call a pumper to inspect the system at least once every two years and pump if needed. For a list of operators in your community, consult the yellow pages under "Septic Tanks- Cleaning". If the access manholes are at ground level or are clearly marked or mapped, the job should be quick and simple.

While your tank is being pumped, have it inspected. Ask the operator to examine the inlet and outlet baffles or tees. If either is broken, have repairs done immediately. The inlet should also be checked to see if wastewater is continuously flowing into the tank from previously undetected plumbing leaks. It is not necessary to leave any of the sludge in the tank as a "seed". Incoming sewage contains all the bacteria needed for proper operation. Acids or bleaches should not be used to clean the tank.

Preventing System Failure

To help protect a septic system against premature failure, the homeowner can follow a few simple procedures:

Reducing Sludge Build-Up

DO	DON'T
<ul style="list-style-type: none">- DO have your tank inspected every 2 years.- DO have your tank pumped as needed.- DO keep a schedule and record of past and future inspections and pumping.- DO compost garbage or put in the trash.- DO collect kitchen oil and grease, compost or put it in the trash.	<ul style="list-style-type: none">- DON'T wait for signs of failure.- DON'T use a garbage grinder. Waste from garbage grinders will not only fill your septic tank rapidly and require more pumping, but also will also float and increase the scum blanket thickness. This will eventually spill into the effluent pipe and clog the leaching system.- DON'T flush sanitary pads, throwaway diapers or cigarettes.- DON'T put automotive oil, cooking oil, or grease in the septic system.

Reducing Water Use

DO	DON'T
<ul style="list-style-type: none">- DO use water-reducing fixtures on sinks, toilets and showers.- DO load your washing machine completely before use.- DO fix leaky faucets and toilets promptly.- DO place one or two bricks or plastic baffles in your toilet tank to minimize water use.- DO limit shower time.- DO take larger, back-to-school or after-vacation laundry loads to the Laundromat.	<ul style="list-style-type: none">- DON'T flush the toilet unnecessarily.- DON'T overflow your bathtub.- DON'T empty roof drains, basement sumps or foundation curtain drains into the septic system.

Protecting the Leaching System and Keeping the System's Bacteria Working

Remember your septic tank and leaching system are full of living organisms that make the system work. The leaching system is a delicate structure.

DO	DON'T
<ul style="list-style-type: none">- DO use caution in what goes down the drain.- DO insist on proper location and construction of a new leaching system. Consult a professional.- DO keep deep-rooted trees and bushes away from the leaching system.	<ul style="list-style-type: none">- DON'T put pesticides, disinfectants, acids, medicines, paint, paint thinner, or other materials that can kill bacteria in the septic system.- DON'T install a poorly thought out system. Consult a professional.- DON'T allow heavy vehicles on the leaching system. (Vehicles can compact the soil, crush pipes and break the septic tank and thus, result in costly repairs.)

Septic System Failure

Causes

If for some reason the effluent from the leaching system cannot sink into the soil, sewage may back up in the system and overflow onto the surface of the ground. There are four major causes of this problem.

1. **High Water Table**

During wet seasons, the ground water table rises. If the water table rises into the leaching system, sewage may be forced up toward the ground surface. This problem is the result of improper leaching system siting. Although it may be possible to install drains to lower the ground water level, generally this problem can only be corrected by relocating the leaching system to a site where at least four feet of soil exists between the bottom of the leaching facility and the maximum high water table.

2. **Soil Clogging**

If sludge or scum from the septic tank overflows into the leaching area, the soil will quickly become clogged with organic matter. This situation can often be corrected by allowing the system to rest for 6 to 12 months. This may mean a new leaching system must be installed. Inspecting the septic tank at least every two years and pumping out its contents as needed, however, can significantly reduce the chance of this problem occurring.

3. **Mineral Deposits**

If the soil in the leaching area is continuously flooded or wet, due either to a high water table or excessive sewage flows, mineral deposits, which clog the soil, tend to form. Such soil clogging can often be corrected by allowing the leaching field to dry out and rest for 6 to 12 months. Reducing the volume of sewage flowing from the home can help prevent this type of failure.

4. **Roots**

The roots of trees and bushes planted over the leaching area can sometimes enter and block pipes. Such plants should be removed.

Symptoms of System Failure

Septic systems generally give little warning that they are about to fail. However, the following symptoms often indicate that the leaching system is becoming clogged:

- Sewage odor near the tank;
- Slow running drains and toilets;
- Sewage on the ground over the leaching area.

If any of these symptoms develop, inspect the tank to see if it needs pumping.

If Repairs Are Needed

If, through neglect or over a period of time, the leaching area becomes clogged to the point that a new leaching system must be installed, follow these rules.

1. Contact your local health officer and/or local zoning administrator to determine if your town has adopted local health regulations covering the septic tank/leaching system installations and if you need a permit before making any repairs. If a permit is required, obtain it.
2. Any new system or modification should be designed by a qualified professional. Using test pits and percolation tests to properly evaluate the site.
3. If there is enough room to install a completely new leaching system, then have the installer put in a distribution valve to divert flow to the new system. Let the old leach field dry out. After

operating the new system for one year, turn the distribution valve to direct flows to the old system. Continue alternating systems at one-year intervals and have the septic tank cleaned regularly.

4. Do not dig up the existing leaching system unless there is no room to install a new system or expand the present one. A clogged leaching system will often recover, given sufficient time.

Supplemental Information

Regulations

On site treatment and disposal of household sewage in Massachusetts is regulated by the State Environmental Code (Title 5). Design criteria may be obtained from the department of Environmental Protection or local Boards of Health. Also, many local boards of Health have adopted supplemental rules and regulations for septic system design, more stringent than Title 5. Alterations to your present on-site system are subject to prior approval by the local Board of Health.