



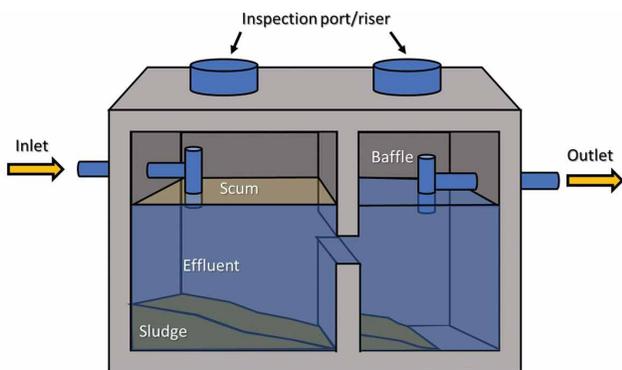
# Septic System Best Management Practices

*Authored by Philip Brown, Virginia Cooperative Extension Specialist, Soil Science and Septic Systems, School of Plant and Environmental Sciences, Virginia Tech; and Steve Thomas, Onsite Technical Services Soil Scientist, Virginia Department of Health*

Septic systems combine soil science, microbiology, and engineering to provide an easy and environmentally conscious way to dispose of household waste. However, if mismanaged, septic systems can fail and can be expensive to repair and hazardous to both people and the environment. This publication offers guidelines for the best ways to manage a septic system to keep it functioning as long as possible.

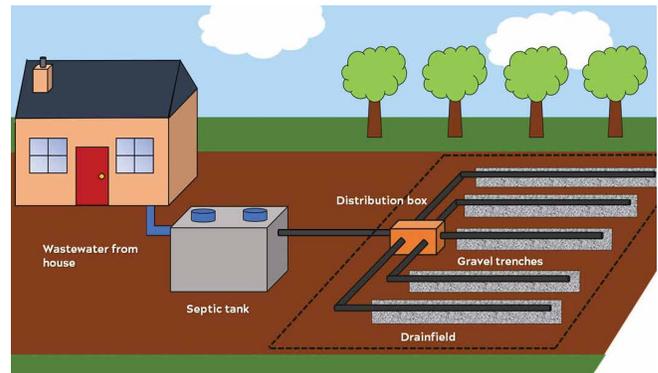
## What is a septic system?

Septic systems use the natural characteristics of soils to dispose, filter, and treat household waste for homeowners who are not part of a municipal sewer system. When wastewater leaves the house, it is transported first to a septic tank (figure 1). Wastewater is separated into three distinct layers in the septic tank: a scum layer made up of fats, oil, and grease less dense than water; an effluent water layer; and a bottom sludge layer made up of heavier solids. Decomposition of the solids occurs within the septic tank, naturally present bacteria in the septic system to digest solids that have settled to the bottom of the tank. These bacteria can transform up to 50% of the solids in the tank into liquids and gases.



**Figure 1:** Illustration of a septic tank. Fats, oils, and grease that make up the scum layer float on the top, while heavier solids that make up the sludge settle to the bottom. This allows effluent water to leave the tank and enter the drainfield where it is treated by the soil.

The main function of the septic tank is to remove solids from household wastewater so that the effluent can more readily filter through the soil in the soil absorption field. Removing solids from the wastewater protects the soil absorption field from getting clogged and failing. When the liquid within the tank rises to the level of the outflow pipe, it enters the drainage system. This outflow, or effluent, is then distributed throughout the drainfield through a series of subsurface pipes typically bedded in gravel (figure 2). Final treatment of the effluent occurs as it enters the soil profile and is filtered, where soil microbes convert the rest of the waste into harmless products.



**Figure 2:** Effluent leaves the septic tank and is distributed through the drainfield via a distribution box. Effluent is treated as it passes through the soil profile.

## Septic System Management

### Have Your Septic Tank Pumped Regularly By a Licensed Service

Having your tank pumped regularly is one of the most important parts of septic system management. Unfortunately, it is often overlooked, which can lead to system failures. Table 1 gives direction as to how frequently septic tanks should be pumped, depending on the size of the tank and the number of people living in the household.

**Table 1:** Estimated septic tank pumping frequency based on tank size and home occupancy. (Adapted from Mancl 1984.)

|                        | Number of Occupants       |      |     |     |     |     |     |     |     |     |
|------------------------|---------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|
|                        | 1                         | 2    | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |
| Septic tank size (gal) | Pumping Frequency (years) |      |     |     |     |     |     |     |     |     |
| 500                    | 5.8                       | 2.6  | 1.5 | 1.0 | 0.7 | 0.4 | 0.3 | 0.2 | 0.1 | –   |
| 750                    | 9.1                       | 4.2  | 2.6 | 1.8 | 1.3 | 1.0 | 0.7 | 0.6 | 0.4 | 0.3 |
| 1000                   | 12.4                      | 5.9  | 3.7 | 2.6 | 2.0 | 1.5 | 1.2 | 1.0 | 0.8 | 0.7 |
| 1250                   | 15.6                      | 7.5  | 4.8 | 3.4 | 2.6 | 2.0 | 1.7 | 1.4 | 1.2 | 1.0 |
| 1500                   | 18.9                      | 9.1  | 5.9 | 4.2 | 3.3 | 2.6 | 2.1 | 1.8 | 1.5 | 1.3 |
| 2000                   | 25.4                      | 12.4 | 8.0 | 5.9 | 4.5 | 3.7 | 3.1 | 2.6 | 2.2 | 2.0 |

Have your septic tank pumped by a reputable service. Check to make sure the septic tank service is licensed and has a state permit to handle and dispose of the material removed from a septic tank by an approved sanitary method. Septic tank pumping services can be found online or in the telephone directory. Your local health department may also be able to provide information about septic tank services in your area. A list of various septic system professionals in Virginia can also be found through an internet search, using the search term, “VDH septic system service providers.”

As with most work you have done at your house, you should obtain several estimates before having the tank pumped. There may be considerable variation in charges for tank cleaning, so it is important to talk to the service about what their charges cover.

### Monitor Your Septic System

Occasionally, problems arise that require your tank to be pumped more frequently. In order to stay ahead of potential problems, you should monitor your system to ensure it is in proper working order. Monitoring the level of the solids at the bottom of the tank and the scum at the top of the tank can assist in determining if the system requires pumping. Many tanks have observation ports to assist in this; however, if they do not, it is recommended that you have them installed. The system’s baffles, which aid in the settling process preventing sewage from reentering the house and non-settled effluent water entering the drainfield, should be checked to ensure they are not worn or damaged. It is important to be careful when checking a septic tank because tanks can contain dangerous gasses such as methane and hydrogen sulfide.

### Reduce Household Water Use

One of the main factors in controlling how quickly waste moves through a septic system is the quantity of water used in the home. Solids in the wastewater that enters the tank require time to settle out of suspension. Adequate settling time prevents solids from overflowing from the septic tank and entering the drainfield. The higher the volume of water that is introduced to the system, the less opportunity the wastewater solids have to settle in the septic tank, and the less opportunity bacteria have to break down the solids. Therefore, limiting excess use of water in the home will go far to prolonging the life of the drainfield.

There are many methods for reducing household water use. One of the most fundamental is to make sure there are no leaks in either faucets or toilets. A small trickle over a long time can result in a large quantity of water entering the septic tank. Using technology that reduces water use is another good way of saving water. Low-flow toilets, water-saving shower heads and faucets, and energy- and water-efficient washing machines can help to achieve a large reduction in household water use.

### Watch What Goes Down the Drain

The life of a septic system can be extended by controlling what is in the water that enters the system. Chemicals that could be harmful to the bacteria in the system should never be put down the drain. These include products such as bleach, paint and paint thinners, and antibacterial cleaners. Bacteria in the system are vital in breaking down the solids. Any harm done to them is harm to the system itself. Alongside this, any chemical that could potentially contaminate the groundwater and waterways after it has passed through the septic system should not be put down the drain.

Diapers, feminine hygiene products, flushable wipes, any kind of plastic product, and excess paper break down very slowly or not at all in septic tanks. Avoid flushing of any of these products, as they can cause blockages and reduce system efficiency. Kitchen waste such as grease and oil can also clog the system. If you have a septic system, use of garbage disposal units should be kept to a minimum or preferably not be used at all. Waste from garbage disposal units accelerates the accumulation of solids in the septic tank.

## Protect Your Drainfield

Management of the drainfield is important in prolonging the life of your septic system, and there are several ways homeowners can do this. Large, heavy objects such as vehicles should never be driven or parked on the drainfield as heavy weight on top of the soil can cause it to compact, reducing its ability to properly treat septic fluid. Heavy objects on top of the system could also directly damage drainage pipes, distribution boxes, and septic tanks.

Be careful when planting near drainfields; deep rooting plants and trees may seek out water in the septic system causing damage to the drainlines, distribution box, pipes, or the tank itself.

Make sure the drainfield soil doesn't get excessively wet. To achieve this, roof drains and sump pumps should not be discharged close to or upslope of the drainfield. If water does begin to puddle on the drainfield it will prevent septic water from being treated by the system and can cause health and environmental hazards. For the same reason, it is important to monitor the drainfield to make sure there are no depressions forming due to subsiding soil along the trenches.

## Use of Additives

There are many products known as additives that are advertised to perform a variety of functions such as increasing septic tank performance, reducing the frequency that septic tanks need pumping, or increasing bacterial populations in septic tanks. Additives can roughly be separated into two categories: biological and chemical. Biological additives are advertised to boost microbial activity in the septic tank and are commonly made up of bacteria, enzymes, or sometimes yeasts. Chemical additives commonly contain an organic or

inorganic chemical with various functions, such as reducing solids, unclogging drainlines, reducing odors, etc. When considering using an additive, be aware of what it contains and any potential harm it can do to your septic system.

Septic systems contain naturally occurring bacteria that break down solids in the septic tank, and more bacteria are added each time the system is used. The small quantities of bacteria found in additives are generally too small to make an impact on a septic system. In a properly working septic system, no additional bacteria should be required.

There are dangers that the addition of certain enzymes can break down the scum layer (the layer of fats, oil, and grease). This can lead to the scum becoming suspended in the effluent water and entering the drainfield. The greasy material can coat soil particles and aggregates, reducing or preventing water infiltration, which can have a catastrophic impact on the septic system. The scum should remain in the septic tank where it cannot damage the soil so that it can be pumped away at a later date.

Yeasts are often promoted as a food source for bacteria. However, the bacteria in a septic tank feed on the contents of the septic tank. They do not require nor would they be capable of using a different food source.

Many of the chemicals advertised to clean or unclog septic systems are very harsh. This means they can kill the bacteria that required to break down solids. In some instances, products advertised as beneficial contain chemicals such as sulfuric acid, which can corrode concrete septic tanks.

It is important to be aware of what you put into your septic system, and that includes any additives.. The use of additives should never take the place of checking and pumping your septic tank. We have no data or information to confirm that additives improve the performance of a septic system.

## References

Mancl, K. 1984. "Estimating Septic Tank Pumping Frequency." *Journal of Environmental Engineering*. 1984.10(1): 283-285.

Visit our website: [www.ext.vt.edu](http://www.ext.vt.edu)

Produced by Virginia Cooperative Extension, Virginia Tech, 2022

Virginia Cooperative Extension is a partnership of Virginia Tech, Virginia State University, the U.S. Department of Agriculture, and local governments. Its programs and employment are open to all, regardless of age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, military status, or any other basis protected by law.

VT/0422/SPES-380P