

A Guide to Septic Systems and Maintenance

A septic system is a valuable and important component of a home. It is specifically designed for your home, including the expected household water use and the soil's capacity to treat wastewater. Maintaining your septic system will not only protect your family's health and groundwater, consistent care of your system also will go a long way in keeping it functioning and lasting for many years.

Septic systems, also referred to as onsite wastewater treatment systems, are a well-established and effective tool for treating waste for homes, businesses, churches and small communities. If you are one of the 420,000+ homeowners in Maryland with a septic system, then you are responsible for maintaining the system to ensure effective operation and prolong its life. Fortunately, septic system maintenance practices are relatively simple. When followed consistently, these practices will reduce the risk of costly, unpleasant, unsightly, and possibly harmful malfunctions or failures.

This publication contains information that will help you maintain your septic system properly. It also provides a convenient place for you to record and file information about your system. Keep it with other important documents in your home, and pass it on to future owners.

Lenders may require a septic system inspection when you sell or refinance your home. The seller is usually responsible for repair of a failing system. Therefore, ignoring your septic system will not save money in the long term.

How Septic Systems Work

Every septic system is specifically designed for each home, based on the number of occupants, estimated water usage, soil properties, and ability to accept and disperse wastewater. Properly designed systems use

natural chemical processes and bacterial decomposition to reduce the concentration of pathogens that can harm human health and nutrient wastes, such as nitrogen, that pollute waterways. Treated wastewater eventually percolates through the soil down to the groundwater. Once that treated wastewater reaches groundwater aquifers, it can be pumped up with wells used for drinking water, therefore it is important to be good stewards by caring for our systems.

Septic System Components

A septic system is comprised of the home, a tank, a drainfield, and the soil dispersal area (Figure 1).



Figure 1. Diagram of a conventional septic system with a tank and soil dispersal area or drainfield.

Sewage flows from the house to the **septic tank**, which is designed to store wastewater, allow solids to settle to the bottom and allow for minimal anaerobic (without oxygen) decomposition (Figure 2).

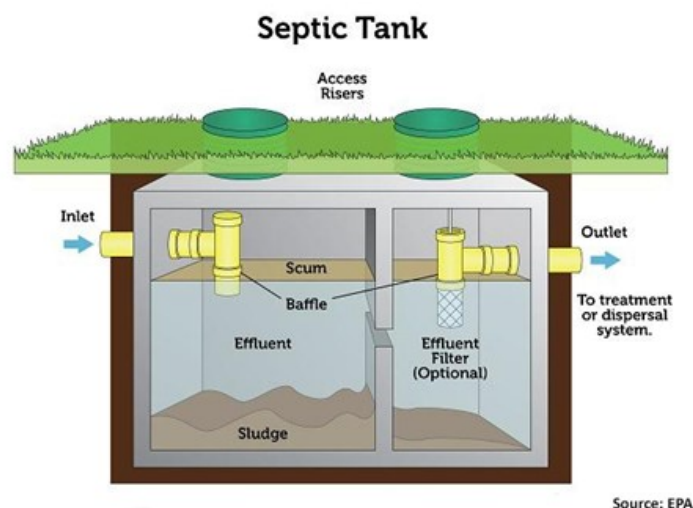


Figure 2. Diagram of a septic tank.

Solids are partially decomposed by bacteria and form **sludge**. Fats, grease and oils float and form a layer of **scum** on top of wastewater. **Baffles** are installed at the inlet and outlet of the tank to slow the wastewater (**effluent**) movement and prevent the scum and solids from escaping into the drainfield.

Modern tanks have two chambers to help contain solids in the first chamber and allow the effluent to enter the second chamber before leaving the tank. Advanced treatment systems (Figure 3), or best available technology (BATs), are typically one unit with several chambers designed to enhance the treatment process. By improving the settling process for solids and aerating the effluent, these units remove 55-80% of nitrogen, compared to 5% from conventional tanks.

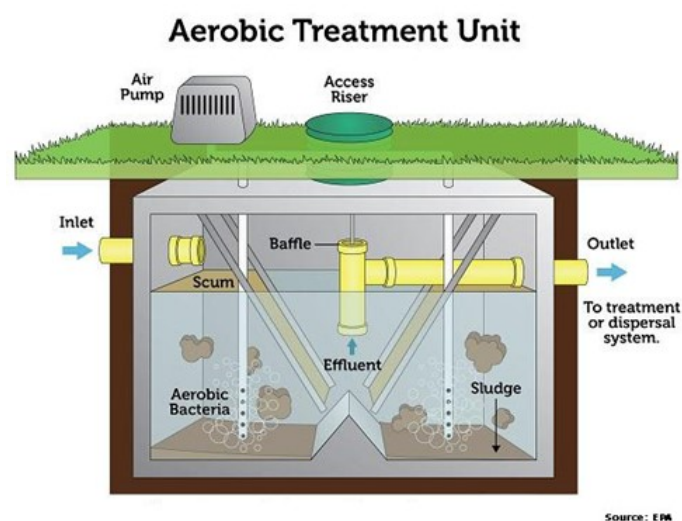


Figure 3. Diagram of a generic advanced treatment system. Design, number of chambers, and process flow vary among the manufacturers.

The **drainfield** ensures that the daily volume of liquid waste gets spread over a predetermined area of soil. A natural film of beneficial bacteria, or biomat, will form on surfaces within the drainfield and aid in treatment. Conventional drainfields typically rely on gravity flow and include several trenches filled with gravel, plastic chambers, or polystyrene tube to aid in wastewater dispersal. A conventional system will typically include a **distribution box** to help disperse the wastewater evenly among the trenches to ensure maximum contact between wastewater and soil. Trench systems are the most common type of system used in new home construction.

Other types of drainfields include at-grade and sand **mound systems** (Figure 4) which are elevated systems used in areas with marginal soil types and high water tables. In a sand mound system, the wastewater flows from the septic tank to a storage tank. The liquid is then pumped from the tank to perforated plastic pipes buried in a mound of sand built on the soil surface. This system provides a layer of sand thick enough to ensure adequate treatment time. Vegetation growing on the mound helps to evaporate some of the liquid. This is particularly important in areas with shallow water tables.

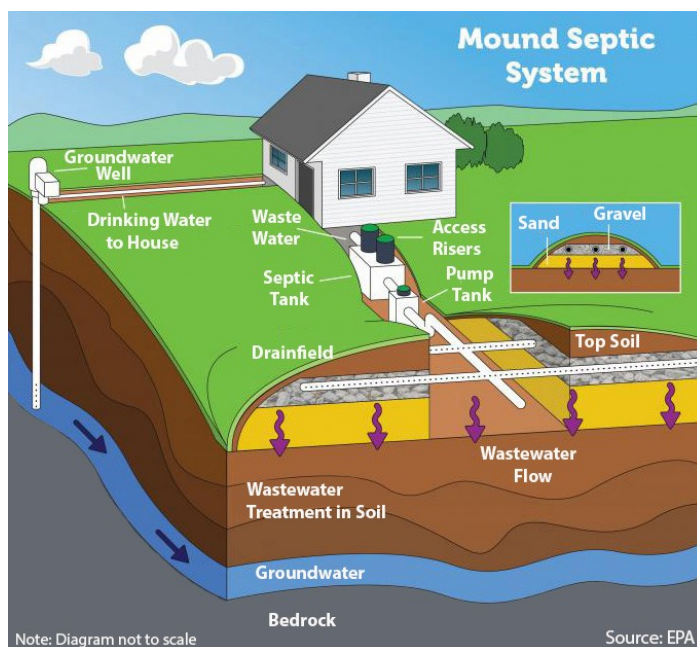


Figure 4. Diagram of a mound soil dispersal system. A mound is used in areas with poorer quality soils or high-water tables to provide needed wastewater to soil contact and treatment.

Another type of non-conventional drainfield is drip dispersal which uses irrigation like tubing placed within the top 6-12 inches of soil. The tubing is supplied with wastewater via a pump typically from an advanced treatment unit and allowed to drip into the surface layers of soils for treatment (Figure 5). Proper drainfield operation depends on unrestricted wastewater flow.

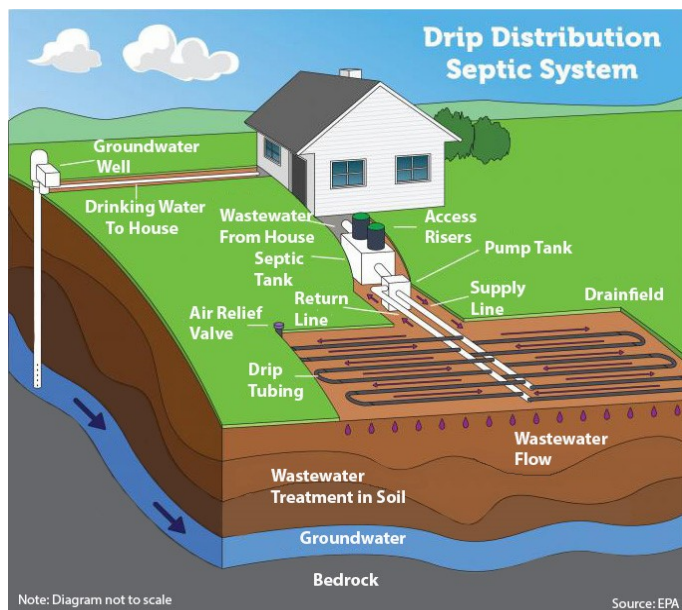


Figure 5. Diagram of a drip dispersal system. Wastewater is pumped from pumping chamber to drip tubes typically placed shallow in the soil.

The purified wastewater then either moves to the groundwater or evaporates from the soil. The soil plays an integral role in treating the wastewater. Serving as a natural filter, the soil can remove harmful bacteria and reduces some nitrogen pollution depending on the depth of soil that the wastewater percolates through.

Regardless of the type of drainfield, once a drainfield malfunctions or fails, it typically cannot be repaired. Since adequate wastewater percolation requires natural or undisturbed soil, a new drainfield may have to be constructed in a new location. Maintaining a system and protecting the drainfield is of the utmost importance as it is much less expensive to maintain an existing system than to replace it.

You Should Know the Location of Your Septic System

The University of Maryland Extension recommends that you know the location of your septic system. Locating the system's components can be difficult, especially with older tanks that may be buried several feet in the ground and do not have the lids exposed. Several clues that will aid in drainfield location include:

- Newer systems may have several **access risers** that expose the lids at or above the soil surface which is recommended for easier maintenance access.
- The drainpipe from the house can also indicate the direction of your tank or drainfield location.

- Soil may have settled overtime and point to your tank or drainfield location.

If you cannot find signs of your system, the local Health Department might have your building records on file.

Most Important Maintenance Step: Routinely Pump Your Tank

Pumping your tank removes the sludge and scum, preventing them from clogging your drainfield. **If you own a conventional system with a standard septic tank, you should pump your tank every three to five years.** Contact your local approving authority (which is typically your county health department) for information on certified septic pumpers. If you own a BAT or advanced treatment unit, the pumping procedure and schedule varies among BAT manufacturers. Call your BAT service provider or manufacturer for details.

The University of Maryland Extension recommends these simple maintenance practices:

- Fix leaking toilets and sinks. Your system is designed to handle a specific volume of wastewater per day. Leaks can overload it.
- Use water efficiently and space out showers, laundry, and dishwashing. This helps to reduce the daily wastewater flow. Do not do more than two loads of laundry at one time if possible.
- Use green cleaners. Conventional household chemicals (cleaners, paints, etc.) can kill the beneficial bacteria in your system.
- Direct rainwater drainage and hot tub water away from the tank and drainfield. You do not want excessive or standing water on your drainfield. Excessive water can overload capacity for wastewater to percolate into the soil. Standing water can also overload the system and block oxygen from entering drainfield soil. The beneficial bacteria need oxygen to do their job.
- Don't use a garbage disposal or drain oils. Undigested food particles require more time to breakdown and increases the sludge volume. Oils and fats add to scum layer reducing wastewater storage capacity of septic tank. Dispose of food waste in trash.
- Don't flush any products other than toilet paper. Adult and baby wipes do not decompose and can clog septic tank filters, BAT pumps, and drainfields.

- Do not drive over, park cars, or build on your septic system or repair area. This can crush pipes or compact the soil and block oxygen entering soil and can cause water ponding.
- Don't plant trees within 50 feet of drainfield. Some trees with shallower roots can be planted 25 feet away. Contact your county Extension office for more information on landscaping septic systems. Tree roots can clog drainfields, causing failures and wastewater back up. Shallow-rooted vegetation such as grasses on the drainfield are beneficial in taking up water and nutrients.
- Do not add enzymes or bacteria to your system. Additives do not improve the performance of your system. Regular use of the toilet will result in trillions of beneficial bacteria cells in the tank, which are sufficient to breakdown wastes. Research has shown that some additives can damage your system by breaking up the sludge and scum layers, causing solids to flush out of the tank and clog the drainfield.
- It is recommended not to discharge water treatment backwash into your septic system.
- If you have an advanced treatment system or BAT, continue the service contract for regular inspection and maintenance. Do not turn off the alarm. Do not turn off the electricity to your unit in an attempt to save money—this can greatly reduce the effectiveness of the system and cause solids to clog your drainfield. The electrical demand of these units is minor, costing no more than \$20/month, depending on the unit. Having to replace a drainfield can cost up to tens of thousands of dollars.
- Keep a record of services and pump-outs to serve as both a reminder of when service is needed and verification of maintenance, especially when selling your home. service is needed and verification of maintenance, especially when selling your home.

Any Sign of Trouble is Hazardous to Your Health and Requires Immediate Attention

If you are experiencing any of the following issues, contact your local county environmental health office and a septic professional to identify the cause of the malfunction and discuss solutions.

- Sewage backing up into your house;
- Foul sewage odors;
- Slow draining sinks;
- Wet, spongy areas near your tank or drainfield (sometimes accompanied by excessive vegetation growth);
- Intestinal disorder among family members or house guests;
- Alarm warnings if you have a pump or advanced treatment system or best available technology (BAT) unit.

Wastewater backing up into the house generally indicates restricted flow in your drainfield. A number of situations can cause this, such as a foreign object (like “flushable” wipes) blocking the baffle in the tank, or a clogged drainfield due to tree roots or broken pipes.

If you smell sewage in the house, but are not experiencing a backup, it may be due to an issue with the toilet vent pipe, or insufficient water in the bathroom water traps. Simply run several gallons of water in the tubs and sinks should. If the odor persists, then the vent pipe on the roof may be clogged. Contact a plumber to service this issue. If the odor is outside the house and near the tank or drainfield, then your tank is overfilling or the drainfield is clogged.

Wet areas or standing water above the drainfield occur when household water use regularly exceeds the system's capacity, or the soil pores get clogged from sludge, fats, oils, grease, or possibly chemicals, such as paint.

Resources

Environmental Protection Agency (EPA). Septic Smart Program. <https://www.epa.gov/septic>

Maryland Dept. of Environment (MDE) Onsite Systems. <https://mde.state.md.us/programs/Water/BayRestorationFund/OnsiteDisposalSystems/Pages/OnsiteSystems.aspx>

Septics 101: A Guide to Septic System Maintenance. Washington State Dept. of Health. <https://www.youtube.com/watch?v=udBaGyzJyU8>

Well and Septic Education Program. University of Maryland Extension. <https://extension.umd.edu/well-and-septic>

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ANDREW
LAZUR

State Extension Specialist
Water Quality
lazur@umd.edu

DAPHNE
PEE

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