Baltimore County
Department of Environmental Protection & Sustainability
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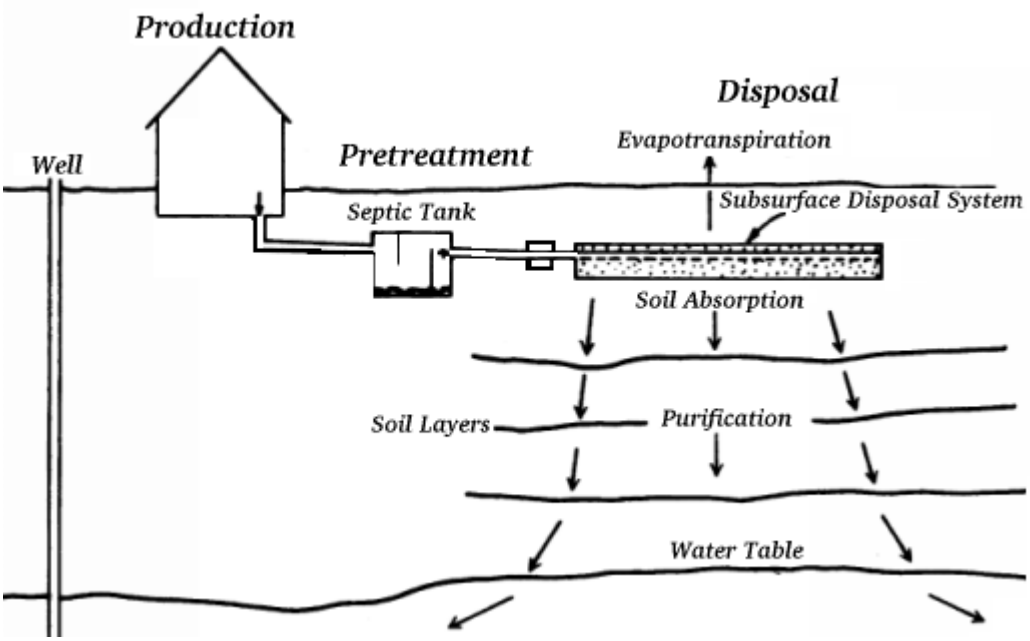
ON-SITE SEWAGE DISPOSAL SYSTEMS

A GUIDE TO MAINTENANCE



This pamphlet is designed to provide homeowners with an understanding of how an on-site sewage disposal system works and what steps can be taken to provide for maintenance of the system. A properly maintained system is essential to overall property value. Neglecting the maintenance of your system will result in premature failure necessitating costly repairs.

What Is An Onsite Sewage Disposal System?

If you live in a rural area or an area not served by a public wastewater treatment system, your house is likely served by an **on-site sewage disposal system (OSDS)**, commonly referred to as a "**septic system**." The OSDS is a long-standing method for collecting, treating, and disposing of sewage (i.e., waterborne wastes generated from the kitchen, laundry, and bathroom) to the subsurface soils. If properly designed, installed and maintained, an OSDS can effectively remove most contaminants from the wastewater before reaching the groundwater. In Baltimore County there are approximately 30,000 OSDS serving approximately 90,000 people.

A typical OSDS is comprised of 4 main components:

- **Piping** - conveys the sewage from the home;
- **Septic tank** - provides physical separation of the wastewater and some treatment of solids;
- **Drainfield** - distributes wastewater into the subsurface soils; and
- **Soils** - filter the wastewater, removing harmful bacteria, viruses, and nutrients**.**

The Septic Tank

A septic tank is a buried **watertight** container typically made of concrete. However, there are some instances where installation of fiberglass or plastic tanks are approved. Metal tanks are no longer used due to their potential to corrode and leak; therefore, if you have a metal tank or a tank that is not watertight, it should be replaced as soon as possible.

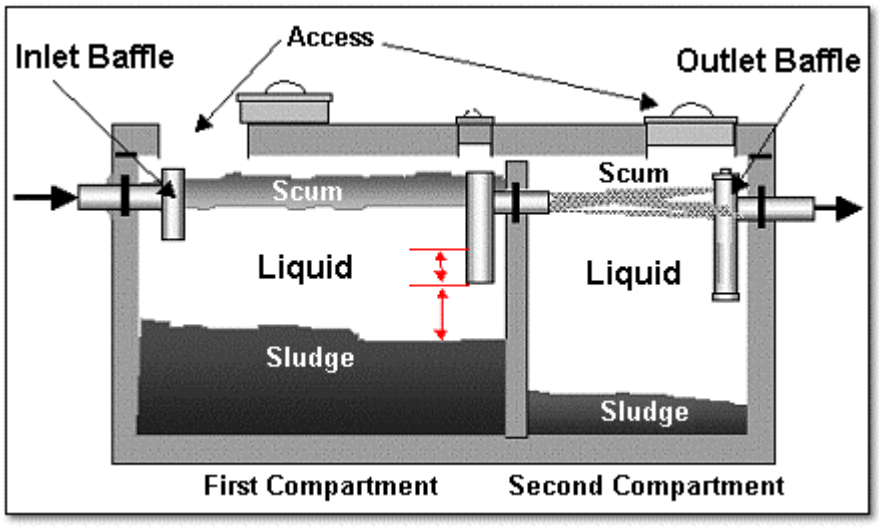
The main purpose of the septic tank is to separate solids (sludge), scum (fats, oils, and grease), and non-biodegradable materials from the wastewater effluent that will be discharged to the drainfield. There are also important chemical and biological actions that occur in the septic tank aiding in the ultimate treatment of the waste.

Septic tanks for residential use are generally 1,000 to 1,500 gallons, and should be sized such that the wastewater has a retention time in the tank of at least two days. The tank should be equipped with outlet baffles or "T" fittings that slow the movement of wastewater from the inlet to the outlet, and prevent solids and scum from entering the field system. The tank may also be separated into two compartments to further aid in the separation of the wastewater.

Failure to properly maintain a septic tank by regularly removing the sludge, scum, and other non-biodegradable waste may lead to early failure of the field system. **Effluent filters** installed on the tank outlet are recommended to prevent solids from entering the drainfield.

Currently, the **Baltimore County Plumbing Code** requires a two-compartment top-seam tank with a minimum size of 1,500 gallons for septic tanks serving new homes (see Figure 1). Additionally, it is required that the tank be equipped with manhole risers to grade with tamper-proof lids. This is an important feature that allows easy access to the tank for pumping and inspection.

Figure 1 - Two-Compartment Septic Tank

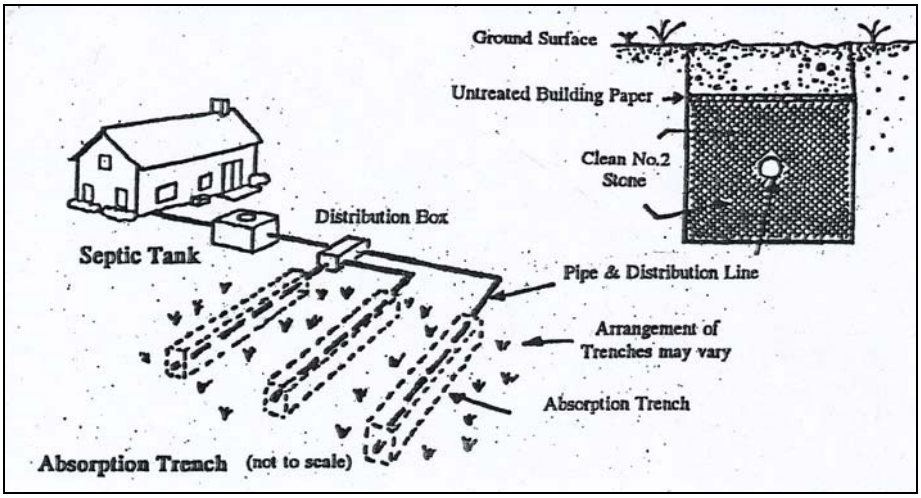


The Drainfield

Once the wastewater effluent leaves the tank, it is conveyed via gravity or pumps to the soils-based field system. The two most common drainfield system designs are as follows:

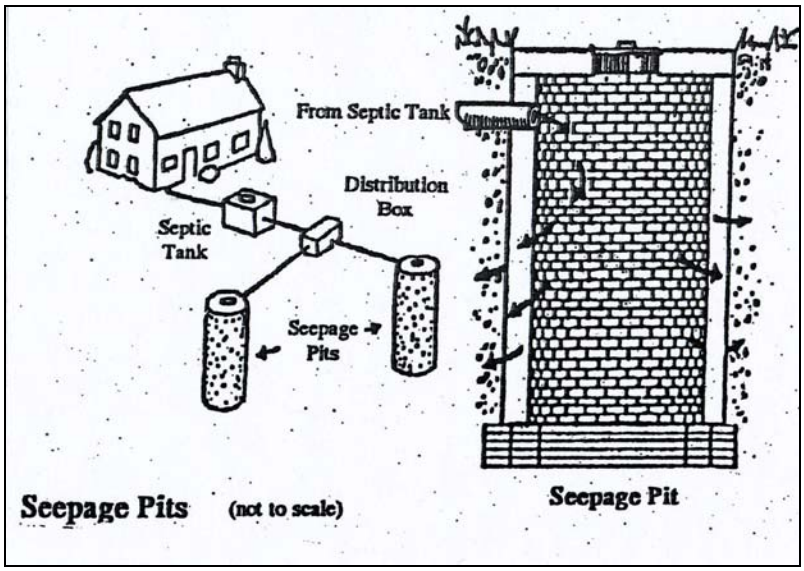
- **Absorption Trenches –** perforated piping installed in long narrow trenches surrounded by coarse stone (see Figure 2). These trenches are typically 2 feet wide and 40-60 feet long. If multiple trenches are used, effluent from the septic tank is usually equalized by a distribution box. Trenches installed after 2004 may also have observation pipes installed at the end of each trench. These observation pipes allow one to easily check the effluent levels in the trenches.

Figure 2 - Absorption Trenches



- **Seepage Pits -** (also called "Dry Wells") typically constructed of dry-stacked block or pre-cast concrete rings, 8 to 14 ft. in diameter (See Figure 3). If multiple seepage pits are used, effluent from the septic tank is usually equalized by a distribution box. These types of systems are rarely, if ever used for repair systems and have not been installed for new construction since approximately 1985.

Figure 3 - Seepage Pits



In situations where the field system is located at a higher elevation than the septic tank, the wastewater leaving the septic tank will drain to a **pumping chamber**, where it will then be pumped up grade to the field system.

Where soils are less permeable and/or the property has other site constraints (elevated water tables, shallow bedrock, etc.), **alternative technologies** may be employed to deliver the wastewater effluent to the soils. These systems include:

- **Elevated Sand Mounds**
- **At-Grade Mounds**
- **Shallow Low Pressure Distribution**
- **Shallow Drip Dispersal**

These alternative systems are **pressurized** to control and evenly distribute the wastewater to the soil. These pressurized systems will usually incorporate the use of an **aerobic treatment unit (ATU)** to provide enhanced treatment of the wastewater (beyond that of a standard septic tank) prior to the distribution to the field system. ATUs are commonly used to reduce nitrogen as well as for treatment of wastewater with elevated levels of complex biodegradable materials such as fats, oils and greases (e.g. wastewater from a restaurant).

ATU's utilize oxygen and recirculation to enhance the reduction of solids, pathogens and nitrates, further clarifying the effluent going to the field system. The Maryland Department of Environment has approved the use of certain ATU's as the **Best Available Technology (BAT)**

for the reduction of nitrogen from an OSDS. BAT units must be installed on all new construction and repairs in the Chesapeake Bay Critical Area (properties within 1000 feet of tidal waters), and may be required by Baltimore County for repairs in other areas.

How to Extend the Life of Your Onsite Sewage Disposal System

Following these care and maintenance guidelines will prolong the life of your OSDS. We recommend that you keep this information along with other property records. If you sell or rent your house, pass it along to the new residents!

Remember: Maintenance is much cheaper than replacement!

Five things you can do to prolong the life of your sewage disposal system:

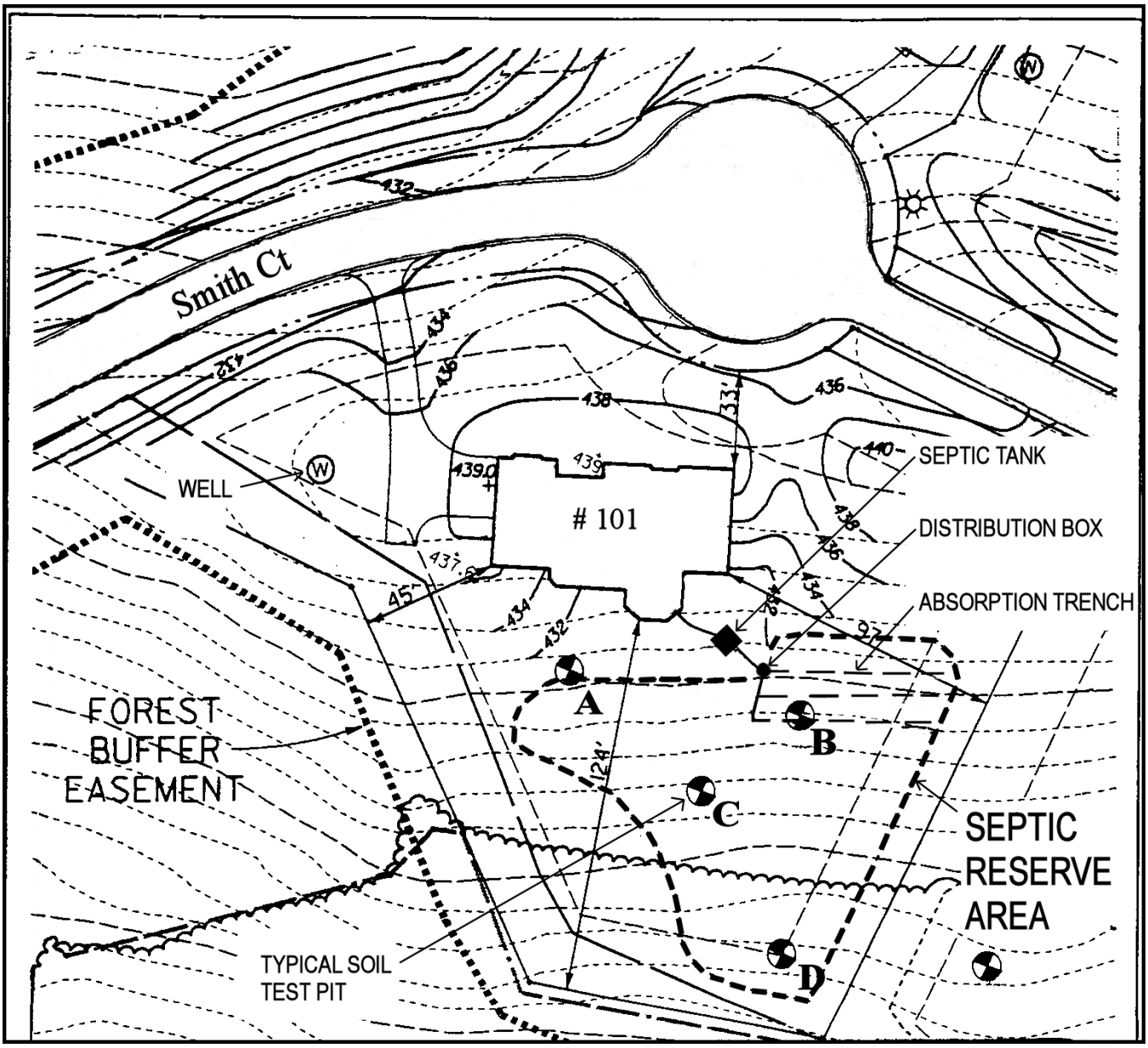
1. **Know where your system is located.**
2. **Pump your septic tank regularly.**
3. **Use water efficiently.**
4. **Manage what goes down drains.**
5. **Protect your drainfield.**

1. Know Where Your System Is Located:

In order to protect and maintain your OSDS, you should know the location of your existing system and each of the field components. Keep all records and site plans you receive with building permit approvals for new dwellings, septic system reconstruction permits, property transfers, etc. A plot plan or drawing of the lot improvements may be on record and available from the Ground Water Management Section of the Department of Environmental Protection & Sustainability (EPS). An example of a site plan is shown in Figure 4.

- Know the location of your **septic tank** cover(s), **clean-outs** and **observation pipes**.
- Know the location of your **distribution box**. A marker may help identify the area.
- Know where your sewage disposal **repair area** is located and ensure that it is managed with the same care as your existing field system.

Figure 4 - Sample Site Plan



2. Pump Your Septic Tank Regularly: One of the most important things you can do to keep the system functioning properly is to have the septic tank pumped on a regular basis. Scum and/or sludge can build up and be carried to the drainfield if the tank is not pumped regularly. This will **clog** the drainfield and impede the treatment of the wastewater. If clogging occurs, wastewater may form a pond in the yard or **back-up** into the house. If this occurs, you will probably be facing costly repairs or replacement, instead of minimal maintenance expenses. Follow these guidelines:

- Ensure the septic tank is easily accessible for pumping. Consider installing man-hole risers to grade if your system does not currently have them.
- **Have your septic tank pumped by a licensed septic system installer or pumper every 2-3 years.** Check the yellow pages or call Baltimore County EPS for information.
- Have the pumper inspect the integrity of the outlet baffle and level of effluent in the observation pipes (if present).
- If your system has a separate pumping chamber, the operation and settings should be checked to ensure their proper operation.
- If your OSDS has an effluent filter, it should be checked and cleaned.
- Ask for a report documenting the services and observations and keep the report with your records.
- Do not wash or disinfect the septic tank after it has been pumped. Typically, a small quantity of sludge is left in the tank to facilitate continued decomposition of new wastes.

*NOTE: If your OSDS includes an **ATU**, it is important that the maintenance be performed by a contractor who is **authorized by the manufacturer** to service the unit. Servicing includes checking computer modules that regulate pumping and re-circulation of wastes within the unit, float operations/settings, monitoring accumulation of solids, etc. Most manufacturers recommend that their units be inspected **at least once per year**. For all ATU's installed since 2005, Baltimore County has required that the property owner maintain an on-going service contract with a qualified contractor.*

3. Use Water Efficiently: As a gallon of wastewater flows into the tank from the house, a gallon of effluent flows out of the tank into the drainfield. If wastewater moves in and out of the tank too rapidly due to constant or heavy water flow, solids remaining in the wastewater may move out of the tank into the drainfield, thus clogging it in the process. Conserve water and spread out water usage by following these suggestions:

- Wash one or two loads of laundry a day, rather than three or more loads in one day.
- Install low-flow water fixtures, low volume toilets, and low water-use appliances.
- Check for and repair leaky faucets and pipes in the plumbing system.
- Take shorter showers.
- Turn off the faucet while brushing teeth or shaving.
- Do not direct drain water from hot tubs toward the septic system.
- Regularly maintain your water treatment system and ensure that the backwash cycle is set to the least frequent setting necessary to maintain good water quality.

*NOTE: If you are considering installing a **whole-house reverse osmosis system (R/O)** on your water supply, please be aware that these systems may increase your household water usage by 2 to 4 times. It is strongly recommended that you contact Baltimore County EPS prior to installing a whole-house R/O to determine if your existing OSDS can handle the increased load or whether additional trenches will be needed.*

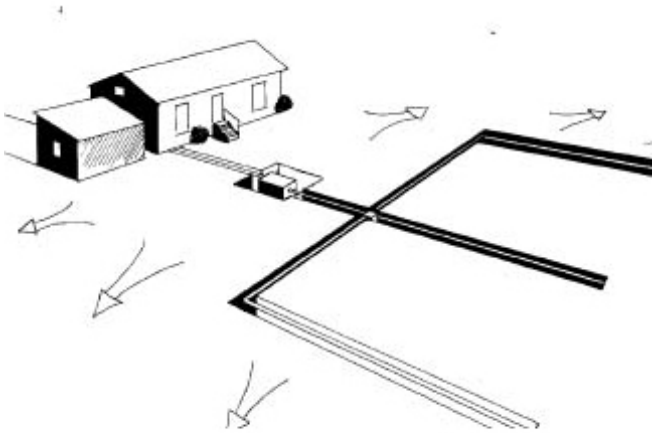
4. Manage What Goes Down Drains: Reduce the frequency of pumping your septic tank by following these tips:

- Your septic system is not a trash can! Do not put dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, or other similar items into the system.
- Do not install a garbage disposal. These add considerably more solids to the system. Consider composting kitchen waste instead. If you must have a garbage disposal, use it sparingly, disposing of food scraps in the garbage as much as possible and consider having the tank cleaned annually.
- Do not put grease or oils down the drain. They can increase the scum layer in the septic tank.
- Do not dump unwanted pesticides, fertilizers, insecticides, paints, thinners, or solvents down the drain.
- Do not dump or flush excess medications down the drain. Visit www.dontflushdrugs.com for helpful information.
- A septic system can handle typical amounts of cleaners used for routine cleaning, as well as normal amounts of anti-bacterial soaps. Do not overuse cleaning products, and do not dump excess cleaning products down the drain.
- Do not use septic system starters, additives, or feeders. They are unnecessary, and may actually cause more solids to flow into the drainfield, doing more harm than good.
- In summary, anything that is not first digested can be potentially harmful to the OSDS.

*NOTE: Baltimore County sponsors a **Household Hazardous Waste** event twice a year where homeowners can safely dispose of all unwanted cleaners, paints, and other chemicals. Please contact Baltimore County EPS for the next event location and date.*

5. Protect Your Drainfield and Repair Area: While the drainfield does not usually require maintenance, there are precautions that can be taken to help ensure proper functioning and a long service life. Remember that high volumes of water and soil compaction will reduce the ability of wastewater to percolate through the soil, preventing the drainfield from treating wastewater properly. Follow these tips to protect the drainfield:

- Do not connect "clear water" wastes, such as footing drains, roof drains, or dehumidifiers to the septic system.
- Divert water from roofs, down spouts, or any other surface water runoff away from the area of the septic tank or drainfield.
- Do not add large amounts of water to the drainfield area by using underground sprinklers. Use a manually operated sprinkler only if it is necessary to maintain the grass cover.
- Do not drive vehicles or heavy equipment over the drainfield or repair area.
- Do not site dog kennels or other animal confinement units over the drainfield or repair area.
- Do not construct driveways, parking lots, sidewalks, patios, or buildings over the septic tank, drainfield, or repair area.
- Maintain at least 20 feet from any component of the OSDS when adding buildings or other improvements to the property.
- Do not place additional soil over the drainfield or repair area, other than to fill slight depressions. A slight mounding will ensure runoff of surface water.
- Keep rodents and other burrowing animals out of the drainfield area.
- Do not plant trees or other deep-rooted plants on or near the drainfield.
- Do not plant a garden over the drainfield.
- Consider installing an **effluent filter** at the outlet of the septic tank to help prevent solids from flowing into the drainfield.
- Protect manhole covers and clean-outs from mowing equipment.



Runoff draining away from the septic system.

NOTE: Drainfields that utilize a sand mound, low pressure piping, or drip dispersal system will require regular maintenance by a qualified contractor. Due to the high cost of these systems it is even more important that the tips highlighted above be followed.

Signs That the OSDS Is Not Functioning Properly

Even with proper maintenance, drainfields and/or seepage pits will not last forever. A typical OSDS (without the use of an ATU) will typically last between 20-30 years. Signs that a system is in need of repair or maintenance include:

- Ponding water or soft spots in the area of your drainfield.
- Sinking or collapsing soils over the area of the septic tank or drainfield.
- Green or lush vegetation above the drainfield compared to other areas of the yard.
- Slow flushing of toilets, particularly on the basement level.
- Periodic sewage back-ups into the house.
- Sewage levels observed at or near the surface in observation pipes or seepage pits.

Corrective Action for A Failing OSDS

When any of the above occurs, the first course of action would be to contact a **licensed sewage disposal contractor** to “troubleshoot” the OSDS serving your dwelling. Generally, the contractor will consult this office in advance of their inspection to obtain information on the type, design, and location of the system serving the dwelling. In most cases, they will be able to inspect the system and advise you of the problem and the means of correcting it.

In some instances the problem may simply be a broken or clogged pipe that needs to be cleaned/replaced, or a distribution box that is not equalizing flows to the drainfield. In other instances, the only solution is to replace the field portion of the sewage disposal system. Should your system need to be replaced, the licensed contractor inspecting the system will call this office to ascertain if there are records of valid soil percolation tests for the site. These tests provide the information necessary to design the repair system.

If no valid tests are on record, new soil percolation tests will need to be conducted on your property in order to accurately design the repair system. The contractor will schedule a time when a representative of this office can be on site to witness and evaluate a soil test pit excavation with a backhoe. There is no application fee for this service, however the costs associated with the contractor operating the backhoe equipment is the responsibility of the homeowner. In either case, the representative from this Department will provide a design of the replacement septic system that will accommodate the anticipated sewage flows from the dwelling. Once you have selected the licensed contractor who will install the system, they will **obtain a permit** to install the replacement system.

REFERENCES

Department of Environmental Protection and Sustainability (EPS):

Ground Water Management - **410-887-2762** (wells, septic systems, residential underground storage tank removals, well water quality complaints)

***Waste Management* – 410-887-3745** (household hazardous waste disposal)

Department of Permits Approvals and Inspections:

Plumbing Inspection – 410-887-3620

Building Inspection – 410-887-3953

Other Resources Available from EPS:

"Building with Well and Septic" – for new construction

"Ground Water and Wells in Baltimore County"

"Radionuclides and Your Well Water: A Homeowner's Guide"

**** NOTE ** These booklets and additional information can be found on our website:**

www.baltimorecountymd.gov/Agencies/environment/groundwatermgt/index.html

Maryland Department of the Environment:

Cooperative Extension Services - Home and Garden Center (pesticides, lawn care):

1-800-342-2507

***Soil Conservation District**: 410-666-1188*

Hazardous Materials and Oil Spills Emergency Response: 1-800-633-4686

Oil Control Program – UST's: 410-537-3442

Individual Drinking Water Supplies/Wells: 410-537-3784

U.S. Environmental Protection Agency:

Safe Drinking Water Hotline: 1-800-426-4791

Radon Information Hotline: 1-800-872-3666

Septic System Resources: http://cfpub.epa.gov/owm/septic/index.cfm