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# Onsite Wastewater Treatment Systems: The Maintenance and Care of Your Septic System

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## Overview:

Most homes that are not connected to a public sanitation system use onsite wastewater treatment systems, more commonly known as septic systems. New Jersey is home to over 380,000 septic tanks. This means that over 16% of NJ homes use septic systems. Half of these systems are more than 30 years old, which is the typical lifespan of a traditional (i.e., concrete) septic tank. Unfortunately, many homeowners using a septic system do not know what it is or how it should be maintained.

Proper maintenance and regular pumping are vital to avoiding septic system backups and expensive repairs. A failing system is not only unpleasant due to overflow to the ground surface or the plumbing in the home backing-up, but it is a human health risk and a hazard to the environment.

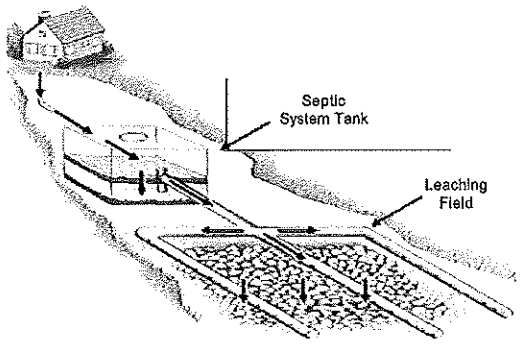


**Figure 1: OWTS Schematic** (USEPA, 1991)

## How it Works:

A conventional onsite wastewater treatment system (OWTS) consists of a septic tank and a soil absorption field (See Figure 1). The septic tank removes solids, nutrients, pathogens, and floatable grease and scum from the wastewater through physical partitioning and microbial degradation (See Figure 2).

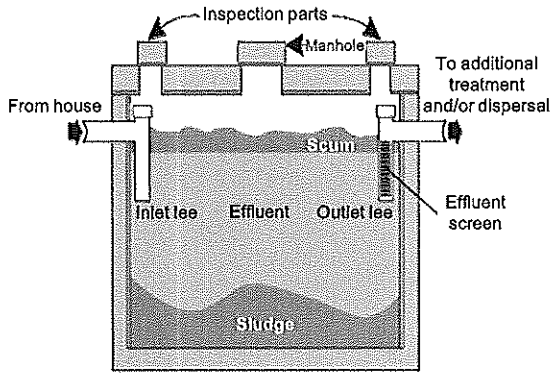


**Figure 2: Septic Tank Schematic** (NSFC, 2000)

To function properly, the septic tank must receive a consistent flow. The septic tank should be pumped out regularly by a qualified professional to remove excessive amounts of sludge and scum. The frequency of pumping is based on the number of people in the household and the size of the septic tank (See Table 1).

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The remaining wastewater that leaves the septic tank slowly drains to an absorption field for further purification. A soil absorption field is typically a perforated piping network that lies on a gravel bed (See Figure 3). The seasonal high water table must be at least four feet below the gravel bed to keep the soil from becoming saturated. The soil must remain uncompacted to absorb the wastewater and support the microbial organisms that degrade pollutants. It is important to avoid driving over this area with vehicles or heavy machinery. If the effluent enters directly into the groundwater without being purified in permeable, aerated soil, it may contaminate both the soil and nearby waterbodies.

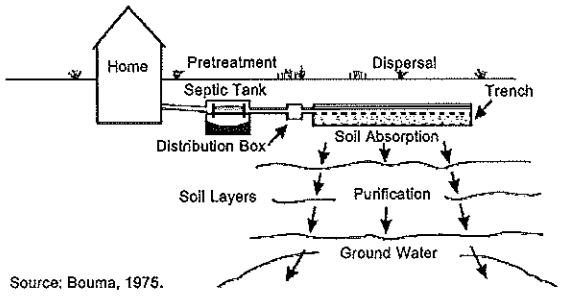


**Figure 3: Soil Absorption Field** (Bouma et al., 1975)

## Caring for your OWTS:

- Know the age, capacity, and location of the septic tank and drainage field.
- Have the system inspected and pumped out by a qualified professional (See Table 1).
- Reduce water use and avoid water intensive activities (e.g. running the dishwasher and washing machine simultaneously).
- Utilize water-saving appliances.
- Do not flush non-degradeable items (cigarettes, diapers, paper towels, cat litter).
- Do not pour toxic chemicals including oil-based paints, paint thinner or cleaning products down the drain.
- Avoid using a garbage disposal; grease and solids may quickly clog the septic system.
- Avoid biological septic tank additives; the use of additives containing yeast, bacteria, enzymes, and solvents have not been proven to improve septic system performance.
- Keep the drainfield clear of trees; plant only grass or short-rooted vegetation over and near your septic system.
- Do not drive or park on the drainfield; this will compact the soil, as well as possibly damage the pipes, tank, or other components of the septic system.

**Table 1: Septic Tank Pumping Schedule (in years) based on Number of Residents and Septic Tank Size** (Mancl, 1983)

| | Household size (number of people): | | | | | | |
|---|---|---|---|---|---|---|---|
| **Tank size (gal)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| | | | | **Years** | | | |
| **500** | 5.8 | 2.6 | 1.5 | 1.0 | 0.7 | 0.4 | 0.3 |
| **750** | 9.1 | 4.2 | 2.6 | 1.8 | 1.3 | 1.0 | 0.7 |
| **900** | 11.0 | 5.2 | 3.3 | 2.3 | 1.7 | 1.3 | 1.0 |
| **1000** | 12.4 | 5.9 | 3.7 | 2.6 | 2.0 | 1.5 | 1.2 |
| **1250** | 15.6 | 7.5 | 4.8 | 3.4 | 2.6 | 2.0 | 1.7 |
| **1500** | 18.9 | 9.1 | 5.9 | 4.2 | 3.3 | 2.6 | 2.1 |
| **1750** | 22.1 | 10.7 | 6.9 | 5.0 | 3.9 | 3.1 | 2.6 |
| **2000** | 25.4 | 12.4 | 8.0 | 5.9 | 4.5 | 3.7 | 3.1 |

## Warning Signs of a Failing System:

- The septic tank has not been pumped in the last five years.
- Toilets and drains are backed-up or not flushing well.
- Liquid is ponding over the absorption field.
- Unusually lush green vegetation is noticed over the absorption field. Unpleasant odors occur near field.
- Effluent or wastewater is seeping into the basement.

If improperly maintained, septic systems will eventually clog and stop working. Again, a failing OWTS is a risk to human health and an environmental hazard. The effluent may contaminate drinking water wells and waterbodies with infectious disease-causing organisms and other pollutants. It is imperative that a failing system be repaired as soon as possible to minimize human health risks and degradation of the environment.

## Unsuitable Locations for Septic Systems:

The U.S. Geological Survey (USGS) estimates that 2/3 of the land in the country is unsuitable for septic systems (USEPA, 2002). Areas with a high water table, shallow bedrock, steep slope, or impermeable clay soils are unacceptable for a septic system. New Jersey has regulations regarding the allowable distance of septic systems from waterbodies, wetlands, potable wells, buildings, and property lines (See Figure 4). In addition, septic systems may not be appropriate if your lot size is small and does not have the proper area for an absorption field. If you are considering installing or replacing an OWTS, contact your local health department for information about siting restrictions in your area.

## Mound System:

Mound systems are a common substitute for conventional systems when conventional systems fail because the water table is high or the soil is impermeable. In a mound system, a septic tank first treats the wastewater as in a conventional system. The liquid then flows into a storage compartment, where it is pumped up to an absorption field within a soil mound a few feet above grade. The mound provides an adequate volume of soil to treat the wastewater that exits the perforated pipe network in the leachfield. Mound systems can be a costly option in areas where the appropriate soil media is expensive. Mounding may also be unsightly when installed in the yard of a house.

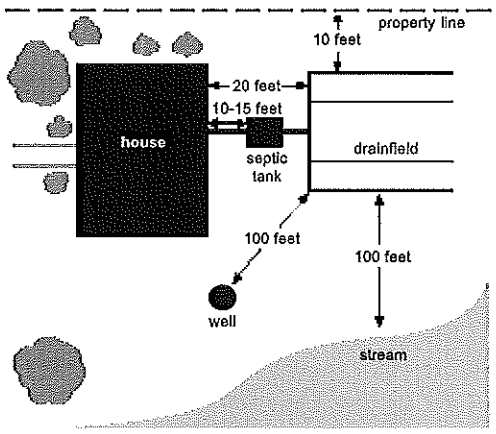


**Figure 4: Example of Septic System Placement** (distances vary by municipal code) (NESC, 2001)

## Alternatives:

Alternative technologies do exist for sites where conventional systems are not an option or to attain increased pollutant removal efficiencies. These systems are not the solution for all sites. However, in some instances they can make onsite wastewater treatment possible. Aerobic treatment and sand filters are among the choices to consider for some sites. Other alternatives to improve the life of your system include low-cost filters and baffles.

An effluent filter is a screen that reduces the amount of Total Suspended Solids (TSS) in the effluent stream. A reduction in TSS can extend the life of the leachfield, which commonly gets clogged and backed-up due to high solid concentrations. Removal of solids also facilitates treatment of wastewater by reducing the oxygen demand of the effluent. The reduction can keep the system aerobic, enhancing microbial degradation. The effluent filter can be placed in the septic tank near the outflow, or between the septic tank and the leachfield. Effluent filters are an inexpensive upgrade to a septic tank that can be helpful in protecting your septic system.

## Contacts:

For more information about septic system/OWTS maintenance and care contact the following entities:

- Rutgers Cooperative Research & Extension, *www.rcre.rutgers.edu*
- Local Health Departments, *www.state.nj.us/health/lh/lhdirectory.pdf*
- New Jersey Department of Environmental Protection Homeowners Manual, *www.state.nj.us/dep/dwq/septicmn.htm*
- EPA OWTS Manual, *www.epa.gov/ORD/NRMRL/Pubs/625R00008/html/625R00008.htm*
- National Environmental Service Center, *www.nesc.wvu.edu/nsfc/*
- Association of NJ Environmental Commissions (ANJEC) has a publication entitled, *Septic System Management for Good Water, www.anjec.org/pdfs/RP_Septic.pdf*

## References:


Bouma, J., J.C. Converse, and F.R. Magdoff. 1975. *Dosing and resting to improve soil absorption beds.* Transactions, American Society of Agricultural Engineers, 17:295-298.

Mancl, K.M. 1983. *Septic Tank Pumping.* Agricultural Engineering Fact Sheet SW-40. The Pennsylvania State University Cooperative Extension Service. State College, PA.

National Environmental Service Center (NESC). 2001. *So... now you own a septic system.* West Virginia University, Morgantown, WV.

National Small Flows Clearinghouse (NSFC). 2000. National Environmental Service Center. West Virginia University, Morgantown, WV.

U.S. Environmental Protection Agency (USEPA). 1991. *Manual: Alternative Wastewater Collection Systems.* Technical Report. EPA 625/1-91/024. Office of Research and Development. Cincinnati, OH.

U.S. Environmental Protection Agency (USEPA). 2002. *Manual: Onsite Wastewater Treatment Systems Manual.* EPA/625/R-00/008. Office of Research and Development. Cincinnati, OH.





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