

SEPTIC SYSTEMS

PUBLIC HEALTH ISSUE:

Subsurface wastewater disposal septic systems provide a cost effective and efficient way of disposing of domestic waste. However, improperly designed, installed, or maintained septic systems may result in the release of poorly treated or untreated effluent. This effect may contaminate adjacent ground and surface waters, endanger public health and threaten the environment.

ROLE OF THE HEALTH OFFICER:

The health officer has four enforcement responsibilities concerning septic systems according to state laws and Administrative Rules:

1. RSA 48A: Addresses rental and public housing: There must be adequate waste disposal available. Toilets must function properly, and there must be an adequate supply of water.
2. RSA 147: When a residential septic system is in failure, creating a nuisance and health hazard, the health officer has the authority to order the system replaced in accordance with Administrative Rule Env-Wq 1003.10. These requirements apply to both rental units and privately owned homes.
3. RSA 147:8 - All occupied buildings must have readily accessible toilet facilities, which are in proper sanitary condition with suitable drains or sewers for conveying wastewater and sewage away from the premises. These requirements apply to both all occupied buildings, including residential and commercial buildings.
4. RSA 485-A:2 IV defines "failure" of a septic system. When there is discharge of sewage into surface water, directly on the ground or into the ground water, or the system threatens to do so, then both the health officer and the DES Subsurface Systems Bureau jointly enforce RSA 147.
5. RSA 485-A:29-44 [Accompanies the Subdivision and Septic System laws.] This law applies to the subdivision of land and construction of septic systems.

Before any new septic system is installed, written approval (i.e. Approval for Construction) must be granted by the DES Subsurface Systems Bureau. Copies of these approvals, and plans when requested by the municipality, are sent to the town or city.

Some towns require that the health officer witness test pits and percolation tests, and sign off on septic plans before the plans are reviewed by the New Hampshire Department of Environmental Services.

THE SEPTIC SYSTEM:

Household sewage is a combination of wastewater from several sources, including sinks, toilets, showers, washing machines, garbage grinders and dishwashers. Depending on the source, sewage is divided into two categories, gray water and black water.

Gray water on average makes up 60% of household wastes. It includes sink(s), washing machine and shower waste. Gray water is high in biological oxygen demand (BOD), and requires high amounts of oxygen in order to start the decomposition process. This is very difficult to obtain when in the ground, although there is a small amount of air transfer from the soil. Gray water tends to stay anaerobic (without oxygen) longer than black water.

Black water is toilet waste and on average comprises approximately 40% of household sewage.

The subsurface waste disposal system (septic system) settles solids and prepares household wastes for disposal into the ground. The system consists of two parts: a septic tank, and a disposal area (leaching system), which disposes wastes in the ground. The sewage generally flows by gravity, first into the septic tank where the larger particles are removed and some decomposition takes place, and then, into the leaching system where it soaks into the ground.

The function of the septic tank is to condition the sewage so that it can percolate into the ground without clogging the soil.

The solids and the liquids in the tank are partially decomposed by bacteria and other natural processes. These bacteria are anaerobic, thriving in the absence of free oxygen. This decomposition of sewage under anaerobic conditions is termed “septic,” hence the name of the system (and the cause of the odor).

A mound, or raised system is a disposal area built up with clean fill material in order to achieve proper height above seasonal high ground water.

The “D” box - or distribution box is a concrete or plastic box connected to the septic tank, which connects the lines into the leach field.

SEPTIC SYSTEM FAILURE:

The legal definition of septic failure is:

“The condition produced when a subsurface sewage or waste disposal system does not properly contain or treat sewage, or causes or threatens to cause the discharge of sewage on the ground surface or into adjacent surface or groundwaters (RSA 485-A-2:IV).”

The proper treatment of wastewater effluent from septic tanks is essential for the protection of ground and surface waters. Poorly designed or improperly operated systems can cause partially treated effluent to reach ground or surface waters. Septic system failure may be obvious, such as sewage backing up into the house or surfacing in the yard and indicates that the system has failed to operate (contain sewage) properly. However, contaminants entering either ground waters or surface waters are much harder to detect.

Septic system failure may be attributed to (a) improper design or installation; and/or (b) improper maintenance or operation of the system or (c) age. Septic systems may have been poorly designed or installed improperly before state regulation. Minimum design standards for septic systems were established for New Hampshire in 1967 for systems located within 1000 feet of surface waters. In 1971, all systems were included in the law. Improper maintenance and operation includes failure to pump out the system regularly or placing materials in the system that are inappropriate for the septic system, such as household chemicals. System failure is also

common when a residence expands or conversion of a building from seasonal to year-round use (RSA 485-A:38). This may occur because the size of the septic tank and leach field does not meet current design requirements for year-round use.

PROPER DESIGN, SITING, AND INSTALLATION:

The failure rate and overall performance of a septic system during its expected lifetime is determined by its design, siting, and installation. Septic systems should be designed so that the soil absorption system provides adequate treatment of effluent prior to entering ground and surface waters. They should be placed away from areas where site conditions are inadequate to allow proper treatment to occur and areas where there is a high potential for subsequent system failures that may cause contamination of surface waters.

DES rules and laws address these concerns for approvals for new systems. Older systems, which come into failure, are then addressed by DES repair rules, Env-Wq 1003.10.

The identification of sensitive soil condition is the responsibility of designers, who are licensed by DES, and is important for determining the appropriate location for septic systems in relation to surface waters. Soil permeability, (i.e., the rate that effluent travels) is one component in the identification of sensitive soil conditions. Permeability is measured as the rate of flow of water through a cross section of saturated soil. This is different from soil percolation. Percolation tests (perc tests) measure the rate at which the soil absorbs water. A percolation test determines the capability of soil to transport pollutants away from the drain field. It does not take into consideration the soil's ability to filter pollutants. Permeability takes into consideration the fact that certain soil conditions require a long minimum distance to remove pollutants, and nitrates in particular.

Soil permeability must fall in a mid-range between impermeable and too permeable for septic systems placement. There must be enough permeable soil under the absorption field to filter and treat the effluent before it reaches the water table or bedrock. Soils such as silts and clays have poor permeability and restrict the movement of water downward.

Perc tests and Test pits determine soil characteristics for a proposed leach field. The test pit is dug into the soil deep enough to visibly inspect the soil for changes of color and indications of water. It must be six feet below the bottom of the proposed bed location.

Some towns require test pits to be witnessed by the health officer. The purpose is to verify that the proposed leach field meets requirements to be four feet or less above seasonal high water table and four feet or less above impermeable soil layer.

A perc test is a hole is dug into the receiving layer (the soil that will actually receive the effluent) approximately 18-36 inches into the ground. The hole should be 4-12 inches wide (Env. 1007.04). It should be soaked in water overnight and evaluated, or "read" the following day.

Perc tests are performed by a licensed septic designer. Some towns require that health officers witness bedbottoms (the receiving layer of the proposed leach field prior to placement of fill). For more information contact the Subsurface Bureau's Regional Office for your town.

MAINTENANCE OF EXISTING SYSTEMS:

Many homeowners are unaware of the proper routine maintenance and operational requirements of their system. DES is required by law to publish guidelines and provide a copy with each approval for construction it issues. Pumping of the tank at regular intervals (approximately once each three years) is recommended. Neglected septic tanks become clogged with sludge and cause excess solids to enter the absorption leach field, thereby causing the system to fail.

OTHER CAUSES OF SEPTIC SYSTEMS FAILURE:

During wet seasons, the ground water table rises. When the water table rises into the leaching system, sewage may be forced up toward the ground surface or back into the house. This is the result of improper leaching system siting.

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 may be alternated temporarily by allowing the system to rest for 6 to 12 months. This may mean a new leaching system must be installed. The chance of this problem occurring, however, can be significantly reduced by inspecting the septic tank at least every year and pumping out its contents if needed.

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 area to dry out and rest for 6 to 12 months. Reducing the volume of sewage flowing from the home may help prevent this type of failure.

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

Foreign objects, which reach the leach field, may clog the leach pipe. For example: cigarette butts, sanitary napkins, or condoms. Regular maintenance should remove such objects.

SIGNS OF SEPTIC SYSTEM FAILURE:

There is often little warning that a septic system is about to fail. Signs of a failing septic system include:

1. backup of sewage into the house
2. surfacing of effluent (untreated septic waste, noticeable by smell and color on the ground); the ground stays wet over the leaching area
3. toilets slow in flushing, bathtubs and sinks drain slowly

CHEMICAL ADDITIVES:

There are currently a wide variety of chemical additives available for use in the septic system. They are said to assist the functioning of the system. There is no scientific data to support the concept any that chemical additive improves operation of the septic system. The use of chemical additives does not eliminate the need for routine maintenance of the septic system and the need for periodic pumping of the tank.

Excessive disinfectant use is discouraged because it could kill the active bacteria in the tank.

DYE TESTS:

A dye test should be used when there is visible suspected sewage flowing on the ground. A dye test may be helpful when there could be more than one source of contaminant, or the individual suspected denies responsibility. It is quick and direct. Dye proves both the source and the presence of sewage. If a dye test is not feasible, a sample of the suspected liquid should be collected and analyzed as suspected sewage (not drinking water).

Flourizine dye (the water-soluble type) may be introduced into the questioned system in cases where a flowing sewage discharge is seen to ascertain the source of the discharge. A positive dye result (where color is noted) is indicative of direct failure. However, a lack of color does not rule out the possibility of failure. A florescent scan may be performed on the samples to determine whether there is a background glow that cannot be detected by human eye.

It is appropriate for health officers to perform dye tests. A ½ cup of dye should be adequate for residential septic systems; a full cup is needed for larger systems. After dye is introduced into the toilet, flush ten times (if possible) to get it moving out of the house and septic tank. Write down the time of injection. Check it hourly or every three hours for the first two days, then daily for three days as long as someone is home and using the water.

The dye comes in liquid, tablet or powder form. DES recommends the liquid due to ease of application. This is usually found at local plumbing supply stores.

SUGGESTIONS FOR HEALTH OFFICER INSPECTIONS:

1. Notify the owner of your activities. If you have not called in advance, knock on the door to inform them you are there to conduct an inspection. If you expect you may encounter an uncooperative person, have a witness (i.e. your deputy health officer or a police officer.) See state laws regarding entry (RSA 147:3) and reversion to warrant (RSA 595:B).
2. Document in your log, the date, time, location of the home, location of the septic system, and your detailed observations.
3. Develop a site sketch showing the house, any fill areas—where the leach field would probably be, any lush growth or vegetation or grass, any soft spots in the soil, or noticeable overland flow of effluent.
4. Carry the legal definition of “failure” at all times and be prepared to show it to the property owner.
5. Perform a dye test when you can see a discharge. Ask the property owner to observe the emerging dye.
6. If you find evidence of failure, notify in writing, the homeowner, town, and DES, by sending a copy of the Letter of Deficiency, that there is a failure, and what steps are necessary to correct the situation (i.e. start to pump within 24 hours, fully correct within 60 days, etc).

Pumping is not a permanent solution. If one has to pump, the system is in failure and must be corrected. A permanent solution has to be reached. This usually involves installation of a new septic system.

CONCURRENT AUTHORITY UNDER RSA 485-A:29-44 AND ADMINISTRATIVE RULES ENV-WQ 1000:

Concurrent authority allows local officials and DES to jointly enforce regulations for the construction of septic systems. Concurrent authority may be conferred upon local officials by DES. It allows local officials to intervene when they observe a house or septic system being constructed when there is no approval by DES.

DES recommends the municipal Board of Health (as defined by RSA 128) be so certified. This certification will then continue even after a change in health officers. There are approximately 90 towns in New Hampshire who have requested and received this authority.

For information about concurrent authority, contact the Enforcement Section of DES, Subsurface Bureau at 271-3501.

ENFORCEMENT:

Using RSA 147, and any health regulations adopted by the town, the health officer has direct enforcement authority over septic system failures. The health officer can issue a pump order or a cease and desist order effective within 48 hours or less. The health officer in such a case has more direct enforcement authority than the DES. The DES's time frame would be in the range of 60 days. Because of this, in some emergency cases it may be more efficient for the health officer to step in to initiate enforcement proceedings. DES advises that after verbal notification, a Letter of Deficiency (LoD) should be issued (sent certified mail) or handed to the property owner. (A sample LoD is included in the attachments.)

If there is sewage discharge directly to surface waters, this can also be enforced by DES (under RSA 485-A). DES should be notified immediately. If there is a sewage discharge directly into a public use area (such as swimming areas), then the health officer would immediately step in to enforce a safety and public health issue, (RSA 147) possibly by temporary closure.

COMPLIANCE FOR FAILED SEPTIC SYSTEMS:

The first step after a health officer inspects a septic system and determines that it is in failure is to write a letter to the owner of the building notifying the owner that a violation exists. DES calls these notification letters "Letters of Deficiency" or "LoDs". An LoD gives the owner an opportunity to voluntarily correct the problem. It should suggest ways to accomplish this (i.e. pumping at set intervals). A copy of the LoD should be sent to the town attorney and to DES, PO Box 95, Concord, NH, 03302. A sample LoD is included in the Attachments.

If after the specified interval, no improvements have been made or attempted voluntarily, the next step would be for the health officer to order in the owner to comply. This is called an Administrative Order. This letter strengthens and orders an owner to comply and references penalties for failure to do so. An administrative Order is enforceable by the courts. Failure to obey an order is handled by the town attorney. A copy of any order written should be sent to DES, and to the town's attorney. A sample order is included in the attachments.

NOTIFICATION:

To make sure the property owner receives the LoD or order, it should be sent certified mail. Reluctance to accept certified mail may occur. In such cases hand delivery to the owner is advised. If hand delivery is unsuccessful, domicile service is another option. In this case the letter or order is thumb tacked to the main door of entry into the home so that the wind will not blow it away (this may not necessarily be the front door).

REMEDIES:

The following are some examples of choices for the health officer in correcting septic problems:

- a. Require pumping of septic tank be performed immediately, or at set intervals (i.e. once a week) so that overflow ceases. This should be paid for by the owner of the building, or pumping may be performed at town expense and a lien put on property. Copies of pumping receipts need to be submitted to the health officer weekly or depending on how often pumping. *{Remember: pumping is a temporary solution.}*
- b. Eviction of the occupants if the dwelling is found to be in unsafe condition and pumping cannot or will not be done by owner.
- c. Issue a cease and desist order. If this order is issued prior to sale of a property and attached to the deed-the new owner must correct the situation before occupying the property.
- d. Place lien on property replace the septic system at town expense.

Note: Contact your town attorney before issuing a cease and desist order, an eviction notice, or a lien on the property. A pump order does not usually have to go before the town attorney.

Note: Copies of all paper work/documents should be kept in health officer files, as well as noted in logbook.

PRIVIES:

According to RSA 147:8, privies are permitted as long as they have the approval of the local health officials as to the location and construction of the facilities. Privies (outhouses not conveying sewage by water), if properly located, designed and constructed are a safe way to dispose of toilet wastes. Privies are used in situations where there is NO electricity or running water supply. Privies must be constructed so that the waste is contained and will not impact groundwater. Doors and openings must be screened to prevent flies from transferring contamination.

Privies should be located seventy-five feet from wells, surface water and neighbors' foundations. The pit should be a sealed concrete vault unless it is four feet above the seasonal high water table and six feet above ledge or impermeable subsoil.

According to 147:11, if a privy is located 100 feet from a public sewer, the health officer may order the discontinuance of the privy and the construction of a toilet connected to the sewer.

PORT-A-POTTIES:

If there is NO water in a structure, a port-a-potty is an acceptable means of waste disposal, subject to the approval of the local health officer. A port-a-potty is an independent, self-contained structure, compared to an out house/privy, which disposes of waste in the ground.

Generally a port-a-potty may be rented from a company with an agreement that it be properly maintained. It should not overflow; there can be no dumping on the ground. The port-a-potty should be located 75 feet from surface water and from a well.

DES REGIONAL OFFICES:

There are 6 DES regional offices located throughout the state. (See Resource Section for a list of DES Subsurface Regional Offices.) The regional staff is responsible for:

- New septic system inspections
- Water quality monitoring
- Providing assistance and information to the public, towns and other local officials. These staff are available as resources for consultation with health officers.

For more information contact:

<p>NH Department of Environmental Services Water Division Subsurface Bureau 1-800-852-3345, ext. 3501, or 271-3501</p>
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PUBLIC HEALTH STATUTES: RSA 147

SUBSURFACE WASTEWATER DISPOSAL SYSTEMS

- 147:1,I Authorizes the health officer of a town with approval from the selectmen to make regulations for the prevention or removal of nuisances, and make regulations relating to public health and safety.
- 147:4 Authorizes the health officer to notify the owner or occupant of any building or property, to remove or destroy any nuisance or other thing considered by them, on inspection, to be injurious to public health. A time limit may be established for the removal of the nuisance. If after written notice is given to the owner/occupant, there is no compliance with the health officer's order, the health officer may (forcibly) enter and cause the nuisance to be removed or destroyed.
- 147.10 Specifically authorizes the health officer to make regulations to ensure the safety and adequacy of subsurface disposal systems with the municipality. No system may be constructed or "continued" in such a place or condition as in the judgment of the health officer to be a nuisance or injurious to the public health.
- 147:7-a As a prerequisite to the use of alternative abatement cost collection procedure under RSA 147:7-b, any notice or order given pursuant to RSA 147:4, 147:11, 147:17 or 147:17a, shall be in writing.
- 147:7-b Authorizes a municipality to recover nuisance abatement costs issued under RSA 147:17a, provided that proper notice is given to the owner.
- 147:17-a,I Whenever a private sewage system is in such disrepair as to constitute a source of danger to the health of the public, the health officer may order the owner to put the system into proper sanitary condition.
- 147:17-a,II Authorizes the health officer, if a person so ordered fails to repair a failed septic system, to request the selectmen, or mayor and council, if sufficient funds have been appropriated for this purpose, to repair the system.
- 147:17-b All expenses to the town or city for repairs made pursuant to the provisions of RSA 147:17-a,II shall constitute an assessment against the owner and shall create a lien upon the lands on account of which such repairs are made. The governing board shall have all the powers in making, assessing, and enforcing such a lien as are provided in the applicable provisions of RSA 252.
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