

Protecting Your Groundwater Through Farmstead Assessment: Assessing Your Household Wastewater Treatment Practices

AE-1975, July 1998

John Nowatzki, Water Quality Associate

Bruce Seelig, Water Quality Specialist

Thomas Scherer, Agricultural Engineer

Household wastewater treatment systems are used to treat and dispose of wastewater from the home. A household wastewater treatment system that is properly constructed and maintained will function for many years and minimize the potential for groundwater contamination.

Basic septic system design and siting requirements for North Dakota are outlined in Chapter 16 of the State Plumbing Code. Local health districts may have more stringent septic system requirements.

An individual household wastewater treatment system, sometimes called a septic system, typically consists of a septic tank and drain field (see Figure 1). Wastewater from bathrooms, kitchen, and laundry room is routed to the septic tank where liquids and solids are separated. Solids such as grease and soap float to the top and form a scum layer. Other solids settle to the bottom where they can be partially decomposed by bacteria. Liquid from the septic tank is discharged into the drain field where harmful, disease-causing microorganisms, organics, and nutrients are removed by adsorption or biological degradation. Consider both design and location when planning construction of a household wastewater treatment system to assess the potential for groundwater contamination.

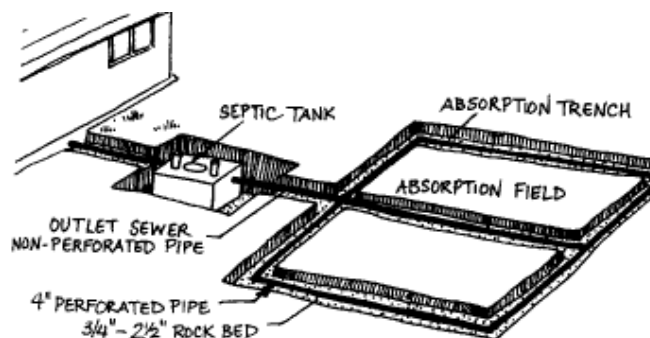


Figure 1. Typical septic tank and drain field.

Design of your household wastewater treatment system

When designing a septic system, you need to consider both the septic tank and the drain field. Septic tanks must be watertight and built of a corrosion and decay resistant material such as concrete. The capacity of a septic system should match the size of your household. Table 1 shows the recommended septic tank liquid capacities for households of various sizes. The liquid capacity of a septic tank is the capacity below the tank outlet.

Table 1. Recommended septic tank liquid capacities.

Number of bedrooms	Minimum liquid capacity, gallons*
3 or less	1,000
4	1,250
5	1,500

* Liquid capacity is the tank volume below the outlet. An additional internal volume equal to 20 percent of the liquid capacity is needed for floating scum storage.

If you know the liquid capacity of your septic tank in cubic feet, multiply that figure by 7.5 to find its capacity in gallons. Compare the liquid capacity of your tank with the guidelines given above. If your septic tank is smaller than recommended, you will probably need to pump your septic tank more frequently than otherwise recommended.

If you do not know the capacity of your septic tank, a reasonable estimate would be to assume that the capacity is equal to the size recommended for the number of bedrooms that were in the house when the septic tank was constructed.

Some soils do not allow adequate filtration of septic tank effluent and create potential contamination problems. Extremely coarse soil, such as sand and gravel, do not filter out fine solids and bacteria from sewage tank effluent. Extremely fine soil, such as clay, is an excellent filter, but it may be too tight to allow much sewage to pass through it. Instead, effluent moves upward to the ground surface. Also, clay soils tend to have high seasonal water tables that do not allow proper flow through the drainage field, causing inadequate treatment of sewage backup.

This circular contains a brief discussion of each question on the Farmstead Assessment checklist, and a section discussing what you can do and who to call if you answer "Yes" to any of the questions.

1. Is your septic tank or drain field less than 50 feet from your well?

A primary concern related to the location of your septic system is safe distance from your well. In North Dakota, private septic systems are required to be at least 50 feet from a well that is at least 100 feet deep and 100 feet from a well less than 100 feet deep.

2. Do you fail to pump out your septic tank on a regular basis?

Management of your septic system can affect the risk of your groundwater becoming contaminated. Maintenance is one of the most important considerations in making sure a septic system will function properly over a long period of time.

Most properly sized septic tanks need the solids pumped out every two to three years. If a garbage disposal is used, a septic tank should be pumped every one to two years. Remember, these are just estimations and the actual interval between septic tank pumping will depend on the quantity of solids entering your tank.

To determine when to have the septic tank pumped, the scum and sludge layer may be measured. To measure the scum layer, attach a hinged flap to the bottom of a 2x2 as shown in Figure 2. Measure the distance from the top of the scum layer to the bottom. If the scum layer is thicker than 12 inches, have the septic tank pumped. Also measure the sludge layer in the bottom of the tank. Wrap 3 feet of white terry cloth or toweling around a 2x2 and push to the bottom of the tank. Turn slowly two or three revolutions, let sit a minute, then slowly and carefully withdraw the 2x2. Sludge thickness can be determined by where the black particles cling to the rough cloth. If the sludge is thicker than one-third of the tank's liquid depth, have the tank pumped.

It is important that you know where the inspection hole or manhole of your septic tank is located. Scum and sludge levels should be monitored on a yearly basis. If you need to pump the septic tank, have a qualified service person do it and make sure it is pumped from the manhole and not through the 4-inch inspection hole.

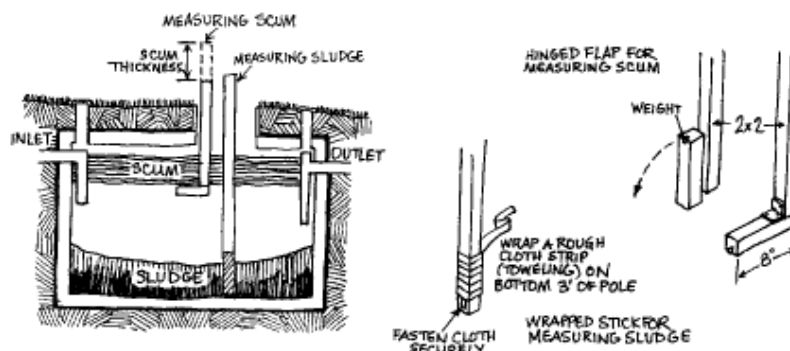


Figure 2. Checking sludge and scum level.

3. Do you commonly dump grease, oils, or leftover household chemicals down the drain?

You should always avoid dumping grease and oils down the drain. They may plug sewer pipes or build up in the septic tank and plug the inlet. Keep a separate container for waste grease and oil and throw them out with the trash.

Household chemicals that are poured down the drain can cause damage to the septic system. Bacteria present in the septic system breakdown the sewage. When household chemicals are added to the system, they may destroy the bacteria, reducing the effectiveness of the sewage treatment process.

Assessing Household Wastewater Treatment Practices

 If you answered
 "Yes" to the
 following
 questions

What you should do	Who to call	Other references
Question 1. Know the location of all components of your septic system.	County health unit or county or regional sanitarian.	Individual Home Sewage Treatment Systems. NDSU Extension Service Circular AE-829.
Test water for bacteria and nitrates.		

Question 2.	Monitor septic tank annually and pump scum and sludge when needed.	Local septic tank pumping service.	Midwest Plan Service. Onsite Domestic Sewage Disposal Handbook. MWPS-24.

Question 3.	Do not allow grease, oil or other household chemicals to be put down the drain.	Local sanitation department to determine where these products can be disposed.	Chapter 16, North Dakota State Plumbing Code (Revised 1996), Published by the State Plumbing Board, Bismarck, North Dakota.

AE-1075, July 1998

County Commissions, North Dakota State University and U.S. Department of Agriculture cooperating. North Dakota State University does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, disability, age, status as a U.S. veteran, sexual orientation, marital status, or public assistance status. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701) 231-7708. This publication will be made available in alternative formats for people with disabilities upon request, 701 231-7881.

INFORMATION ACADEMICS RESEARCH EXTENSION PUBLICATIONS CALENDAR WEATHER DIRECTORY

[Information for Prospective Students](#)

NDSU is an equal opportunity institution

This information may be photocopied for noncommercial, educational purposes in its entirety with no changes.
 Requests to use any portion of the document should be sent to NDSU.permission@ndsu.edu.
 North Dakota State University Agriculture and University Extension
 Dept. 7070, Morrill 7, P.O. Box 6050, Fargo, ND 58108-6050