

Chapter 4

HOUSEHOLD WASTEWATER: Septic Systems and Other Treatment Methods

This chapter covers three factors that affect your pollution risks:

1. *Septic System Design and Location.* Topics covered in this section include knowing your septic tank capacity, soil type in the soil absorption field, and the system's location.
2. *On-Site System Maintenance.* Pumping the septic tank, protecting the soil absorption field, and watching for signs of trouble are discussed in this section.
3. *Septic or Sewage System Inputs.* Reducing the amount of water, solids, and harmful chemicals going into an individual septic or municipal wastewater treatment system is reviewed in this section.

This chapter will help you evaluate your septic system and pinpoint risks before they become problems. It provides general guidelines for safe management of household wastewater. Be aware that local county sanitary codes may impose additional requirements and stipulate a permit to construct or alter the existing system. Contact your county health, public works, or environmental department or your county or K-State Research and Extension office, for technical assistance and problem-solving ideas.

Why should you be concerned?

Wastewater treatment systems help protect your health and the environment. Household wastewater from sinks, toilets, washing machines, and showers carries dirt, soap, food, grease, and bodily wastes "down the drain" and out of your house (Figure 4.1).

Wastewater also carries disease-causing bacteria, viruses, and other pathogens as well as nutrients like nitrogen, phosphorus, and organic wastes. Such nutrients promote weed growth and lower oxygen levels in surface water and thus affect fishing and recreational use of rivers and lakes.

Wastewater treatment systems are designed to remove or break down these contaminants before they enter groundwater via wells, nearby lakes, streams, or wetlands.

Wastewater treatment is often out-of-sight and out-of-mind until problems occur. Knowing the basics about your household system and taking simple precautions can prevent problems. It's a wise investment to keep your system working well. Replacing a failed system can cost thousands of dollars.

Where is your wastewater treated?

Do you have a septic system or other on-site system to treat wastewater?

This chapter is geared primarily toward homeowners or tenants who have septic systems buried in their yards. A typical septic system consists of a septic tank and soil absorption field, which is also known as a drainfield or tile field (see Figure 4.1). It is important to maintain your wastewater treatment system and use it wisely whether you have a holding tank or septic tank followed by a mound, sand filter, or other alternative on-site treatment system. (These types of systems are discussed further on the following pages.)

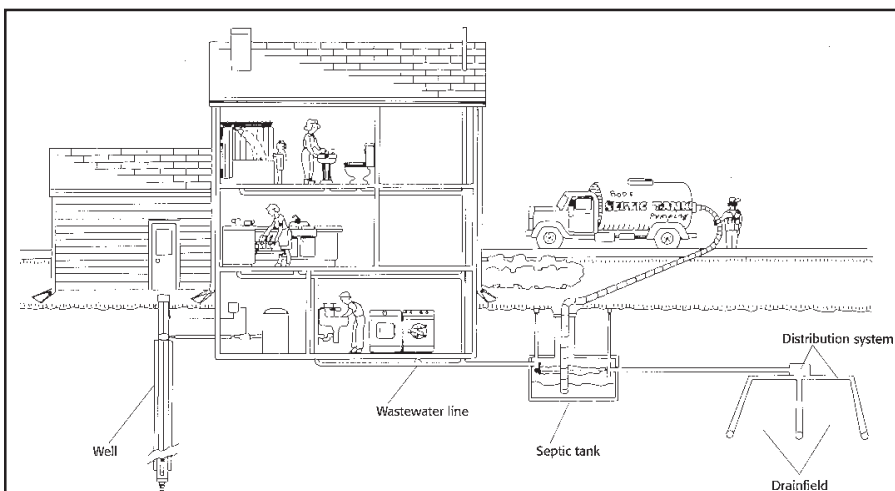


Figure 4.1 Household wastewater carries dirt, soap, food, grease, and bodily wastes "down the drain" and out of your house to an on-site septic or municipal wastewater treatment system.

Are you hooked up to a city or community sewer system?

Even if wastewater is not treated on your home site, there are still ways you can reduce the impact your wastewater has on your community and the environment. Conserving water and being careful about what you put down the drain are easy ways to help. This is discussed in Part 3 of this chapter. Using your municipal sewage treatment system wisely saves taxpayers' dollars and protects our water resources.

How does a conventional septic system work?

First, wastewater flows through a sewer pipe out of your house and into the septic tank, a box or cylinder commonly made out of concrete (Figure 4.2). Fiberglass and polyethylene tanks are also used. The tank must be watertight to keep sewage from leaking out and groundwater from seeping in. Septic tanks must meet standards set forth in county sanitary codes and KDHE Bulletin 4-2, Minimum Standards for Design and Construction of Onsite Wastewater Systems.

The wastewater is detained in the tank for at least two days. Lighter solids in the wastewater—like grease, hair, and soap—float to the top of the tank and form a scum layer. Heavier solids settle to the bottom and form a layer of sludge. Bacteria in the tank begin to break down some of the sludge into simple nutrients, gas, and water. The remaining solids are stored in the tank until they are pumped out. A baffle or a sanitary tee pipe at the tank inlet slows the incoming rush of water, so the scum and sludge are not stirred up. A baffle or a sanitary tee pipe located at the tank's outlet keeps solids from leaving the tank. A large hatch (or hatches) in the top of the tank allows access for evaluation, pumping, and repairs.

Next, the liquid waste, or effluent, flows out of the tank, through the distribution system, and into the soil absorption field (Figure 4.3). The distribution system commonly consists of a series of perforated plastic distribution pipes in gravel-filled trenches or plastic chambers laid directly on the soil in the bottom of the trench. Effluent can be fed into the pipes by gravity or by a pump. The effluent

moves slowly out of the trench and is absorbed into the soil. An effluent filter at the tank outlet is recommended because particles carried out of the septic tank can clog the soil absorption field.

A CONVENTIONAL SEPTIC SYSTEM HAS THREE COMPONENTS:

- The **septic tank** which separates, stores, and begins to treat solid wastes (sludge and scum).
- The **distribution system** which disperses the liquid effluent over a large area of soil.
- The soil in the **soil absorption field** which absorbs the effluent and treats it by natural physical, chemical, and biological processes.

The soil must be of a suitable type and deep enough to treat wastewater before it reaches groundwater. The soil filters out larger particles and pathogens, which eventually die off in the inhospitable soil environment. Under suitable conditions, beneficial soil microbes and natural chemical processes break down or remove most of the contaminants in the effluent. Hazardous synthetic chemicals such as solvents and fuels are not easily degraded in wastewater treatment systems. Some wastes such as those generated by body shops, furniture refinishing,

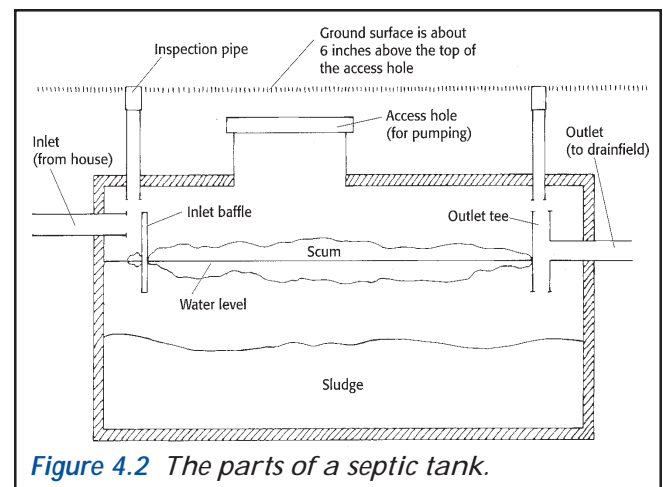


Figure 4.2 The parts of a septic tank.

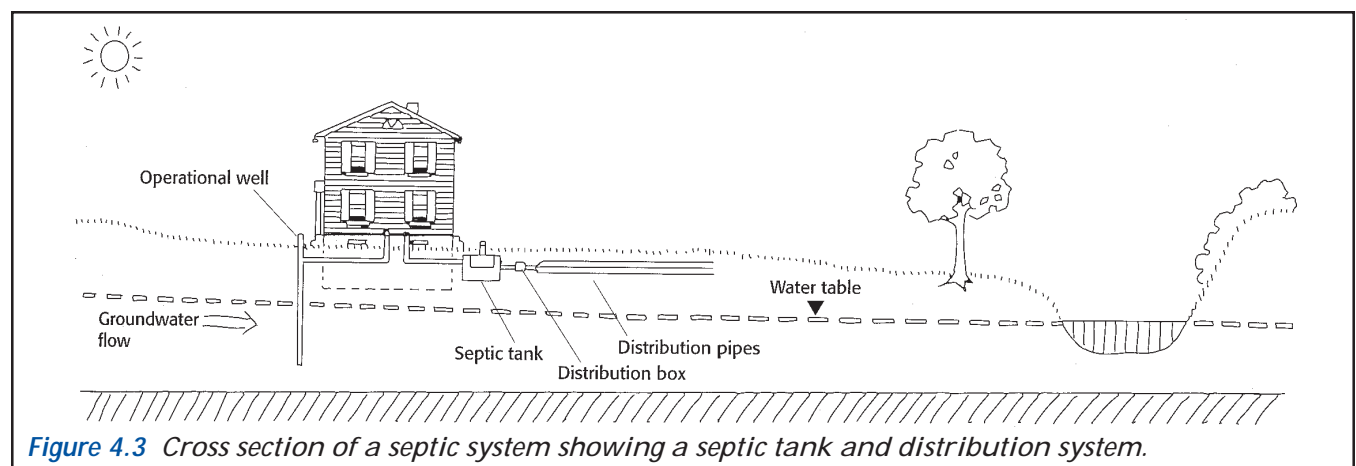


Figure 4.3 Cross section of a septic system showing a septic tank and distribution system.

machinery repair, etc. are not “healthy” for wastewater treatment systems. These chemicals can contaminate sludge in the septic tank, kill the beneficial bacteria that digest wastes, and travel into groundwater. Hazardous chemicals **MUST NOT** be discharged to soil absorption fields.

Soils vary in their ability to absorb and treat wastewater. Well-drained, medium-textured soils such as loam are best. Coarse gravel or sandy soils allow wastewater to flow too quickly for treatment to occur. In fine clay or compacted soils, water moves too slowly. Soil microbes need oxygen to digest wastes quickly. If air spaces between soil particles remain filled with water, the lack of oxygen prevents the rapid breakdown of wastes by aerobic (oxygen-requiring) soil microbes.

Anaerobic soil microbes (those that live in the absence of oxygen) digest wastes slowly and give off putrid, smelly gases characteristic of a failing septic system. Anaerobic conditions occur when soils are poorly drained, groundwater levels are high, surface runoff saturates the soil absorption field, or excessive amounts of water are used in your household.

Good wastewater treatment depends on uniform dispersal of wastewater over the soil absorption field. In a conventional, gravity-fed distribution system, the distribution pipes are often laid out in a fork-shaped pattern joined by a distribution box (Figure 4.3). Leveling devices on the distribution box help ensure an even flow of wastewater to every trench. Often, however, certain trenches or low points in the distribution system receive more effluent than others.

A dosing or enhanced-flow system has a pump or siphon to improve the distribution of effluent. Periodically pumping a certain volume of effluent to wet the entire soil absorption field area and then allowing the soil to drain between doses provides a period of aeration, which helps microorganisms in the soil digest the wastes.

In a pressure distribution system, effluent is pumped directly through small-diameter pipes, not sent through a distribution box. Wastewater is evenly distributed throughout the entire soil absorption field, promoting better treatment of wastewater and system longevity.

Alternating absorption fields or trenches are another means of providing a period of aeration (Figure 4.4). Adjusting the outlet levels or using a

plug or valve in the distribution box allows effluent to flow into only some of the trenches while other trenches are allowed to rest for about 6 months. A serial distribution system is designed so that the trenches are used in sequence; when the first trench is loaded to capacity, the wastewater overflows into the next trench downslope.

Seepage pits and cesspools are perforated tanks or pits lined with concrete blocks or bricks through which wastewater can seep into the ground. They are illegal in Kansas because they contribute to pollution of our precious groundwater. K-State Research and Extension bulletin “Plugging Cisterns, Cesspools, Septic Tanks and Other Holes,” MF-2246, describes the appropriate procedures to properly abandon these pits.

What are some alternative systems?

If soil or site conditions are not suitable for a conventional soil absorption field, an alternative system might be used. In a mound system, the soil absorption field is built on an elevated sand bed to compensate for shallow soils, thereby providing for treatment before the effluent reaches groundwater (Figure 4.5 on the following page). A sand filter consists of layers of sand and gravel in which the wastewater is treated before it is distributed into the soil. Other types of filters use small foam pieces or peat as a filter medium. The treatment provided by these filters allows for better absorption by the soil in the drainfield.

With suitable climate and soil conditions, other alternative systems such as mechanically aerated systems, constructed wetlands, lagoons, or evapotranspiration systems for household wastewater treatment are approved in some counties. Descriptions of these systems are beyond the scope of this publication; please see “For More Information” beginning on page 44 for additional resources.

Aerobic treatment units operate much like a municipal sewage treatment plant, where wastewater is mixed with air, promoting bacterial digestion of organic wastes and pathogens. The biological breakdown of wastes in a septic tank’s anaerobic (oxygen-deprived) conditions is relatively slow. Aerobic units are more expensive and require significantly more maintenance than conventional septic tanks. However, they provide good wastewater treatment on homesites that are otherwise unsuitable for

development because the soil type, depth, or area is inadequate for a conventional on-site treatment system. Effluent from an aerobic unit must be discharged into a soil absorption system and where soil conditions are a problem, may be absorbed more easily than effluent from a septic tank.

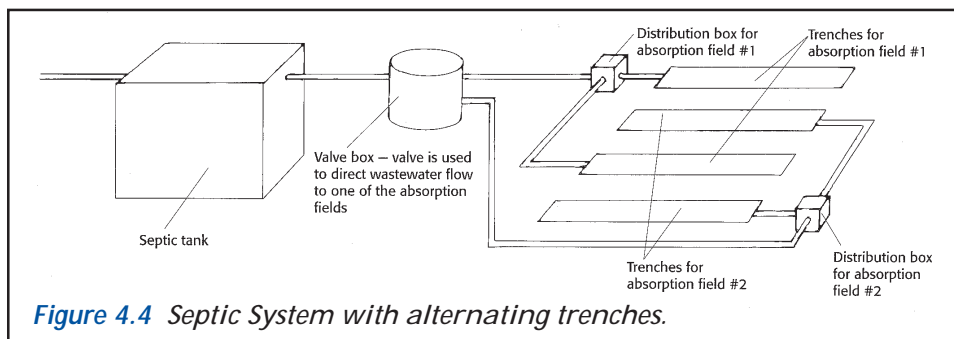


Figure 4.4 *Septic System with alternating trenches.*

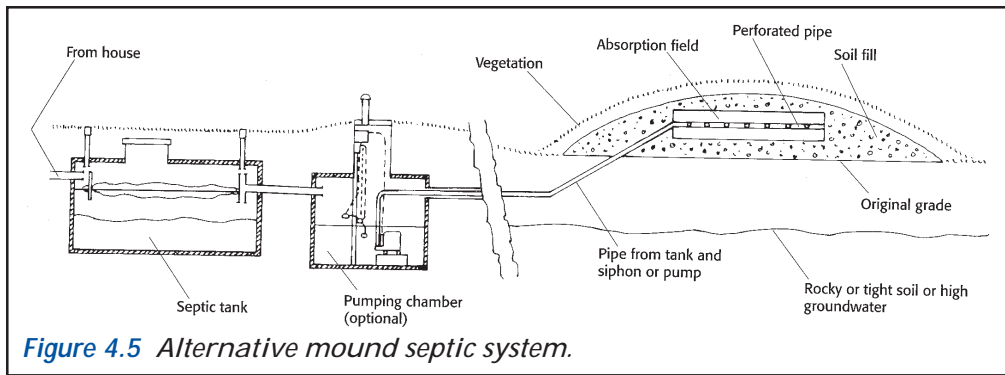


Figure 4.5 Alternative mound septic system.

flowing out of a house is an average of 150 gallons per bedroom per day, multiplied by the number of bedrooms in the home. Each county sanitary code sets procedures for calculating wastewater flow and sizing on-site treatment systems. Installing low-flow toilets and

Holding tanks may be allowed in temporary situations such as when you are awaiting a new system hookup or at a summer residence. Unlike a septic tank, a holding tank has no sanitary tee or outlet and must be pumped frequently by a septage hauler who takes the contents to a treatment facility. Holding tanks are not designed or intended for long-term use.

Disposal of toilet wastes does not have to mean flushing away great volumes of water. Composting toilets use microbes to aerobically digest toilet wastes; they work well only if the right temperature, moisture level, oxygen level, and nutrient mixture is maintained. Other types of waterless toilets include incinerating toilets, recirculating oil-flush toilets, and chemical disinfecting toilets. Without the blackwater (water carrying human body waste) from toilets, the volume of greywater (wastewater other than sewage) from sinks, tubs, and washing machines can be treated in a household wastewater system of smaller size.

Although some local sanitary codes address the issue of separating gray water from blackwater, greywater is still regarded as sewage, and cannot legally be discharged to the ground surface.

Greywater may contain infectious bacteria and viruses (for example, from soiled diapers or clothing worn by someone with an infectious disease). Direct contact with greywater must be prevented. Beware that certain detergents, bleach, and salts may damage the health of plants and soils.

In areas with limited water resources, particularly during drought periods, water use must be reduced. Water conservation methods (see page 42 for suggestions) are encouraged, along with unrestricted uses of clear wastewater (for example, flushing toilets with shower warm-up water).

PART 1—Septic System Design and Location

How much wastewater can your system handle?

Both the septic tank and soil absorption field should have adequate capacity to treat all wastewater generated in your house, even at times of peak use. The system must be designed for the maximum occupancy of your home. The amount of wastewater

water-saving faucets will reduce the load on the drainfield, lengthening its useful life.

The septic tank should be large enough to hold at least two days' worth of wastewater. (Two days is long enough to allow solids to settle out by gravity.) Most county codes require at least a 1,000 gallon septic tank for a new three-bedroom home; however, the expense of installing a larger tank is modest and well worth the money in terms of extended use and providing for future expansion of the house. A larger tank, a two-compartment tank, or a second tank in series should improve sludge and scum removal and help prevent clogging of the soil in the absorption field.

The required size of the soil absorption field is based on how much wastewater will be put in the system and how much water a unit area of soil can

IS YOUR SEPTIC TANK CAPACITY ADEQUATE?

Water usage in the United States ranges from 50 to 100 gallons per day (gpd) per person. Estimate the wastewater load from your household using the equation below. Your septic tank should be able to hold two days' worth of wastewater. Always check with your county officials for the requirements in your area.

___ people in household × (average use) 75 gallons per day (gpd) = ___ gpd

___ gpd × 2 days = _____ gallons

What is your septic tank capacity? _____ gallons (If you do not know, ask your tank installer or pumper.)

Is your tank size adequate for your present household size? Yes No

Calculate the wastewater load from your home if each bedroom were occupied by two people:

___ bedrooms × 150 gpd = ___ gpd × 2 days = _____ gallons. This is the recommended tank size for your home if each bedroom were occupied by two people.

Would your septic tank capacity be adequate if each bedroom were occupied by two people? Yes No

treat. The better the soil type or larger the soil absorption system, the higher the system's capacity for wastewater treatment. Contact your home contractor, septic system installer, or local health department for information they may have on file about your septic system age, design, and location. Keep this information in a handy file for future reference or when you sell your home.

Water use in your household in excess of the system's design capacity leads to inadequate wastewater treatment or system failure. Conserving water or more frequent pumping of the septic tank may extend the life of the system. The addition of a bathroom, bedroom, or water-using appliance (such as a whirlpool tub, dishwasher, or water softener) to your home may require expanding your system. The use of former vacation cottages as permanent dwellings or as heavily used vacation rentals may render an existing system inadequate. Water use usually increases dramatically as children become adolescents. Several teenagers living in a house may overload the system's capacity.

How close is too close?

To prevent contamination of water supplies, the soil absorption field should be at least 100 feet from any wetland, shoreline, stream bed, or drinking water well (see Figure 4.6 ; county regulations regarding separation distances do vary). The greater the distance, the lower the chance of contaminating the water supply. If your system is downhill from a well, the well will be better protected. (If you do not

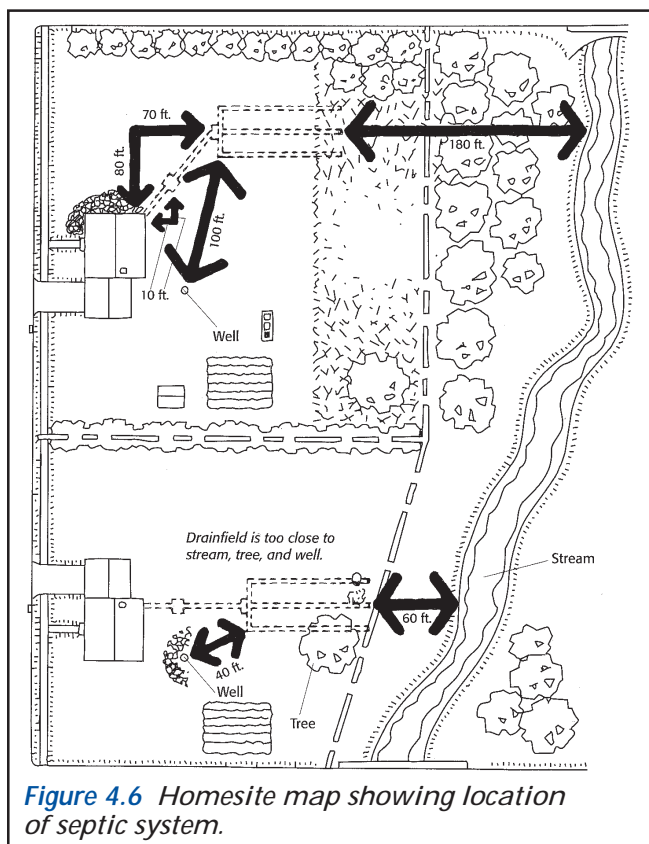


Figure 4.6 Homesite map showing location of septic system.

know where your system is located, see Part 2 of this chapter.)

You should test your well water more often for nitrates and bacteria if your system is closer to your well than recommended. For information on certified laboratory testing, contact your county Extension office or county environmental health department, or look under "laboratories" or "water" in the yellow pages. Chapter 3 provides more information on well protection. Many county environmental health departments offer screening services for private water well. Samples are tested for nitrate and bacteria (some offer additional tests) at low cost.

When was your septic system installed?

Septic systems should last fifteen to forty years or longer, depending on how appropriately they were designed for the site and the expected use, and on how well they are maintained. The older your system, the more likely that it does not meet current standards. If your septic tank is made of steel, the top will rust away, creating a dangerous hidden pit. Even a relatively new system can fail if it is located in poor soil, undersized, or not properly installed or maintained. Look for the signs on failure listed in Part 2 of this chapter.

Do you have an effluent filter and gas baffle installed at the septic tank outlet?

Solids that do not settle out in the tank can be carried out of the tank with effluent, clog the soil absorption field, and lead to premature system failure. Effluent filters on the outlet capture small particles and prevent them from clogging the soil absorption field; it is important to periodically clean the filter. Gas bubbles are produced by anaerobic bacteria slowly digesting wastes in the tank. A gas baffle near the outlet deflects the bubbles and bits of disturbed sludge away from the outlet.

Does your system need safety devices?

To prevent hazardous sewage overflows, tanks and pumping chambers should have a storage capacity above normal working levels. In addition, an alarm should be installed on holding tanks or pumping chambers to warn you if the tank is nearly full. If your system depends on a pump (and not gravity), you may need to have a backup power supply available in addition to adequate storage capacity in the tank.

In flood hazard areas, backflow prevention valves should be installed on the tank outlet line to prevent wastewater from flooding back into the tank and then into your home.

Assessment 1—Septic system design and location

Use the assessment table below to begin rating your risks related to septic system design and location. For each question, mark your risk level in the right-hand column. Although some choices may not

correspond exactly to your situation, choose the response that best fits.

Responding to risks

Your goal is to lower the risks. Use the Action Checklist on page 46 to record medium- and high-risk practices. Use recommendations in Part 1 to help make plans to reduce your risks.

PART 2—On-Site System Maintenance

Do you know exactly where your system is located?

To take proper care of a septic system, you must know where it is. Exact locations of system components are not obvious, because they are below ground. If the location of your system is not in your

ASSESSMENT 1—Septic system design and location

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Capacity of system	Tank is designed to handle more wastewater than required, based on the size of the home.	Capacity just meets load requirements, but I watch out for factors indicating system overload. Water conservation measures are taken.	Bathrooms, bedrooms, or water-using appliances are added without reexamining the capacity of the wastewater system. Two or more teenagers live in the house.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Separation distance	Soil absorption field is at least 100 feet from any well or surface water.	Soil absorption field is between 50 and 100 feet from a well or surface water.	Soil absorption field is less than 50 feet from a well or surface water.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Age of system or holding tank Year Installed: _____	System is 5 years old or less.	System is between 6 and 20 years old.	System is more than 20 years old.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Effluent filter	An effluent filter is installed and cleaned regularly every 3 years.	An effluent filter is installed but not cleaned often enough.	There is no effluent filter installed on the septic tank outlet.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Safety devices	An alarm on the pumping chamber or holding tank indicates that the tank is full or power has been cut off to the pump.		There is no alarm to indicate tank overflow or that power has been cut off to the pump.	<input type="checkbox"/> Low <input type="checkbox"/> High
Backflow protection	A backflow valve is installed to prevent backup during floods.		No backflow valve is installed to prevent backup during floods.	<input type="checkbox"/> Low <input type="checkbox"/> High
Treatment effectiveness	Only normal household wastewater is treated by system.	Water softener discharge is added to wastewater system.	Discharge from body shop, engine repair shop, etc. is added to waste water system.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

home records, then a previous homeowner, county environmental health department, or pumper's records may hold the answer.

You may be able to locate your septic tank yourself. In the basement, look for the sewer pipe leaving the house and note the depth and direction in which it goes through the wall. If the sewer pipe is not visible, go outside and look for a 3" to 4" diameter pipe (sewer stack vent) protruding through the roof. Many times this pipe is above the sewer pipe exit from the foundation. Then, probe the ground with a narrow metal rod or dig into the ground 10 to 20 feet away from the house in the direction of the house sewer line. *At least 24 hours before digging or probing with a metal rod, notify "Dig-Safe" at 1-800-344-7233.* This allows time to provide the necessary information regarding all transmission lines on the site. The septic tank is usually within 2 feet of the ground surface. The distribution box (if installed) and soil absorption field are usually located downslope from the septic tank. In some situations, the wastewater is pumped to a soil absorption field uphill from the septic tank.

Once you have located the septic tank, sketch a map of your house and yard (Chapter 1, "Site Assessment," will get you started on a map). Note the distances from the septic tank opening to at least two permanent points such as the corner of the house foundation or survey stakes on the property line (see Figure 4.6 on page 38). As long as the distances are correct, the map does not have to be drawn to scale. If known, show the location of the soil absorption field. Keep the map on file along with other maintenance records and pass it on to subsequent owners of the house.

Do you know when your tank was last pumped or inspected?

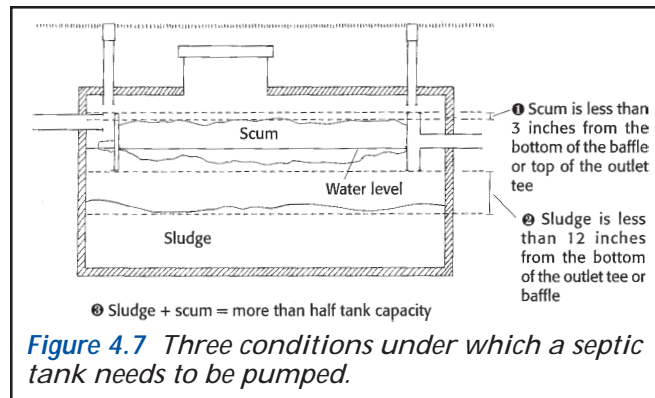
Keeping good records each time your septic system is pumped, inspected, or repaired will help you make cost-effective maintenance decisions (see sidebar on page 41). This information also will be valuable if you sell or transfer your property.

How often should your tank be pumped?

Regular pumping is the most important action you can take to maintain your system. As more solids accumulate in the tank, particles are more likely to flow out of the tank and into the soil absorption field. The cost of pumping a septic tank (\$80 to \$250) is far less than the expense of replacing a soil absorption field (many thousands of dollars) which has been clogged by escaping solids.

The best way to determine when to pump your tank is to have it inspected annually. The tank needs to be pumped if (see Figure 4.7):

- the sum of the solid layers (sludge plus scum) takes up more than half of the tank capacity,



- the top of the sludge layer is less than a foot below the outlet baffle or tee, or
- the scum layer is within three inches of either the bottom of the outlet baffle or the top of the outlet tee.

Pumping as needed based on results of periodic inspections will minimize your maintenance costs and maximize the system's longevity. Inspections can also identify problems with system components before they cause a backup or soil absorption field failure.

A general rule of thumb is to have a septic tank pumped by a licensed pumper every three to five years. But how often a tank needs to be pumped depends on size of your tank, amount of wastewater generated in your household, amount of solids carried in the wastewater (increased by the use of a garbage disposal), and age of the system.

You can estimate how frequently your tank needs to be pumped using the table on the following page or obtaining the K-State Research and Extension bulletin, "Septic Tank Maintenance: A Key to Longer Septic System Life," MF-947. Find your tank size (in gallons) along the left side of the table. Go across the row for your tank size and down the column for the number of people in your home. Where the row and column intersect, you will find the estimated number of years between pumpings.

After pumping, the tank should also be inspected by a professional for cracks and the condition of the baffles. Leaks should be repaired

ESTIMATED NUMBER OF YEARS BETWEEN SEPTIC TANK PUMPINGS

Tank size (gallons)	Number of people in your household					
	1	2	3	4	5	6
500	5.8	2.6	1.5	1.0	0.7	0.4
1,000	12.4	5.9	3.7	2.6	2.0	1.5
1,500	18.9	9.1	5.9	4.2	3.3	2.6
2,000	25.4	12.4	8.0	5.9	4.5	3.7

promptly. Never crawl inside or lean into a septic tank without proper ventilation and safety procedures—the gases inside the tank are deadly!

If provided, the distribution box should be periodically checked to be sure the distribution pipes are properly leveled. Solids accumulating in the distribution box indicate damaged baffles, inadequate septic tank pumping, or a tank too small to handle the wastewater load. If the system includes a pump, it should be checked along with the float switch, alarm, and air vents to the dosing tank.

A holding tank must be pumped frequently because it has no outlet. Depending on the amount of wastewater generated and tank capacity, you may need to pump it every month or every week. If you assume that every person in the house uses 25 to 75 gallons of water a day, four people can fill a 1,500-gallon tank in five to fifteen days. Overflows are illegal and a sure sign that you need to schedule pumping more often or add tank capacity.

How can you protect the soil absorption field?

A septic system depends on good soil conditions for treatment and disposal of effluent. Water must be able to percolate through the soil at a reasonable rate. The following are tips for protecting the soil absorption field:

- To prevent soil compaction and damage to pipes, **do not drive** vehicles on the soil absorption field.
- Do not pave, build, pile logs or other heavy objects, or put a swimming pool over the soil absorption field. These activities compact the soil and soil microbes need oxygen to digest wastes.
- Divert roof runoff, footer drains, sump pumps, and other surface runoff away from all parts of the system. Saturated soil is less effective at treating wastewater.
- Avoid planting trees and shrubs whose deep roots can damage piping. Do not garden or till over the drainfield and do not irrigate this area. Drought tolerant grass is the best cover for a soil absorption field.

- Install an effluent filter or screen on the septic tank outlet to prevent the carryover of solids into the soil absorption field.

What are the signs of trouble?

- Foul odors in your home or yard tell you that your system is not working well.
- Slow or backed-up drains may be caused by a clog in the house pipes, septic tank, soil absorption field, or roof vent for your sewer line.
- Wet, spongy ground or lush plant growth may appear near a leaky septic tank or failing soil absorption field.
- Repeated intestinal illnesses in your family may occur if your water is contaminated by poorly treated wastewater. Have your drinking water tested annually for coliform bacteria and nitrates.
- Algal blooms and excessive weed growth in nearby ponds or lakes can be caused by poorly treated wastewater leaching from septic systems.

Respond quickly to any problems you observe.

You may need to expand or modify your system to avoid further problems. There are many good publications and other resources to help you decide (see “For More Information” beginning on page 44). Sanitarians in your county environmental health department are good sources of advice. Always check with them regarding a permit.

Try to base your decision on what is best for the environment and your health. Remember, what may seem to be the least expensive option may not be economical in the long run. For example, installing a larger septic tank initially may cost 10% more, but the cost is quickly recovered in reduced pumping expenses and extended life of the soil absorption field.

Assessment 2—On-site system maintenance

Use the table below to begin rating your risks related to system maintenance. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits.

KEEP A MAINTENANCE RECORD		
Keeping good records each time your septic system is pumped, inspected, or repaired will help make cost-effective maintenance decisions. Your Wastewater System Owner/Operator Manual is a file folder available from your county extension office and from many contractors. Don't forget to check out the informative brochures, too.		
Date	Work done	Work performed by
May 20, 1997	Installed septic system, diagram in files	Installer's name, phone number
April 1, 2001	Septic tank pumped, effluent filter cleaned	Pumper's name, phone number, license number

Responding to risks

As always, your goal is to lower your risks. Use the Action Checklist on page 46 to record your medium- and high-risk practices. Use recommendations in Part 2 to help make plans to reduce your risks.

PART 3—Septic or Sewage System Inputs

What solid wastes are acceptable?

Your wastewater treatment system is not a substitute for the trash can or a compost pile. Dispose of tissues, diapers, baby wipes, sanitary napkins,

ASSESSMENT 2—On-Site System Maintenance

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Maps and records	I keep a map and good records of repairs and maintenance.	The location of my tank and date of last pumping are known but not recorded.	The location of my system is unknown. Pumping and repair records are not kept.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Tank pumping (including holding tanks)	The septic tank is pumped regularly as determined by an annual inspection, or about every 3 to 5 years. The holding tank is pumped as needed.	The septic tank is pumped, but not regularly.	The septic tank is not pumped. The holding tank overflows or leaks between pumpings.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Condition of tank and baffles	The tank and baffles are inspected for cracks or other damage; repairs are made promptly.		The tank was last inspected more than 4 years ago. The condition of the tank and baffles is unknown.	<input type="checkbox"/> Low <input type="checkbox"/> High
Soil absorption field protection	Vehicles and other heavy objects or activities are kept from the soil absorption field area.	Occasionally, the soil absorption field is compacted by heavy objects or activities.	Vehicles, livestock, heavy objects, or other disturbances are permitted in the soil absorption field area.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Diverting surface water	All surface runoff is away from the soil absorption field.	Some surface water flows into the soil absorption field area.	Runoff from land, rooftops, driveways, etc. flows into the soil absorption field.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Plantings over the soil absorption field	Perennial grass or other shallow-rooted plantings are over the soil absorption field.	A garden is planted over the soil absorption field.	Trees and shrubs are growing on or near the soil absorption field.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Signs of trouble	Household drains flow freely. There are no sewage odors inside or outside. Soil over the soil absorption field is firm and dry. Well water tests negative for coliform bacteria.	Household drains run slowly. Soil over the soil absorption field is sometimes wet.	Household drains back up. Sewage odors can be noticed in the house or yard. Soil is wet or spongy in the soil absorption field area. Well water tests positive for coliform bacteria.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

tampons, condoms, cigarette butts, and other solid waste with regular garbage and not down the toilet. Since these materials do not break down easily, they will cause your septic tank or the settling tanks in a municipal treatment plant to fill up faster.

Do not use a garbage grinder (disposal) in the kitchen sink; it adds to the load on the system. Excess grease, fats, and coffee grounds can clog your system.

Consider composting food waste and even some paper wastes as an alternative. Your county environmental or K-State Research and Extension office can provide information about composting.

What household chemicals can go down the drain?

Wastewater treatment systems are not designed to neutralize the wide variety of common household chemicals. Paints, solvents, acids, drain cleaners, oils, and pesticides can pass untreated through your system and contaminate the groundwater. Though generally safe when diluted, high concentrations or large volumes of water-soluble cleaners or bleach can harm septic tank microbes. See Chapter 5, “Managing Hazardous Household Products,” for information on the proper disposal of hazardous chemicals.

In Kansas, soil absorption systems may receive only domestic wastewater, which does not include hazardous chemicals. It is illegal to discharge hazardous chemicals into soil absorption systems due to the potential for groundwater contamination.

Chemical products advertised to “sweeten” or improve your septic system operation cannot replace routine pumping and may even be harmful. Buying and adding yeasts, bacteria, or enzymes is not necessary; there are already plenty of the right microbes digesting wastes in your system. Additives containing solvents to unclog your system can kill the microbes needed to digest wastes in your septic tank and soil absorption field. Furthermore, these solvents may contaminate your drinking water supply.

Why save water?

Average household water usage is shown in Figure 4.8. Reducing the flow of wastewater through the septic tank allows more time for solids to settle out and less chance of solid particles being carried over to the soil absorption field. Less water in the soil absorption field means better aeration for the soil microbes at work in the system. There are many steps you can take to reduce how much water you use. Here are a few:

- Consumption by toilets can be reduced as much as 50 percent, by installing low-flow toilets. Water-saving shower heads and faucets also help. (Low-flow fixtures are required by some codes.)
- Take shorter showers. Take showers instead of baths.

- Repair leaky faucets and toilets immediately. Monthly, put red food coloring in the toilet tank. In two hours check for color in the toilet bowl; color indicates a leak which needs immediate repair.
- Do not run water longer than necessary; for example, turn the water off while brushing your teeth or shaving.
- Wait until dishwashers and washing machines are full before running a load; scrape but do not pre-rinse dishes before loading them into the dishwasher.
- Adjust water softener settings to reduce the amount of water needed for backwashing and regeneration.
- Spread out laundry and other major water-using chores over the week or day.
- Avoid using a garbage disposal.

Assessment 3—Septic or sewage system inputs

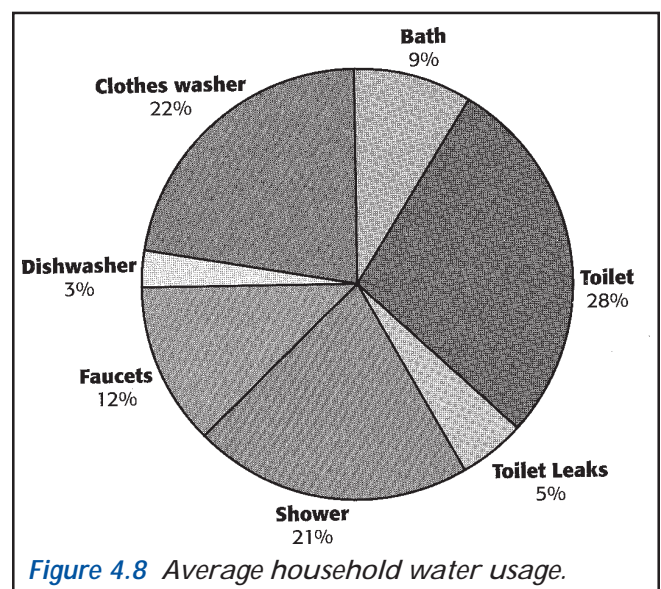
Use the assessment table on the following page to begin rating your risks relating to system inputs. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits.

Responding to risks

As always, your goal is to lower your risks. Use the Action Checklist on page 46 to record your medium- and high-risk practices. Use recommendations in Part 3 to help reduce your risks.

ACTION CHECKLIST

It is easy to understand how household wastewater systems can be ignored: out of sight, out of mind. But what you do or don’t do to maintain your system may affect the health of your family, your neighborhood, or the environment . . . and your bank account!



ASSESSMENT 3—Septic or Sewage System Inputs

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Soil wastes	There is no garbage grinder (dispose-all) in the kitchen. No grease or coffee grounds are put down the drain. Only toilet tissue is put in the toilet.	There is moderate use of a garbage grinder, and some solids are disposed of down the drain.	There is heavy use of a garbage grinder, and many solids are disposed of down the drain. Many paper products or plastics are flushed down the toilet.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Cleaners, solvents, and other chemicals (also applies to holding tanks)	There is careful use of household chemicals (paints, cleaning products). No solvents, fuels, or other hazardous chemicals are poured down the drain.	There is occasional disposal of hazardous household chemicals in the wastewater system.	There is heavy use of a strong cleaning products that end up in wastewater. Hazardous chemicals are disposed of in the wastewater system.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Water conservation	Only water conserving fixtures and practices are used. Drips and leaks are fixed immediately.	Some water-conserving steps are taken (such as using low-flow shower heads or fully loading washing machines and dishwashers).	Standard high-volume bathroom fixtures are used (toilets, showers). No effort is made to conserve water. Leaks are not repaired.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Water usage	Laundry and other major water uses are spread out over the week.		Several water-using appliances and fixtures are in use in a short period of time.	<input type="checkbox"/> Low <input type="checkbox"/> High

Go back over the assessment tables to make sure that you recorded all the high and medium risks you identified in the Action Checklist (on page 46). For each medium and high risk uncovered, write down improvements you plan to make. Use recommendations from this chapter and from other resources to decide upon an action you are likely to complete. A target date will keep you on schedule. You do not have to do everything at once, but try to eliminate the most serious risks as soon as you can. Often it helps to tackle the inexpensive actions first.

For More Information

No matter where you live, there are people in agencies such as your county Extension office, county environmental health department, and the Kansas Department of Health and Environment (KDHE) who can help. Pumpers, contractors, and laboratories are valuable sources of information.

Bulletins available from your county K-State Research and Extension office:

- *Get to Know Your Septic System.* MF-2179, 3/96.
- *Minimum Standards for Design and Construction of Onsite Wastewater Systems.* MF-2214, 11/97.
- *Rock-Plant Filter Design & Construction.* MF-2340, 6/98 \$0.15.
- *Rock-Plant Filter Operation, Maintenance & Repair.* MF-2337, 6/98, \$0.15.
- *Septic Tank Maintenance: A Key to Longer Septic System Life.* MF-947, 8/98, \$0.15.
- *Septic Tank—Soil Absorption System.* MF-944, 7/92. \$0.15.
- *Soil Evaluation for Home Septic Systems,* MF-945. 3/93, \$0.15.
- *Wastewater Pond Design and Construction.* MF-1044, 11/97.
- *Wastewater Pond Operation, Maintenance and Repair.* MF-2290, 11/97.
- *Why Do Septic Systems Fail?* MF-946, 10/91, \$0.15.

- *Your Wastewater System Owner/Operator Manual* (File Folder). S-90, 1/96, (sale only \$0.35).
- *On-Site Domestic Sewage Disposal*, (38 pages). MWPS-24, 1st Ed., 8/82, \$6.00.

The National Small Flows Clearinghouse (NSFC) has several publications on septic system design and maintenance, as well as information about alternative systems. Contact them at NSFC, West Virginia University, P.O. Box 6064, Morgantown, WV 26506–6064, or call (800) 624-8301 to request their catalog. The following publications are available from NSFC:

- *Your Septic System: A Reference Guide for Homeowners*, WWBRPE17. This brochure describes a conventional septic system and how it should be cared for to achieve optimal results.
- *The Care and Feeding of Your Septic Tank System*, WWBRPE18. This brochure describes septic tanks and soil absorption fields and provides guidelines to prolong their usefulness.
- *So . . . Now You Own a Septic Tank*, WWBRPE20. This document describes how a septic tank system works and how to keep it functioning properly.
- *Preventing Pollution Through Efficient Water Use*, WWBRPE26. This brochure describes efficient water use and its role in preventing pollution.
- *Homeowner's Septic Tank System Guide and Record Keeping Folder*, WWBLPE30. The National Onsite Wastewater Recycling Association developed this folder to provide septic system owners with simple operation and maintenance guidelines to ensure their system will work properly.

Water testing

Contact your local health department, your county K-State Research and Extension office, or private testing laboratories which are listed in K-State Research and Extension bulletin *Testing to Help Ensure Safe Drinking Water*, MF-951 (Revised).

Groundwater and geology

Contact the Kansas Geological Survey at (785) 864-3965, or your county conservation district.

Drinking water quality standards

Call the Kansas Department of Health and Environment (KDHE) at (785) 296-5514.

Or contact the U.S. Environmental Protection Agency's Safe Drinking Water Hotline, toll-free at (800) 426-4791. The hotline is open from 7:30 A.M. to 4:00 P.M., Central Standard Time, Monday through Friday

Water Conservation

The Kansas Rural Water Association has water conservation information and devices which reduce water use; call (785) 336-3760 or write them at P.O. Box 226, Seneca, KS 66538.

Many local water utilities have booklets of water conservation tips available. Publications are also available from the American Water Works Association; call (303) 794-7711 for more information. The U.S. Environmental Protection Agency has publications as well, such as document number EPA/841/B-95/002, *Cleaner Water Through Conservation*; to order contact the National Center for Environmental Publications and Information, P.O. Box 42419, Cincinnati, OH 45242–2419; fax (513) 489-8695.

Appreciation is expressed for review and revision to:

- Debra Baker, Environmental Scientist, Bureau of Water, Kansas Department of Health and Environment
- Barbara Dallemand, Asst. Extension Engineer, Kansas State University

This chapter was based on materials written by Barbara Kneen Avery, College of Human Ecology, Cornell Cooperative Extension.

*Kansas Home*A*Syst*, an environmental risk-assessment guide for the home, is a cooperative project of the Pollution Prevention Institute, K-State Research and Extension Service, Kansas Department of Health and Environment, U.S. Environmental Protection Agency, and the Environmental Department, Conservation District, and Natural Resources Conservation Service of Johnson County, Kansas, and Johnson County/K-State Research and Extension Office.

Illustrations used in this publication are taken from *Home A Syst: An Environmental Risk-Assessment Guide for the Home* developed by the National Farm*A*Syst/Home*A*Syst Program in cooperation with NRAES, the Northeast Regional Agricultural Engineering Service. Permission to use these materials was granted by the National Farm*A*Syst/Home*A*Syst Office.

Special thanks are due to all those who so graciously reviewed the materials. They are listed at the end of each chapter. It is appropriate to also acknowledge the staff of the national Farm*A*Syst/Home*A*Syst office who originally coordinated development of the original materials at the University of Wisconsin–Extension.



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