

Septic Tank - Soil Absorption Systems

K. Mancl and J.A. Moore

Households not served by community public sewers or a sewer authority often depend on septic tank-soil absorption systems to treat and dispose of wastewater. The septic tank removes most settleable and floatable solids from the wastewater; the soil absorption system filters and treats the clarified septic tank effluent. By removing most solids, the septic tank protects the soil absorption system from clogging and premature failure. For the entire system to work

properly, the septic tank needs periodic maintenance.

In Oregon, several inches of suitable soil is required under the soil absorption system to provide adequate treatment of the septic tank effluent. The soil absorption system must be at least 100 feet from a water supply, and 10 feet from the property line, right-of-ways, and buildings. Septic systems cannot be placed on the flood plain and are limited to areas with less than a 30 percent slope.

SEPTIC TANK

A septic tank is a watertight container constructed of a sound, durable material resistant to corrosion or decay. Septic tanks may have one or two compartments.

Important components of a septic tank are the baffles. The inlet baffle forces wastewater down into the tank, preventing short-circuiting across the top. The outlet baffle keeps the scum layer from moving out of the tank and into the soil absorption system. Septic tanks have inspection ports for checking the condition of the baffles and a manhole for cleaning the tank.

The selection of the capacity of the septic tank is based on the size of the house. In Oregon, a 1,000 gallon tank is required for a home with one to four bedrooms. A 1,250 gallon tank is required for 5 bedrooms and a 1,500 gallon tank is required for 6 or more bedrooms.

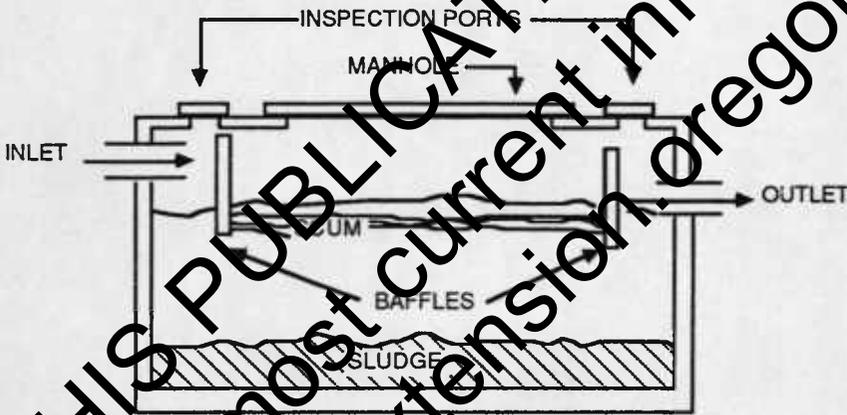


Figure 1. CROSS SECTION OF SEPTIC TANK

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SOIL ABSORPTION SYSTEM

The soil absorption system receives effluent from the septic tank and filters and treats the effluent before it enters the groundwater. Several inches of unsaturated soil beneath the soil absorption system is needed to renovate wastewater before it reaches a limiting layer. A limiting

layer may be bedrock, an impervious soil layer, the temporary or permanent water table.

The soil absorption system is commonly a set of trenches 18 to 36 inches deep, at least 24 inches wide, and placed at least 8 feet apart. The maximum length of a trench is 125 feet.

The bottom of these trenches must be level; and constructed to follow the contours of the lot.

The bottom of each trench is filled with at least 6 inches of clean gravel. A 4-inch perforated pipe (used in gravity systems) or a 2-inch pipe with drilled holes (used in pumped systems) is placed on top of the gravel and covered with 2 more inches of gravel. The top of the gravel is covered with 2 inches of straw or a layer of unglazed building paper before the trench is backfilled with native cover soil. The straw or building

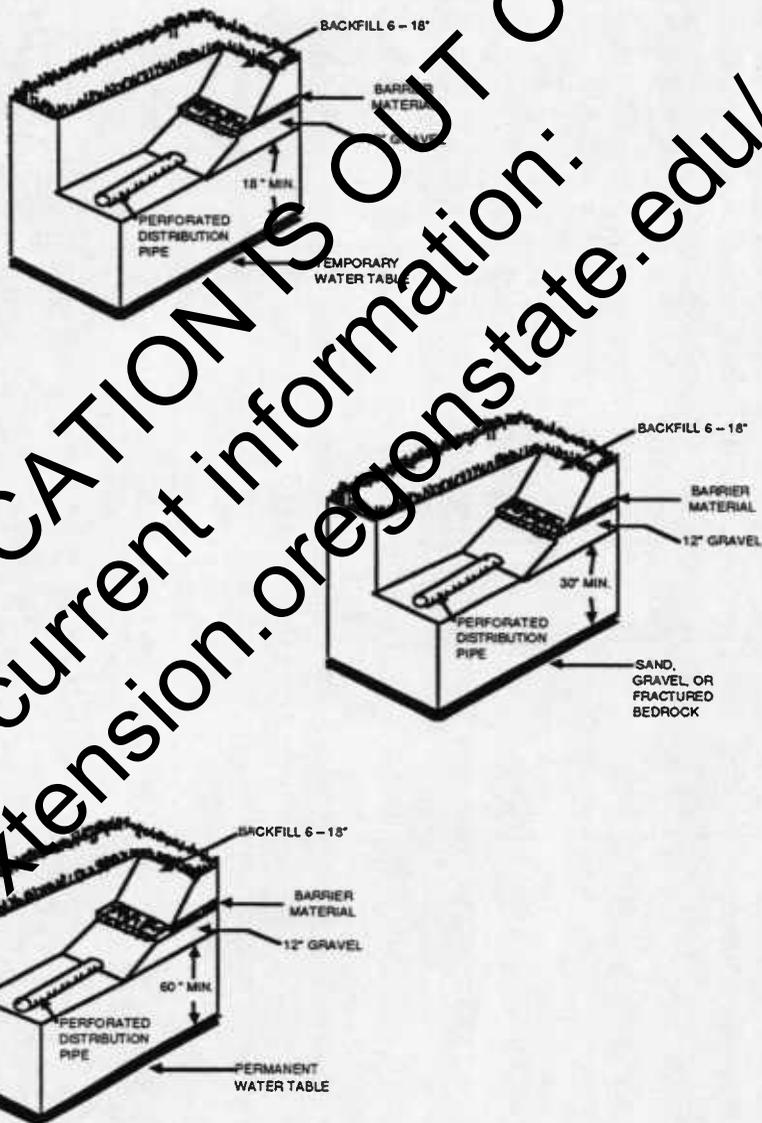


Figure 2. DEPTH OF SUITABLE SOIL REQUIREMENTS BELOW A TRENCH BOTTOM IN A SOIL ABSORPTION SYSTEM

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paper prevents the soil particles from moving down into the gravel. The cover soil should be mounded to account for settling, the area graded to avoid ponding of rainwater, and seeded with grass to prevent erosion.

To provide adequate wastewater treatment, at least 18 inches of suitable soil is required between the trench bottom and the temporary water table (indicated by gray soil or mottles) or an impermeable soil layer. At least 30 inches of suitable soil is required above a layer of sand, gravel, or fractured bedrock, and at least 60 inches of suitable soil is required above the permanent water table.

The size of a soil absorption system is based on the size of the house and the soil texture. For a 3-bedroom home the yard area needed for the absorption

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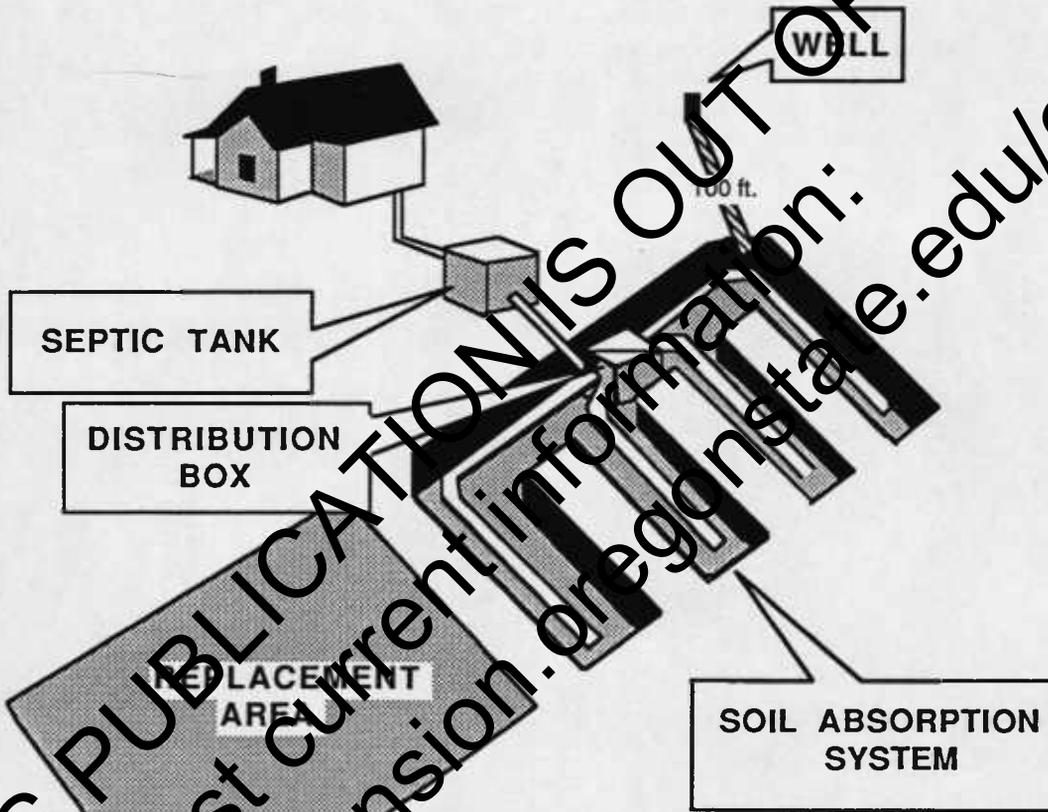


Figure 3. SEPTIC TANK - SOIL ABSORPTION SYSTEM

system could range from 1,000 square feet for a sandy soil to 6,000 square feet for a clay soil. This provides only the minimum area for the soil absorption system and the required replacement area. The set-backs from the water supply, lot lines, and drainage lines must also be taken into account.

WASTEWATER DISTRIBUTION

In Oregon, septic tank effluent may flow by gravity to the soil absorption system or it may be pumped. While pumped systems have been shown to have a longer life, the pump and pump chamber must be purchased and maintained. Serial distribution systems are usually used with gravity fed units on sloping ground.

THINGS TO WATCH OUT FOR

Keep heavy equipment off the soil absorption system area both before and after construction.

Soil compaction can result in premature failure of the system.

- Divert rainwater from building roofs and paved areas away from the soil absorption system. This surface water will increase the amount of water the soil has to absorb and cause premature failure.

- Make sure the perforated pipes in the trenches are level to provide even distribution of the septic tank effluent. If settling and frost action cause shifting, part of the soil absorption system may be overloaded.

- Septic systems are not allowed in recently filled soil or on unstable land forms.

- Avoid installing the septic tank and soil absorption system when the soil is wet. Construction in wet soil can cause puddling, smearing, and increased soil compaction. This can greatly reduce soil permeability and shortens the life of a system.

- Install water-saving devices. Water conservation can greatly reduce the amount of water going into the soil absorption system and extend its useful life.

- Have the septic tank pumped and inspected regularly.

For more information on septic tank soil absorption systems, contact the local health department or your county Extension office.

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