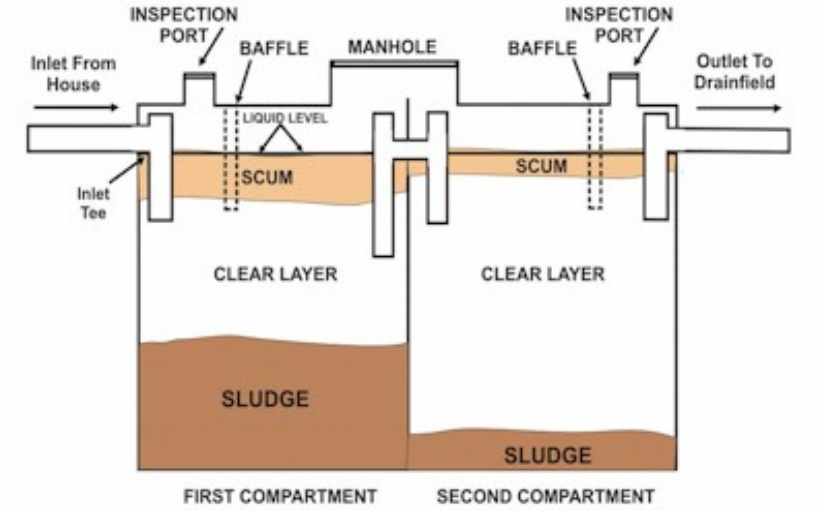
Private Sewage Treatment System Design

Parts of the Typical Treatment System

Private sewage treatment systems typically consist of two parts, the two-compartment septic tank and the soil absorption area or lateral field. The septic tank receives and provides primary treatment for the raw sewage. Primary treatment in the septic tank is the separation of liquids and solids. Three distinct layers are formed in the septic tank: the scum layer, sludge layer, and clear layer.



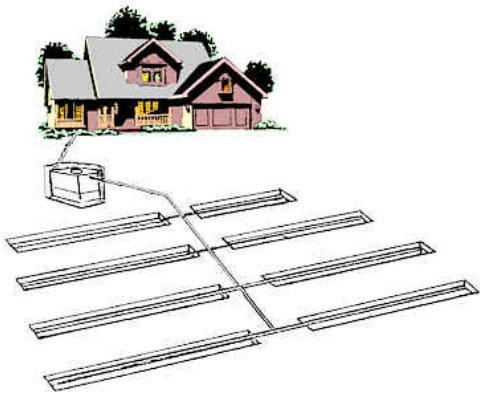
The upper portion, or scum layer, is where detergent waste, greases, and oils naturally accumulate in the tank. The lower portion is called the sludge layer. This layer is composed of the solids that settle at the bottom of the tank. Bacteria which are naturally present in sewage work to digest, or break down, the sludge and scum layers.

The clear layer is mostly liquid. The liquid is passed out of the tank into a lateral field, where further treatment of the sewage occurs. At this point, the liquid is referred to as effluent. Effluent contains many disease-causing organisms (pathogens), and thus needs further treatment.

Special additives are NOT needed for a septic tank to function properly. However, in time the accumulated solids will need to be pumped. To maintain a septic tank in good working order, it is recommended that it be pumped once every 3-5 years.

The second part of the private sewage treatment system, the lateral field, consists of graveled trenches which contain perforated pipe. The effluent is distributed through the pipes, flows out the holes, and trickles through the gravel into the soil.

The soil below the lateral trenches provides the final treatment and dispersal of the septic tank effluent and is the most critical component in the proper functioning of the system. The soil filters effluent as it passes through the pore spaces. Chemical and biological processes that take place in the soil treat the effluent before it reaches groundwater or a restrictive layer, such as bedrock. Soils must be capable of absorbing the volume of effluent from the septic tank at all times of the year.



The Environment Division performs a soil profile analysis on each lot prior to issuing a permit to install a private sewage treatment system. The soil profile analysis identifies particular soil characteristics and limiting soil conditions, and uses these in determining the design of private sewage treatment systems.

Limiting soil conditions include:

- high water tables
- seasonal water tables
- shallow soil depth to bedrock
- soils with heavy clay content

Alternative systems, such as elevated sand mounds, intermittent sand filters, shallow-in-ground, and low-pressure pipe systems, can be used to overcome these limiting conditions. Proper design and installation of a private sewage treatment system will prevent premature failure and groundwater contamination.