



Understanding Septic Tank Systems

Sewage and effluent can contain a variety of human disease-causing microorganisms and parasites. Disease can be spread to humans from this material by direct contact or indirectly by consumption of contaminated food or water. The safe disposal of sewage and effluent is therefore essential to protect the health of the community.

Septic tank systems

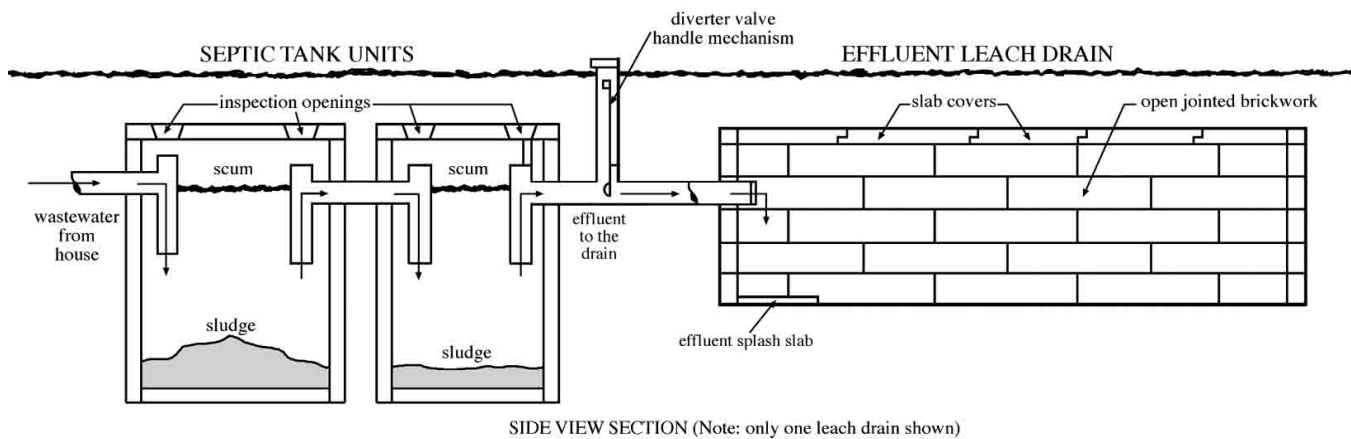
Most unsewered developments in Western Australia use septic tank systems to treat and dispose of sewage, also referred to as wastewater. Septic tank systems generally consist of one or two watertight cylindrical tanks called septic tanks and one or two sets of drainage receptacles which have holes in their side and no base e.g. leach drains or soakwells.

How a septic tank system works

When wastewater passes through the septic tanks, heavier solids sink to the bottom and undergo bacterial digestion. This reduces the quantity of solids and also changes its composition to sludge, which builds up in the bottom of the tank. Materials such as grease and oil float to the surface in the tanks to form a crust over the liquid. The remaining liquid, called effluent, flows from the tanks into the drainage receptacles to soak into the surrounding soil where it may undergo further natural treatment processes.

Since 1989, most household septic tank systems have been installed with either two leach drains or two sets of soak wells. These systems are called alternating systems as they have a diverter box which can change the flow of effluent allowing one half of the soak wells or one of the leach drains to be shut off at anytime. This allows the unused portion to dry out which rejuvenates the soil's ability to receive effluent.





Siting septic tank systems

Septic tanks or their disposal systems must be installed to ensure minimum clearance distances from:

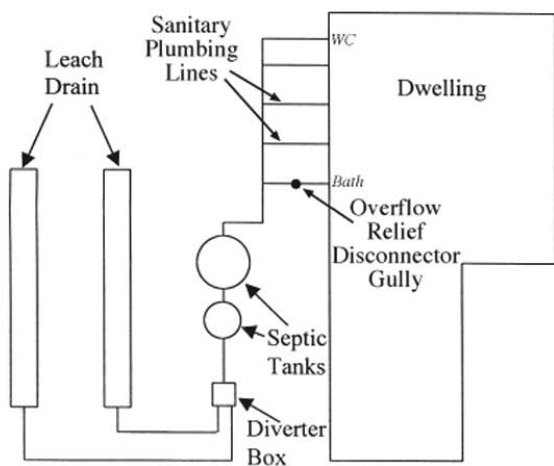
- the highest groundwater level,
- water supplies such as bores, creeks, dams etc.,
- buildings and boundaries,
- subsoil and open drainage channels.

They should not be located where vehicles will drive over them. The weight of a vehicle may damage system components and compact the surrounding soil which reduces its ability to absorb effluent.

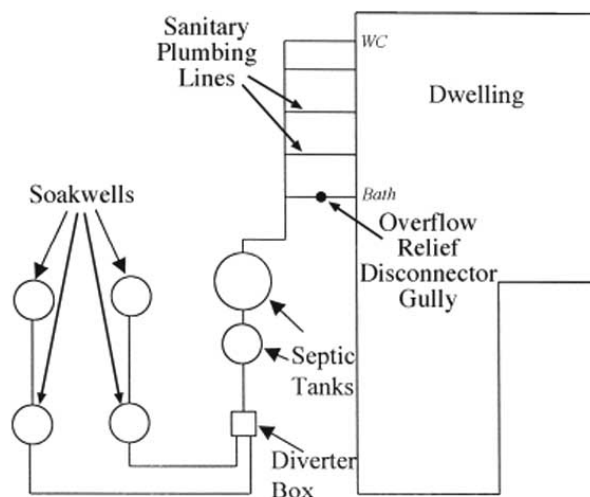
Drainage characteristics of soils are of importance in both the sizing and siting of drainage receptacles. In poor draining soils, such as clay, bigger drainage receptacles are needed to increase the area of soil into which the effluent can be absorbed. In contrast, some coarse sands can be so free draining they provide little ability to filter out pollutants. In these cases it may be desirable to surround the sides and base of drains with loam or other fine-grained soil.

In areas with either shallow groundwater and/or where only a thin layer of free draining topsoil overlies less absorbent soils, the drainage receptacles may need to be installed fully or partially above the natural surface. This is to achieve the required groundwater clearances and/or to allow effluent to be dispersed into and be absorbed by surrounding soils.





Schematic Diagram of Septic Tank and Leach Drain System



Schematic Diagram of Septic Tank and Soakwell System

Approval to construct and approval to use a septic tank system

An application for approval to construct a septic system must be made to either the local government or the Executive Director, Public Health, depending on the development. Your local government can advise you to whom the application should be made. This approval permits the system to be constructed only, not used. It is an offence to commence construction of a wastewater system without an approval. Before it can be used, the local government must inspect the system to ensure it is installed correctly. If satisfactory, the local government will issue an approval for the system to be used. It is an offence to commence using the system prior to receiving the local government's approval. Fees are payable for approval and inspection of septic systems.

Maintenance of septic tank systems

The major function of a septic tank is to separate solids, grease and oils out of the wastewater before it enters the drainage receptacles. When a septic tank system is correctly installed and maintained, it should work effectively for many years.

If the septic tanks accumulate too much sludge and scum, the effective volume of the tank is reduced which in turn reduces the time for separation to take place. This means not all the solids, grease and oils will separate and will pass out of the septic tanks and into the drainage





receptacles. This will clog the soil surrounding the drainage receptacle and should be avoided. To prevent this from happening, it is necessary to have the septic tanks desludged (pumped out) regularly.

Desludging requires that a licensed liquid waste contractor be engaged to open the septic tanks and pump out the contents. The desirable frequency of desludging is dependent on the number of people contributing to the wastewater load. As a guide, every eight years for a two-person household, every four years for a four-person household and more often for households with greater numbers, is recommended. Alternating drainage receptacles should be switched regularly (annually). This requires that the diverter box be opened and the effluent flow handle turned to the appropriate position.

Problems

Failure of septic tank systems generally means failure of the drainage receptacles. Failure is most commonly seen in older systems constructed with a single non alternating drainage receptacle, particularly if large volumes of water are frequently used, or in systems that have not been correctly installed or maintained. In systems that have been used for some time, the soil surrounding the drainage receptacle can begin to clog up. Effluent is less able to freely soak into the surrounding soil and begins to accumulate in the drainage receptacle until it fills up.

When this happens, the following can occur:

- Sewage begins to back up into household pipes. This is commonly first noticed when household fixtures such as the toilet or kitchen sink won't drain away easily, or you notice sewage overflowing from a small grated pipe located outside the building called an overflow relief disconnecter gully.
- The ground becomes soggy around the drainage receptacle and effluent may seep from the soil to the surface. This smells unpleasant and is a health risk.





In either case, a plumber or drainage contractor should be called in for repair work.

When soils surrounding the drainage receptacle clog, remedial measures are necessary. These may include pumping out of the entire system and replacement of the clogged soil or the installation of an additional drainage receptacle and diverter box to allow the old drainage receptacle to be rested.

Septic system additives

In recent years many products purporting to improve performance, remove the need for desludging, increase the life expectancy, and fix failing septic tank systems have become available. The Health Department of Western Australia does not promote the use of these products.

What about disused systems?

When a property is connected to sewer a disused septic tank system will be present on the property and ultimately require decommissioning. This entails pumping the contents out of the tanks preferably followed by removal of the system. In most cases removal is not possible and the base of the impervious tanks are broken and the entire system (tanks, leachdrains and soakwells) are backfilled with clean soil.

To ensure owners are not discouraged from connecting to sewer when it becomes available, there is no legal obligation to have the disused system decommissioned at the time of sewer connection.

However, decommissioning is legally required when:

- the property is sold.
- the use of the development changes e.g. from a residence to a childcare centre.
- the building extensions encroach on the minimum setbacks from the system.





Recent innovations in septic tank systems

Septic tank systems are now available in lightweight materials such as plastics and fibreglass and can also come in disassembled components for ease of transport.

Another development is the use of filters on the outlet of septic tanks which reduces the amount of solids in the outgoing effluent. These are not yet commonly used in Western Australia.

Use of garbage grinders

Garbage grinders are common in the USA where they are used to dispose of kitchen waste via the wastewater stream. This practice is not encouraged by Australian authorities because of the increased loading they place on the sewerage system. Also, garbage grinders are not permitted for use with septic tank systems, without special authorisation from the Executive Director, Public Health.

Tips for a healthy efficient septic tank system

- Have the septic tanks pumped out regularly.
- Allow as little fat or grease as possible into the system.
- Minimise and stagger water usage.
- Regularly switch the drain or soakwells in use if you have an alternating system.
- Do not dispose of non-biodegradable materials into your septic, e.g. plastics.
- Do not dispose of old medicines, large amounts of disinfectant (biocides) or other strong chemicals into the septic tank. These can kill the normal bacteria and interfere with the system. Bleaches and detergents have no adverse effects when used in moderation.
- Do not drive vehicles over the system.





More Information:

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