Septic Systems

The septic system accepts wastewater from the home (sinks, shower, toilets, dishwasher, washing machine), treats the wastewater and returns the treated effluent to the groundwater. A conventional septic system is comprised of two components: a septic tank and a leaching bed.
Septic Tank
A septic tank is a buried, watertight container, which accepts wastewater from your house (see Figure 4). Septic tanks can be made from concrete, polyethylene or fiberglass and in the past were sometimes made from steel (if the property has a steel tank, it is likely rusted through and needs replacing). Older tanks may be smaller than those found today. Current tanks have two compartments, while older tanks may only have one compartment. Solids settle to the bottom of the tank to form a sludge layer, and oil and grease float to the top to form a scum layer. The tank should be pumped out every three to five years or when 1/3 of the tank volume is filled with solids (measured by a service provider such as a pumper). Some municipalities require that septic tanks be pumped out more frequently. Bacteria, which are naturally present in the tank, work to break down the sewage over time.

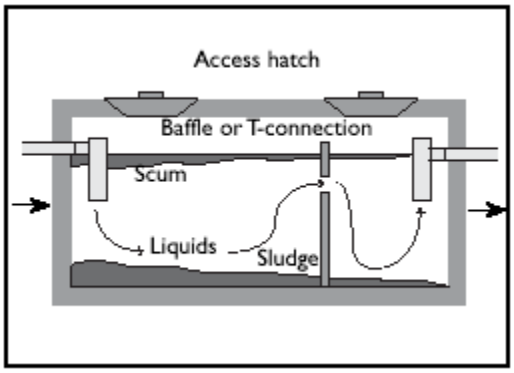

Figure 4: Common Septic Tank (source: CMHC)
Leaching Bed

The wastewater exits the septic tank into the leaching bed—a system of perforated pipes in gravel trenches on a bed of unsaturated soil (minimum 0.9 m/3 ft. - see Figure 5). The wastewater percolates through the soil where microbes in the soil remove additional harmful bacteria, viruses and nutrients before returning the treated effluent to the groundwater. In cases where there is more than 0.9 m (3 ft.) of unsaturated soil from the high water table or bedrock, a conventional system is used, where the network of perforated drainage piping is installed either directly in the native soil or in imported sand if the native soil is not appropriate for treatment. In cases where the groundwater or bedrock is close to the surface, the leaching bed must be raised 0.9 m (3 ft.) above the high water table or bedrock. This is called a raised bed system.

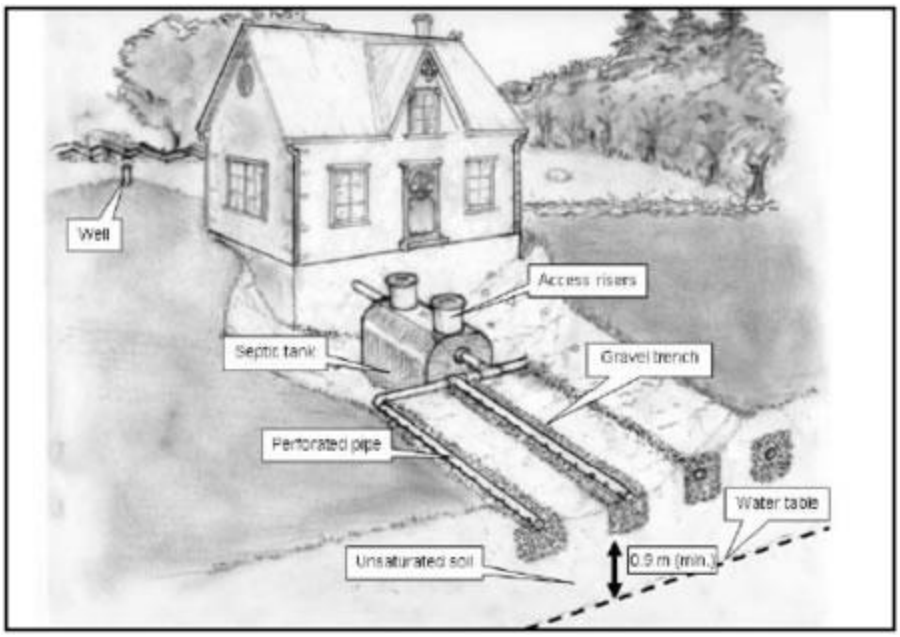

Figure 5: Septic System (credit: Eric Brunet, Ontario Rural Wastewater Centre, University of Guelph)

Alternative Systems

Under certain site conditions such as limited lot area, high groundwater table or poor soil conditions (clay or bedrock for example), a conventional system will not provide sufficient treatment of the wastewater. Under these conditions, it is often possible to install an alternative treatment unit. The two most common types of alternative treatment units are trickling filters, where the effluent from the septic tank trickles through an unsaturated filter media (such as peat or a textile filter), and aeration systems, where the effluent from the septic tank passes through an aerated tank.

Alternative treatment units provide a higher level of wastewater treatment, allowing the effluent to be discharged to a smaller area than in a conventional leaching bed. Effluent from an alternative treatment unit can also be discharged to a shallow buried trench, which is a pressurized pipe system 15 cm (6 in.) below the ground surface. In most provinces homeowners with alternative treatment units are required to have a maintenance contract with a service provider to inspect and maintain their systems.

Inspecting the Septic System

You should have the septic system inspected by a certified on-site system professional (such as a certified installer or engineer) prior to purchasing the home. Call your local municipal office, public health office for a list of qualified professionals. Inspections can cost anywhere from $50 for a simple file search to $500 for a complete inspection of the tank and leaching bed.
The inspection should include: a discussion with the homeowner, a review of the system permit, a tank inspection, a leaching bed inspection and a house inspection.

System Replacement or Repair

A septic system should last anywhere from 20-25 years, or even longer, if it is properly installed and maintained with regular pump-outs every three to five years. The cost of system replacement can vary between $12,000 to over $20,000 depending upon site conditions and local market conditions. The cost of system repair can vary from $500 for line flushing to $1,000 for a new septic tank to over $6,000 to replace clogged leaching bed lines (tile lines).

Questions to ask the homeowner:

*Do you have a copy of the septic system permit?
*When was the last time the septic tank was pumped out? Are there records of system maintenance (tank pump-outs, system repair)?
*Have there been any problems with the septic system: system backing up, foul odors, effluent on the surface, soggy ground in the leaching bed, system freezing, toilet and drains gurgling or draining slowly?
*Have there been any potable water quality problems (E. coli, faecal coliform, nitrate)? This could be due to infiltration of the well by leakage from the septic system and could indicate a malfunctioning system. Results from the water quality samples that you take of the well water may help indicate septic system problems.

Permit Review Checklist

The septic system permit can be obtained from the homeowner or the local municipal or public health office, depending on the jurisdiction. There may not be a permit for older systems.
*Review the system permit: age, size and type of system and separation distances (particularly from wells).
*Verify the size of the system with respect to the size of the house.

Tank Inspection Checklist

NOTE: Never enter or stick your head into a septic tank. Dangerous gases are present in septic tanks, which can be lethal, even after the tank has been pumped out.
*Compare the size of the tank and the expected water use, observe the general condition of the tank: baffles, partition wall, look for cracks and leaks. A steel tank is likely corroded and in need of replacement.
*Observe the water levels in the tank (too high suggests a clogged leaching bed while too low suggests a leaking tank).
*Have the septic tank pumped out (the owner should pay).
*Observe connections to the house and to the leaching bed (leaking pipes, crushed pipes), look for direct discharge of surface drainage into the tank. Tire tracks on the leaching bed could indicate crushed pipes.
*Clean the effluent filter (if one exists) by rinsing with an outdoor hose back into the septic tank.

Leaching Bed Inspection

*Check for effluent on the surface, odours, lush growth, soggy field/ saturated soil.
*Check for obstructions to the leaching bed (pavement over bed, trees in bed).
*Verify that surface drainage is directed away from the leaching bed (for example, downspouts are not saturating the leaching bed).
*Dig test pits in the tile lines for signs of ponding water and biomat (slime) growth. This indicates plugged tile lines, which may require repair or eventual replacement.
*Inspect all mechanical equipment (pumps, aerators, alarms) to be in good working order.

Indoor Inspection Checklist

*****Check for leaking faucets and runon toilets (a run-on toilet can flood the septic system). Slow moving drains and sewer-gas smells from flowing drains can indicate a failing system.
*Verify the plumbing (storm water and sump pump to ditch or dry well, toilet and sinks to septic system). If there is a direct grey water discharge (sinks and bathtub are not going to the septic system), it likely does not meet building code or health department standards. Connecting the grey water to the septic system may require the installation of a larger septic system.
*Water softener discharge: USEPA reports suggest that it is appropriate to discharge water softener backwash to a septic system. However, many jurisdictions encourage the discharge of the water softener's backwash to a sump pump, ditch or dry well.
*Under exceptional circumstances, the home may have a holding tank as opposed to a septic system. A holding tank must be pumped regularly (every few weeks) which can add a considerable expense to the household.
*Inspect the sewer vent stack for damage or blockage. Simply removing an old bird's nest might eliminate sewer-gas problems.