



Waste Systems Primer

Domestic waste from waste systems is the largest human source of phosphorus. Caring for the land and the water, not only the land you own but the places and spaces around you, is vital to our future. Becoming a guardian of land and water will allow creatures to thrive and maintain the ecological balance that is so important.

This primer refers to private systems of less than 10,000 litres/day. Systems for larger flows require Ministry of Environment and Climate Change approval. Private systems regulations were transferred in 1998 to the *Building Code Act* (1992) and are covered in Part 8 of that Act. For an interesting article about protecting our water see the GBA UPDATE article, *How Healthy is Your Septic System* (Spring 2017).

Septic Systems (all classes) Best Practices

All septic systems utilize the surrounding land to act as a filter and digest nutrients, so the percolation rate of the soil, and distances from shorelines, low-lying areas and spring-flood areas are all important. Here's what every person can do:

- Check all plumbing lines to ensure there are no breakages or leaks
- Ensure that the set-backs from water are sufficient
- Reduce your water use at the cottage. Excessive water use is the most common cause of system failure. Install low flow toilets (or marine toilets) and showerheads, timers on showers, aerating nozzles and take laundry home to wash.
- Implement septic system inspections (for all systems). Conduct voluntary inspections, or have your local cottage association arrange for an inspector to come to your area
- Support township/municipal re-inspection programs (and the development of Source Water Protection Plans)
- Support inspections at property purchases.
- Invest in the development and piloting of other waste technologies better suited to rocky terrain

Septic tank and drain field (Class 4) Best Practices

For more information about these systems see the GBA Primer, *Septic Tanks 101* (Fall 2016).

The best video we have found is "[Poop Talk - It's All About The Water](#)". See:

<http://vimeo.com/channels/506748>

- A properly functioning septic system needs special care. Briefly:
 - no plants with deep roots or compaction of the drain field
 - no grease, chemicals (including toilet deodorizers), no bleach, coffee grounds, water softening backwashing or antibacterial products down the drain
- Inspect, or have someone else inspect, your septic tank to see if it needs to be pumped (to remove the build-up of solids and scum). Take this opportunity to have the system checked for any required maintenance.

- If you are adding any fixtures (i.e. dishwashers or washing machines or showers), or increasing the capacity of your cottage (gross area by more than 15%, or adding bedrooms) or converting a cottage into a permanent dwelling these all reduce the performance level of your system and you will have to comply with current standards (i.e. upgrade your system). Exceeding the capacity of your system or reducing the performance level could result in the remobilization of phosphorus in the soil.¹
- Tertiary systems can be added to a conventional septic tank and drain field to make it better and/or to reduce the drain field size by adding aerobic digestion (an aerobic treatment unit (ATU)). Ecoflow, Bionest, Waterloo Biofilter System are the approved manufacturers in Ontario.
- Support research and piloting of novel approaches to improving septic systems (using alum in the septic tank, using iron and electrodes to bind with Phosphorous, etc.)
- Encourage enhanced septic system setback limits. The current minimum setback requirement in the Ontario Building Code (OBC) is 15 metres. The MOE recommends a minimum clearance of 30 metres between septic system and the water's edge.

Grey water leach pits (Class 2) Best Practices

A grey water leach pit is an underground catch basin (often a plastic drum with holes) for liquid waste, lined with brick, concrete or stone. Once the pit becomes full, the leachate drains into the surrounding soil. They are designed for & can only handle small amounts of waste and never for toilet waste (called "black water"). They are only permitted only in low-flow conditions (the building inspector determines this by taking into account usage (is it seasonal?), plumbed or pressurized water system, size of building...). They cannot cope with lots of people and never dishwashers, washing machines or showers. Composting toilets are often plumbed so that overflow (black water) runs into a cess pool (a leach pit that accepts black water).

- Make sure there is only a small amount of liquid waste going into the pit
- No black water should go into a grey-water leach pit
- Make sure drain pits are not overflowing by checking the pit area to ensure there is no soggy ground, no odours, no standing water

Pit Privies, Outhouses (Class 1) best practises

Pit privies (outhouses) are permitted but must meet current standards which include being (3 feet) above the high ground water table, having the sides of the pit reinforced and surrounded on all sides and on its bottom by not less than 600 mm (2 feet) of soil or leaching bed fill.

- Check that there is suitable soil surrounding the pit and distance from high water mark

Compositing toilet (Class 3) best practises

Composting toilets are designed to break down human waste through decomposition. Proper and complete decomposition of human waste is required to make the soil safe. The process of decomposition requires organic material, oxygen and moisture.

- Ensure proper decomposition of waste by making sure it sits (matures) for long enough. It's generally assumed that the waste within a composting toilet is safe after it has been left to sit for a season. One method is to have 2 composting toilets, one is in use while the other one rests or matures.

- Size the system properly for the number of people who will use it. Generally, composting toilet systems work well for a few people but do not work well when there is an increase in use. If there is extra use (more people, visitors, renters, a party) a composting toilet can become full before the season is over. Spreading this waste before it has decomposed is spreading raw sewage.
- Ensure proper decomposition of waste by ensuring it reaches proper temperatures. A composting thermometer is useful to help determine if your compost is hot enough as to destroy bacteria and parasites compost must reach 140°F or 60°C (and stay at that temperature for a period of time). An appropriate mix of “green” (wet) and “brown” (carbon/cover material) waste will promote decomposition and create heat. Many commercially available composting toilets add heat which allows the material to reach decomposition temperatures more quickly, although this is generally not possible without power. Compost material can be removed to decompose in another location. Some people use simple methods to ensure decomposition temperatures are met (metal cans in the sun) and others use commercial composters such as the Joracan which is designed to be bear-proof and can allow kitchen waste to be composted as well.
- Make sure your composting toilet is not too wet. Excess urine within a composting system is often the cause of system malfunction (odours, flies and overflow). Most composting toilets have a drain (or overflow drain) and this must be connected to a cesspool (drainage pit for black water), and a permit is required. Many commercial designs include a fan to increase evaporation of urine. This requires power, but is possible with a 12-Volt system. Forward-looking solutions are urine-separating systems that can allow for the phosphorous in urine to be recycled as a fertilizer.
- To reduce odour and insect issues completely cover waste with organic matter (coconut coir, peat moss, sawdust, leaves) to stop contact with the air. Fine material works better than coarse material.
- Commercial brands include: Envirolet, Biolan, BioLet, Sun-Mar, Clivus Meltrum, Ecoethic, and Nature’s Head although simple systems can work just as well as commercial models. For ideas on building your own composting toilet see: http://humanurehandbook.com/humanure_toilet.html
- To learn more about this here are 2 good starting points: <http://www.clivusmultrum.com/science-technology.php> and *Humanure Handbook*.

Storage Tank or Holding Tank (Class 5) best practises

A Class 5 sewage system may be installed to upgrade a sewage system on an existing lot or parcel land where upgrading through the use of a Class 4 system is not possible due to a lot size, slope or clearance limitations.ⁱⁱ

- Pump out tanks on regular basis and have waste hauled to an approved site
- Check for leaks on a regular basis.
- Support the investment in municipal treatment facility/facilities (improved/expanded lagoon system).

ⁱ BCC Ruling No. 00-43-775

ⁱⁱ BCC Ruling Nos. 00-44-776, 08-15-1189