The drop on water

Wastewater – Central Treatment

Wastewater or sewage is water that has been used for washing, flushing, or manufacturing processes by homes, businesses, and industries. About 99 per cent of wastewater is water. The rest is anything that goes down the drain – human waste, organic waste, and detergents.

Wastewater Disposal

In many communities wastewater is collected through a network of underground pipes and delivered to a centrally operated treatment facility. The treated wastewater, or effluent, is then disinfected and discharged to the environment. About 55 per cent of homes in Nova Scotia dispose of their wastewater through central sewer collection.

The remaining 45 per cent of homes have individual home sewage disposal systems, mostly in rural areas. These are called septic systems or on-site sewage disposal systems. An on-site sewage system consists of a septic tank for settling and treatment, and a sub-surface disposal field that distributes the effluent. See our fact sheet *Wastewater – Septic Systems*, for more information.

Central Collection

In many urban areas of Nova Scotia homes are directly connected to a municipal sewer system. Pipes connect your home to the central sewer system (see Figure 1) which transports the wastewater from each home to the wastewater treatment plant where it is treated to remove pollutants before it is released to the environment.

QUICK FACTS

- Wastewater is used water from homes, businesses, and industries.
- Most homes in Nova Scotia are either connected to a municipal sewer system that leads to a treatment plant or have an on-site sewage disposal system.
- Wastewater may be treated in a number of ways, depending on where the treated wastewater is released into the environment and the size of the population.
- Wastewater treatment reduces the level of organic chemicals, nutrients, illness-causing germs, and suspended solids released into the environment.
- Many substances should never be disposed of in a drain, such as unused medicines, grease, and paints. They can disrupt the treatment process or end up in our lakes and rivers untreated.

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Wastewater Treatment Levels

Wastewater treatment is usually a multi-stage process. The goal is to reduce or remove as much organic matter, solids, nutrients, disease-causing organisms, and other pollutants as possible from the effluent before it is discharged into the environment.

Wastewater may undergo up to three levels of treatment before it is discharged into the receiving body of water, or no treatment at all:

0 raw wastewater
1 primary treatment
2 secondary treatment
3 tertiary treatment

The receiving water body is a watercourse, such as a river, stream, lake, or ocean into which wastewater or treated effluent is discharged.

The level of treatment depends on the

- salinity of the receiving water body – whether it is freshwater or saltwater
- existing quality of the receiving water body
- existing use of the receiving water body
- size of the treatment plant – that is, the amount of wastewater effluent being generated
- current federal, provincial, and municipal regulation

Raw Wastewater

Raw wastewater is untreated wastewater. In the past, even once sewers became common, wastewater was often discharged without treatment directly into receiving water bodies. Water bodies have a certain natural ability to cleanse themselves, up to a point. Communities now realize the importance of maintaining good quality water for human and ecosystem health. Discharging raw wastewater into the environment is no longer considered appropriate. In most municipalities in Nova Scotia, wastewater is now treated before it is released.

Figure 1 – Wastewater is Transported from Buildings to the Wastewater Treatment Plant

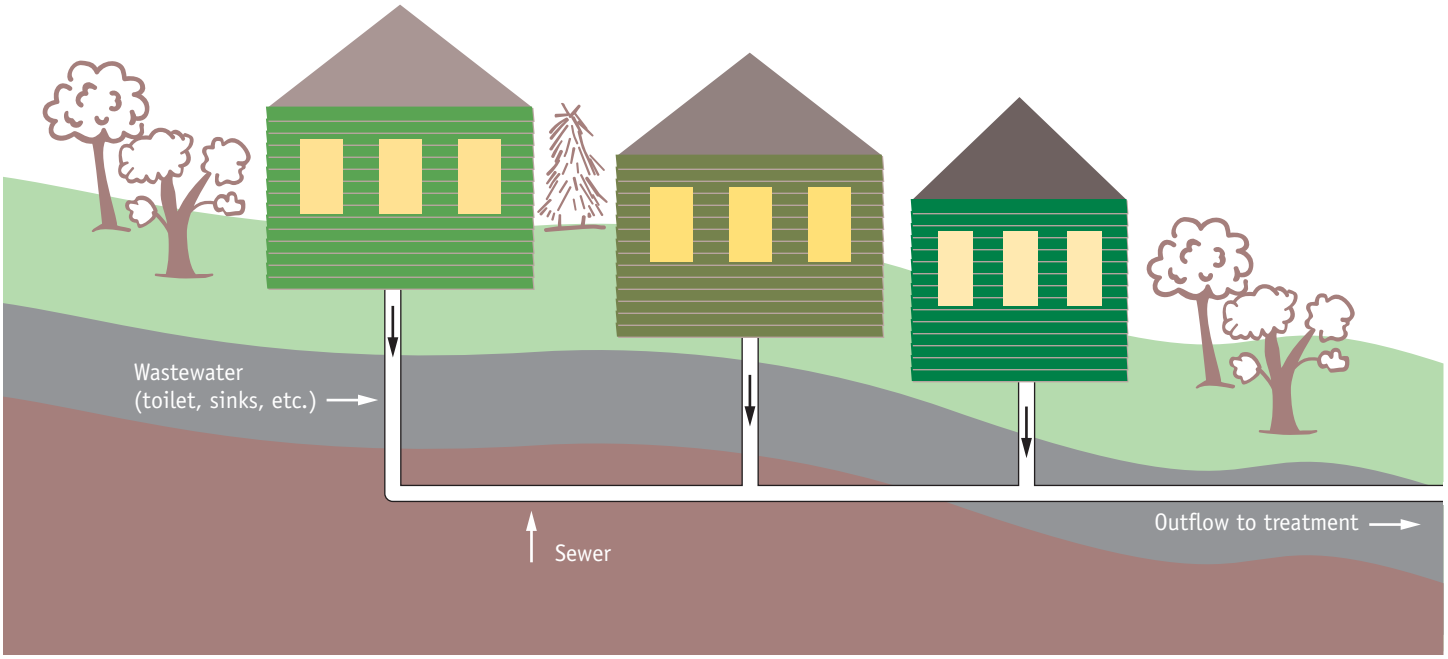

Diagram not to scale.

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Primary Treatment

The first step in wastewater treatment involves separating large pieces of debris when the wastewater first enters the treatment plant. Debris may include wood, cloth, plastics, glass, metal, sand, and gravel. This is referred to as pre-treament.

The wastewater is held in a large sedimentation tank for several hours. This allows heavier sewage solids to settle to the bottom and form a sludge layer. Lighter solids, fats, oil, and grease float to the top creating a scum layer. The solids and scum are removed to receive further treatment as sludge. The clarified wastewater flows on to the next stage of wastewater treatment if there is to be further treatment of the effluent. If primary treatment is the only level of treatment, the clarified wastewater is disinfected and then discharged into the receiving water body.

In **Enhanced Primary Treatment** (also called **Advanced Primary Treatment**) chemicals are added to the sedimentation tanks to help waste particles bond together and settle out more readily. Figure 2 shows a schematic diagram of the typical processes of primary wastewater treatment.

Secondary Treatment

Secondary treatment involves biological treatment of wastewater usually following the primary treatment stage. Some secondary treatment plants do not include the primary treatment process. Naturally-occurring bacteria break down the organic components of wastewater and additional settling occurs. These solids are either reused in the biological process or removed for further treatment and disposal. If secondary treatment is the final level of treatment, the clarified wastewater is disinfected and then discharged into the receiving water body. Figure 3 shows a schematic diagram of the typical processes of secondary wastewater treatment.

Tertiary Treatment

Tertiary treatment of wastewater uses additional processes to further increase the quality of the wastewater effluent. These processes can be physical (filtration), biological, or chemical, based on the substances to be removed. This step further reduces the level of organic chemicals, nutrients, pathogens, and suspended solids in the treated effluent. Tertiary treatment is needed if wastewater must be treated to very high levels, such as when it is released into fresh water bodies. Figure 4 shows a schematic diagram of the typical processes of tertiary wastewater treatment.

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Figure 2
Typical Primary Treatment Process

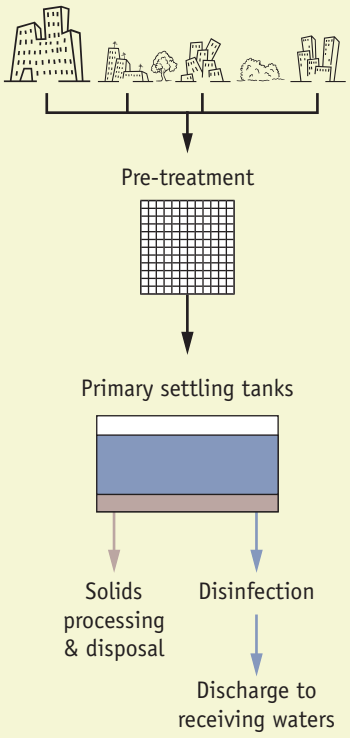


Figure 3
Typical Secondary Treatment Process

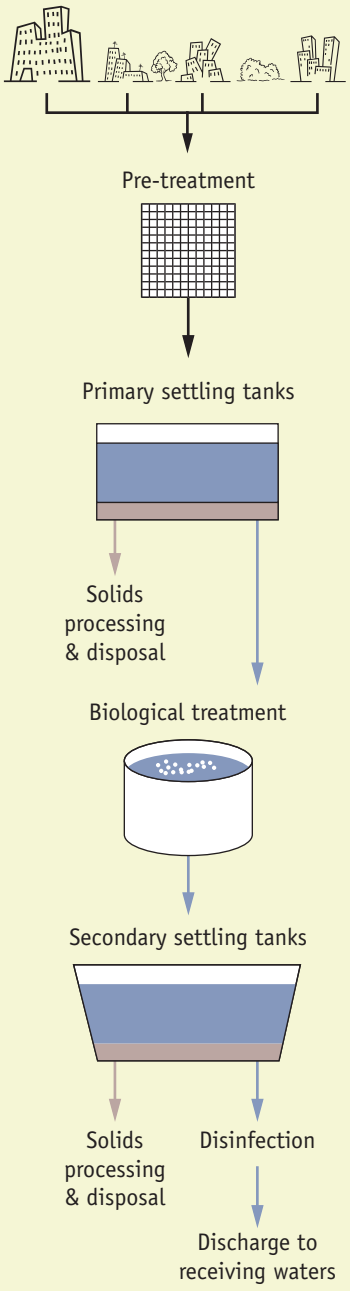
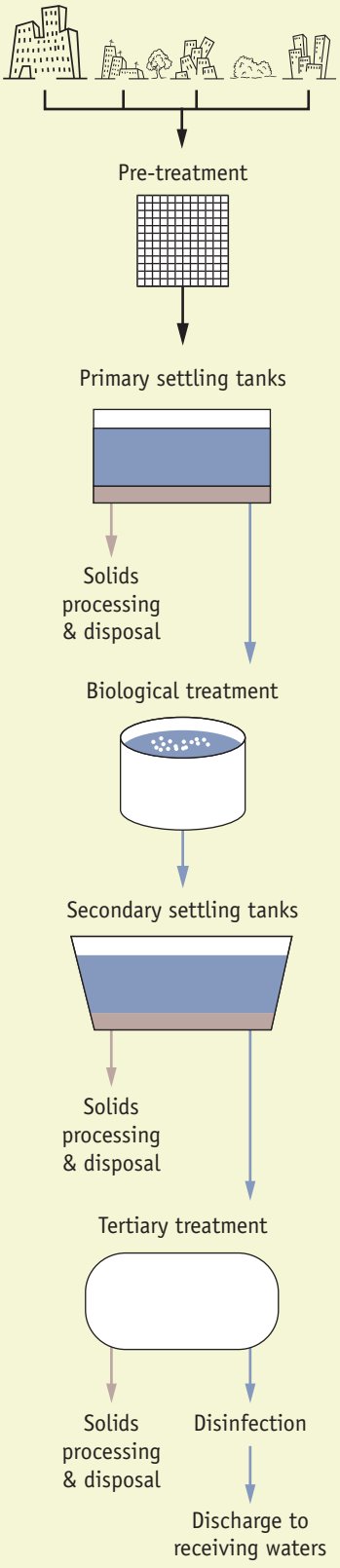


Figure 4
Typical Tertiary Treatment Process



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Wastewater Management

The best way to limit the impacts of wastewater discharge is to reduce our water use. By practicing smart water usage and using water-efficient devices, such as low flow toilets, your household can drastically reduce the amount of water you consume, and in turn reduce the wastewater you generate. Additionally, some of the substances we flush down the drain cannot always be handled by the treatment system and can disrupt the treatment process. Because treatment systems are not designed to treat these substances, they may end up in our lakes, rivers, and oceans untreated.

The following things should **never** be discharged down a drain:

- Unused household chemicals – Purchase only as much as you need.
- Unused pharmaceuticals, medications – Return unused pharmaceuticals or medications to a pharmacy.
- Fats, oils, and grease – These can block your pipes and may result in expensive repairs. Dispose of these in your regular garbage or in your organics bin collection, if appropriate.
- Paints, solvents, and vehicle fluids – These are household hazardous wastes. Contact RRFB Nova Scotia for disposal information at **www.rrfb.com** or 1-877-313-RRFB (7732).

Municipal collection systems often have a sewer-use bylaw that governs the type of waste that can be discharged to a sewer system. Many municipalities are also developing pollution prevention programs to educate residents on the effects of discharging such substances into the sewer system.

FOR MORE INFORMATION

Contact
Nova Scotia Environment at
1-877-9ENVIRO
or 1-877-936-8476

www.gov.ns.ca/nse/water/

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My notes