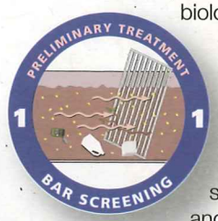
A Typical Treatment Plant: Clean Water Step by Step

Most homes, businesses, and institutions are connected to a sewer system that carries their wastewater to a treatment plant. Sanitary sewer systems carry only domestic and industrial wastewater, while combined sewer systems also carry stormwater runoff. Wastewater in these systems flows mostly by gravity with occasional help from pumps, until it reaches the treatment plant.

At the plant, wastewater is typically treated through a series of five major steps: preliminary treatment, primary treatment, secondary treatment, tertiary treatment, and disinfection, followed by processes to reuse or to dispose of the remaining products. This treatment requires an intricate balance of physical, biological, and chemical processes.



Step 1: Preliminary Treatment

This step includes screening to remove large objects (such as sticks, rags, leaves, and trash) and the settling of grit (heavy, sandy, abrasive matter). The removed material is collected and discarded, and the remaining flow moves on to primary treatment.

Step 2: Primary Treatment

In this phase, the flow is slowed to allow large particles of solid organic matter to settle by gravity to the bottom of settling basins known as sedimentation tanks or clarifiers. Primary treatment can remove 50% or more of the solids from the wastewater.

Step 3: Secondary Treatment

Wastewater flowing out of primary treatment still contains solid matter, mostly dissolved or suspended in the water. Secondary treatment plant processes are designed to grow naturally occurring microorganisms to digest the solids in the wastewater and then to settle to the bottom of a secondary sedimentation basin. After secondary treatment, 85% to 90% of the solids have been removed from the wastewater.

Step 4: Tertiary (or Advanced) Treatment

Tertiary treatment is used to improve the quality of the water even more. The most common systems remove minute suspended solids, and also nutrients such as nitrogen and phosphorus.

Step 5: Disinfection

Disinfection reduces remaining bacteria and viruses in the final effluent and helps protect the public from exposure to pathogens. Alternatives for disinfection include chlorination followed by dechlorination, exposure to varying intensities of ultraviolet light, and the infusion of ozone.

Reuse and Recycling

Wastewater treatment produces two major products: clean water, which is used over and over again, and treated solids, known as biosolids. The cleaned wastewater is released to a waterway, such as a lake, stream, river, or underground aquifer, where it is often used again in ways such as golf course and landscape irrigation or even for recreation or drinking water. Some of it will evaporate into the atmosphere and return as rain in some other part of the world. The biosolids can be recycled in a variety of ways: applied as a fertilizer/soil conditioner, burned to produce energy, or used as a filler or binder in construction products.

Your Support Can Help

Your support for efficient wastewater treatment is extremely important to the vitality of your community. Start by learning as much as you can about your local wastewater treatment plant and then make a difference through your support for measures to protect and improve clean water infrastructure. Clean water is everyone's right and responsibility.

To learn more about protecting water and wastewater infrastructure, visit www.waterislife.net.

Ever wonder where it goes?

Down your drain isn't the end of the line. It's the start of our clean water commitment to you.