

Wastewater Treatment Plants: Where Clean Water Begins

Clean water is critical for sustaining life and health, yet people often take for granted the flow of water in and out of their homes. Where does it go after we flush the toilet or empty the sink, and how does it safely find its way back into the environment?

Wastewater from homes, businesses, industries, and institutions drains into a community's sanitary sewer system, an underground network of pipes that leads to the wastewater treatment plant. At the wastewater treatment plant the used water is cleaned and returned to the environment to be used over and over again. These complex treatment processes are essential to the protection of our water resources. There are no holidays for wastewater treatment — in fact most plants operate 24/7 to meet clean water standards on a continuous basis.

Your Treatment Plant Team Protects Water Quality—and the Environment

Treatment of wastewater is a relatively modern practice. While sewers were common in ancient Rome to carry away wastes, it was not until the 19th century that cities began to understand the effects of wastewater on the environment. Since then, the practice of clean water collection and treatment has undergone substantial engineering improvements, and many state and federal regulations have been enacted.

Today's wastewater treatment plant employs people skilled in environmental engineering, chemistry, biology, microbiology, and public policy to ensure the efficiency and effectiveness of the treatment process. Clean water production requires programs for maintenance and repair of equipment, upgraded operator skills, attention to safety, energy conservation, process efficiency, and up-to-date treatment and analytical technologies.

Each plant's treatment team is committed to a cleaner environment, and as a result of their continuous attention, public health and water quality are better protected today than ever before.



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This brochure describes wastewater treatment in very general terms; your local plant may use different processes, tailored to local conditions and requirements. For more information, contact your local wastewater treatment plant or visit www.wef.org to learn how you can help protect our precious water resources.



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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.



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

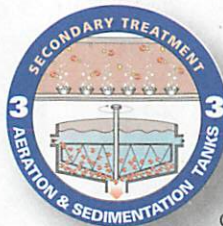
This step includes screening to remove large objects (such as sticks, rags, leaves, and trash) and the settling of grit (heavy, sandy, abrasive matter). The removed material is collected and discarded, and the remaining flow moves on to primary treatment.

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.