

Fort Wayne's Water Pollution Control Plant

Protecting Public Health and the Environment



Fort Wayne's Paul L. Brunner Water Pollution Control Plant – located on Dwenger Avenue east of Anthony Boulevard -- provides wastewater (also called sewage) treatment for the City of Fort Wayne and surrounding areas. Following the treatment process, cleaned water (effluent) is released to the Maumee River. The water released from the Plant after treatment process is actually cleaner than the water in the river. Organic matter that is removed from the wastewater (also called sludge) is treated, dried, mixed with composted yard waste and made available as a soil amendment/fertilizer known as biosolids.

Since the Water Pollution Control Plant (WPCP) opened, City Utilities' commitment to public health and the environment, along with changing environmental regulations, has required a number of expansions and enhancements at the Plant. Because Fort Wayne's treatment Plant is in the Great Lakes watershed, the quality standards for the treated water released from the Plant are stricter than those that apply to other Plants in Indiana that discharge to water bodies that eventually drain to the Gulf of Mexico. Despite all of the regulatory requirements, in 2017 the Plant operates with only one more employee than it had when it opened in 1941 and sewer rates charged to customers remain in the lower two-thirds of communities around the region.

Quick Facts

Current peak treatment capacity	100 MGD
Original Plant constructed	1938 – 1940
Dedicated	March 1941
Chlorination added	1970
Capacity addition	1975
Nitrogen removal	1983
New Headworks	2005
New Primary Treatment	2008
Wet Weather Pump Station upgrade	2013 - 2015
Design population (1940)	125,000
Population currently served	310,000
Geographic area served 1940	14.5 sq. miles
Geographic area served 2015	over 120 sq. miles



**Original entrance to the Plant
constructed in 1938—1940**

How Sewage Is Treated

Sewage (wastewater) treatment is the process of removing physical, chemical and biological contaminants from sanitary sewage and industrial wastewater so that, at the end of the treatment process, the treated water is clean enough to be returned to the environment. Sanitary sewage is the household liquid waste that comes from the community's toilets, showers, kitchen sinks, washing machines, etc. It also includes some wastes from businesses and industries. In Fort Wayne, sewage treatment is done in three stages called preliminary, secondary and tertiary treatment.

Preliminary Treatment:

The first treatment step at the WPCP is called “preliminary treatment” and consists of physical processes.

Raw Sewage Pumping and Screening: Sewage from homes, neighborhoods and businesses is collected in large interceptor sewers and arrives at the Water Pollution Control Plant at a depth of as much as 35 feet below ground. Six raw sewage pumps lift the sewage to an elevation where the wastewater will flow by gravity through the rest of the treatment processes in the Plant. The raw sewage is first directed into the headworks. A new \$23.5 million headworks building was completed in 2005 in anticipation of upgrading Plant capacity.

At the headworks, wastewater passes through screens to remove solid debris and floating materials, such as rags, paper, plastics, and metals that could cause problems later in the treatment process. Most of the removed material is sent to a landfill. The wastewater also goes through a grit separation area where sand, gravel, and other solid materials that are heavier than the organic solids in the wastewater are allowed to settle out. The majority of the suspended organic material remains in the wastewater stream as it moves into the next process.



Screens remove debris from sewage at the Headworks

Primary Settling: When wastewater leaves the headworks, the flow is split between four primary settling basins. The four round basins were completed in late 2008 to replace eight rectangular “primaries” that were original to the Plant. The new primaries cost \$38.7 million and are an important part of City Utilities’ investment to reduce the amount of sewage that overflows to the rivers during wet weather.

During primary settling, the velocity of flow is reduced so that suspended organic and inorganic material can settle to the bottom of the tanks. Revolving “arms” simultaneously scrape solids that have settled to the bottom and skim grease from the top. The solids and grease go to digesters where they will receive further treatment.



New primary treatment tanks under construction, October 2007

Secondary Treatment:

This treatment stage uses biological processes to treat the organic content of sewage including human waste, food waste and detergents.

Aeration Tanks: The liquid from the primary settling tanks, called primary effluent, flows to an aeration system where it splits between the nine aeration tanks. A high concentration of air is bubbled into the tanks to energize microorganisms needed for the aerobic treatment taking place in these tanks. Bacteria consume organic material and grow larger creating biological “floc” that traps other particles in the wastewater.



Air bubbles through sewage feeding the “bugs” in the aeration tanks

Secondary Settling Tanks: In the final part of secondary treatment, the liquid from the aeration tanks flows to the secondary settling tanks. Material in these tanks is very calm allowing the heavy biological “floc”, created in the aeration tanks, to settle to the bottom. The water leaving these tanks is much cleaner but still contains very low levels of organic material and suspended matter.

Tertiary Treatment:

This last stage of treatment further improves the effluent quality before water is discharged to the Maumee River.

Chlorine Contact Tank: Water leaving the secondary settling tanks, which has had practically all of the organics and solids removed from it, flows to the chlorine contact tank. Here chlorine is added to kill disease-causing organisms before the water is released into the environment. Chlorination of the effluent is performed during the months from April through October. Dechlorination – removal of the chlorine that has been added -- is necessary before the water is released.

Polishing/Wet Weather Storage Ponds: Fort Wayne is fortunate to have access to a large tract of land on the north side of the Maumee River across from the Water Pollution Control Plant. The land is covered by three large, open-air holding ponds. One of the ponds is used for “effluent polishing.” After wastewater has been treated at the Plant and has received a dose of chlorine (if needed) the cleaned water is held in a pond for a few hours up to a few days. Here, additional settling takes place and some chlorine is released.



Effluent leaving the treatment works is cleaner than the Maumee River

During wet weather when Fort Wayne’s combined sewer system fills up with a combination of sewage and rainwater, excess flow that cannot be immediately treated at the Plant is pumped into two ponds on the north side of the Maumee River. An upgrade to the Wet Weather Pump Station that became operational in 2015 is integral to reducing the amount of wet weather flow being discharged to Fort Wayne’s rivers each year during wet weather (primarily during rain storms) and is part of the City’s agreement with state and federal regulatory agencies. Wet weather flows are held in the ponds temporarily until the event is over and are then pumped back to the Plant to be treated.

Reaeration Structure: Effluent from the final holding pond is directed through a re-aeration structure before it is discharged to the Maumee River. As water drops into the three discharge chambers and mixes with air, additional oxygen dissolves in the water. Dissolved oxygen is required to support aquatic organisms, so this step ensures that the treated water released from the Plant can support species that live in the River.

Sludge Handling:

A byproduct known as sewage sludge is produced at a number of stages in the sewage treatment process.

Digesters: Sludge from the primary and secondary settling tanks is pumped to the six digesters for further treatment. Within these heated tanks, microscopic bacteria “digest” the sludge, breaking it down into stable organic matter. The treated sludge is pumped to a series of lagoons where it is dried and mixed with composted yard waste.



The compost material is called biosolids and is sold as a soil amendment/fertilizer. Over the past several years, projects have been done to upgrade the 1940's digesters. The improvements allow the Plant to accept more "high strength" material such as oil and grease from food service establishments and by-products from food manufacturers. The improvements also allow the Plant to increase the amount of methane gas it produces and uses.

Gas Utilization System: Methane gas produced when the digesters process sludge is used in several areas of the Plant as fuel, thereby reducing the amount of electricity and natural gas the Plant is required to purchase. Energy and chemicals used in the sewage treatment process are some of the of the Plant's highest expenses, so using energy produced in the process helps manage costs.

Controls and Testing: The Plant's administration building houses the blowers that provide air for secondary treatment. The building also contains the administrative offices, the maintenance office and shop, the control room, the boiler room, hot water circulating pumps, air handling equipment, piping, and air filters. Processes are operational either by manual, local, semiautomatic, or computer control.

Main Control Room: The many treatment processes are monitored in the main control room.

Laboratory: Modern laboratory facilities are an essential element in the total treatment process. The many tests performed daily on the wastewater stream are integral to controlling the treatment process. Test results are submitted to state and federal regulatory agencies to demonstrate that City Utilities remains in compliance with the Plant operating permit issued through the National Pollutant Discharge Elimination System (NPDES).

History

Fort Wayne's Water Pollution Control Plant was originally constructed between 1938 and 1940 at a cost of approximately \$5.3 million. Funding came from a \$2.3 million grant from the federal Public Works Administration and a \$3 million dollar bond issued by the City of Fort Wayne. The initial facility provided secondary level treatment utilizing the activated sludge process for an average flow of 24 million gallons per day (MGD). The WPC Plant — like the Three Rivers Water Filtration Plant located at the confluence of Fort Wayne's three rivers — was constructed in the Collegiate Gothic style. Buildings are covered with Indiana limestone.

The quickly growing city soon required that the Plant be expanded to increase capacity. As a result, additions were made in 1960 that provided the capability for primary treatment of 60 MGD and secondary treatment of 32 MGD. Progressively more stringent water quality regulations necessitated the addition of a chlorination facility in 1970. Also during the early



Sewage digesters produce methane gas that is collected in storage "globes" and used in the Plant



The 2005 headworks building was designed to match the style of the original Plant

1970's, three ponds were added on the north side of the Maumee River. These can be used to store flows that exceed the Plant's treatment capacity during wet weather.

In 1975, work began to increase secondary treatment capacity to accommodate an average flow rate of 60 MGD. The increase in capacity allowed the Plant to treat a peak flow rate of 72 MGD. Additionally, two more terminal ponds were constructed on the north side of the Maumee River to increase storm water treatment capability and provide effluent polishing.

Consent Decree

In 2008 Fort Wayne City Utilities entered into an agreement with state and federal regulatory agencies to reduce the amount of combined sewage and stormwater is discharged to Fort Wayne's rivers during wet weather. The agreement came after more than five years of intense negotiations.

Part of the agreed upon solution is to increase the capacity of the WPCP to store and treat more combined sewage during wet weather. Building upon the work already done to upgrade the headworks and primary treatment basins, City Utilities has recently invested more than \$30.4 million in a Wet Weather Pump Station to route more flow to the Wet Weather Storage Ponds during wet weather and to send it back to the Plant for treatment when wet weather ends. Improvements have been made to the wet weather storage ponds themselves, aeration and blower upgrades have improved the effectiveness of the secondary treatment systems, and digester improvements are on-going. As a result of all of these investments the Plant's peak wet weather treatment capacity has now been increased to 100 MGD. Plant improvements have already prevented billions of gallons of sewage from being discharged to Fort Wayne's rivers.

