

St. Marys Wastewater Treatment Plant



SINCE 1908

Protecting Water
Quality...Yesterday,
Today, Tomorrow

Our mission...To provide safe, reliable, and cost effective wastewater services to the citizens and businesses of St. Marys.

New Wastewater Treatment Plant



The result of fifteen years of engineering studies and design, EPA negotiations, and planning by St. Marys Council, the Administration, and plant operators, a new wastewater treatment plant began operation in 2009.

The new wastewater treatment plant increases daily treatment capacity to

3,000,000 gallons and allows for the treatment of wet weather flows up to 9,000,000 gallons each day. Total construction cost amounted to \$11,012,020.

The new facility includes:

- New maintenance building including office and training room.
- Modifications to the existing Administration Building including laboratory improvements.
- Influent screening and vortex de-gritting system.
- Three-channel oxidation ditch.
- Chemical phosphorus removal.
- Two final clarifiers.
- Ultraviolet disinfection.
- Cannibal® solids reduction process.
- Non-potable (plant effluent) water recycle system.
- New generator.
- New discharge structure to the St. Marys River.
- New process monitoring and control system.

Environmental Protection

“The new facility will improve the quality of wastewater discharged to the St. Marys River and allow the City to reliably treat current and estimated future wastewater flows and

maintain compliance with regulatory requirements. An important environmental benefit of the new facility is the expansion of treatment capacity which will allow the City to continue to pro-

vide regional wastewater treatment. The expansion of treatment capacity will protect the public health and the environment.”

(from a 2007 Ohio EPA report)

100+ Years of Service

St. Marys began treating wastewater in 1908, when citizens constructed one of the first complete sanitary sewer systems in Ohio. One hundred years later, in January 2008, construction of a new wastewater treatment plant began. Completed in September 2009, the new facility is the City's third new treatment plant and fifth major treatment plant project, an investment that shows the concern that St. Marys citizens have for public health and the environment, dating back a century.

Protecting Water Quality...Yesterday, Today, Tomorrow



Influent screens (top)
Vortex grit system

“ST. MARYS HAS

OVER \$30
MILLION
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WATER QUALITY”



Oxidation ditch (top)
and final clarifiers

100+ Years of Wastewater Service

Clean water is critical for sustaining life and our most basic sanitary needs. But fresh, clean water is not so plentiful and keeping it clean is a challenge. Cleaning used water is one of the best ways to protect this vital resource. Wastewater treatment is the process used to clean used water.

St. Marys has been cleaning used water since 1908, when citizens built one of the first complete wastewater systems

in Ohio. Our duty to clean used water, to safeguard the environment and the health of those who use it after we do, continues to this day.

Today, our wastewater facilities serve a population of over 10,000 people, providing for the comfortable life style, industrial growth, economic security, and public health that people have come to expect.

St. Marys has over \$30 million invested in wastewater

facilities which shows the concern that citizens have for water quality, dating back a century.

Citizens can be assured that St. Marys will continue to protect water quality, using the most progressive methods possible.

St. Marys encourages all citizens to learn more about water resources, water conservation, and protecting the environment. Please contact us for more information.

Wastewater Collection

The collection system consists of a grid of underground sanitary sewers that conveys domestic and industrial sewage to pump stations, where pumps send the sewage to the treatment plant for processing.

Pump stations included in the system can pump over 10,000,000 gallons of wastewater each day.

Conditions at six major pump stations are monitored by a process monitoring and con-

trol system.

The wastewater collection system includes all areas inside corporate limits and also several areas bordering Grand Lake St. Marys.

The systems bordering the lake are owned by Auglaize County or the State of Ohio. St. Marys treats the wastewater but does not operate or maintain these systems.

System Components:

- 58 total miles of gravity

sewer mains, 6” through 24” in diameter: 46 miles City owned, 10 miles County owned, 3 miles State owned

- 1,256 manholes: 1,016 City owned, 214 County owned, 26 State owned.
- 24 pump stations: 15 City owned, 4 County owned, 4 State owned.
- 10,000 feet of force mains (pressurized sewer pipe).
- 4,300 service connections.

Flow Equalization

Equipment at the beginning of the treatment plant controls the volume of wastewater that can be processed for treatment. During high flow conditions (>9,000,000 gallons per day) when the plant

cannot treat all of the flow, an electric gate can divert a portion of the flow to a 2,700,000 gallon equalization basin for storage. The captured wastewater in the equalization basin is auto-

matically returned to the treatment plant for treatment when system flows return to normal. A computerized process monitoring and control system controls all aspects of flow equalization.

St. Marys Wastewater Treatment Plant

Wastewater Treatment

Polluted wastewater pumped into the Wastewater Treatment Plant goes through a complex, multi-stage treatment process that takes about 22 hours. The treatment plant uses physical, biological, and chemical processes to remove contaminants, producing a high quality discharge.

Influent Screening & Vortex Degritting System

Two identical 1/4" screening units and a bypass channel are provided. The screens intercept flows going to the equalization basin as well as the plant influent flow. Material removed by the screens is dewatered.

The grit removal facilities consist of a vortex style grit tank with one grit pump which sends the grit slurry to a cyclone separator and grit classifier. The grit cyclone separates coarse and fine grit from the slurry, discharging a small volume of water and the grit into the grit classifier. The grit classifier separates grit from water and discharges relatively dry grit.

Orbal® Oxidation Ditch

The oxidation ditch process consists of three concentric channels with mechanical aeration disks which provide oxygen and circulate flows in the channels. The oxidation ditch has been sized to accommodate the design loading without the need for separate primary settling

tanks. The wastewater is biologically treated in the oxidation ditch to reduce biological oxygen demand and to oxidize ammonia.

Influent flow enters the interior channel where it combines with return activated sludge (RAS). The oxidation ditch operates in an extended aeration mode to achieve ammonia removal (nitrification), which occurs in the outer rings of the ditch. A chemical is fed into the outer ring to remove phosphorus.

Final Clarifiers

Effluent from the oxidation ditch flows to the final clarifiers. Two peripheral feed final clarifiers separate sludge from treated wastewater. Supernatant from the clarifiers flows to the disinfection process. Sludge from the clarifiers is pumped to the oxidation ditch (RAS) or wasted to the solids reduction process. Scum is skimmed from the final clarifiers via a rotating skimmer arm attached to the sludge removal mechanism.

UV Disinfection

Ultraviolet (UV) disinfection utilizes the energy from UV light emitting lamps to reduce the pathogen content of the treated wastewater. The UV lamps are submerged in a channel which the plant effluent flows through before discharge.

Plant Effluent

Treated wastewater is discharged to the St. Marys

River through a new 36" outfall structure, sized to accommodate a peak capacity of 9,000,000 gallons per day.

Cannibal® Solids Reduction Process

Solids removed or generated during treatment undergo further treatment through a cannibal solids reduction process.

In this process, the return sludge flow (RAS) is pumped through a solids separation module consisting of fine screening, screenings compaction, and cyclone grit removal to remove the inert material from the sludge.

From the solids separation module the majority of RAS is returned to the oxidation ditch, while a portion is sent to one of two interchange tanks. In the interchange tanks, the environment is converted between an aerobic (with oxygen) one to a facultative (without oxygen) one, which causes microorganisms to cannibalize each other, significantly reducing the volume of the sludge.

Solids ultimately are wasted from the cannibal process to a digester for storage. The solids will either be applied to agricultural land as a soil conditioner (biosolids) or dewatered and disposed of in a landfill.

Laboratory

Water quality is checked at all stages of the treatment process by thoroughly trained laboratory analysts.



UV Equipment (top)
Cannibal® Screens

"THE NEW TREATMENT PLANT INCREASES DAILY TREATMENT CAPACITY TO 3,000,000 GALLONS AND ALLOWS FOR THE TREATMENT OF WET WEATHER FLOWS UP TO 9,000,000 GALLONS EACH DAY. TOTAL CONSTRUCTION COST AMOUNTED TO \$11,012,020."



Remodeled laboratory and office



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SINCE 1908

Construction Progress



March 2008



May 2008



August 2008



December 2008



May 2009



August 2009

History of the St. Marys Wastewater Department

1908

The original 1908 wastewater treatment plant cost \$10,727 and had a daily capacity of 400,000 gallons. Treatment consisted of two septic tanks, one dosing chamber, six sand filters, and one sludge drying bed. A sewage pump station and a complete sanitary sewer system were included in the project. Total project cost was \$101,210.

1948 & 1969

In 1948, a new treatment plant started operation across the river from the original plant. The new plant utilized primary and secondary treatment and anaerobic sludge digestion. It had an 800,000 gallon per day capacity and cost \$316,000. An addition, completed in 1969, increased daily capacity to 2,000,000 gallons and cost \$681,000.

1960

The Northwest Trunk Sewer Project was completed, which serves the west portion of the City, including Villa Nova. Two new pump stations also were built.

1989

A project to address high wet weather flows, completed in 1989, cost \$3,284,000. The original 1908 pump station was replaced and the two 1960 stations were remodeled, increasing capacity. The project included building a 2,700,000 gallon retention basin to store excess storm water, laboratory improvements, a process monitoring system, and emergency generators. Treatment capacity was not increased.

1991 & 1992

The Grand Lake St. Marys Southeast Sewer District and the Sandy Beach Sewer District, both constructed and operated by Auglaize County, were built. St. Marys treats the wastewater.

2000

The Northeast Sewer Improvement Project included a new gravity sewer to serve McKinley Rd. and construction of the Northeast pump station to pump directly to the treatment plant.

2008

The Northeast Relief Sewer Project diverted all flows in the northeast portion of St. Marys to the Northeast pump station. The project provided additional capacity at the New York Central pump station, part of a larger plan to address storm water flows.

2009

New treatment plant at site of existing facility increased daily treatment capacity to 3,000,000, with a peak daily capacity of 9,000,000. Cost was \$11,012,020.

2009

For the first time, wastewater services were extended north of U.S. Route 33, initially to serve the new High/Middle School complex, but sized to serve a much larger area.

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