ANNUAL REPORT 2021

Prepared by:
Michael Eroshevich
Director of Sanitary Engineering
Jefferson County Water and Sewer District
596 State Route 43
P.O. Box 2579
Wintersville, OH 43953-0579
www.jcwatersewer.com

Table of Contents

Operation and Maintenance Highlights

Water

During 2021, the District prioritized the delivery of clean water to each of their household and commercial connections. The District continued to inspect and paint fire hydrants in their four service areas, Area M, Area A, Area O, and Area J.

The District conducted over 2,800 daily, weekly, monthly, and quarterly test to ensure water quality. 41 water taps were installed for new customers. The District also conducted drone inspections of all the JCWSD's water storage structures.

The District repaired 125 water lines in 2021! The repairs are broken down by system as follows:

Area M: 94 Area A: 31 Area O: 0 Area J: 0

Sewer

In 2021, the Jefferson County Water and Sewer District continued to operate and maintain its seven wastewater treatment plants and planned for improvements at two of those treatment plants. The District also conducted over 1,000 laboratory tests of wastewater for EPA compliance and to ensure proper treatment.

The District continued to perform routine infiltration and inflow investigative work on parts of its sewer system and performed important preventive maintenance on its sewage treatment plants, pump stations, and manholes on an as needed basis. The District's seven Wastewater Treatment Plants processed and treated 360,000,000 gallons of sewage.

JEFFERSON COUNTY
WATER AND SEWER DISTRICT

GIS Asset Digitalization and New Technology

In conjunction with RCAP, the District uses GIS Equipment to map the water and sewer system. This special piece of equipment, specifically a Trimble GPS Unit, is a top-of-the-line technology capable of mapping assets down to the nearest centimeter of accuracy. The District previously worked with RCAP to map the water system and sewer system. The District now has obtained that equipment, along with necessary accessories to use the equipment, such as tablets. The District employees have received the necessary training to use this equipment and will begin the mapping of new assets in 2022, including the new Amsterdam Sewer System. This priceless resource allows the county to easily recognize areas where the system can be expanded, and quicky isolate and shut off flow to leaking water pipes by following the pipe routing on the GIS map and locating the nearest shut off valves. It also allows the District to help protect public safety by understanding the exact location of the thousands of feet of buried assets within the county, which is vital to any emergency response program and the protection from security threats. Digitalizing the locations of all assets will ensure this information is all in one place and protected for the future.

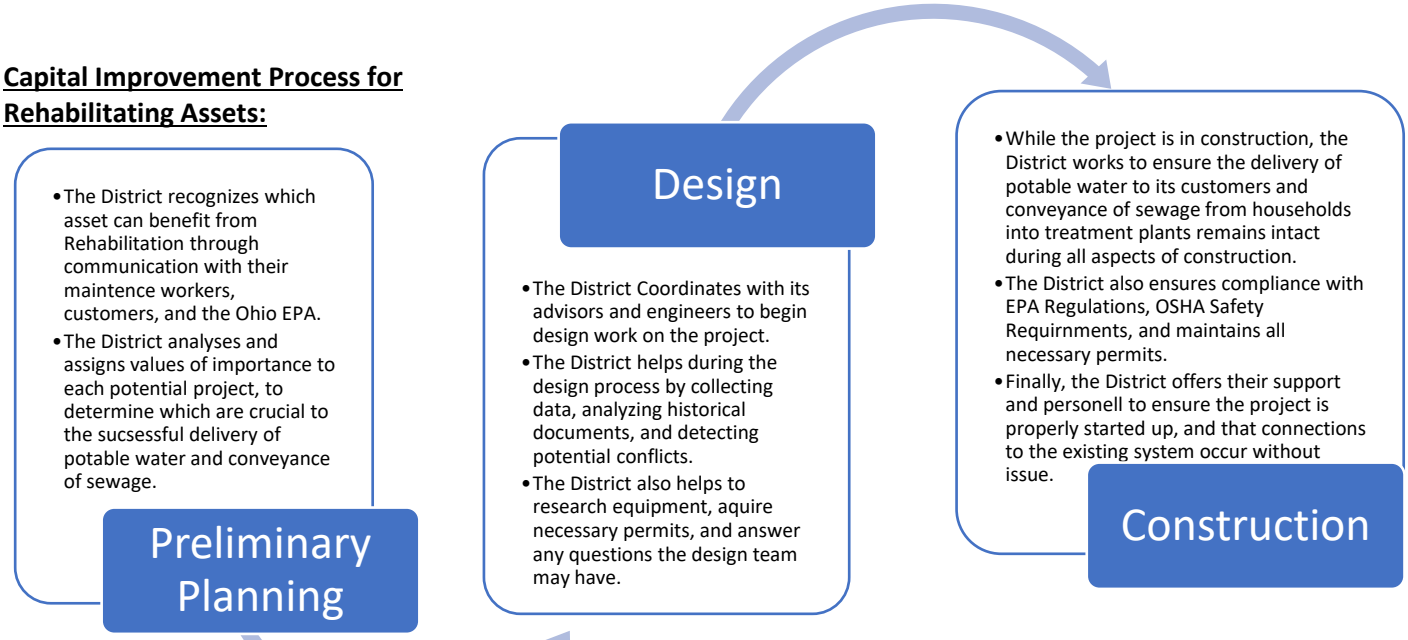
The District continued with its technological upgrades and purchased quadcopter drone equipped with both a regular camera and a thermal imaging camera. The regular camera, capable of taking high-definition photos and videos, is incredibly helpful for the inspection of elevated water tanks and the structural integrity of the tank's support structure. This task would previously have taken multiple days to be completed and requires personnel to climb the structure for inspection. The drone allows the inspection process to be completed in a day, along with an incredible increase in personnel safety by removing the need for personnel to be on the physical structure. The thermal imaging camera is used to detect water leaks quickly and effectively. The difference in temperature between the surrounding environment and the water escaping from a leak can be quickly spotted in the thermal image the drone produces. The previous method of finding a leak would require personnel to slowly walk on top of a buried water line and look for visual clues of a leak. As some transmission lines traverse hundreds of miles, walking these lines to detect leaks can take days or weeks, and require lots of personnel. As the drone is capable recording miles and miles of thermal imaging in one single flight, it is another priceless resource to the District in its mission to provide safe and reliable drinking water to the residents of Jefferson County.

A mockup of a drone inspection of the Norton Hill Tank, which sits next to the Jefferson County Water and Sewer District's Service Center headquarters.

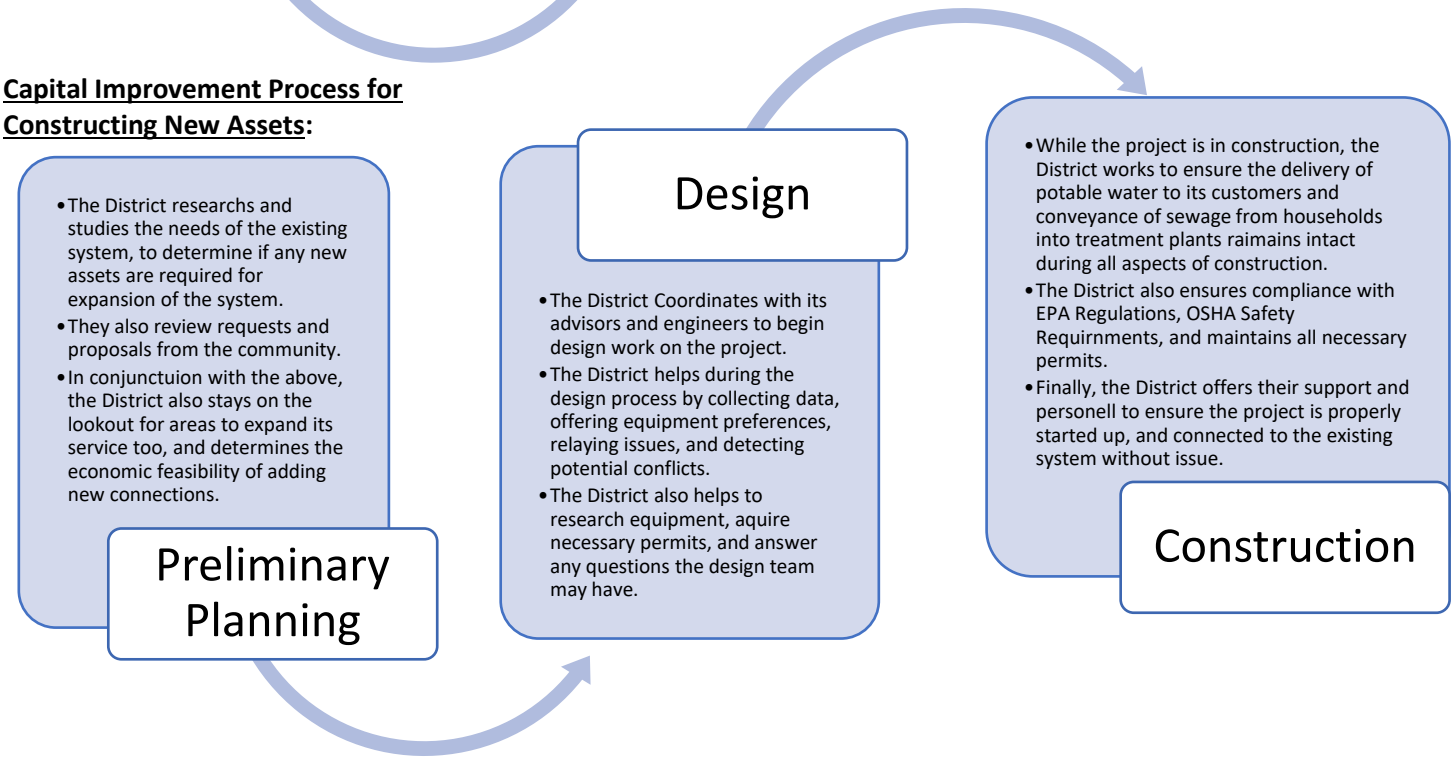
Capital Improvement Projects

The Jefferson County Water and Sewer District continued to review and refine their Capital Improvement Program to assure that the District's water and sewer infrastructure remain in top operational condition and in a state of good repair. This program includes replacements/improvements to existing assets, as well as the creation of new assets. The projects can vary in size, from replacing pumps to the construction of large scale sewer systems and elevated water storage towers.

Capital Improvement Process for Rehabilitating Assets:



Capital Improvement Process for Constructing New Assets:



Norton Hill Water Tank

The Water and Sewer District had a comprehensive internal and external inspection done on the Norton Hill Water Tank on Route 43 next to the District Service Center. This one (1) million gallon prestressed concrete ground storage tank is a major component of the District's county-wide water system. The inspection determined that the tank was in need of structural repairs and painting to maintain its operational status for many years to come. Design work on this tank was completed in the summer of 2021, and the project went to bid in the fall of 2021. Construction work on the tank will take place during the summer of 2022.

Reeds Mills Pump Station Rehabilitation Project

The Reeds Mills Pump Station was next on the list for rehabilitation. Design work wrapped up in early 2020, and the project went to bid in the fall of 2020. Construction will start in the summer of 2022. This project includes major equipment and electrical upgrades to the existing station, along with the construction of a brand-new building to house the station's various complex electrical systems. Moving these systems out of the pump station itself and into its own space will help comply with safety regulations. The absence of wastewater and corrosion elements in the new electrical building will help greatly extend the working life of the electrical equipment and reduce maintenance costs.

As this is an active pump station, the District focused on construction sequencing during the design phase of this project to ensure that the station remains operational during construction. The pump station serves the residents of the Reeds Mills/Belvedere/Valley View, within Wayne Township. Once complete, this station will be set to continue to convey wastewater to the Jefferson County Wastewater Treatment Plants for many years to come.

The Reeds Mills Pump Station Site will soon include a new building to house the electrical systems needed to keep this pump station running 24/7.

Ridgeland Sewage Treatment Plant Replacement

The Ridgeland Subdivision sewer system is in need of a new treatment plant, as the existing plant is quite outdated. Design work on the new 20,000 Gallon per Day Package Plant was finalized in 2020, and the project went to bid in the fall 2021. This new plant will include ten tanks, including an equalization basin, clarifier, sludge holding tanks, multiple aeration tanks, and a state of the art UV Disinfection System. Design emphasis was placed on constructability, as it is crucial that the existing sewage treatment plant stays online to treat sewage and discharge clean water while the new plant is being constructed. Construction on this project will commence near the end of the 2022 summer.

Ultraviolent (UV) Light Disinfection is the newest top-of-the-line water treatment technology. Standard water treatment typically involves the addition of a chemical compound to the wastewater near the end of the treatment process, to reduce microbial contamination before the water is discharged into the environment. Before UV, the two most comment compounds used near the end of the treatment cycle were Chlorine and Sodium Hypochlorite. Chorine, especially in its unpressurized gas state, can be very dangerous and difficult to handle. Sodium Hypochlorite also presents its fair share of challenges. There are also a variety of additional operating costs associated with those chemicals, which are greatly decreased when using UV Disinfection instead. UV Disinfection offers cheaper O&M Costs and significantly less regulatory compliance and leak detection costs. As a result, UV Disinfection is much safer for the operator to use when compared to Chlorine and Sodium Hypochlorite, therefore making this incredibly technology a perfect fit in new wastewater facility construction.

Ongoing Expense	Chlorine Gas	Sodium Hypochlorite	UV Disinfection
Disinfection/ Dechlorination Chemical Supply	$$$ Purchase and delivery of chlorine gas cylinders.	$$$$$$ Purchase and delivery or on-site generation of hypochlorite.	None No chemical supply is required.
Electricity	$ Relatively low power requirements for chlorine gas disinfection.	$ Power is required for operating chemical feed pumps and aeration equipment (if applicable).	$$$$ Electricity is required to power the UV lamps.
Replacement Parts	$ Replacement parts are minimal with chemical disinfection systems.	$ Replacement parts are minimal with chemical disinfection systems.	$$$ Replacement parts associated with UV disinfection systems consist primarily of UV lamps.
Operator Labor	$$$$$$ Labor required for changing chlorine cylinders, maintaining lead detection and emergency equipment, maintaining on-site chemical distribution and storage equipment.	$$$ Labor required to maintain pumps, generators, storage tanks, water conditioning equipment, de-scaling equipment, on-site chemical distribution piping.	$ Labor includes replacing UV lamps periodically and ensuring that quartz sleeves that house the UV lamps are kept clean.
Leak Response Requirements	$$$$$$ Costs for responding to and repairing leaks are very high.	$$$ Since hypochlorite is less toxic than chlorine gas, costs in this area are reduced. However, there are costs associated with containment and leak protection of the hazardous chemical.	None UV lamps contain a very small amount of mercury. Leak response and emergency preparedness plans are not required, however, local guidelines must be adhered to. Trojan offers a complimentary recycling program in which used lamps are picked up and shipped to an approved recycling facility.
Administration for Ensuring Regulatory Compliance	$$$$$$ Time-intensive administration for compliance with regulated risk management plans, emergency response plans and community right-to-know programs.	$$$ Although sodium hypochlorite is exempt from "hazardous" designation, it is unstable and corrosive. As such, procedures must be in place to ensure proper transportation, handling, storage and spill protection.	$ Administration costs for UV are low. No special safety programs or risk mitigation plans are required.
Training	$$$$$$ Employees must be trained on process safety management, risk management plans, and evacuation procedures in addition to routine operation of the system.	$$$ Training programs must be in place to ensure chemicals are properly transported, stored and handled.	$ UV equipment is simple and straight-forward to operate. No special training or certification is required for operators.

Smithfield Sewer System Improvements Project

With the Jefferson County Water and Sewer District concluding negotiations in early 2018 with the Village of Smithfield, Ohio EPA, and USDA, the District assumed official operation of the Village sewer system, including the sewage treatment plant. The District also had the National Pollutant Discharge Elimination System (NPDES) Permit transferred into its name from the Village's name as a last step in this complicated transfer process. The District is now under OEPA Findings and Orders to bring the system into compliance with environmental regulations after years of neglect.

The Design engineering work for improvements to the existing sewage treatment plant and nine (9) sewage pumping stations has been completed. The project is ready to be advertised for public bid pending the resolution of a property ownership issues. A program to pump out septic tanks and evaluate sewer lines is currently underway. This work is intended to bring the system into compliance with OEPA regulatory requirements and NPDES effluent limits. It is estimated that the cost for this effort will be approximately $4.4 million. Construction in Smithfield will begin in the summer of 2022.

The exterior of one of the nine sewage pump stations in the Smithfield Wastewater System

The inside of the pump station as seen to the left. Visible in this photo are two discharge force mains, chains for pump removal, access steps, and pump control equipment.

One of the two aerated lagoons located at the Smithfield Wastewater Treatment Plant. These lagoons create an aerobic environment which promotes the natural breakdown of wastewater solids.

Smithfield Water Tank

Demolition of the old Smithfield Water Tank took place in December of 2019.

The new painted water tank with the Jefferson County identification on the side.

Various custom pieces of metal were shipped to the site, where they were then welded together to create the new tank bowl and tank base.

The Smithfield Water Tank serves the Village of Smithfield, Piney Fork, and Dillonvale Ridge. Construction of this new 200,000 above ground spheroid tank was completed in the fall of 2020. The contractor for the project was McGuire Iron from Sioux Falls, South Dakota. The project work went very smoothly with very few issues, despite the fact that most of the construction occurred during the pandemic year of 2020.

The new tank is located on a property procured by the County adjacent to the County's public works storage facility on Route 152. The tank is a 200,000 gallon spheroid water storage tank that has been sized to meet the demands of not only current customers but also future service area expansions. The budget for construction was $1.60 million dollars, and the project was completed under budget! This new tank provides the District with a crucial water delivery asset, and ensures that the residents of the Village of Smithfield receive clean and healthy water at their taps.

Amsterdam Area Sanitary Sewer Project

Construction work on the new sewer system for the Village of Amsterdam in Springfield Township (Jefferson County) and Loudon Township (Carroll County) commenced in early 2020 after the public bidding process was executed in late 2019. Approvals were obtained from the US Army Corps of Engineers and United States Department of Agriculture. Low bid contractors for this large project include Workman's Industrial for the Sewage Treatment Plant, Rudzik Excavating for all sewers and pump stations in Jefferson County, and Alex Paris for the sewers located in Carroll County. The project includes the construction of about 63,000 feet of sanitary sewer lines, two sewage pump stations, and a 50,000 gallon per day sewage treatment plant. The plant is located on property purchased by the County adjacent to the Village's Rogers Park. The cost of the project is in excess of fourteen (14) million dollars, with approximately 50% of this amount paid for by grants from various agencies.

Despite all the challenges produced by the COVID-19 Pandemic in 2020, this complex construction project continued along quite successfully. The Village of Amsterdam was flooded with construction workers and equipment, and at times there were nine different crews working at various places throughout the Village. This project could not have been completed during this difficult year without the support of the Jefferson County Commissioners, and the cooperation of the Mayor and residents of the Village of Amsterdam. The project was completed in 2021, and residential connections to the sewer system will begin in the summer of 2022.

A newly placed sanitary manhole

Trench boxes are used to protect workers against cave ins while laying pipes and setting manholes

GPS Surveying equipment is used to ensure accurate locations and elevations of all pipes and manholes

Excavators digging out and backfilling trenches for pipeline installation

Water and Sewer Rates Billing Guide

2021 Basic Water Bill = $33.79 (3,000 gallons)

2021 Basic Sewer Bill = $44.75 (3,000 gallons)

2021 Basic Water & Sewer = $78.54 (3,000 gallons)

*2021 Overage: $7.50 for Water per 1,000 gallons

*2021 Overage: $7.50 for Sewer per 1,000 gallons

2021 Water Rates			
Meter Size	**Min. Bill**	**Allowance**	**Overage**
3/4"	$33.79	3,000 Gal.	$7.50
1"	$56.77	5,000 Gal.	$7.50
2"	$142.59	12,000 Gal.	$7.50
4"	$287.22	24,000 Gal.	$7.50
6"	$577.13	48,000 Gal.	$7.50

2021 Sewer Rates			
Meter Size	**Min. Bill**	**Allowance**	**Overage**
3/4"	$44.75	3,000 Gal.	$7.50
1"	$59.75	4,500 Gal.	$7.50
2"	$110.75	9,600 Gal.	$7.50
4"	$476.75	46,200 Gal.	$7.50
6"	$707.75	69,300 Gal.	$7.50
Georges Run	$21.75	9,000 Gal.	$7.50
Century Hills	$41.75	9,000 Gal.	$7.50

Water and sewer bills can be paid in person at the Water and Sewer District offices. The District also offers an option to pay your bill online, at **www.jcwatersewer.com/pay-your-bill-online**

Jefferson County Water and Sewer Rules and Regulations

Did you know that the Jefferson County Water and Sewer District has a comprehensive set of Rules and Regulations for its water and sewer systems? These Rules and Regulations include industry standard details for the Water and Sewer division and include 807 sections with three Appendices equaling 140 pages. Why? Because it is the goal of the Water and Sewer District to protect you, the customer, and make certain that water and sewer rates stay as low as possible!

These regulations and standards govern all administrative and construction related activities of the District's water and sewer systems and set forth consistent standards to be followed by any party or parties doing business with the Water and Sewer District.

The standards were adopted by the Board of County Commissioners in 2017 and are available for viewing on the District's website **(https://www.jcwatersewer.com/rules-and-regulations/)**. This was a major administrative achievement for the District and puts it in the position of being at the forefront of water and sewer utilities in the State of Ohio.

District Fire Hydrant Maintenance Procedures

The Water and Sewer District executes a comprehensive fire hydrant maintenance program to protect these valuable assets of the District and maximize each hydrant's ability to furnish water during times of need, especially during emergencies. This program will ensure that hydrants are inspected twice a year, spring and fall. These inspections will involve:

- Check chains – make sure they allow nozzle cap to turn freely
- Check all caps – make sure they all can be removed
- Check paint – remove all lose paint and repaint if necessary
- Lubricate the hydrant
- Test the hydrant and valves

As part of this program, all hydrants are flushed once per year, typically in the spring or fall. The District is also proceeding with a program to paint all hydrants to make sure they are visible from the road in times of need. Fully functional fire hydrants are crucial for the safety of our customers and their property. This program is designed to make sure every fire hydrant is functioning to the fullest extent possible, especially in times of emergency.

Unauthorized Water Use Is A Crime!

Unauthorized Consumption can occur in many manners as there are always unscrupulous persons who contrive ways to avoid paying for service. The JCWSD has clearly defined policies and regulations for water service provision, and means to detect common breaches in the supply, metering and billing processes. The JCWSD also understands that sometimes circumstances arise that are beyond a customer's control and therefore has policies for customers who encounter a true inability to pay for water service. Unauthorized consumption results in wasted water resources and billings lost by the water utility. This often results in additional cost being passed along to the paying customer population.

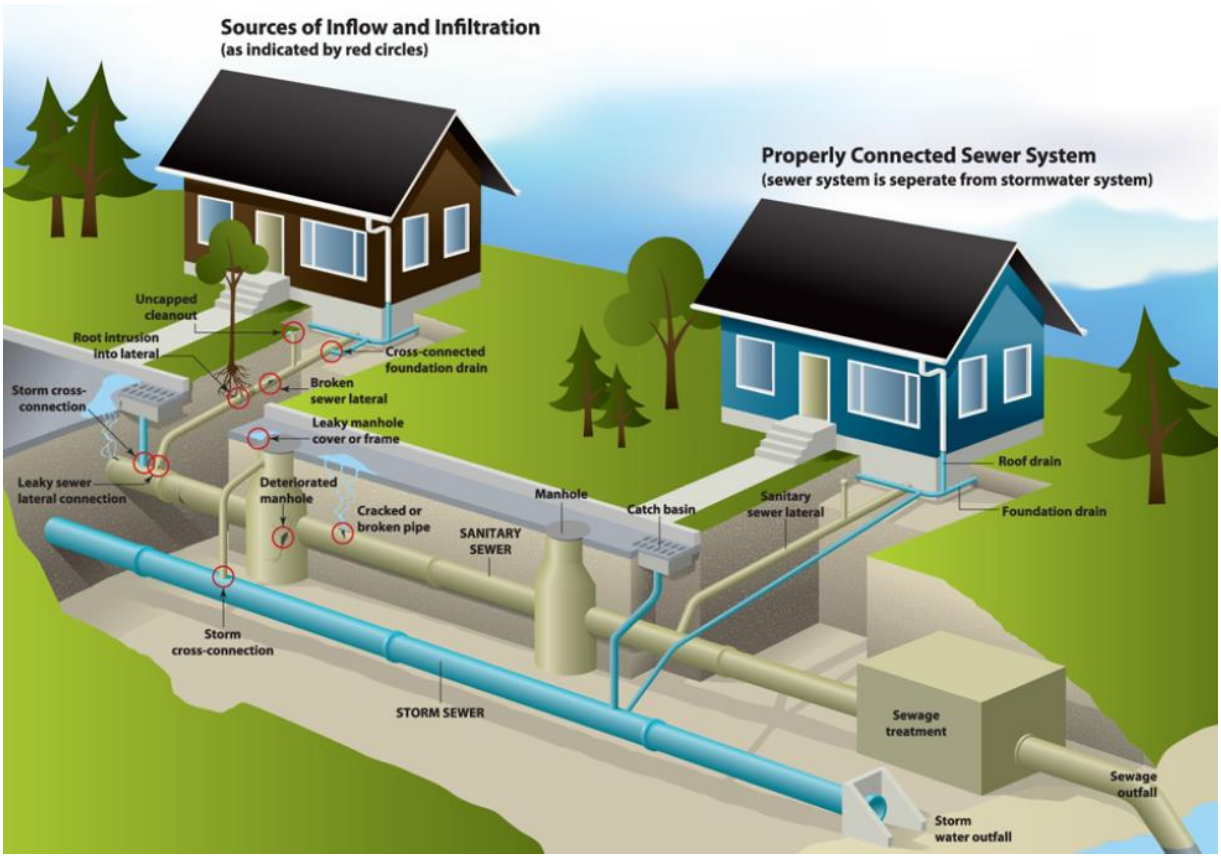
Drinking water is a critical service for customers on the County's public water system, but this service must generate revenue for District to meet their cost of service in maintaining its water infrastructure. Adequate revenue capture relies upon the District's efficient systems of customer metering, meter reading, billing and enforcement that prevent consumption data error – and revenue loss – from occurring. The customer billing system also becomes the de facto customer consumption database, and many functions rely upon the integrity of the customer consumption data that is included here. When consumption data integrity is corrupted by errors or tampering, the effects of water conservation programs might not be accurately assessed. Similarly, demand data for water distribution system hydraulic modeling or planning studies may be corrupted.

Therefore, please report any observed unauthorized use of the public water system of the JCWSD such as turning on fire hydrants, tapping into a neighbor's service line, tampering with the water meter, or unauthorized filling of swimming pools. Additionally, please report any person who is NOT an employee of the JCWSD observed to be turning on water service to a residence or business that has been turned off by JCWSD personnel. Only JCWSD personnel are permitted to turn on and turn off water service to a property.

You as customers of the JCWSD can do YOUR part to keep water rates as low as possible!

Illegal Discharges

The discharge of storm water runoff, including roof drains, foundation drains, stairwell drains, area drains, or groundwater, including french drains, or sump pumps that pump ground water or storm water from a basement or basement foundation to a sewer line owned by the Jefferson County Water and Sewer District is strictly prohibited. All Persons connected to, or connecting to, the public sanitary sewage system shall provide adequate means for excluding storm water runoff and groundwater from the connection to the sanitary sewer. French drains may not discharge or connect to the trench within which the building or lateral sewer is situated. The provisions are outlined in the District's Rules and Regulations. Storm water runoff and ground water may be discharged to storm sewers or to natural water courses within JCWSD's service area. The District reserves the right to enter upon all properties and into all structures receiving sewer service for the purpose of inspecting, observing, measuring, sampling, and testing to ascertain whether or not storm water runoff or groundwater is being discharged to sanitary sewers. Exclusion of these flows from the sewer system helps keep operating costs down and enables the District to hold rates as low as possible.



Senate Bill 2 Asset Management Plans

Ohio Senate Bill 2 required that an Asset Management Plan (AMP) be implemented by all public water systems in Ohio by October 1, 2018. This bill issued general guidance for implementing an asset management plan with more specific rules being developed by the Ohio EPA. The Jefferson County Water and Sewer District fully complied with this State mandate and completed Asset Management Plans for each of the four water systems it owns and operates. These systems are the M System, the A System, the O System, and the J System. These AMPs include the following information:

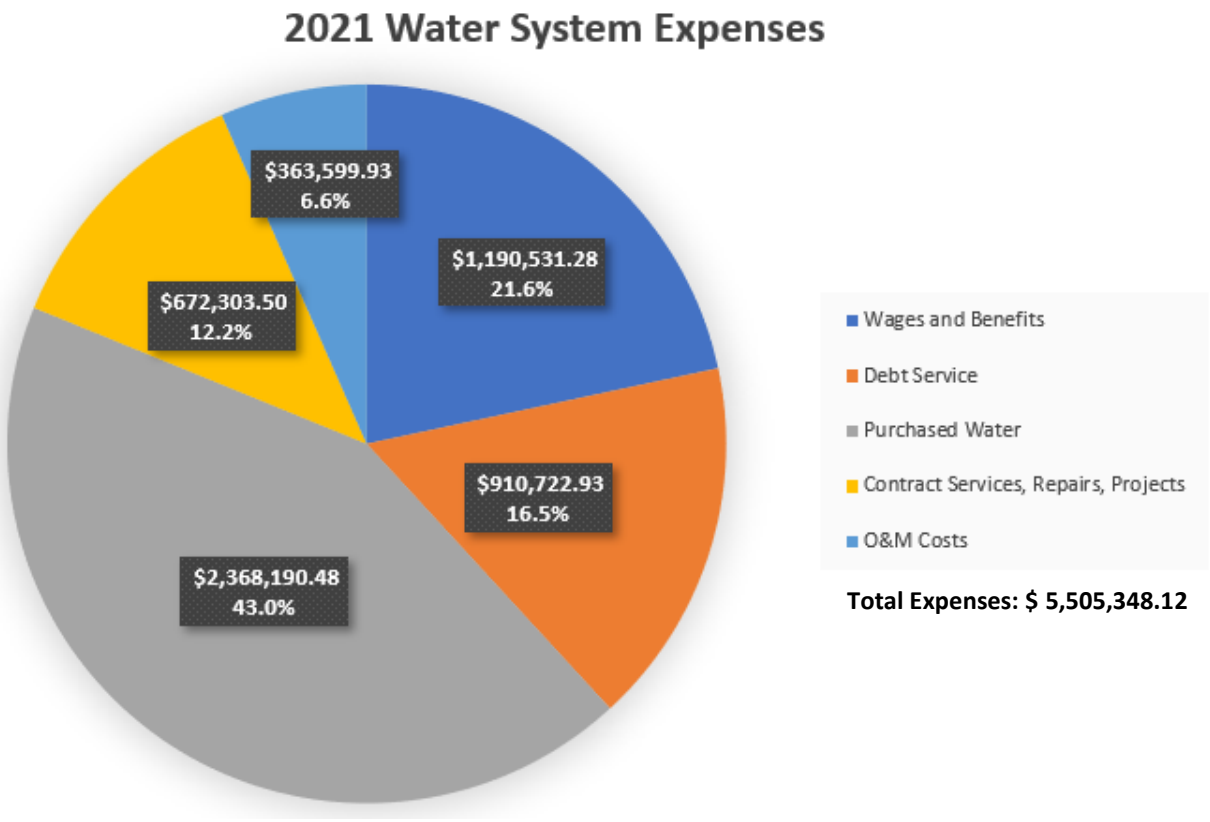
- Asset Inventory and Evaluation
- Operations and Maintenance Program
- Emergency Preparedness and Contingency Planning
- Infrastructure Rehabilitation and Replacement
- Capacity Projections and Capital Improvement Plan
- Long-Term Funding Strategy

This document incorporates the District's existing methodologies for assessing the condition, criticality, useful life, and asset valuation of the District's assets and also sets forth an operating and capital improvement budget to meet the system's needs in the future.

Maintaining a sound and functional water system will result in reliable and safe drinking water for the District's customers that meet or exceed federal standards. This is the goal of the District as well as the State of Ohio and Ohio EPA. The AMP is one mechanism used to achieve those goals. That plan is currently being updated for the current year, with the addition of assets to the plan. The AMP will continue to be updated as new assists are refurbished and built. The District updated the 2018 AMP during 2020 to comply with mandates issued by the Ohio EPA, and ensure that all system upgrades/changes are properly documented.

Water System 2021 Expense Summary

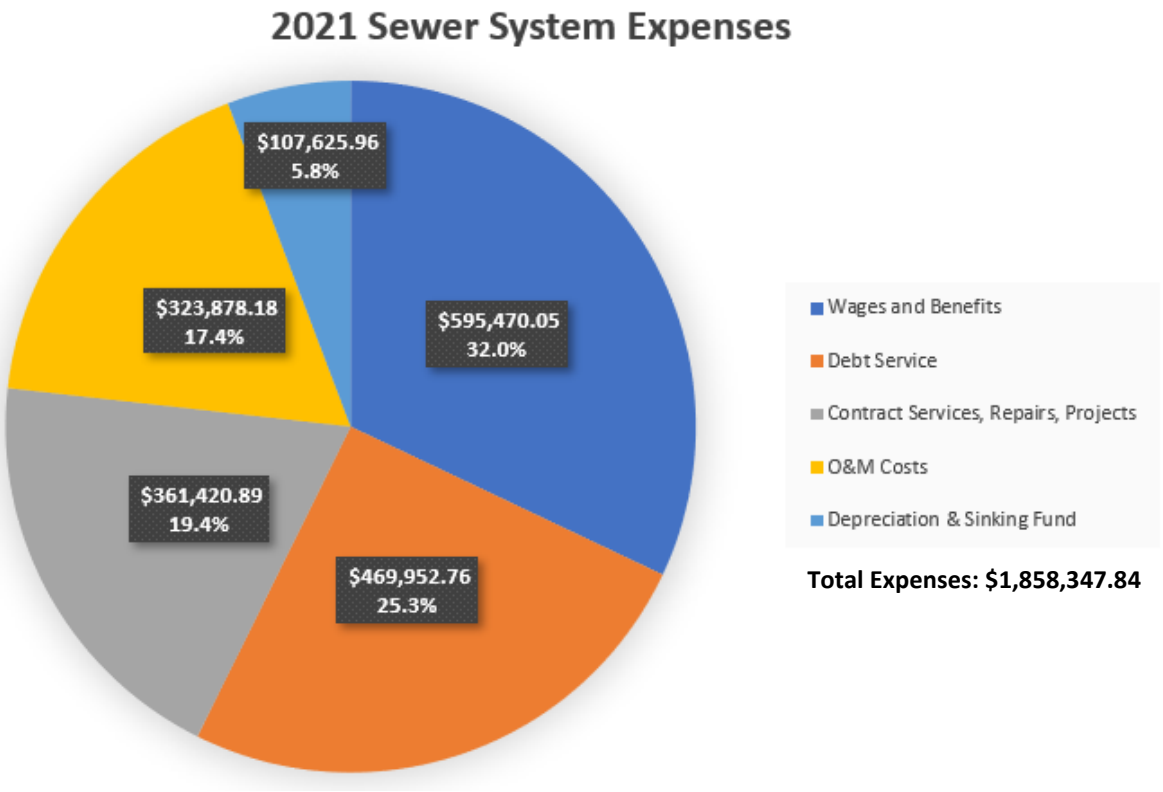
The Jefferson County Water and Sewer District owns and operates a water distribution system that serves nearly 8,000 customers county wide. The District purchases its water from the City of Toronto, the Village of Mingo Junction, the Village of Brilliant, the City of Steubenville, and the Village of Tiltonsville and distributes that water to the customers throughout the County. As can been seen in the chart above, over 38% of the 2020 costs to operate and maintain its water system can be found in the costs to purchase water from these reliable sources. Only 24% of the costs to operate the system, including the purchase of water, are related to operating personnel wages and benefits. This is amazing when one considers the extent of the system operated by the District throughout the County and serves as testimony to the efficiency of the staff doing this work.



Total Expenses: $ 5,505,348.12

Sewer System 2021 Expense Summary

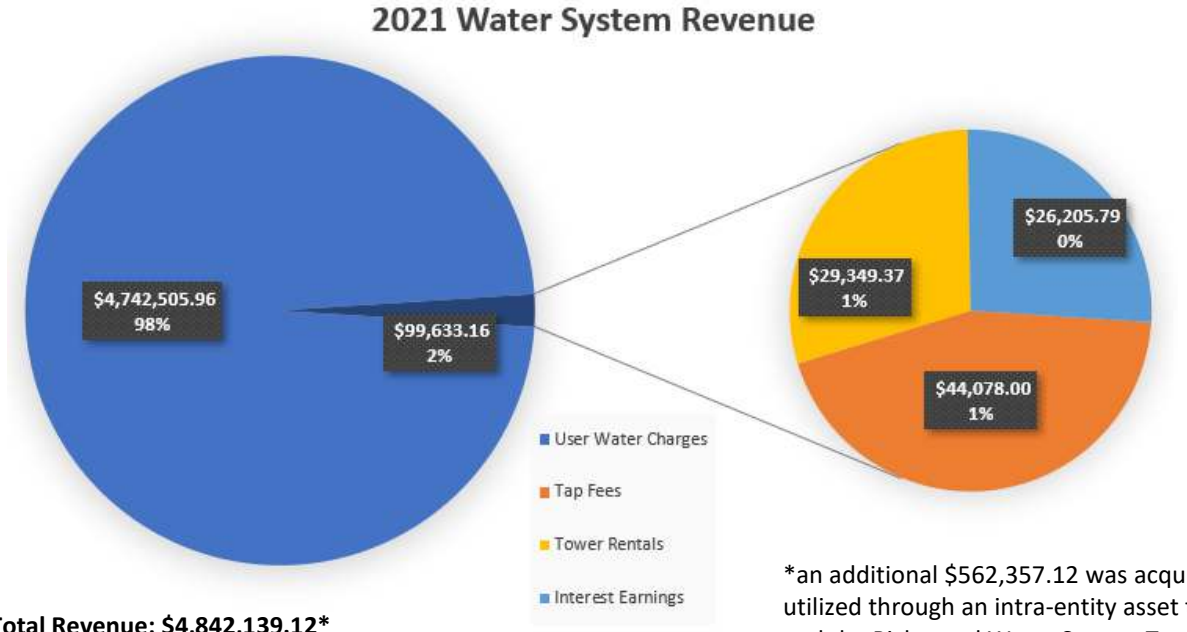
As evident from the chart shown below, the Water and Sewer District operates and extensive sewer system which includes sanitary sewer lines, pumping stations, and seven (7) treatment plants with personnel costing less than 32% of the total cost of running the system. The District also provided for depreciation in administering the sewer system so that funds can be accumulated to handle unanticipated repairs and aging equipment replacements. Debt Service costs in 2021 for the JCWSD equaled about one-fourth of the total money spent in operating and administering the sewer system.



Total Expenses: $1,858,347.84

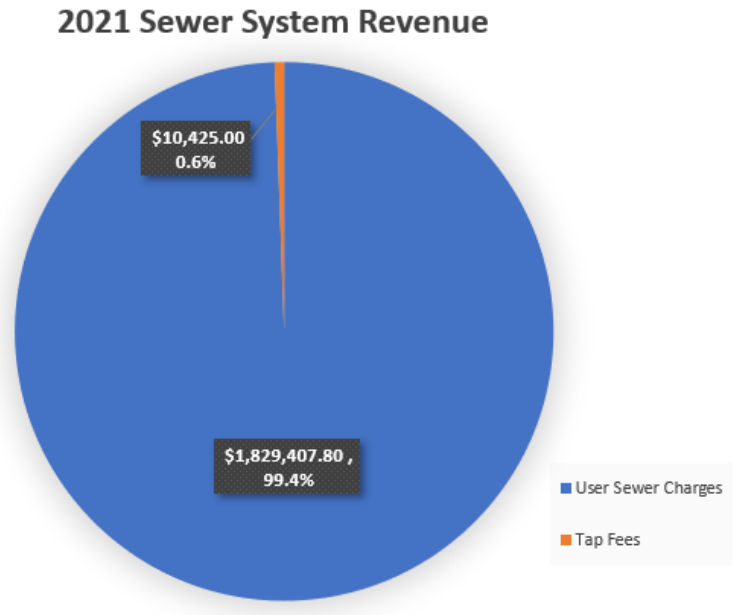
2021 Revenue Overview

The JCWSD realizes virtually all of its revenue for the sewer system from user fees charged to existing customers. This is because the areas served by public sewers are populated areas where virtually no available land exists for development. Relative to the water system, while almost 98% of the revenue generated comes from user fees, transmission lines pass through areas of undeveloped land that is developed, thus generated tap fee revenue. The District also realizes modest amounts of income from account interest and cellular companies renting space on water towers for their transmitting and receiving devices.



Total Revenue: $4,842,139.12*

*an additional $562,357.12 was acquired and utilized through an intra-entity asset transfer and the Richmond Water System Transfer.

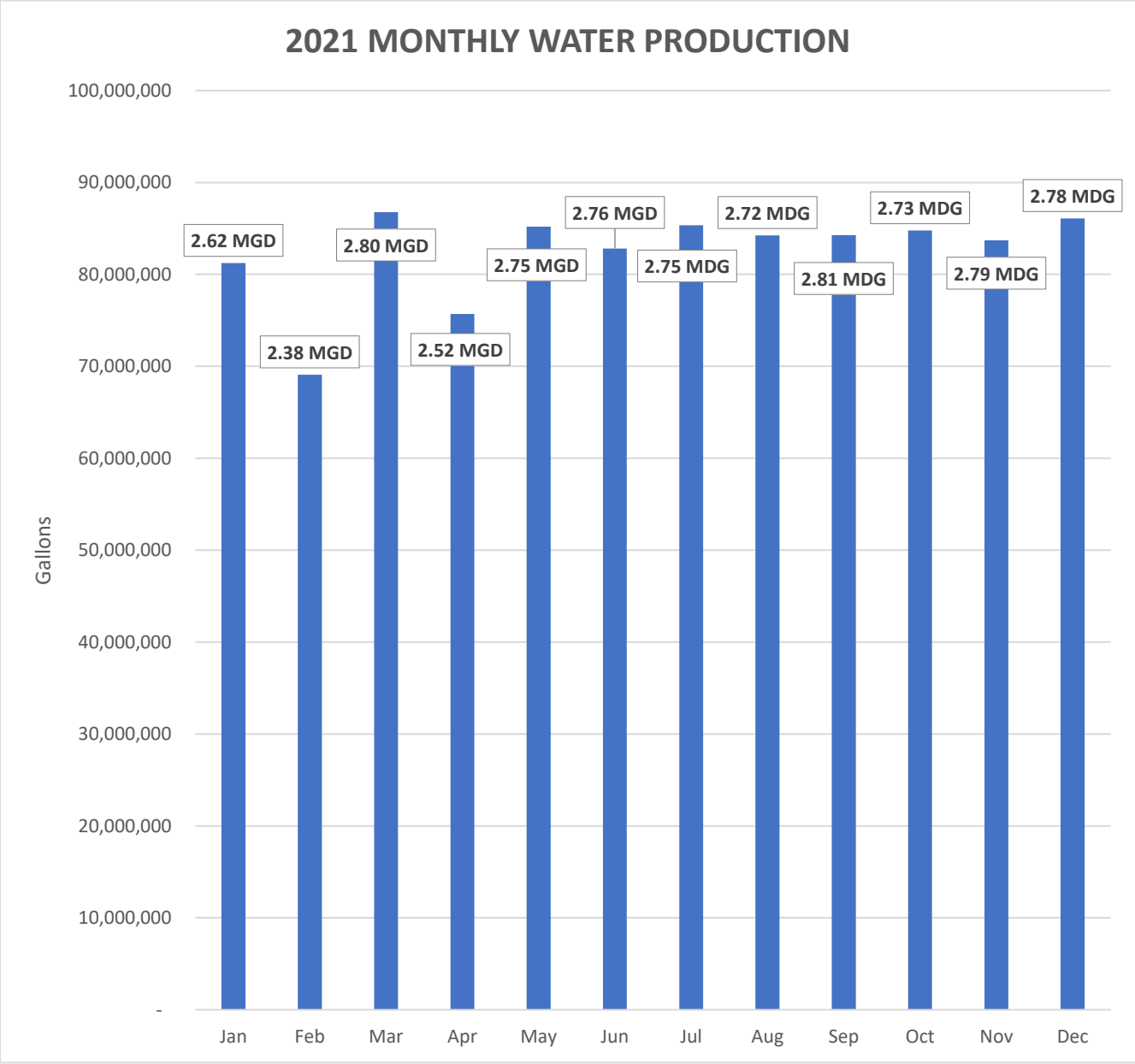


Total Revenue: $1,839,832.80

2021 Total Water Distribution

The Jefferson County Water and Sewer District was just under eleven million gallons shy of distributing one billion gallons of water in 2021. They are broken down by system usage below.

Area M: 613,918,000 Gallons
Area A: 214,600,000 Gallons
Area O: 5,479,000 Gallons
Area J: 12,126,000 Gallons
Municipal Bulk Dist.: 143,040,900
Total: 989,164,000 Gallons



JEFFERSON COUNTY
WATER AND SEWER DISTRICT

Located at 596 State Route 43 in Wintersville, OH 43953-0579

Proudly serving 8,026 water and 3,675 sewer customers throughout Jefferson County.

Please visit our website at:
www.jcwatersewer.com