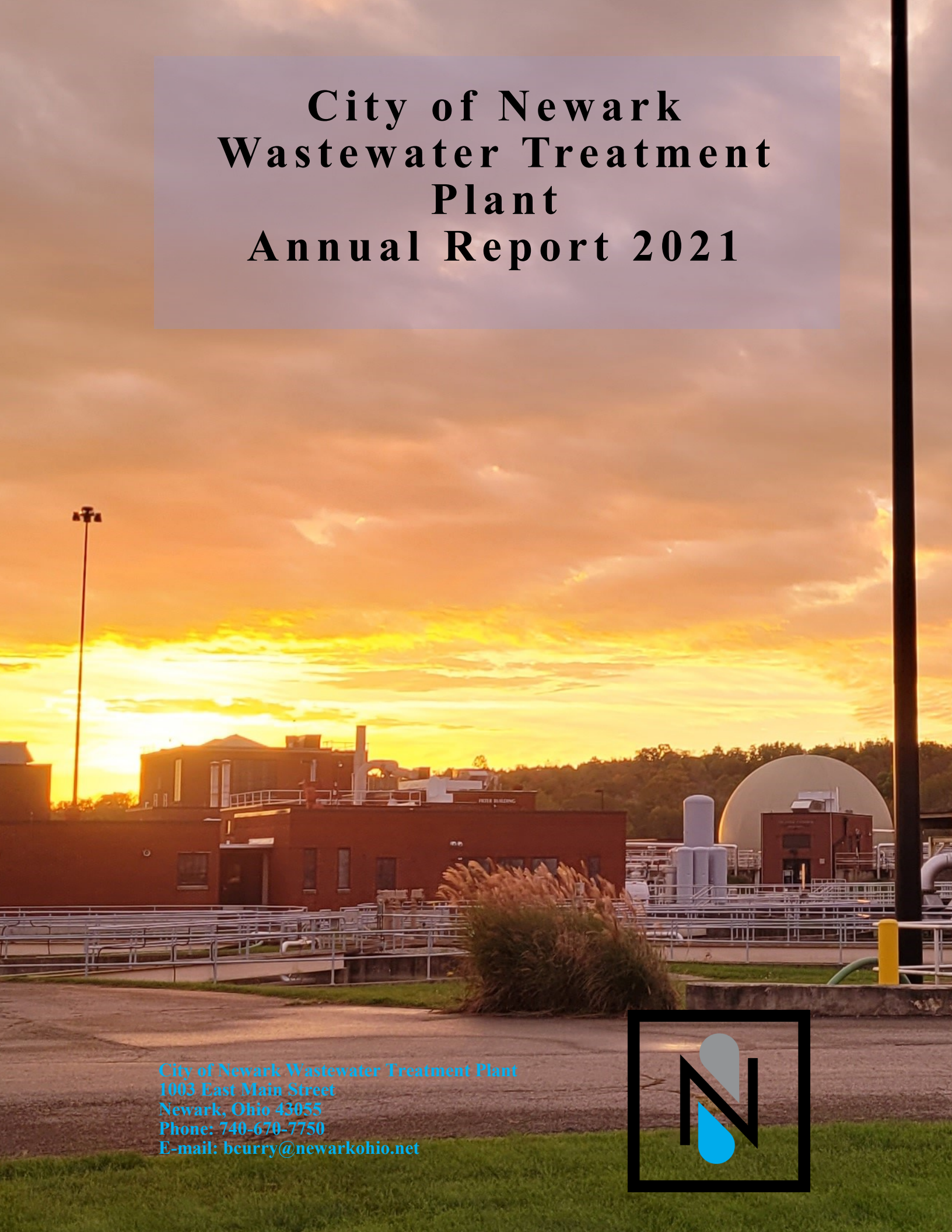


City of Newark Wastewater Treatment Plant Annual Report 2021



City of Newark Wastewater Treatment Plant
1003 East Main Street
Newark, Ohio 43055
Phone: 740-670-7750
E-mail: bcurry@newarkohio.net



Introduction

The Newark Wastewater Treatment Plant represents the City's ongoing commitment to serve the community's needs while protecting the environment.

The City of Newark's original plant was built in 1948, and was later modified to better serve the wastewater treatment needs of residential, commercial and industrial users. In 1984, faced with more stringent treatment requirements, and a July 1, 1988 Clean Water Act deadline imposed by the U.S. EPA, the City began planning its modifications and improvements with the goal of designing a cost effective treatment system. Not only did the City meet the July 1, 1988 deadline, but also the project has improved the water quality in the Licking River, enhancing both the aquatic habitat and the river's recreational potential.

The Wastewater Treatment Plant has continued work to improve the plant with several major capital projects over the years. Two major capital improvement projects completed in 1999 & 2000 included construction of a new Influent Screen Building and a new Supervisory Control and Data Acquisition (SCADA) System. The Screen Building Project included fine screening along with equipment to process screenings for final disposal. The SCADA System provides real time data and operational information that gives Plant Operators the ability to operate the plant with more accuracy and efficiency.

The Electrical Switchgear and Substation/Septic Receiving Projects were completed in 2007. The new septic receiving unit consists of an automatic screening unit, with a screenings compactor located inside a new building. An operator control panel is located on the outside of the building for the haulers to initiate the off-loading cycle. A new automated truck scale was installed, that uses a swipe card system for the haulers to weigh in and out without interaction from the plant employees. A report of all waste hauled here by each hauler is automatically generated for the billing office to enter into the billing software. The new Electrical Building houses the new switchgear and the old plant generator.

In 2006 we completed the Licking River Interceptor Project. The new 54" Interceptor and two new siphons at the confluence of the North Fork Licking River and South Fork Licking River, combined with the existing 42" sewer line, conveys more flow to the plant during rain events therefore causing fewer overflows of our Combined Sewer Overflows (CSO's). This is in accordance with the EPA's goal of reducing or eliminating CSO's. We have been in the planning and construction stages of separating, reducing or eliminating all of our CSO's, and we built a \$25 million high rate treatment (HRT) system on the west side of the wastewater treatment plant. This facility began operating in early 2011, with construction substantially completed in 2012. We received a \$5 million grant in ARRA stimulus money for the HRT project.

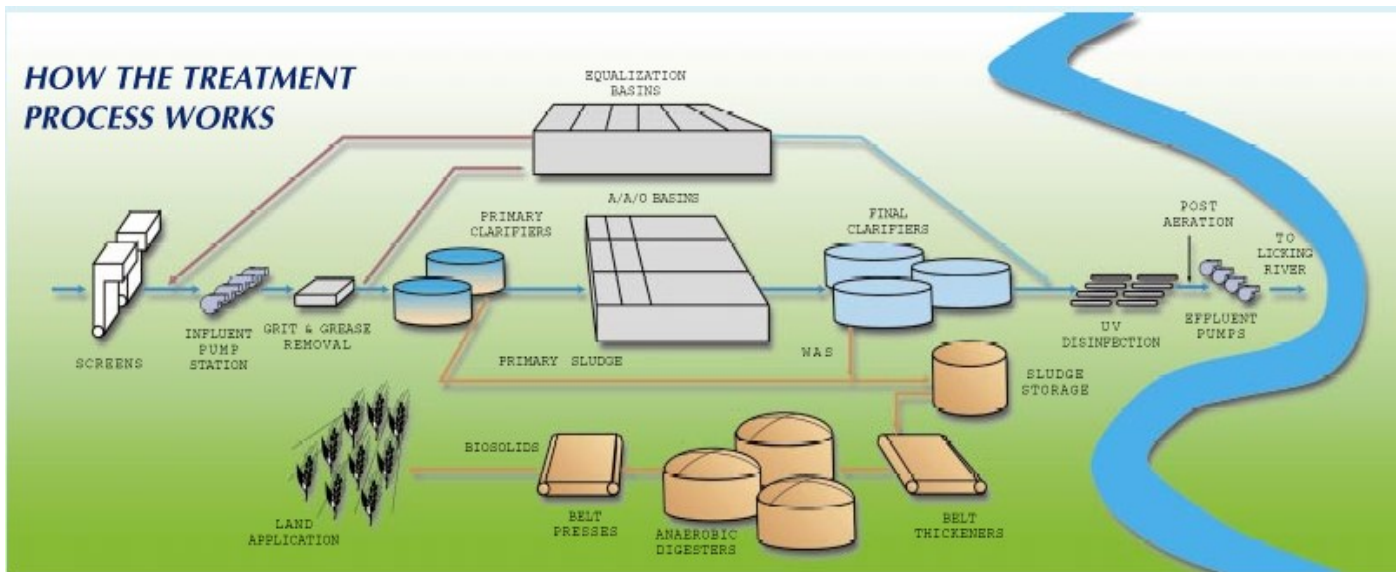
In 2013-2014 we upgraded our aeration blowers and diffusers for increased efficiency, providing substantial energy savings, along with the ability to provide full treatment while on standby generator power.

Since October 2017 the solar array has been producing electricity that is used by the Wastewater Plant. The solar array has produced over 4.3 Gigawatt hours of energy.

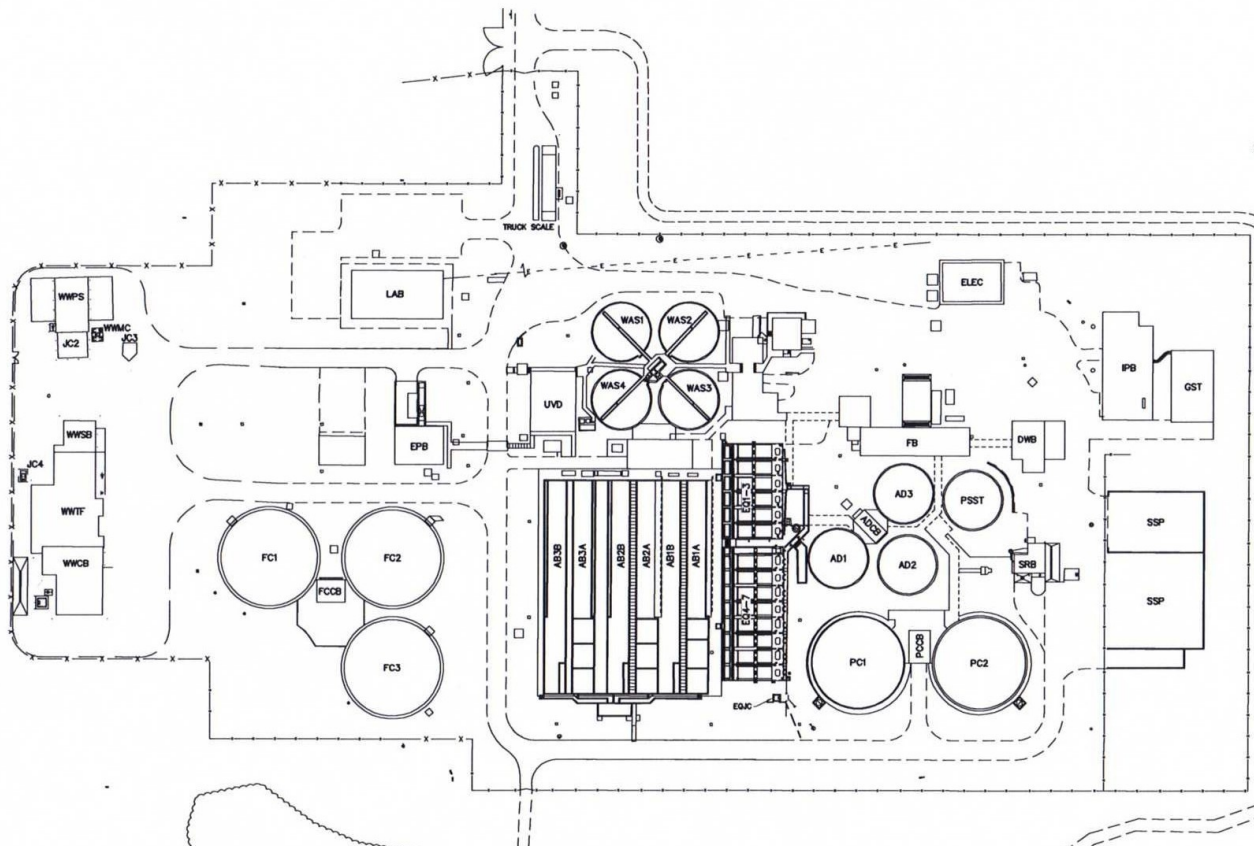
The Anaerobic Digesters project was completed in 2020. The digester lids were replaced with concrete covers. The digester were completely rehabbed with new heating, mixing and circulating equipment. Along with the new equipment we replaced all electrical controls, breakers and switches. The project removed all equipment, plumbing and electrical and replaced with new. This project will allow us to further reduce waste products while making beneficial use of the by-products (Bio-solids). Bio-solids are land applied to area farm fields for beneficial reuse of the nutrients it contains.

December 2021 started the replacement of our Ultra Violet Disinfection unit. The original UV unit has been in service since 1998. For 24 seasons the UV unit ran with I believe no violations for Fecal Coliform or E.Coli. The new Trojan Signa unit will be easier to maintain and use 60% less electricity than our old Trojan 4000 unit.

The diagram below illustrates the wet stream and solids handling processes of the treatment plant:

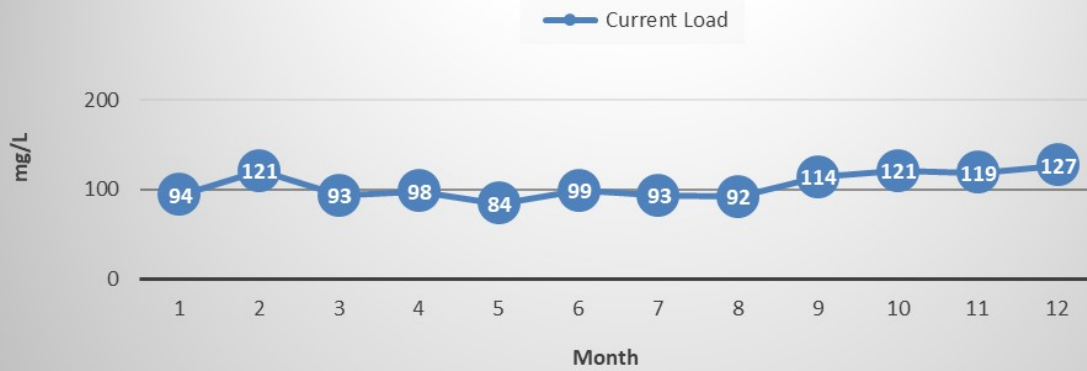


The following diagram represents an actual plant overview:

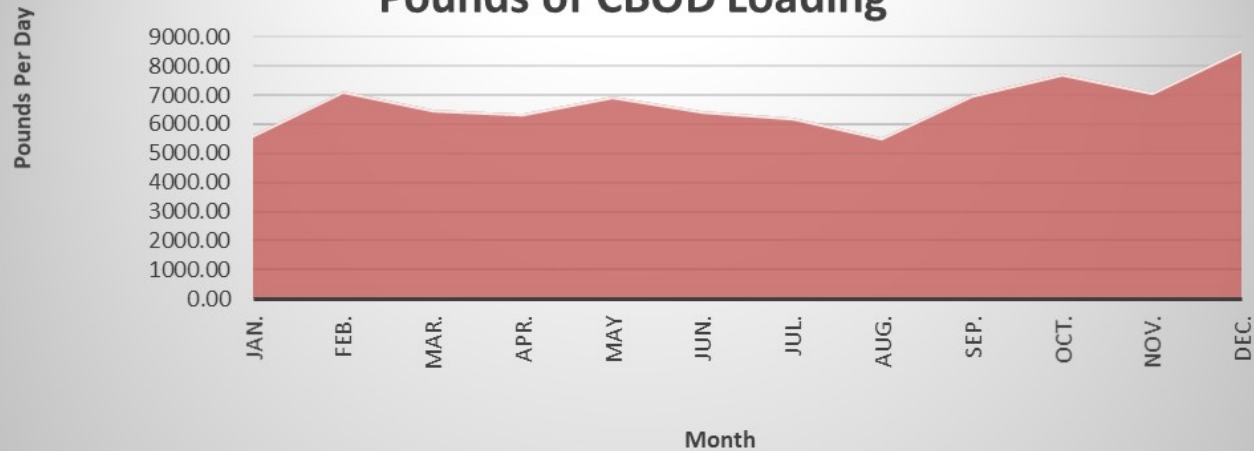


Total Flow		Ave. Flow		SS		CBOD		Raw % Rem.		Raw NH3		Final NH3		F/M		MCRT	
MG	MGD	Raw	Sett	Final	% Rem.	Raw	Sett	Final	% Rem	Raw NH3	Final NH3	Ratio	Days				
Jan.	221.94	7.16	125	52	2	98.40	94	68	2.8	97.02	10.5	0.1	0.05	15.7			
Feb.	197.73	7.06	155	71	2.3	98.52	121	90	3.1	97.44	11	1.2	0.07	16.2			
Mar.	259.59	8.37	124	63	1.8	98.55	93	75	2.5	97.31	8.9	1.6	0.05	17.0			
Apr.	233.26	7.78	151	64	1.7	98.87	98	81	2.4	97.55	10.2	0.2	0.06	15.4			
May	308.43	9.95	112	35	1.4	98.75	84	41	2.2	97.38	8.8	0.2	0.04	14.8			
Jun.	234.42	7.81	175	48	1.3	99.26	99	47	2.2	97.78	10	0.1	0.05	14.9			
Jul.	248.08	8.00	151	49	1.9	98.74	93	50	2.0	97.85	10.2	0.1	0.06	15.7			
Aug.	224.19	7.23	140	47	1.7	98.79	92	48	1.9	97.93	13.1	0.1	0.07	16.2			
Sep.	220.59	7.35	157	49	1.8	98.85	114	52	4.2	96.32	11.4	0.1	0.06	15.4			
Oct.	237.52	7.66	158	53	2.1	98.67	121	66	2.3	98.10	12.4	0.2	0.08	16.2			
Nov.	213.86	7.13	155	46	2.1	98.65	119	64	3.0	97.48	12.1	0.1	0.07	17.3			
Dec.	250.77	8.09	163	49	2.5	98.47	127	74	2.6	97.95	11.9	0.1	0.07	15.7			
Total	2850.38																
Ave.	237.53	7.8	147.2	52.2	1.9	98.7	104.6	63.0	2.6	97.5	10.9	0.34	0.06	15.9			

CBOD Loading

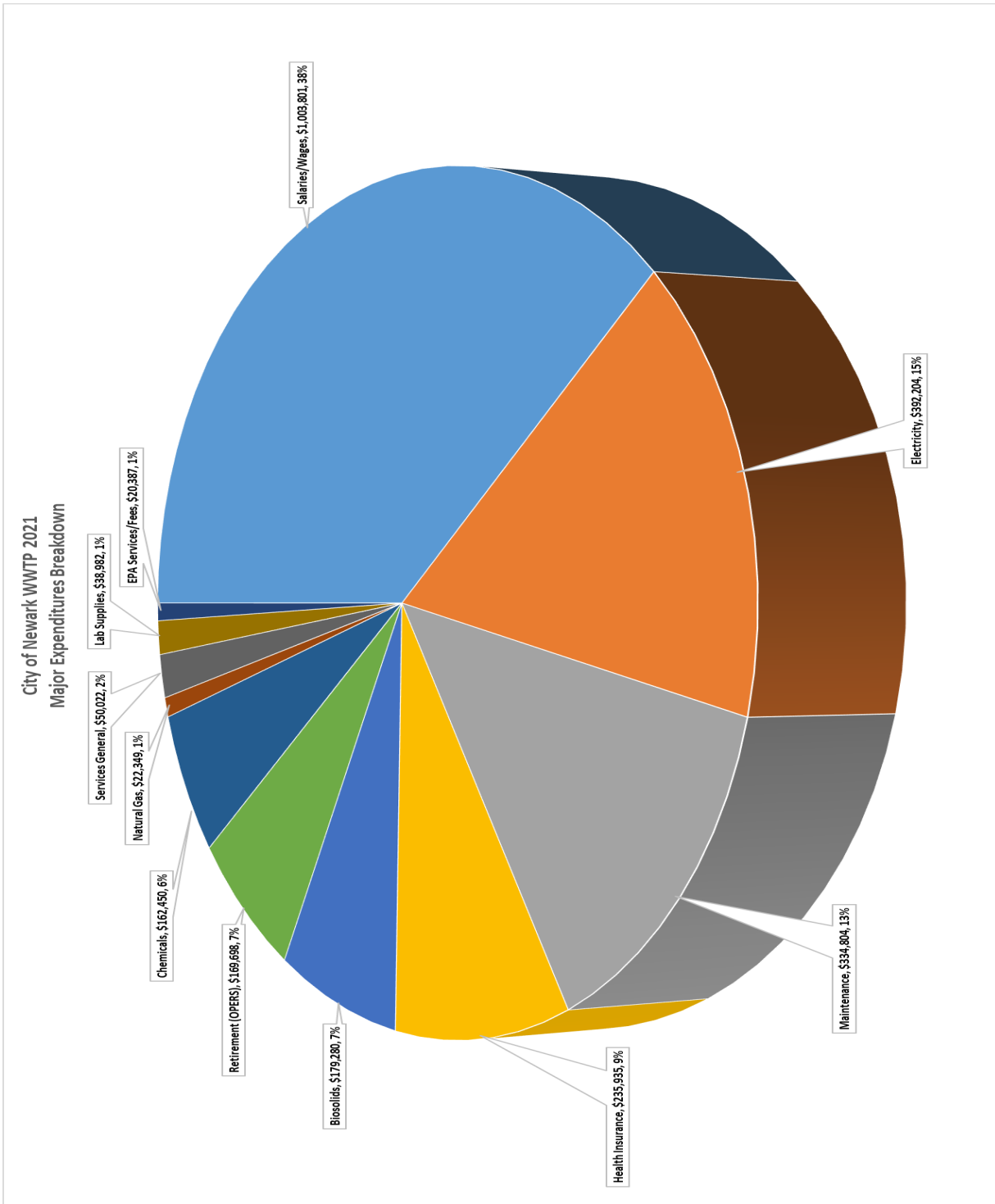


Pounds of CBOD Loading



Percent SS and CBOD Removal





Human Resources: *To have a highly competent, motivated work staff that is adequately trained and informed to run the plant in an efficient and proper manner.*

Position	Name	Years of Service
Industrial Waste Inspector	Randy McDaniel Class II Operator	33.8
Operator	Jon Moulton Class III Operator	32.1
Chemist	Nancy Taylor Class III Operator Class IV Lab Analyst	31.8
Instrumentation Technician	Jeff Krauskopf Class I Operator	29.5
Facilities Manager	Bryan Curry Class IV Operator	28.6
Maintenance Supervisor	Jay Fisher Class I Operator	19.3
Laboratory Technician	Angela Reischman Class II Lab Analyst	17.1
Maintenance Mechanic/ Operator	Fred Nance	11.1
Assistant Facilities Manager	Scott Knighton Class III Operator	9.3
Electro-Mech. Technician	Keith Doles	6.8
Operations Technician	Eric Mitchell Class III Operator	5.8
Operator	Christopher Robinson Class I Operator	3.7
Operator	Christopher Sims Class I Operator	2.5
Operator	Colton Curry	1.0
Operator	Gay Dornbirer	0.5
Operator	Hunter Ardrey	0.0

Operations: *To operate the wastewater plant as efficiently as possible with the highest degree of treatment that our facility is capable of performing.*



Salt Spreader



Turblex Blower

As shown by the data listed on page 4, the treatment operation achieved full compliance for removal of CBOD, ammonia, and suspended solids, while treating over 2.8 billion gallons of wastewater.

During this year we contracted with Alfa-Laval to refurbish both of our belt presses. The cost of the project was \$385,825. The original presses were purchased in the late 1980's. The belt presses had previously been rebuilt in 2004. Rollers, bearings, chicanes, pans, and belts were replaced, everything but the frame. Hydraulic pumps and belt drive motors were also replaced. We believe this rebuild will last at least another 15 years or until a better technological piece of equipment takes its place. These particular belt presses consistently deliver solids over 20%.

In 2013/2014 two of the original aeration blowers were replaced with Turblex compressor blowers. These blowers have been running 24/7 for the last 8 years. According to manufacture recommendations they were due to be serviced. Each blower had approximately 35,000 hours run time. The treatment plant contracted with a blower service company at a cost of \$29,000 to have both blowers tore down, cleaned, inspected for wear and bearings replaced. Both blowers showed a small bit of wear but were overall in very good shape. Hopefully with preventative maintenance we can avoid any costly breakdowns and loss of run time.

The successful operation of the wastewater treatment plant (WWTP) would not be possible without the dedication and hard work of the employees. The management and staff at the WWTP strive to provide the best service possible while surpassing EPA standards for effluent quality.

Projects Completed in 2021

- Rebuilt both Dewatering Belt Presses.
- Disassembled, cleaned, inspected and replaced bearings on both Turblex blowers.
- Rebuilt one Flyght effluent pump.
- Replaced the 3 main control valves for the aeration basins.
- Replaced mag meters for Dewatering presses.
- Replaced 30 plus year old main generator control panel.
- Continued engineering and planning for replacement UV system.
- Paint floors in Digester building.
- Replaced Dewater building overhead crane assembly.
- Rebuilt several pumps and motors.



Dewatering Belt Press

2022 Projects List

- Replace 1998 Trojan UV 4000 disinfection unit with new Trojan Signa unit.
- Recommission #1 Thickener - New PLC and flow meter.
- Add radar level indicators to influent wet well.
- Continue repairing and/or replacing all doors that are showing signs of wear after 30 plus years of use.
- Replace impellers on Return Activated Sludge pumps.
- Replace mag meter for sludge storage pumping.
- Replace last of 3 aging Mixed Liquor Suspended Solids meter.
- Replace #1 Influent pump wear rings.
- Inspect building roofs and replace or repair as needed.
- Continue replacement of aging equipment.

Environmental Laboratory and Industrial Pretreatment

- *To provide accurate and timely data for plant operational control, industrial pretreatment monitoring and regulatory reporting*
- *To ensure industrial facilities discharging to the Newark WWTP comply with local, state and federal regulations designed to protect both the integrity of the wastewater treatment process and the biological integrity of the surface waters receiving the WWTP outfall*

Highlights of 2021

The Newark Environmental Lab continues to provide data for WWTP process control, provide industrial surveillance, and enable investigative studies of the collection system. Approximately 16,248 routine analyses were performed in-house in 2021, with an overall QA/QC analysis rate higher than the 10% required by Ohio EPA.

The Newark Environmental Lab analyzed 1,813 industrial samples for various parameters as part of the City of Newark's Industrial Pretreatment Program.

DMR-QA Study 41

In 2021, the Newark Environmental Laboratory participated in USEPA's DMR-QA Study 41. This mandatory laboratory proficiency study uses a single blind approach by sending unknown samples to individual labs for testing. After analysis, the testing labs submit the results for grading.

The Newark Environmental Lab participates in this blind testing for 19 parameters annually as part of the mandatory DMR-QA study. In 2021, all but one of the parameters required by Newark's NPDES permit were graded as "acceptable" for accuracy on the first attempt. The cBOD testing failed due to a problem with the refrigerator where the DMRQA vials were stored. A follow-up Proficiency Testing Study was performed on cBOD, and the parameter was graded "acceptable" in the follow-up.

Industrial Pretreatment Program

The Industrial Pretreatment Program generated \$482,517.11 in 2021 through the Industrial Surveillance and Surcharge Program. Each industry that has a significant discharge to the City's sewer is billed based on pounds of cBOD, Solids, and Ammonia that are present in their wastewater. This bill is in addition to the standard water and sewer bill that all customers pay based on cubic feet of water used. While these parameters are present in all wastewater, even residential sewage, industrial contributions that are higher than the residential "background" levels can increase the amount of money required to effectively treat these waste streams. Generally speaking, increased cost translates into more electricity required to achieve effective aeration, as well as increased trucking costs to haul biosolids (the end product of treatment) offsite. By billing industries for the pounds of "high strength" wastewater each discharges, the City can recoup some of the cost of treatment in a fair and consistent manner.

Each industry is also charged a flat surveillance fee based on the number of times samples are collected at each facility. Frequent sampling of each significant industrial user helps to establish a waste profile of each industry's "baseline" discharge. Any departures from baseline are usually detected promptly and appropriate action is taken before the WWTP experiences a problem. The purpose of the Industrial Pretreatment Program is to protect the WWTP from toxicity that could be discharged from our industrial users. Toxic loads can kill off the bacteria used to treat wastewater at the WWTP, resulting discharge of untreated sewage to the Licking River.

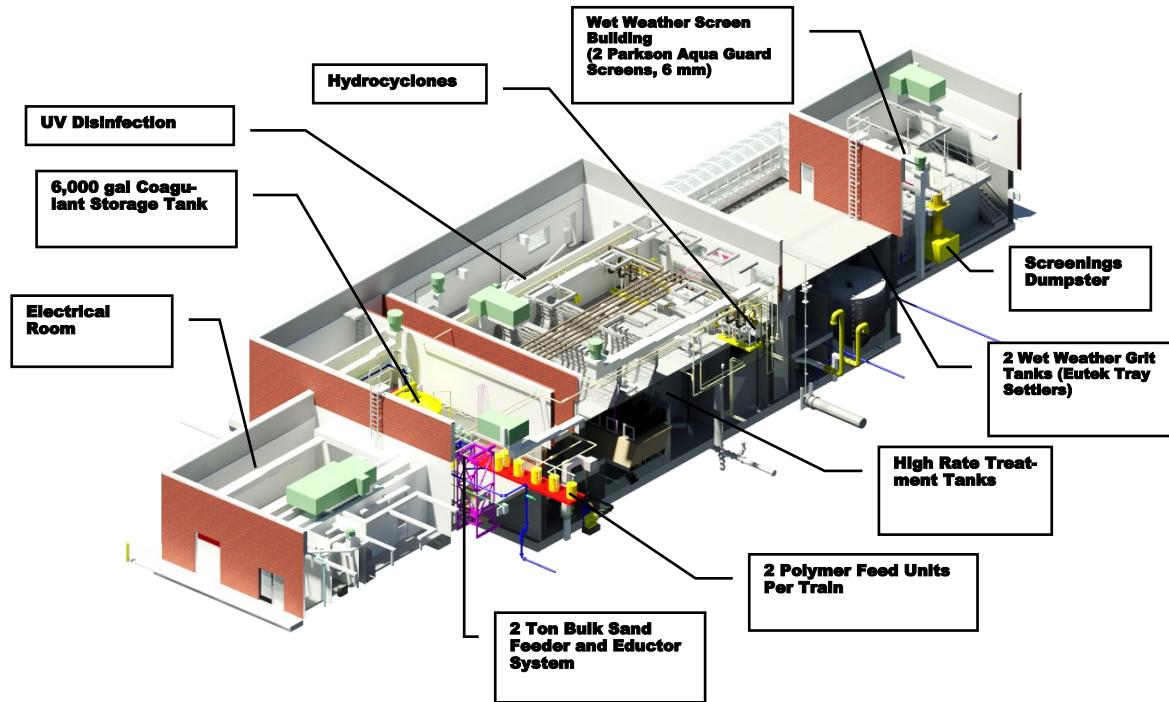
The Industrial Pretreatment Program is mandated by the Code of Federal Regulations.

2021 Completed Project List

- Continued employee training
- SOPs, benchsheets, and Quality Assurance Plan updated
- Finished autosampler replacement plan; 1 discrete sampler purchased in 2021
- Continued inventory control program
- Purchased an infrared thermometer to monitor high temp ovens and muffle furnace for accuracy
- Identified other laboratory equipment that will be replaced as funds become available

Goals for 2022

- Continue employee training
- Dispose of more hazardous chemical waste generated from lab operation
- Continue inventory control program
- Continue with equipment replacement plan
Ammonia meter and TKN manifold are high priority for 2022
- Continue updating SOPs, benchsheets and Quality Assurance Plan as needed



High-rate treatment unit

Our High Rate Treatment facility began operating while still under construction in 2011, before it was completed in 2012. This process treats wet weather flows that have been re-routed here after several planned collection system improvements. During heavy rains, when the collection system gets above its capacity to convey flow to the wastewater treatment plant, the system was previously designed to relieve itself by overflowing into the river. The EPA has given us requirements to reduce these overflows, and we are achieving this by treating these flows in a high-rate treatment system. This process consists of influent pumping, screening, grit removal, coagulation and flocculation, disinfection, and discharging up to 28 million gallons per day of treated water into the Licking River. Phase II of our Long Term Control Plan was recently completed, with recommendations for \$61 million in future projects. Construction has already begun on the next phase of sewer separations and improvements to the Collection system.

Through the collective efforts of everyone in our department, we strive to make this addition to our facility a successful operation.



Final Comments from the Facilities Manager:

This past year (2021) the treatment plant was able to upgrade and refurbish some of our critical equipment. These pieces of the wastewater treatment process are critical to maintaining good quality effluent and biosolids for land application. Although it has been 34 years since the last major upgrade, we are dedicated to continuing to rehab and refurbish equipment along the way in order to maintain the quality of clean water that we produce. The continued dedication of the Wastewater Treatment staff has ensured that clean recreational water is returned to the Licking River.

Why do we put so much time and energy into treating used water? Isn't water just about everywhere? Three quarters of the earth's surface is covered by water, but of that, only 3% is usable freshwater. To make matters worse 77% of the freshwater is frozen in polar ice caps and glaciers. Another 22% is groundwater. It is amazing to think that of all the water in the world only a small fraction is available for us to use. We cannot treat water as if we have an unlimited source. Water is definitely a finite, precious resource in need of protection.

The City of Newark, through proper operation of its wastewater treatment plant, makes a small, but important contribution to preserving the nation's water supply. Preventing the discharge of pollutants into the waterways of this area preserves the water for others and allows people to continue their way of life. We can never take this unique and precious resource for granted. We must continue to be protective of our vital water resources. The employees of the City of Newark Wastewater Treatment Plant can be proud of the work they have accomplished in 2021 and look forward to meeting challenges of preserving our water resources in 2022.

-Bryan Curry, Wastewater Facilities Manager

