

City of Newark Wastewater Treatment Plant Annual Report 2022



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.

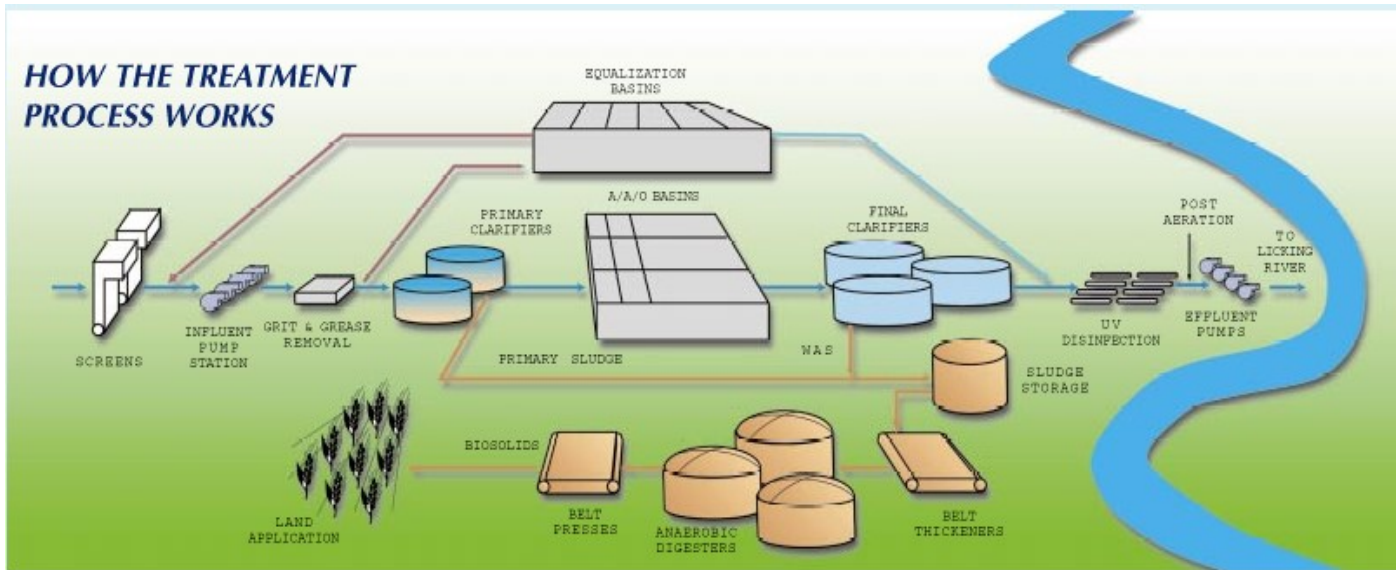
In 2013-2014 we upgraded our aeration blowers and diffusers for increased efficiency, providing substantial energy savings, along with the ability to provide full treatment while on standby generator power.

Since October 2017 the solar array has been producing electricity that is used by the Wastewater Plant. The solar array has produced over 5.2 Gigawatt hours of energy.

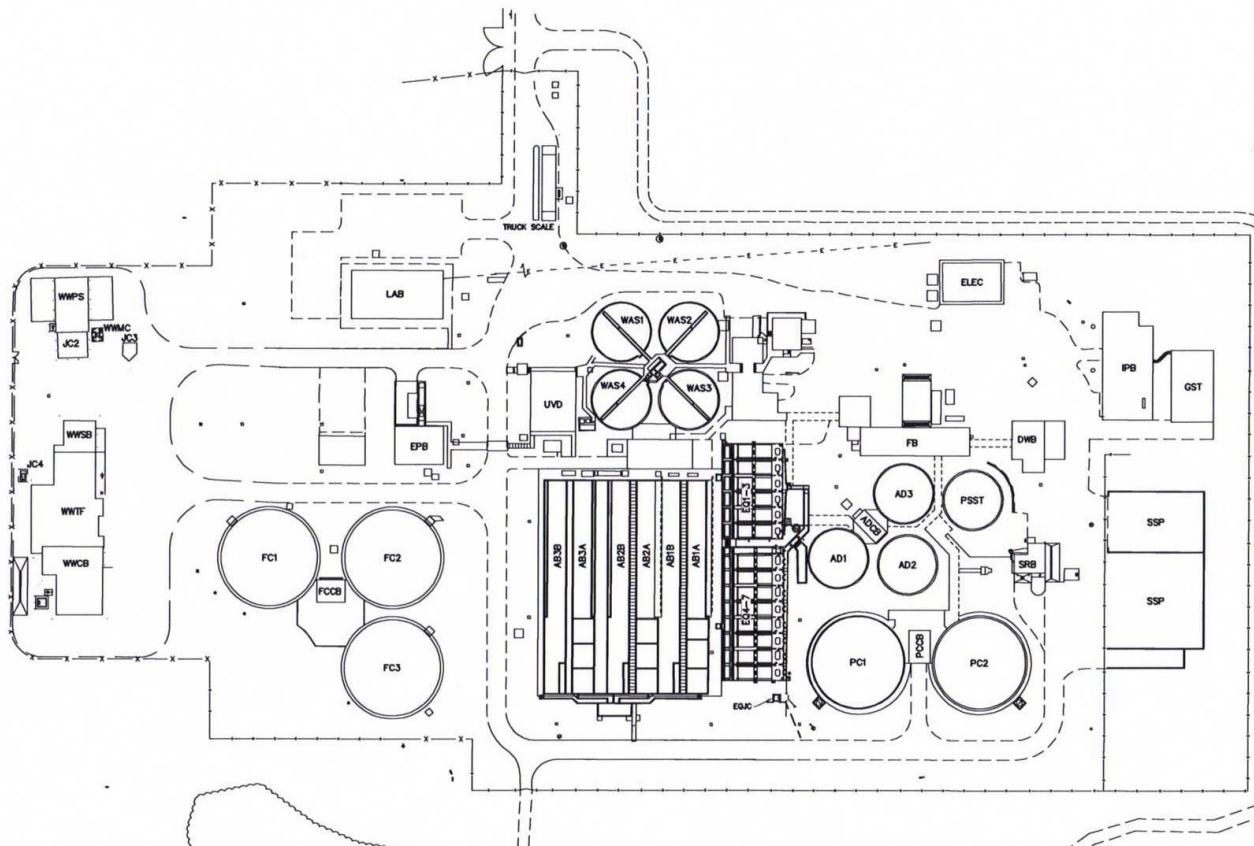
The Anaerobic Digesters project was completed in 2020. The digester lids were replaced with concrete covers. The digester were completely rehabbed with new heating, mixing and circulating equipment. Along with the new equipment we replaced all electrical controls, breakers and switches. The project removed 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.

Replacement of the Ultraviolet Disinfection System (UV) was completed in 2022. The original UV unit had 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:

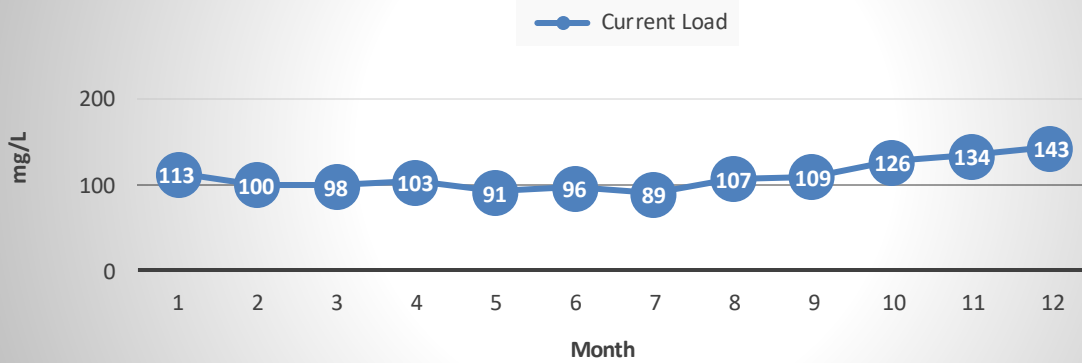


The following diagram represents an actual plant overview:



Total Flow		Ave. Flow	SS		CBOD		Raw		Final	F/M	MCRT		
MG	MGD	Raw	Sett	Final	% Rem.	Raw	Sett	Final	% Rem	NH3	Ratio	Days	
Jan.	257.81	8.32	154	45	2.3	98.51	113	69	2.8	97.52	11.1	0.08	11.6
Feb.	351.25	12.54	156	60	2.6	98.33	100	85	3.3	96.70	8.2	0.11	14.1
Mar.	331.23	10.68	127	56	1.7	98.66	98	76	2.5	97.45	7.8	0.10	10.1
Apr.	290.18	9.67	138	49	2.1	98.48	103	65	2.9	97.18	9.6	0.09	10.6
May	366.69	11.83	136	44	2.4	98.24	91	57	3.3	96.37	8	0.10	11.4
Jun.	287.04	9.57	164	49	1.7	98.96	96	53	2.6	97.29	8.4	0.08	13.2
Jul.	277.89	8.96	140	43	1.6	98.86	89	47	2.0	97.75	10	0.07	16.7
Aug.	240.41	7.76	155	51	1.8	98.84	107	54	2.2	97.94	9.6	0.07	14.0
Sep.	216.36	7.21	142	50	2.8	98.03	109	59	2.9	97.34	11	0.09	15.7
Oct.	190.13	6.13	174	58	3.3	98.10	126	76	3.0	97.62	13.7	0.09	17.6
Nov.	193.52	6.45	186	71	3.3	98.23	134	104	3.4	97.46	15.1	0.10	17.7
Dec.	209.06	6.74	146	68	5.5	96.23	143	157	4.7	96.71	13.3	0.10	15.6
Total	3211.57												
Ave.	267.63	8.8	151.5	53.7	2.6	98.3	109.1	75.2	3.0	97.3	10.5	0.09	14.0

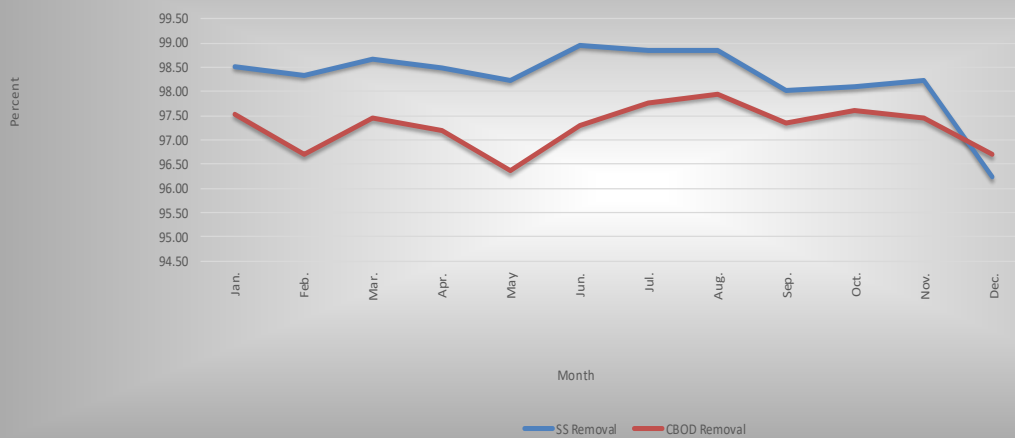
CBOD Loading



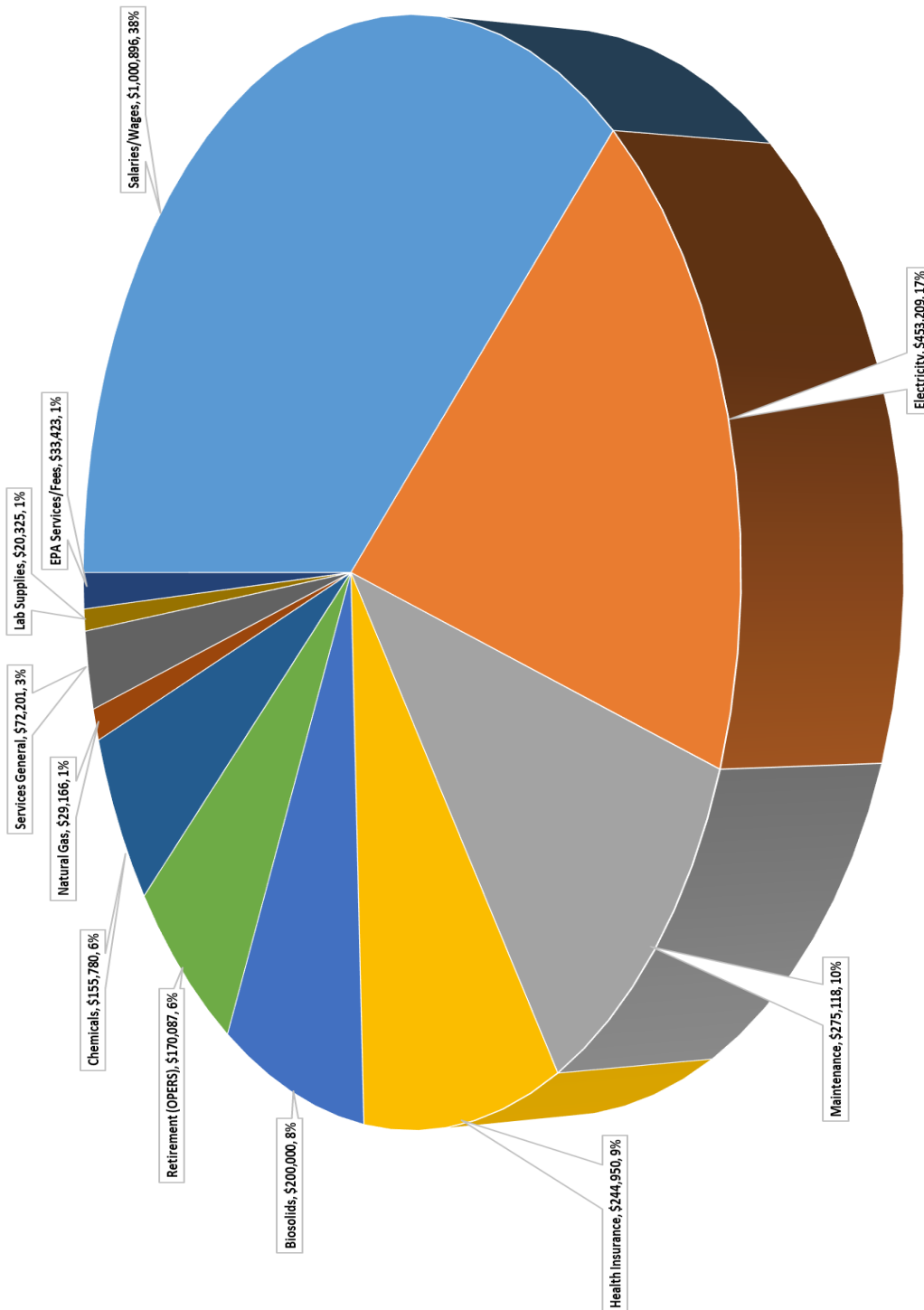
Pounds of CBOD Loading



Percent SS and CBOD Removal



City of Newark WWTP 2022
Major Expenditures Breakdown



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	34.8
Operator	Jon Moulton Class III Operator	Retired
Chemist	Nancy Taylor Class III Operator Class IV Lab Analyst	32.8
Instrumentation Technician	Jeff Krauskopf Class I Operator	30.5
Facilities Manager	Bryan Curry Class IV Operator	29.6
Maintenance Supervisor	Jay Fisher Class I Operator	20.3
Laboratory Technician	Angela Reischman Class II Lab Analyst	18.1
Maintenance Mechanic/ Operator	Fred Nance	12.0
Assistant Facilities Manager	Scott Knighton Class IV Operator	10.3
Electro-Mech. Technician	Keith Doles	7.8
Operations Technician	Eric Mitchell Class III Operator	6.8
Operator	Christopher Sims Class I Operator	3.5
Operator	Colton Curry	2.0
Operator	Gay Dornbirer Class I Operator	1.5
Operator	Vincent Hickman	0.3
Operator	Terry Saunders	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.*



Trojan Signa UV Disinfection

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 3.2 billion gallons of wastewater.

During this year we replaced our 24 year old Trojan 4000 UV system. The new Trojan Signa contains fewer lamps than the old system and should use about 1/3 as much energy as the previous system. The system has been in place since the beginning of the disinfection season (May 1st) and has performed without flaw achieving E.Coli test results well below the limits set by the Ohio EPA.

During the upgrade of the ultraviolet disinfection system, we had covers put on the final clarifier troughs. These troughs were notorious for growing lots of algae in the summer and the operators would have to clean them weekly. The algae would then collect on the UV lamps and need to be removed. With the covers in place algae does not grow and the disinfection of the effluent is not affected.



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 2022

- Replaced 1998 Trojan UV 4000 disinfection unit with new Trojan Signa unit.
- Added covers to the final clarifier laundering troughs.
- Replaced 4 out of 10 obsolete Programmable Logic Controllers (PLC) along with upgrading associated SCADA screens.
- Recommissioned #2 Thickener - New PLC.
- Replaced mag meter for sludge storage pumping.
- Replaced/repared several entryway doors around the plant.
- Inspected building roofs and in the process of replacing or repairing.
- Painted bridges over the Sludge Storage tank and 2 WAS holding tanks.
- Painted floors in Filter building.
- Painted floor in Environmental Lab.
- Rebuilt several pumps and motors

2023 Projects List

- Replace roof on the Influent pump building .
- Minor repairs to several of the plant roofs .
- 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.
- Paint Environmental Lab cabinets.
- Replace last of 3 aging Mixed Liquor Suspended Solids meter.
- Replace #1 Influent pump wear rings.
- Replace mag meters for #1 and #2 thickeners.
- Continue replacement of aging equipment.
- Continue replacing obsolete PLCs

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 2022

The Newark Environmental Lab continues to provide data for WWTP process control, provide industrial surveillance, and enable investigative studies of the collection system. Approximately 16,156 routine sample analyses and 3,911 QC analyses were performed in-house in 2022. This equates to an overall QA/QC analysis rate higher than the 10% required by Ohio EPA.

The Newark Environmental Lab analyzed 1,844 industrial samples for various parameters as part of the City of Newark's Industrial Pretreatment Program.

Tectum Inc., a division of Armstrong Ceilings, began discharging Industrial Waste to the City's collection system. In the past, this industry discharged non-hazardous industrial process wastewater to settling ponds on their property. The ponds allowed solids and water to separate, and the water either evaporated from the pond, or overflowed to the Licking River during heavy rain events. These ponds were permitted by OEPA through the NPDES permitting process, however OEPA directed Tectum to transition from the ponds to the City sewer for discharge of all industrial wastewater. Tectum upgraded its TSS removal system, and has installed an extensive pH adjustment pretreatment system in order to comply with Newark's requirements for industrial dischargers. Newark issued Administrative Orders to this industry in October 2022, allowing industrial wastewater discharge to the City sewer to begin.

DMR-QA Study 42

In 2022, the Newark Environmental Laboratory participated in USEPA's DMR-QA Study 42. This mandatory laboratory proficiency study uses a single blind approach by sending participating laboratories samples of known value for various parameters. The Study Provider knows the value of each standard, but the participating laboratories do not know the value prior to analysis. After analysis, the labs submit the results for grading. Each year, Newark is required to analyze 19 parameters as part of the mandatory DMR-QA study. In 2022, all but one of the parameters required by Newark's NPDES permit were graded as "acceptable" for accuracy on the first attempt. The O&G testing failed due to issues during the solvent extraction. A follow-up Quick Response Study was performed, and the repeated O&G result was graded "acceptable", indicating no systemic errors with our analytical procedures.

Industrial Pretreatment Program

The Industrial Pretreatment Program generated \$618,002.71 in 2022 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.

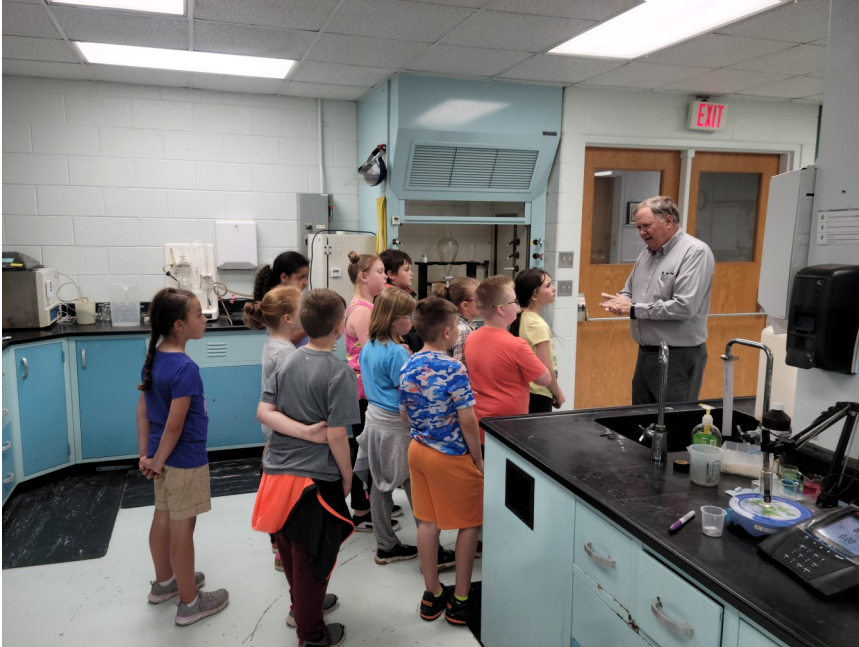
2022 Completed Project List

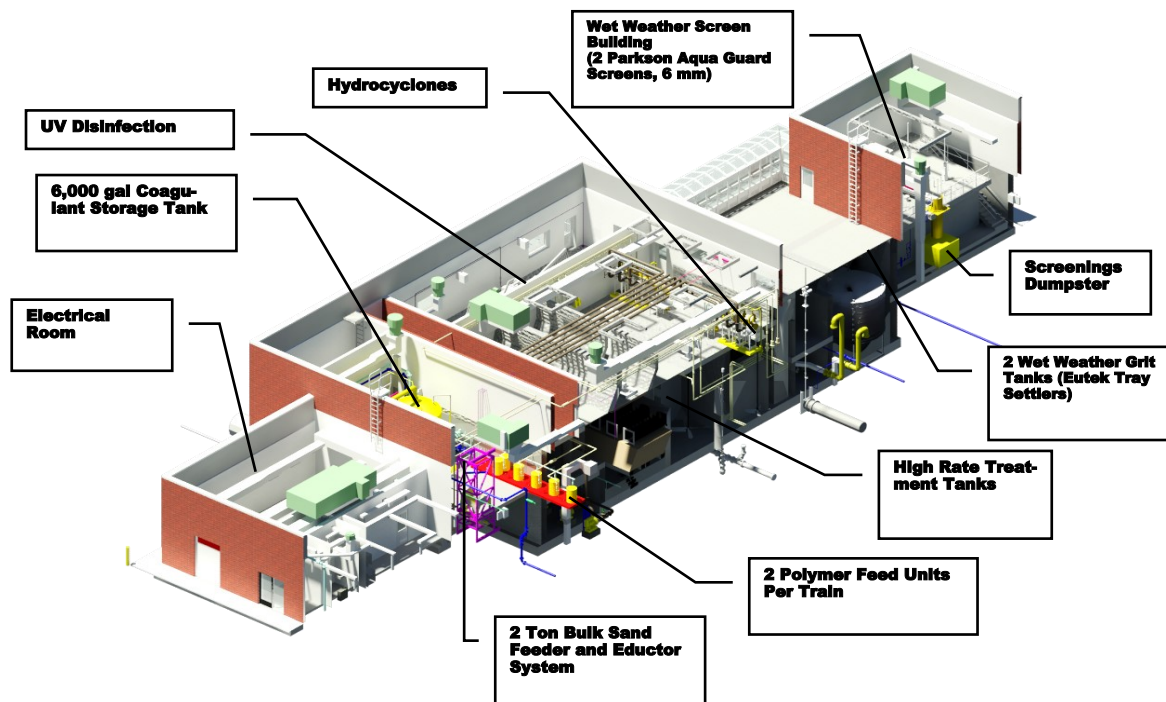
- Continued employee training
- Continued inventory control program
- Replaced Ammonia meter
- Identified other laboratory equipment that will be replaced as funds become available

Goals for 2023

- Continue employee training
- Dispose of more hazardous chemical waste generated from lab operation, including FAA source lamps
- Continue inventory control program
- Continue with equipment replacement plan
- Continue updating SOPs, benchsheets and Quality Assurance Plan as needed

Tour Groups





High-Rate Treatment

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 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:

Continuing to press on replacing old and outdated equipment to further the life of the treatment plant has been a major goal of 2022. Although it has been 35 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 2022 and look forward to meeting challenges of preserving our water resources in 2023.

-Bryan Curry, Wastewater Facilities Manager

