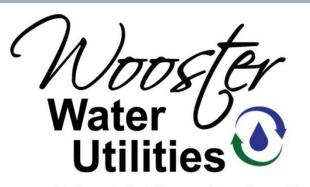
WooPoo™ and the Power of #2 Wooster's Bioenergy Adventure

"Safety, Reliability and Excellence!"



"Safety, Reliability, and Excellence!"



The Mission begins with a Vision

* Our Mission

The mission of the City of Wooster is to partner with our community to deliver services, conserve resources, protect quality of life, and plan for the future. We will endeavor to accomplish this mission in the most efficient and fiscally responsible manner possible, and in accordance to the City of Wooster's Core Values. The Daily Mission of Clean Water is our resolve.

* Our Vision

Stakeholders, customers, and peers recognize our utility as a leader of excellence. Our focus is to be the epitome of public servanthood, stewardship, environmentally conscious, and dedicated to our community. <u>The Daily Mission of Clean Water is our vision</u>.

* Our Values

Our values create cultural expectations and define the pursuit of excellence in public servanthood. The Daily Mission of Clean water is defined by our values.

A 1894 Vision

- * In 1894, Minor Scovel reported to the Wooster Water Commission to help find sustainable water sources for public wellbeing and safety.
- * Socvel urged elected officials to find a ground water source with a focus on public health. The study determined a safe ground water source at the site of the first treatment plan near Old Mansfield Road.
- * It took nearly 40 years before Scovel's recommendation became a reality. The report urged elected officials to spend no more than \$40,000 to build a modern water treatment plant to ensure public health. Scovel stated in the report,

"Poor water is dear, and pure water is cheap at any prices."

356 is to 1, the 356 representing the habitations in the Apple creek water shed, including the towns of Apple Creek, Edinburgh. and Honeytown, together with their barn yards, pig pens, vallts. the Distillery, Brewery, Slaughter Mouses, and other similar nuis ances.

Can we afford to take the chances. Poor water is dear, and pure water is cheap at any price. Here are some interesting cor parative figures concerning city water supplies and typhoid feve deaths, during the year 1890; taken from the Census report. Thesince receiving from you upon Oct. 1st, 1894, the necessary

cities take their water supply from the rivers.

City.	Deaths from all causes.	Deaths from Typhoid.
Cincinnati, 0.	6,640	151
Pittsburg & Allegheny City, Pa.	7,328	496
Philadelphia, Pa.	23,738	770
Chicago, Ill. (River pollutes Lake). 23,162		794
Washington, D. C.	5,955	200
Nashville, Tenn.	1,376	49

WOOSTER, OHIO, Nov. 19th, 1894. , 189

Honorable Council

of the city of

Wooster. Ohio.

iation and your ratification of our election of a Consultinser, your Water Extension Commission has diligently conits investigations on the subject of securing an adequate

lesome public water supply. evious reports have briefly outlined the discoveries your ioners have made, and this final report will embrace a m

scussion of the problem to be solved, the factors and co affecting its solution, together with the conclusions mission, and the report, estimates of cost and recomme

tions of our Consulting Engineer.

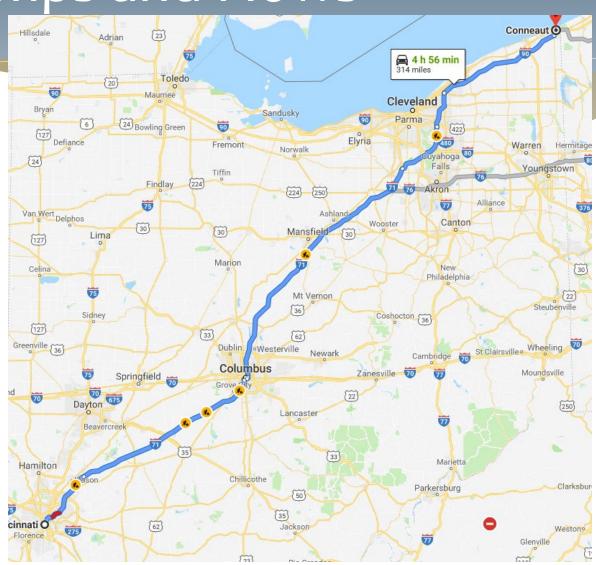
The very first question was; - "What do we want water for fire or domestic purposes?* In short, for what sort of

t we make our search?



Pumps and Flows

- * 160.7 miles of water main
- * 161.6 miles of sanitary sewer main
- Enough pipe line to cover one corner of the state to the other.

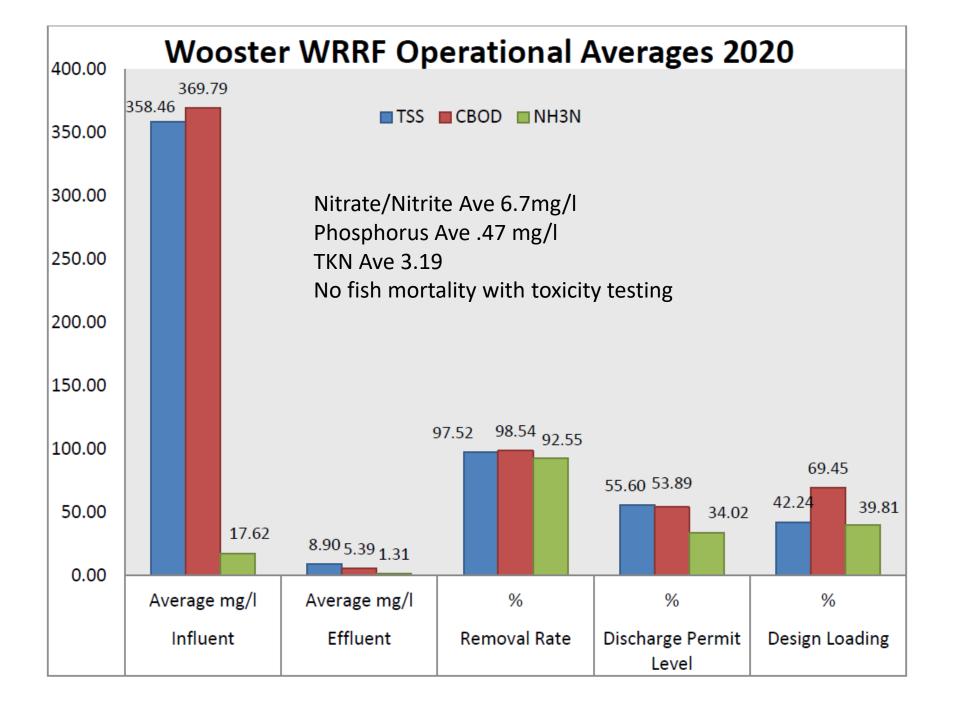


About Us

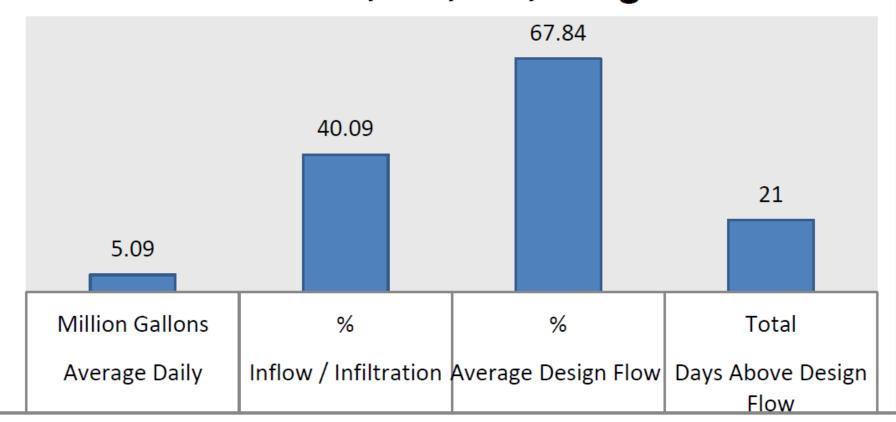
- * Wooster Water Utilities (WWU) is owned by the citizens of Wooster, Ohio and operated by stewards.
- * Services provided include water treatment and distribution, wastewater treatment and collection, and any service to ensure the delivery and treatment of water for the citizens of Wooster.
- * WWU serves a current population of 27,000 people with 9,907 active utility accounts, in a nearly 17 square mile service area. WWU has a total of 32 employees and operated with a requested 8.9 million dollar budget in 2019, came in 20% under budget due to project delay.

Water Resource Recovery Facility

- * WRRF assets include 162 miles of sanitary sewer main, ten lift stations, and a modern treatment facility with anaerobic digestion including the co-generation of methane gas and electrical energy for facility operation. Additional assets include a staff of thirteen individuals.
- * In 2020, the WRRF treated 1.86 billion gallons.
- * 2020 ADF was 5.08 million gallons, or 67.84% of the facility design capacity of 7.5 million gallons per day. The facility was designed with the peak high flow rate of 27 million gallons per day.
- * ADF design was exceeded 21 days in 2020 directly related to 34 inches of precipitation. I&I estimate of annual flow is 40.09%.





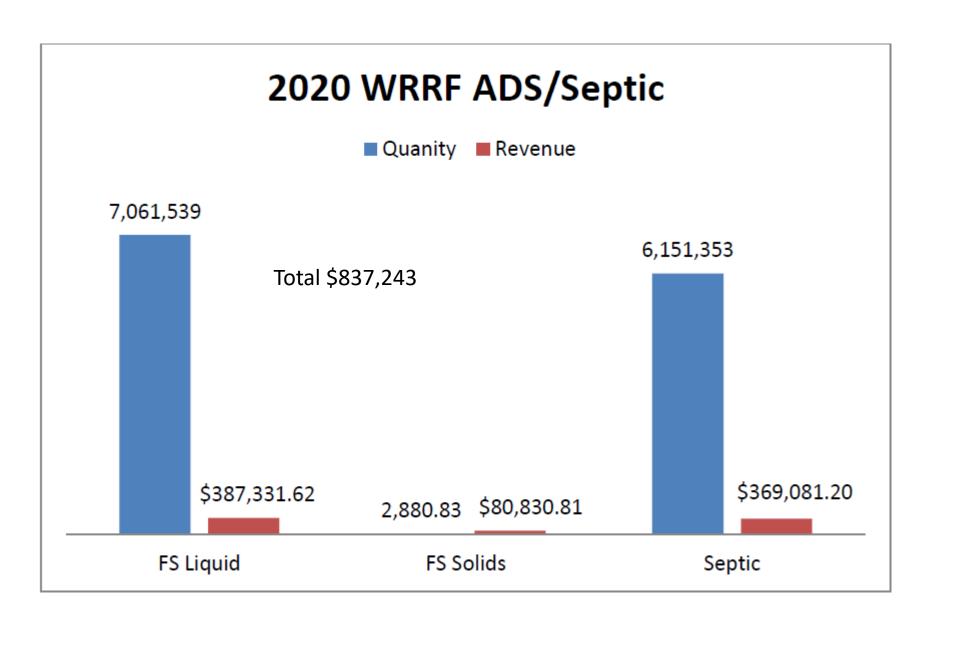


ADS and Power 2019

- * 4.3 megawatts of power, or 48% of facility electrical needs which resulted in \$229,703 of "savings". Current goal for 2020 is 60%.
- * \$1,065,457 of revenue through accepting third party waste at the facility. 46% (food waste), 41% (septic) and 13% (cake)
- * 2,466 dry tons (16.3 million gallons) of beneficial reuse biosolids to agricultural fields.

ADS and Power 2020

- * 1.85 megawatts of power, or 27% of facility electrical needs which resulted in \$79,337 of "savings".
- * \$837,243 of revenue through accepting third party waste at the facility. This was a 7.5% reduction due to facility issues and in ability to accept.
- * 3,791 dry tons (18.231 million gallons) of beneficial reuse biosolids to agricultural fields.

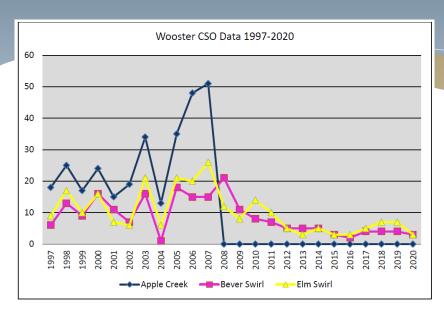


Industrial Pretreatment

- * The WRRF manages an Industrial Pretreatment Program to meet state and federal regulatory requirements.
- * Total of 9 Significant Industrial Users and a total of 17 routine sample sites. Surcharges totaled \$597,942 in 2020.



Combined Sewer Systems

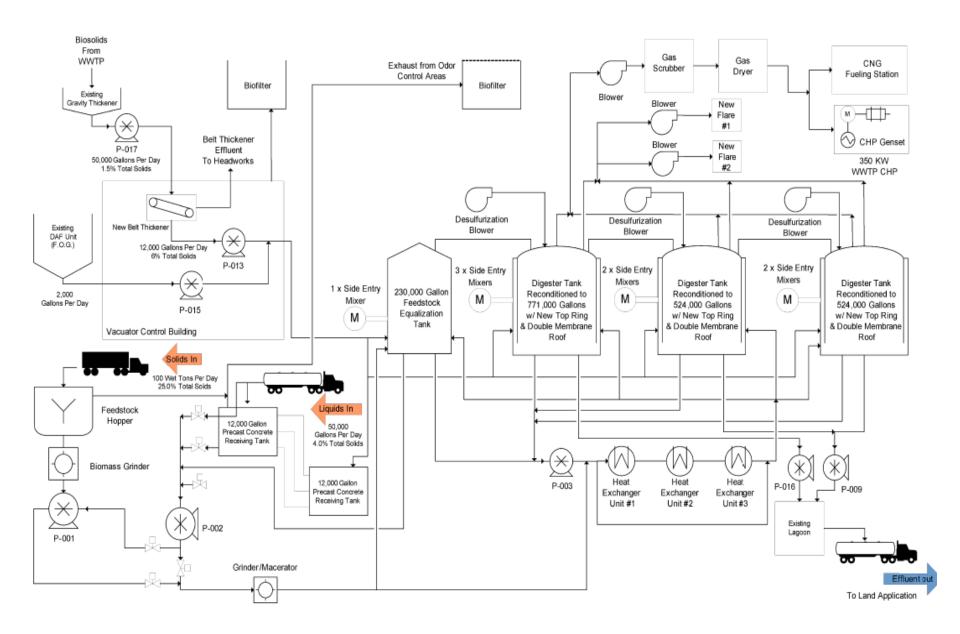


* To date, 15 separation projects have been completed with a total system investment of \$9,276,235.13. The intentional focus on proper conveyance ensures system reliability and to ensure local water way integrity. Reduction and elimination of combined systems and infiltration sources is not only wise businesses practice but prudent in the mission of clean water.



Bioenergy Partnership

- * 2014 partnership with private venture. By 2017 Wooster was the sole owner and operator.
- * BioHio- OSU Wooster was involved in local partnerships and research.
- * Wet stream was previously improved, the partnership allowed for economical solids stream improvements. Digester Rehabilitation
- * Ability to receive additional revenue and utilize selfsufficient green technology.

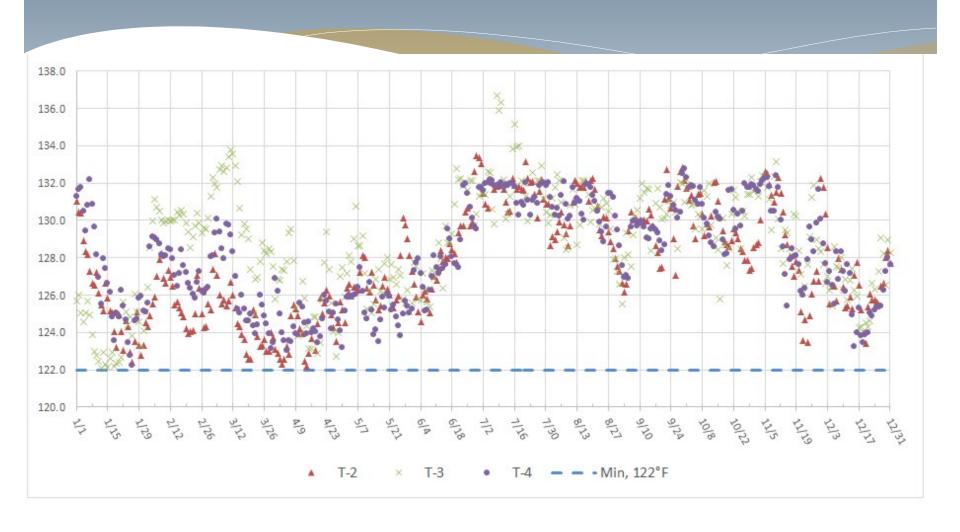


Bioenergy Basics

- * Anaerobic digestion, microorganisms break down organic material in the absence of oxygen. Treatment occurs in airtight tanks with mixers and heat exchangers. Intentional dosing efforts.
- * Feedstocks (biosolids, food waste, FOG,GoJo) are delivered via truck by waste haulers and facility generated solids. The material is macerated and blended into a homogenous slurry and dosed into the system. In the tanks, the material is kept at above 122°F (Thermophilic) and continuously mixed to maintain the optimal environment for anaerobic bacteria.

Bioenergy Basics

- * Bugs breakdown organic waste by feeding on the fats, proteins, sugars and starches. Greater than 15 days, 2020 was 31. The bacteria produce biogas which is typically composed of 60 to 65% methane, 30 to 40% carbon dioxide and other trace gases. Acute testing with OSU Wooster has indicated results as high as 89% methane.
- * Harvested gas is used to run the generator, heat exchangers and recovered heat of the engine.



Total ADS Flow Income	\$1,065,475.47
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2019

KW

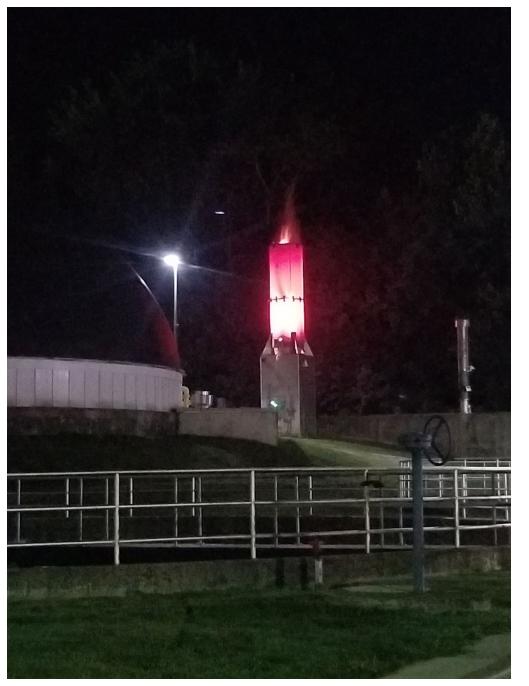
Produced
382,723
373,097
598,663
575,442
567,880
514,047
192,219
0
0
400,136
427,528
256,852
357,382
4,288,587

Total ADS Flow Income \$837,243.63

2020

KW

	Produced
January	388,658
February	487,397
March	314,406
April	358,236
May	249,187
June	0
July	0
August	0
September	22,421
October	29,248
November	0
December	0
Average	154,129
Total	1,849,553



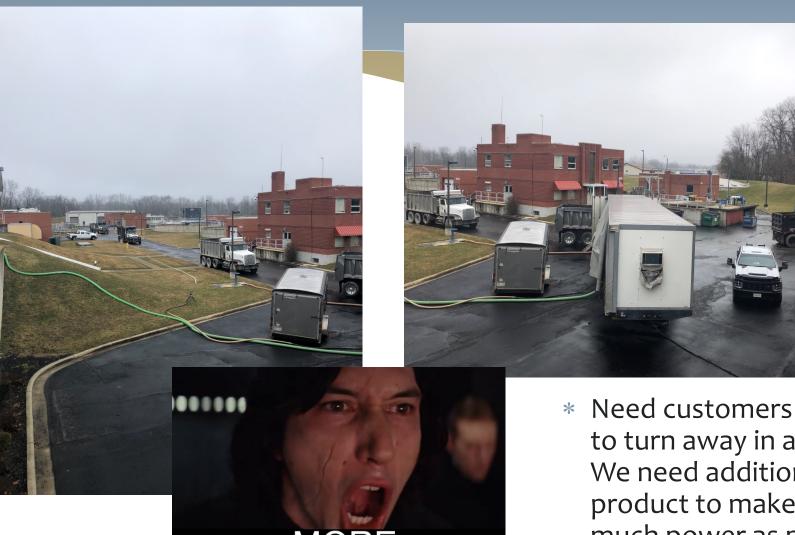
"It'll be a hot one, on the old town tonight!" Photo Credit Chad Frank



When you don't have CHP Heat

- * Single back up boiler is on natural gas \$12,000 / month
- Emergency purchase of a biogas boiler for back up
- * Scheduled for install June 10, 2021. This will use digester gas to heat.





* Need customers – hard to turn away in a pinch. We need additional product to make as much power as possible.

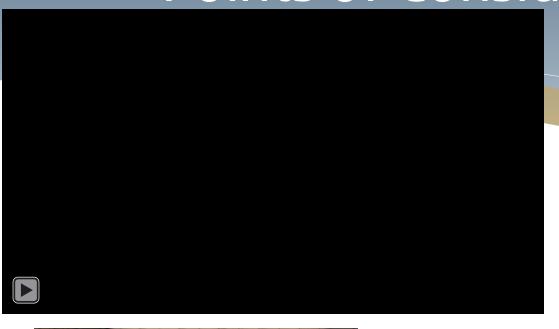
* 8 million gallons of lagoon space-rate of 44,000 gpd.





* Even with Class A mother nature has to cooperate.



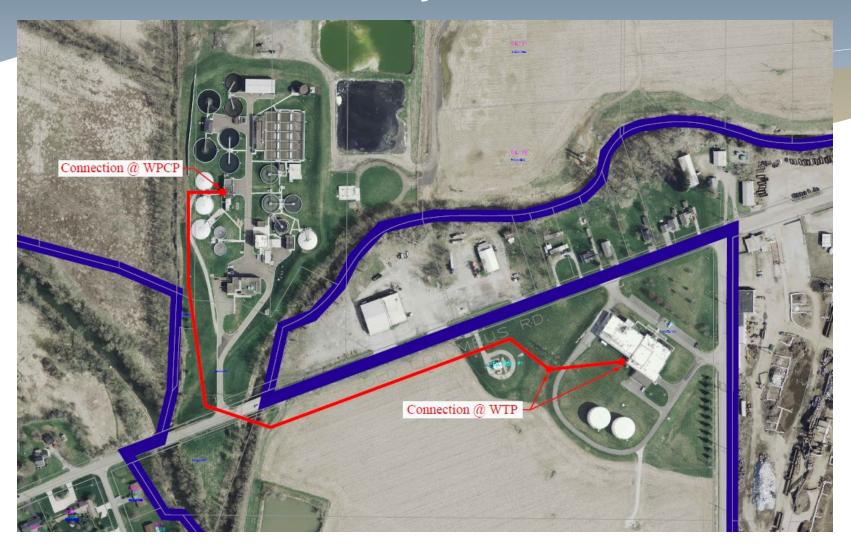




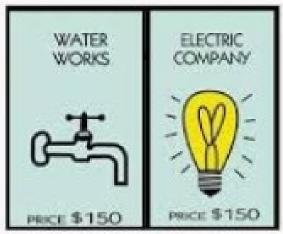


* When making your own power-you own the lines and transformers, capacitors etc., reporting. Whole new level of knowledge and troubleshooting. Power fails on you.

Water Facility off AEP Grid

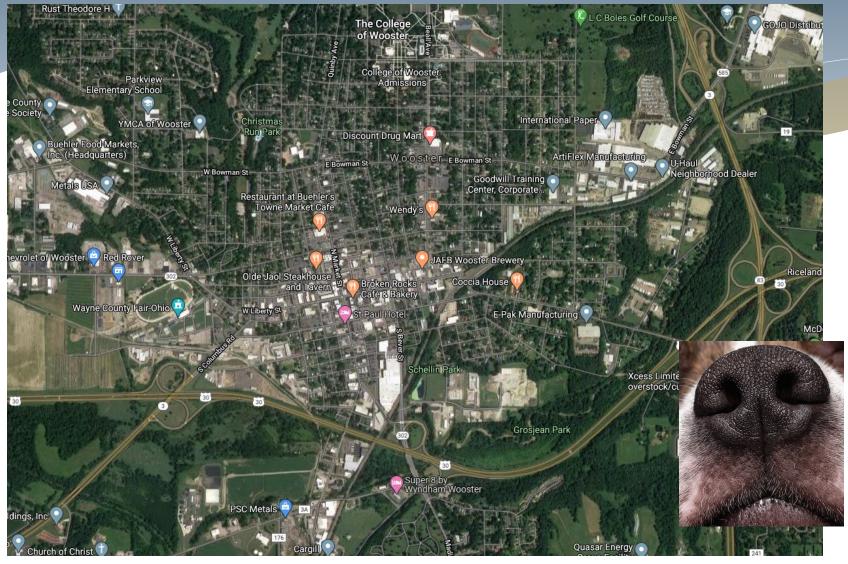


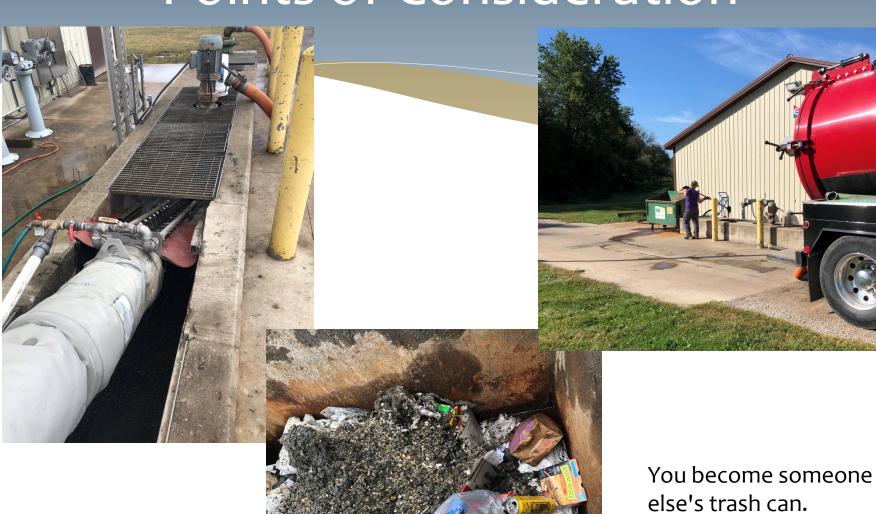
- Back up generator for both facilities.
 Back up for water plant.
- * Monopoly game you want the Water and Power but when you are designed to be revenue neutral, it can be a challenge.



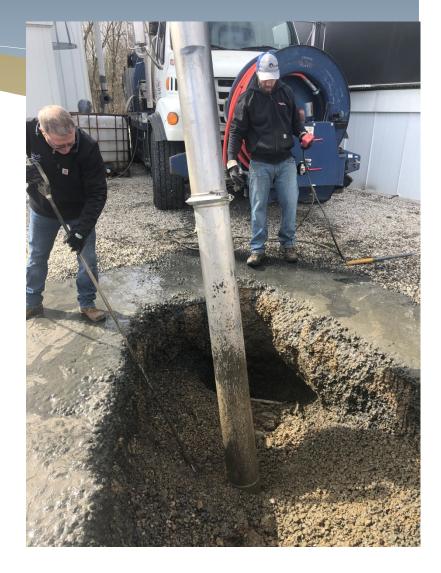


- * Flares. Air permits.
- * Storage for CNG station?









Water Recovery Pictures









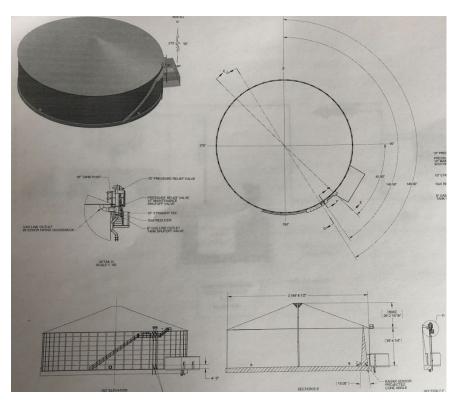




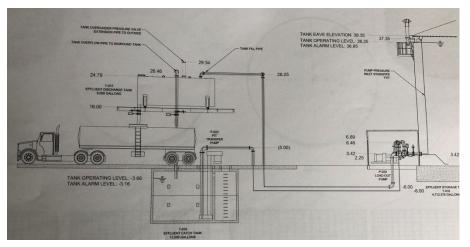


Upcoming Projects

- Final Biosolids Storage Tank
 - * Reduce hauling fees, harness additional gas, and improve operational control and <u>redundancy</u>.

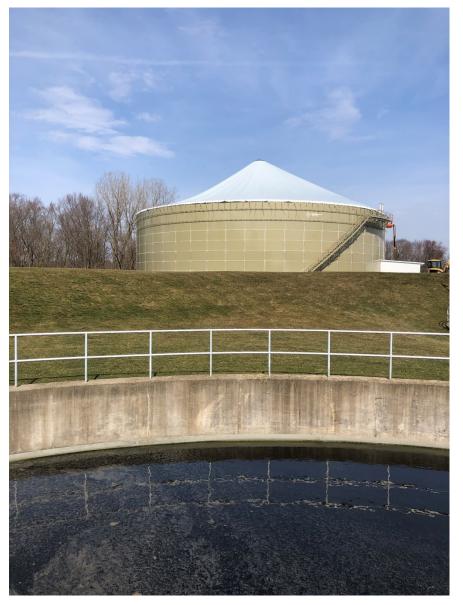


* Continual efforts to install redundant systems.



New Day Dawn







Upcoming Projects

- * Contract and Study with RETTEW
 - Focus on efficiency and redundancy.
 - * Cost reduction and reliability.
 - * As of June 1st due to equipment issues, feedstock acceptance has stopped. Septic receiving still open.

Awards WEF Utility of the Future 2018 ICMA 2019 Award



Facility of the Future

Water Resource and Recovery Facility Receives National Recognition





Nate Coey, Utilities Manager Kevin Givens, Water Supervisor Steve Carathers. Waste Supervisor

Wooster OHIO

When the original sewage treatment plant in Wooster, Ohio began operation in 1938, it consisted of primary settling tanks, an anaerobic digester, and sludge drying beds. The facility was upgraded several times through the years, but it still failed to meet performance standards for digestion and solids handling.

Something needed to be done.

The three existing digesters in the Wooster facility were enlarged. New mixing, cover membranes, and heat exchangers were added, along with a gravity belt thickener (for city biosolids), a solids receiving vault, a liquids receiving pit, and a feedstock holding tank. A larger, combined heat and power unit was installed to heat the new organic biosolids receiving building as well as the tankage in the anaerobic digestion system.

Within 12 months of startup, the power generation was exceeding the facility's daily demand.

Why the Water Resource and Recovery Facility?

RENEWABLE ENERGY

The ability to accept feed stock, septage, and food waste solids to create methane provided nearly \$900,000 in additional revenue. The end product provides not only self-reliant power sources, but also a nutrient-rich soil product that saves farmers money and eliminates commercial fertilizer runoff from agricultural areas.





LEADING EDGE TECHNOLOGY

No other facility in Ohio produces power from an anaerobic digestion process to power both water and wastewater facilities.



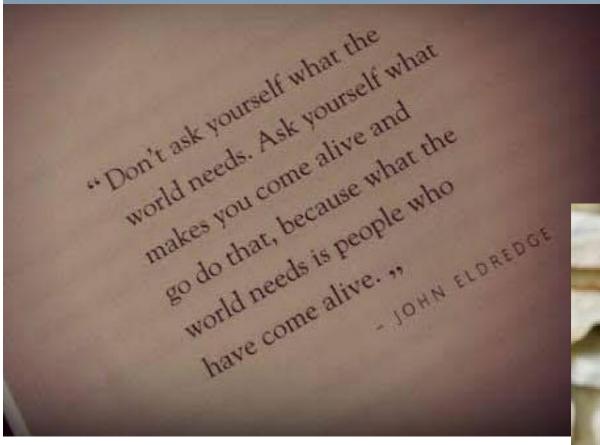
ENVIRONMENTAL STEWARDSHIP

The facility provides self-reliant power sources and creates a renewable form of soil enrichment for the agricultural community.





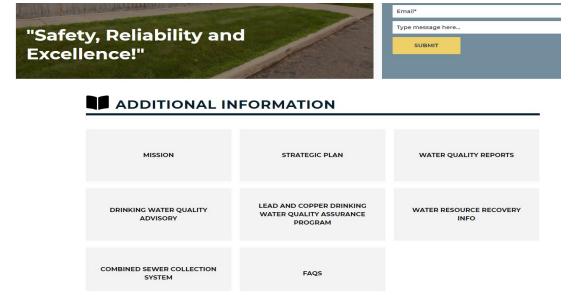
Soap Box





Additional Information

* For more information visit our webpage at https://www.woosteroh.com/water



Questions



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* 330-263-5284

