

A tall, blue water tower stands in a grassy field under a blue sky with white clouds. The tower has a spherical tank at the top and a lattice structure below. In the background, there are trees and a small structure.

CITY OF WOOSTER

UTILITIES DIVISION

ANNUAL REPORT FOR YEAR 2017

Prepared by

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Contributions from

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Water Resource Recovery Facility Supervisor

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Distribution/Collection/Meters Supervisor

Cody Bower

Donavon Reichert

Laboratory Technicians

Adam Wilford

Pretreatment Coordinator

February 7, 2018

Executive Summary

In 2017, the Utilities Division celebrated the completion of the addition (3,300 sq. ft.) at the newly renovated Distribution/Collection/Meters Facility on West Old Lincoln Way. The site is the former ODOT garage that was purchased from the state in 2016 for \$100. The staff moved to the facility in July allowing all the Utility Operators, Tradespersons and Technicians to be located in one location along with the consolidation of all their supplies, equipment and material that had been spread throughout the City in various locations due to space limitations.

The Water Treatment Plant pumped a total of 1.018 billion gallons of water in 2017. This number shows a reduction of 26 million gallons from 2016. In contradiction to Wooster's increasing Industrial usage and population growth, the total water production is the lowest in the last 20 years. The lower production can be attributed to customer conservation, the use of more water efficient products and appliances and mitigation of system water losses. Unaccounted water held steady when compared to the previous year. This is an improving trend over the last five years that began with losses at 42% in 2013 to the current 23%. These losses are attributed to distribution line losses (main leaks), service leaks, unmetered accounts, unauthorized use and meter inefficiency. In 2017, the entire system was leak surveyed twice and 21 main leaks were identified and repaired.

The gas transmission pipeline work that has occurred in the area over the past two years has also had an economic impact on revenues at both treatment facilities. Bulk water sales are up over 292% during the two year span. Septage receiving has also increased by 216% over the same time frame. Pipeline construction operations used the bulk water for dust control and horizontal boring while waste from portable toilets located at excavation sites was transported to the WRRF (septage). In addition, after purchasing the Anaerobic Digestion System from Quasar during 2017, the plant collected over \$80,000 in revenue from tipping fees from third party waste in 6 months of operation.

In its second year of operation, the AquaHawk notification system alerted 350 customers to meter problems and high usage that saved our residents thousands of dollars in higher water bills and prevented the wasting of millions of gallons of water down the drain. The AquaHawk system monitors meter flows and usage to locate anomalies that may be a stuck flushing valve on a toilet, an outside spigot that was left on or a broken pipe in an empty home or building.

2018 Divisional Goals

- Continue to invest in water infrastructure and innovation to reduce unaccounted water loss
- Expand the "Culture of Safety" within the division by increasing training frequency and promoting the use of personal protective equipment on the job
- Develop additional Standard Operating Procedures in each subdivision to help new employees with their start up training and encourage the use of "best practices"
- Improve employee knowledge base with a recommended training program for each position that outlines job specific courses and a plan to merge with the existing employee stipend program

Water Resources Recovery Facility

SUMMARY TREATMENT OPERATIONS

City of Wooster Water Resources Recovery and Bioenergy Facility



The purchase of the Anaerobic Digestion System (ADS) from Quasar Energy Group was completed in March of 2017. After completion of deferred maintenance and replacement of worn equipment, the City began accepting third party waste. On June 2nd, GOJO Industries delivered the first load to the City operated facility. The WRRF staff will continue to seek out waste streams to maximize the energy potential of the ADS and also work with local industries to provide an alternative waste disposal method that captures latent energy and can save money for both the City and local businesses.

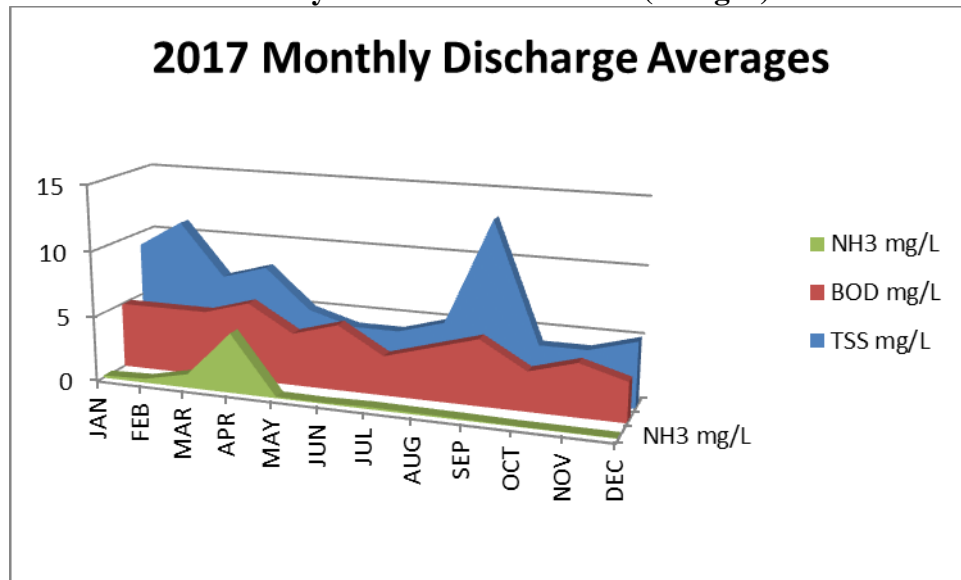


First GOJO Load 6/2/2017

In total, the WRRF treated a total of 1.719 billion gallons of wastewater with the average daily flow being 4.71 million gallons per day receiving a peak daily flow of 15.73 million gallons on January 12, 2017. This represents an increase of 129 million gallons over 2016 (2017 saw almost 7 more inches of precipitation). In addition, the plant removed 4.91 million pounds (design is 5.02 million pounds) of biological oxygen demanding (BOD) substances and 2.94 million pounds (design is 3.65 million pounds) of suspended solids from the wastewater. The flow design of the facility is for 7.5 million gallons per day with a hydraulic maximum of 27 million gallons.

In contrast to the wastewater treated at this facility, the Water Treatment Plant produced on average 2.78 million gallons per day. The reasons for this obvious disparity of 1.93 million gallons per day between water produced and wastewater treated in 2017 is attributed to a combination of precipitation entering the WRRF through the combined sewer system, collection system infiltration and un-metered sources. The infiltration component of this disparity continues to be actively addressed. Unmetered sources are being identified and metered as part of the continuing meter upgrade program; however, some areas of the system (i.e. Killbuck South sewer district and some areas in Madisonburg) will not be metered as they are sewer only accounts and receive a flat rate billing.

Monthly Final Effluent Results (in mg/L)

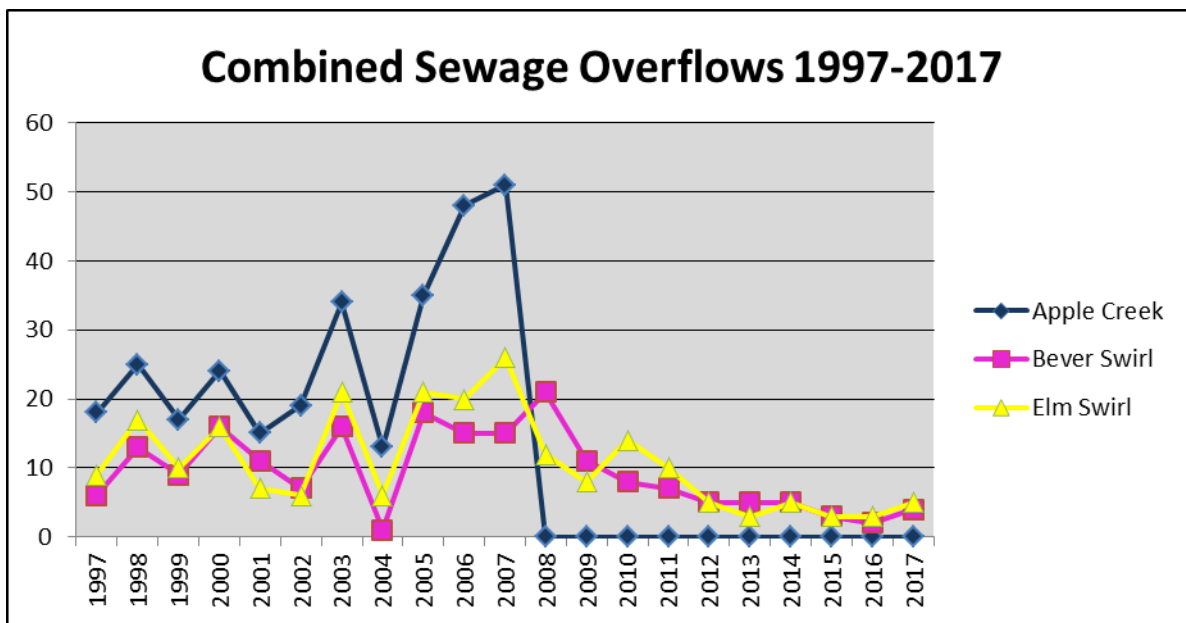


The typical strength of wastewater is calculated in relationship to three basic attributes, Carbonaceous Biochemical Oxygen Demand (CBOD), Suspended Solids (SS) and Ammonia (NH3). An additional indication of wastewater strength, Chemical Oxygen Demand (COD) is used primarily at our industrial users due to the repeatability and speed in which information can be derived by testing. The average daily strength of the raw wastewater treated at this facility in calendar year 2017 was 13,616 pounds of CBOD, 8288 pounds of TSS and 585 pounds of NH3. When comparing to the design of the facility, the plant is operating at 90% CBOD loading, 82% TSS loading and 67% Ammonia loading. In regard to removal efficiency of these parameters, the plant removed 97%, 98.8% and 99.9% respectively.

WRRF cost per million gallons of treated wastewater in 2017 was \$897 for O&M and the total cost of WRRF operations and personnel was \$1,515/MG.

Given that based on design criteria, a person contributes 0.167 lbs of BOD and 0.2 pounds of SS per day. Looking at 13,616 lbs per day influent BOD and 8288 pounds per day of TSS load to the plant, the plant is treating the equivalent waste stream of 81,533 people for BOD and 41,440 people for TSS.

The ongoing sanitary/storm water separation projects (now in its final stages) continue to show improvement on controlling surface water from entering the City collection system and overloading the hydraulic capacity of the treatment plant. The combined sewer overflow structures that allow raw wastewater to enter the Apple Creek were activated 9 times during 4 separate storm events in 2017. That total represents a steady decline since the plant redesign in 2007. As part of the City’s long term control plan, the goal is to only activate the overflows when a 5-year storm event occurs.



INDUSTRIAL PRETREATMENT / BIOSOLIDS PROGRAM

2017

Program Evaluation:

The City of Wooster's Sewer Use Ordinance and Enforcement Response Guide provide the legal authority to enforce the Ohio EPA approved pretreatment program of the city as well as US EPA regulations. A conscious effort is made through training, continued education and Ohio EPA's numerous websites and links to keep current with rule changes pertaining to pretreatment. Modification requests will be submitted for EPA approval, when deemed necessary.

The primary objectives and activities of the Pretreatment Program are to:

- Protect the environment and public health and safety.
- Protect the sewers and wastewater treatment plant from damage due to an accidental or deliberate discharge of pollutants.
- Provide safe working conditions for sewer utility workers.
- Locate all industrial users and identify the pollutants they discharge.
- Issue discharge permits to industrial users (IU's) classified by the POTW as a significant industrial user (SIU).
- Sample and analyze the wastewater discharge from IU's and conduct yearly inspections.
- Investigate instances of noncompliance with pretreatment standards and permit requirements.
- Collect samples in order to surcharge industries for high strength wastes.

Pretreatment operating procedures that are in place are adequate and are followed to meet program goals. All industrial sampling and reporting requirements were met this pretreatment year. Annual industrial inspections were completed in March 2017.

All industrial users that meet the criteria, as established by the EPA, of a Significant Industrial User (SIU) or Categorical Industrial User (CIU) are monitored for compliance with categorical and/or local limits for conservative and conventional pollutants. Additional sampling is done to insure non-domestic wastewater dischargers are in compliance with local limits. Currently the city has seven permitted SIU's, four of which are CIU's, and monitors numerous other non-significant dischargers for compliance.

In 2017, the City added two more SIU's (CNC and Rayco) to monitor as a result of the Hillcrest Agreement that the City of Wooster and the Wayne County Commissioners entered into back in 2011. CNC and Rayco used to be covered by an Ohio EPA discharge permit before the Hillcrest wastewater plant converted into a City of Wooster pump station in 2015.

In addition to quarterly compliance sampling, several industrial users discharging higher than normal conventional pollutants are sampled weekly for Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS). The analytical results of those samples are averaged for each month and a sewer surcharge for high strength waste is billed accordingly. These surcharge fees brought in more than \$300,000 last year.

Also in 2017, the WRRF published one Significant Industrial User (ArtiFlex) and one Non Significant Industrial User (Buckeye Container) for discharge violations. The ArtiFlex violations were for two separate occurrences, both due to minor equipment failures at the plant. They were fixed and addressed in a timely fashion. Buckeye Container had two violations of cyanide for the year. As required by the City's Ohio EPA discharge permit, the public notice was posted in the Daily Record on 12/15/17.

In 2017, we compiled a list of dental offices in the city so we can distribute a One-Time Compliance report regarding amalgam separators.

The City of Wooster Pretreatment Program is financed through the city sewer fund. No financing problems were experienced in this pretreatment year or are anticipated for the next pretreatment year. All financing needed for the administration of the program is available.

Approximately seventy-five percent of the Pretreatment Coordinators time is spent on pretreatment, sample collection, EPA reporting, plant visits, meetings, paperwork and record keeping with the remaining time spent working on the FOG (Fats, Oils and Grease) program, covering vacation time for lab technicians, and maintaining all pretreatment equipment. A van is always available for the pretreatment employees to do sampling, inspections, attend training, etc.

The WRRF experienced no spills, interferences or pass through of toxins directly attributable to industrial discharges in 2017.

All U.S. and Ohio EPA reporting requirements for the WRRF bio-solids program were met in 2017. In 2017, the WRRF contracted with Burkey Excavating to land apply biosolids. The equivalent of 1,044 total dry tons of biosolids was land applied in 2017.

Special WRRF Projects Completed in 2017

- Rebuilt Plant Water Reuse Pumps
- Achieved Class A designation for plant biosolids for exceptional quality which will allow additional land application options
- Development of Operational SOPs for Storm Flow Events
- Refurbished one UV disinfection train (1 of 3)
- Replaced gravity belt thickener belt tensioner
- Collected over \$80,000 in feedstock tipping fees
- Septage Receiving billed over \$162,000
- Modified polymer feed system in ADS to improve operation and safety
- Replaced ADS progressive cavity pump
- Poured concrete pad in MLSS Building for additional rack storage
- Employed 3 interns from OSU ATI's Bioenergy and Biological Waste Management program in a continuing effort to partner with OSU for student educational opportunities and access for land application sites on OSU/OARDC fields
- Replaced switchgear boiler
- Tied in natural gas supplemental fuel line to cogeneration unit
- Bob Parsons and Kevin Cormany acquired Class I certification and Rory Reed earned a Class II certification

WATER RESOURCE RECOVERY FACILITY
EMPLOYEE ROSTER as of 1/1/17
(Certification level)

MANAGEMENT:

Utilities Manager

Kevin Givins (WW III & WS III)

Plant Supervisor

Steve Carathers (WW IV)

LABORATORY TECHNICIANS:

DJ Reichert (WWIII & WS II)

Cody Bower (WWII & WSI)

PRETREATMENT/BIOSOLIDS COORD.:

Adam Wilford (WW III)

OPERATORS:

Tony Reddix (WW II)

Emma Fox (WW I)

Derek Sigler

Kevin Cormany (WWI)

Charles Scott (WWI)

ASSISTANT OPERATOR

Bob Parsons (WWI)

PLANT MECHANICS

Rory Reed (WW II)

Chad Frank (WW III)

OFFICE COORDINATOR:

Pam Corbett

Water Resource Recovery Facility Goals and Objectives for 2018

- **Maintain Compliance with NPDES Permit**
 - Modify process flows to improve ammonia/nitrogen treatment
 - Reduce permit exceedances to zero
 - Initiate Win911 system to notify Operators/Supervisors of alarm conditions 24/7
 - Pump down and clean contact chamber
 - Increase land application acreage by 500 to ensure field availability
 - Increase feedstock revenue by 25%
 - Increase ADS electrical production by 20%
 - Integrate Fecal Count Test into plant laboratory to reduce analysis turnaround time

- **Continue Staff Training and Professional Development-**
 - Update Lock Out/Tag Out, Blood Borne Pathogen, and Personnel Protective Equipment Training
 - Hold in house exam review sessions to assist Operators
 - Have 100% staff certification
 - Update/write SOPs for all the process changes due to plant upgrade
 - Continue to Partner with OSU ATI for staff training and student internships of Waste Management/Renewable Energy Program

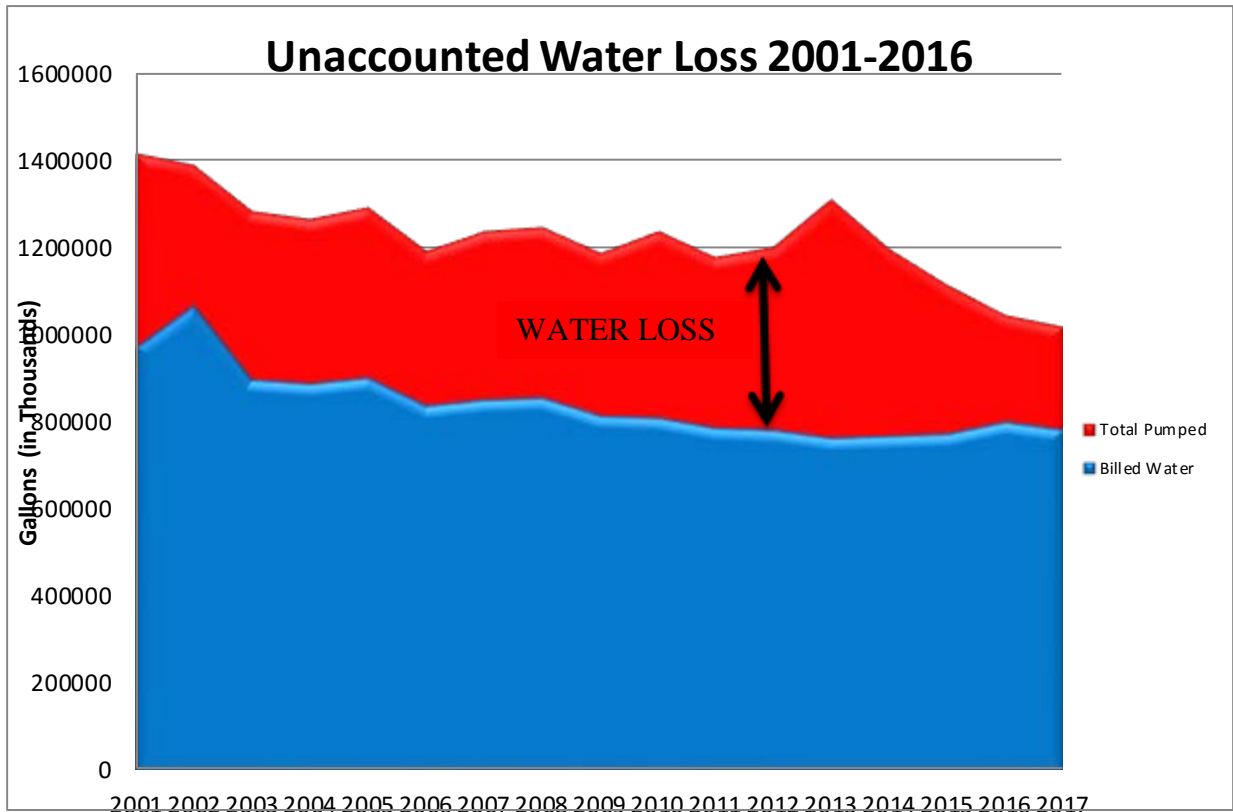
- **Replacement of Obsolete and Worn Equipment**
 - Rebuild Moyno sludge pumps (as needed)
 - Restore Aquionics UV unit (1 of 3)
 - Refinish/replace pumps at older lift stations (ongoing)
 - Finish training room remodel (add electric and network connections)
 - Rebuild influent raw water Flyght pumps
 - Refurbishment of Nupp Drive Lift Pump Station

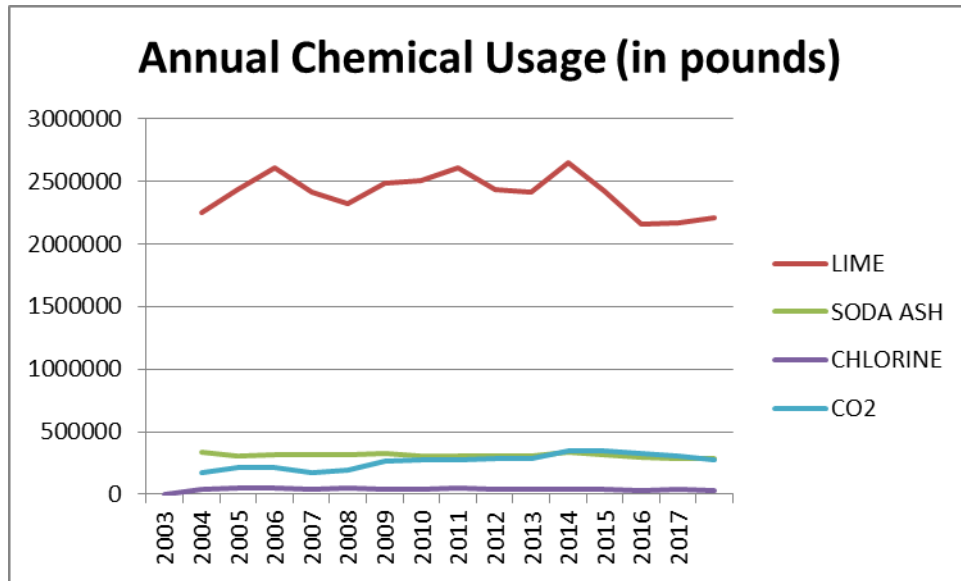
WATER TREATMENT PLANT *TREATMENT OPERATIONS*

The City of Wooster's Water Treatment Plant (WTP), now in its 20st year of operation, continues to perform well. The overall reliability of the plant systems has been excellent with the aid of our well trained and attentive operations and maintenance staff.

Finished water pumped to the city in 2017 decreased by 17 million gallons from the previous year for a total of 1.019 billion gallons (These numbers represent a 20 year low). The high duty pumps sent an average of 2.79 million gallons per day of finished water into the distribution system. The peak-pumping day occurred on September 25th when 3.837 million gallons of finished water was pumped into the city. The average per capita usage of water in 2017 was 103 gallons per day (based on population data of 27,027).

The chemical cost per million gallons of treated water in 2017 was \$212.24 while the total cost of WTP operations and personnel was \$1,820/MG.





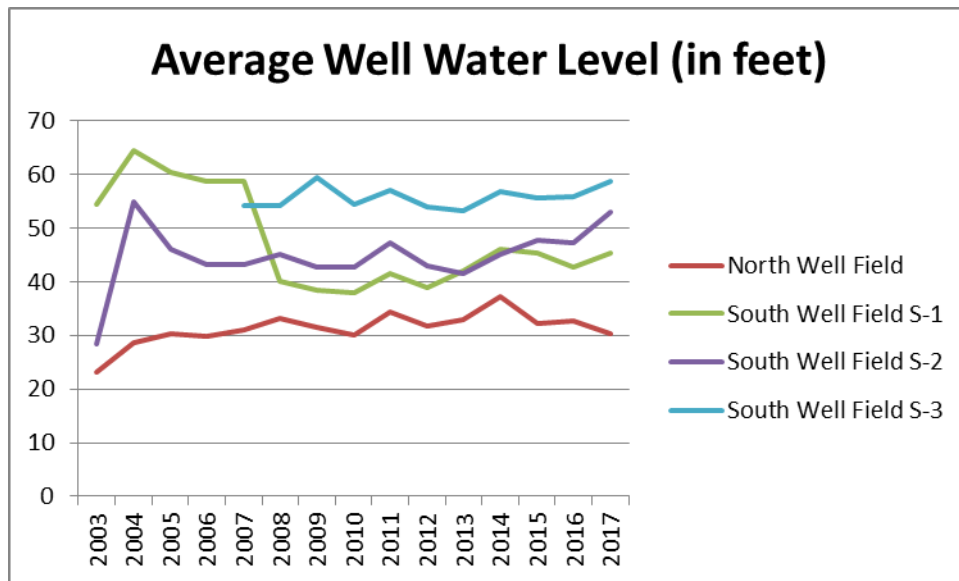
Average Chemical Cost/Million Gallons Finished Water

YEAR	LIME	SODA ASH	CHLORINE	CO2	Total
2003	\$59.48	\$15.77	\$17.36	\$7.25	\$99.86
2004	\$72.31	\$17.95	\$21.46	\$9.91	\$121.63
2005	\$114.06	\$23.59	\$31.73	\$10.56	\$179.94
2006	\$121.44	\$25.82	\$31.05	\$8.52	\$186.83
2007	\$114.16	\$31.80	\$22.58	\$9.95	\$178.49
2008	\$122.28	\$35.32	\$22.38	\$13.47	\$193.45
2009	\$127.19	\$38.54	\$30.87	\$14.83	\$211.43
2010	\$125.71	\$37.69	\$29.41	\$12.65	\$205.46
2011	\$140.69	\$41.73	\$23.44	\$12.59	\$218.45
2012	\$148.08	\$42.93	\$34.42	\$15.01	\$240.44
2013	\$144.28	\$43.67	\$25.86	\$16.92	\$230.73
2014	\$147.67	\$43.87	\$24.85	\$15.16	\$231.55
2015	\$131.19	\$43.99	\$22.51	\$15.11	\$212.80
2016	\$120.91	\$45.15	\$24.65	\$16.62	\$207.33
2017	\$125.18	\$45.43	\$21.42	\$20.21	\$212.24

Annual Water Plant Production 2003-2017

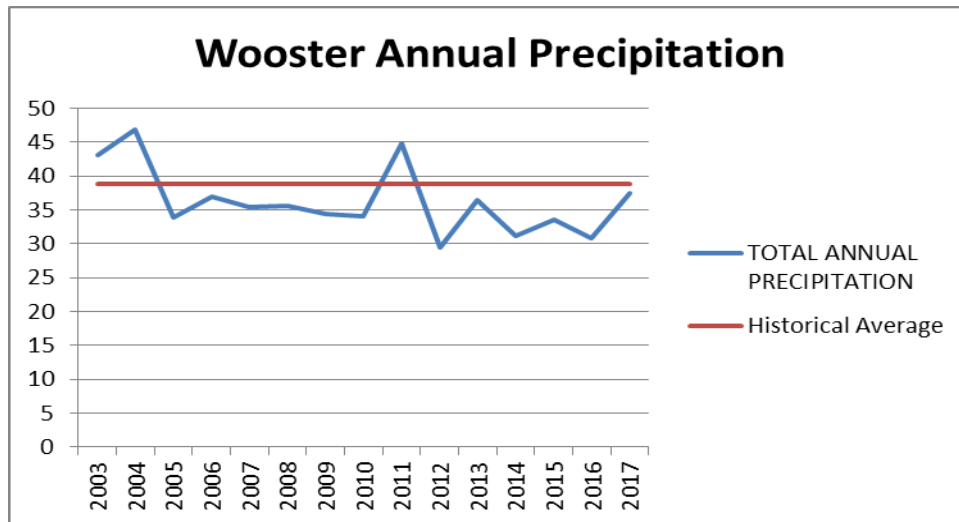
YEAR	TOTAL MILLION GALLONS RAW WATER	TOTAL MILLION GALLONS FINISHED WATER	AVERAGE CHEMICAL COST PER MILLION GALLONS	AVERAGE HARDNESS RAW WATER mg/L	AVERAGE HARDNESS FINISHED WATER mg/L
2003	1391	1378	\$99.86	371	111
2004	1278	1267	\$121.10	389	117
2005	1303	1290	\$179.94	389	119
2006	1260	1249	\$186.83	379	114
2007	1252	1240	\$186.83	365	110
2008	1260	1248	\$193.45	371	110
2009	1197	1185	\$211.43	374	112
2010	1281	1269	\$205.46	369	108
2011	1188	1176	\$218.47	369	108
2012	1209	1197	\$240.43	367	107
2013	1325	1312	\$230.73	365	108
2014	1209	1197	\$231.55	365	107
2015	1123	1113	\$212.79	358	103
2016	1046	1036	\$207.51	364	104
2017	1029	1019	\$212.24	357	104

Sludge, a byproduct of the lime and soda ash softening process, is pumped to the sludge lagoon at the Water Resource Recovery Facility. There were 8.92 million gallons of lime and soda ash sludge pumped to the WRRF in 2017. The sludge is held in a storage lagoon until it can be transported to farm fields for agricultural use.



The City wells are rotated monthly (with the exception of S-1 as it is used as an interceptor to prevent underground contamination from migrating into the other production wells) to allow for recharge periods and scheduled maintenance. The North Well Field average water level was 30.3 feet. Its lowest level was in September at 22.3 feet, and the high was at 41.7 feet in March. The S-1 Well in the South Well Field averaged 45.4 feet of water peaking at 48.3 feet in June and a low of 36.3 feet in November. The S-2 Well in the South Well Field averaged 52.9 feet, peaking at 53.9 feet in April, and a low of 37.9 feet in November. The S-3 Well averaged 58.8 feet, peaking at 59.7 feet in June to a low of 51.8 in October.

The OARDC reports of 2017 show 37.5 inches of precipitation in the Wooster area compared to 30.9 inches in 2016. The average rainfall is 38.9 inches for the Wooster community. For the year 2017, the area was 1.4 inches below the normal precipitation. The slightly below average precipitation (in conjunction with lower production) had little effect on well measurements which posted mostly higher results for water levels.



Production of safe and satisfactory drinking water throughout 2017 was indicated by negative E-Coli bacteria results in samples of finished water collected from representative points of the distribution system. There were a total of 1,188 bacteria tests completed including Wooster Distribution, new water lines, water line breaks, depressurization events, boil advisories, outside water systems and private wells.

SOUTH WELLFIELD CONTAMINATION

Since 1985, the city has operated interceptor wells and packed media stripping towers to remove volatile organic contamination from the South Well Field. The interceptor wells protect the City’s production wells from the contamination plume migrating further into the South production wells. In addition, the operations staff conducts a semiannual testing event of monitoring wells in and around the South Well Field to record movement and levels of contaminants found in the ground water. Twelve test wells are measured for water depth, tested for turbidity, pH, conductivity and sampled for volatile organics.

In 2017, the packed media stripping towers treated 217 million gallons of contaminated water then discharged into the Little Apple Creek.

SPECIAL PROJECTS COMPLETED IN 2017

- ❖ Overhauled #8 Production well (swabbed and acid backwash) in North Well Field & rebuilt pump and motor
- ❖ Remodeled former Meter Technicians Office
- ❖ Refurbished #1 High Duty Pump
- ❖ Replaced North Chlorine Analyzer
- ❖ Calibrated analytical balances for water laboratory
- ❖ Completed coupon test in the distribution system to gauge corrosion
- ❖ Developed SOPs for some chemical analysis
- ❖ Completed 4 tours for public groups
- ❖ Cody Bower earned a Class I Water certification
- ❖ Added plant flow totalizers to AMR system
- ❖ Refurbished North Well Field; electrical, new vaults and check valves, piping and a flushing hydrant
- ❖ Added VFD to North Well Field Booster Pump Station

WATER TREATMENT PLANT
EMPLOYEE ROSTER (as of 1/1/2017)
(Certification level)

MANAGEMENT:

Utilities Manager

Kevin Givins (WS III & WW III)

Plant Supervisor

Robert King (WS III & WW I)

LABORATORY TECHNICIAN:

Cody Bower (WW II)

OPERATORS:

Michael Stebelton (WS III)

Dave Mosher (WS III)

Tim Breneman (WS I)

Justin Bower

Jacob White (WS I)

ASSISTANT OPERATOR:

Vacant

OFFICE COORDINATOR:

Pam Corbett

Water Treatment Plant Goals and Objectives for 2018

- Offer additional onsite training in order to ensure compliance of all regulatory and safety requirements
 - Lock Out Tag out training
 - Hazard Communication
 - Confined Space Entry training
 - Water Treatment and chemistry

- Improve unaccounted water by 5% (held steady in 2017)
 - Leak detection survey of entire system twice
 - Use AquaHawk to isolate leaks to pressure zones
 - Use weekly flow readings by zone to track water losses
 - Incorporate tank isolations to track water usage by pressure zone and presumably find loss and leaks

- Increase distribution turnover and improve water quality
 - Continue pump rotation between Mechanicburg and Melrose Pump stations to better turn over water in North High Zone.
 - Initiate AquaHawk customer portal to allow ratepayers the option of setting usage triggers to be notified or monitor possible service side leaks (ongoing)
 - Increase Backflow/Cross Connection enforcement of missing and untested devices

- Maintain Well Field Reliability
 - Overhaul and acidized #8 production well
 - Add VFD to S-1 Production Well
 - Flow/capacity Test Interceptor wells

- Increase Building Maintenance of 20 year old water plant
 - Refinish floor and paint in Chlorine Storage Room
 - Paint clearwell tank (1 of 2)
 - Replace plant control system with updated, serviceable equipment

Distribution/Collection/Meters

The Distribution/Collection/Meters (D/C/M) Subdivision is responsible for the maintenance and operation of all the City's underground utilities and the water metering system. As part of the ongoing water loss reduction program, D/C/M completed 2 full sonic leak detection survey rounds of the distribution system. All the distribution system pump stations have now been added to the AMR system (completed in 2017) to help monitor flows into each of the City's four pressure zones. The intent is to compare pumping rates with the consumer's meters within a zone to find anomalies that may lead to the discovery of leaks within the system.

In July, the D/C/M group completed the remodel of the former ODOT facility on W. Old Lincoln Way and moved all personnel, equipment and materials into the facility in July. The current configuration allows better oversight and communication between the Supervisor and staff and among all subdivision employees.





Distribution/Collection repaired
21 water main breaks in 2017

Other highlights of the D/C/M Group for 2017;

- 634 Water Main valves cycled
- 3 Hydrants repaired
- 38 Curb boxes repaired or replaced
- 21 Main Breaks repaired
- 1377 Hydrants flushed
- 5.5 miles of sewer mains jetted
- 2.6 miles of sewer mains televised
- 2.06 miles of sewers root treated
- 387 Delinquent water shut offs
- Meters processed 1700 work orders

Distribution/Collection/Meters Goals for 2018

- Jet 10,000 feet of sewer main
- Televis 2 miles of sewer main
- Switch more focus to sewer maintenance to reduce overflows and WIBs
- Flush every hydrant in distribution system
- Cycle 20% of main water valves
- Complete 2 leak detection surveys
- Reduce water loss by 5% utilizing district/zone metering comparisons to actual water meter readings
- Replace 20 year old Vac-Truck
- Partner with WRRF and Engineering to investigate illicit sewer connections and reduce water intrusion into the sanitary collection system

Distribution/Collection/Meters **EMPLOYEE ROSTER** (as of 1/1/2017) (Certification level)

MANAGEMENT:

Utilities Manager

Kevin Givins (WS III & WW III)

D/C/M Supervisor

Milan Steiner (WD II & WC II)

UTILITY OPERATORS

Ed Flinner (WC II & WDII)

John Bender (WD II & WC I)

UTILITY OPERATOR TRAINEES

Ben Martin (WW II)

Barb Hardin (WD I & WC I)

John Rutter (WD II & WC I)

Erik Ungerer (WS I & WW I)

METER TECHNICIANS

Tim Moretti (WD II)

Jerry Hartzler (WD I)

Joseph Geitgey

OFFICE COORDINATOR

Pam Corbett

Wooster vs Ohio

In the latest Ohio EPA rate survey, when comparing Wooster's water and sewer rates to all other systems in Ohio, Wooster rates fall below the 50th percentile. Wooster annual cost is \$269 less than the comparative average water/sewer rate across the Buckeye state (based on 7,756 gallons used per month). Wooster rates have not changed since 2012.

