A photograph of a large white water tower with a red and white tower structure on top. In the foreground, there is a silver utility trailer and a blue car parked on a gravel lot. The background shows green trees and a clear sky.

CITY OF WOOSTER

UTILITIES DIVISION

**ANNUAL REPORT
FOR YEAR 2015**

Prepared by

Kevin P. Givins
Utilities Manager

Contributions from

Robert King
Water Treatment Supervisor

Steve Carathers
Wastewater Treatment Supervisor

Milan Steiner
Distribution/Collection/Meters Supervisor

Michael Schultz
Laboratory Technician

Adam Wilford
Pretreatment Coordinator

March 1st, 2016

EXECUTIVE SUMMARY

The most significant events for the Division in 2015 were the addition of the 1.5 million gallon Melrose Tank and pump station, integration of the electrical supply for the Water Resource Recovery Facility (WRRF) and the Water Treatment Plant (WTP), addition of a full time Office Coordinator for the Division, completion of the meter transmitter unit replacement and the start of wet stream improvements at the WRRF. In addition, 2015 saw the retirement of Water Treatment Plant Operator, Jim Phillips and the transfer of Pam Corbett from the City's Recreation Division to fill the Office Coordinator position. Also, we welcomed new employees Tony Reddix, Bob Parsons and Erik Ungerer to Utilities.

In total, the WRRF treated 1.593 billion gallons of wastewater in 2015 with the average daily flow being 4.36 million gallons per day and receiving a peak daily flow of 16.92 million gallons on March 14, 2015. This is a decrease of 93 million gallons over 2014. In addition, the plant treated 3.33 million pounds of biological oxygen demanding (BOD) substances and 2.96 million pounds of suspended solids from the wastewater.

The Water Treatment Plant produced a total of 1.113 billion gallons of potable water in 2015. This total is a decrease of 86 million gallons from 2014. The average daily production was 3.05 million gallons with a peak of 4.95 million gallons on July 1st. The average per capita usage was 114 gallons per day based on the current population estimate of 26,619. Production costs for chemicals alone totaled \$212.80/Million Gallons (MG) of water produced; however, total plant expenses (minus capital improvements) put the costs at \$1,867/MG produced.

Unaccounted water losses showed moderate improvement during the year. In 2015, 31% of the water treated and pumped from the plant was not billed to an account (down from 36% in 2014). These losses are attributed to distribution line losses (main leaks), service leaks, unmetered accounts, unauthorized use and meter inefficiency. In 2015, the entire system was leak surveyed twice and 29 main leaks were identified and repaired. Hydrant flow meters were also utilized and integrated into the AMR system to help track water that normally went undocumented.

Water Resources Recovery Facility

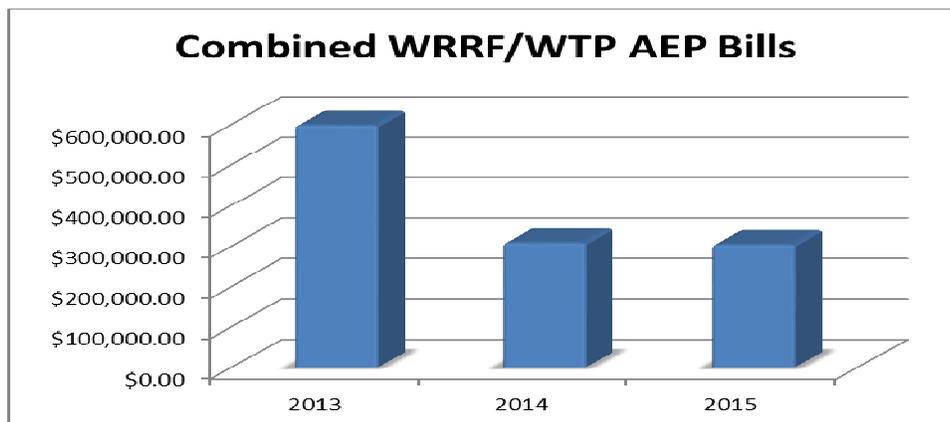
SUMMARY

TREATMENT OPERATIONS

City of Wooster Water Resources Recovery and Bioenergy Facility



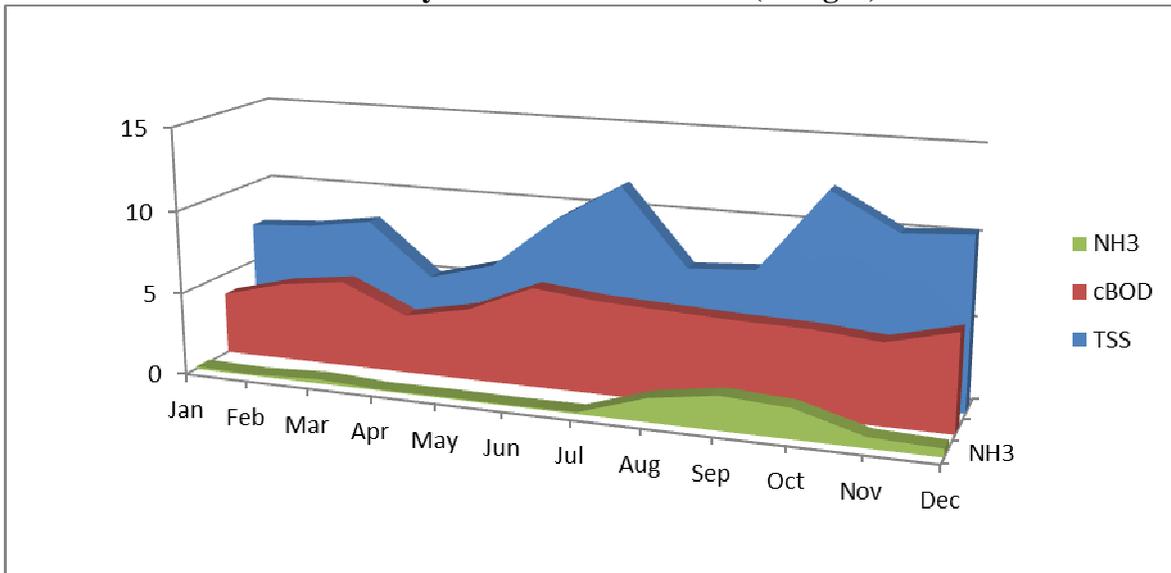
The 1.1 megawatt cogeneration system installed as part of the 2013 agreement with Quasar performed well throughout the year. In August, a transmission line was connected to the Water Treatment Plant to fully utilize the power being produced by biogas. 2016 should produce even better results with a full year of operation for the two facilities. Both treatment facilities' (WRRF & WTP) annual cost to the electric supplier, AEP, was reduced by \$293,926 from 2013. The following chart shows the impact to the annual electrical cost.



In total, the WRRF treated a total of 1.593 billion gallons of wastewater with the average daily flow being 4.363 million gallons per day receiving a peak daily flow of 16.92 million gallons on March 14, 2015. This represents a total decrease of 93 million gallons over 2014. In addition, the plant removed 3.33 million pounds (design is 5.02 million pounds) of biological oxygen demanding (BOD) substances and 2.96 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 3.05 million gallons per day. The reasons for this obvious disparity of 1.31 million gallons per day between water produced and wastewater treated in 2015 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. The Utility and Engineering Divisions jointly continue to pursue the implementation of a sewer separation program. 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)

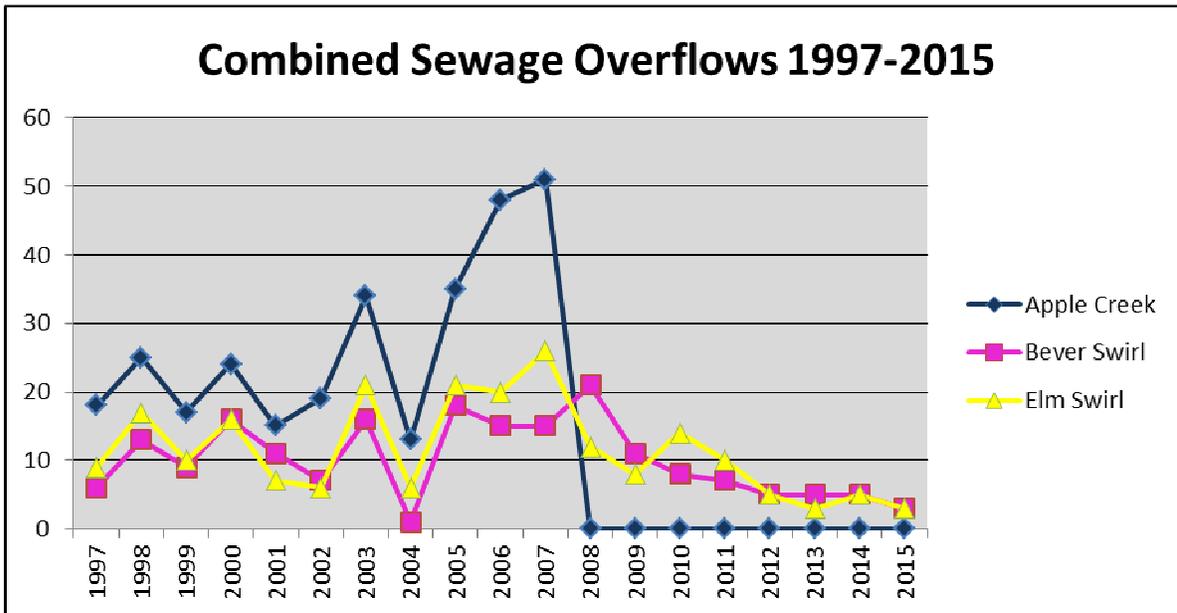


The typical strength of wastewater is calculated in relationship to three basic attributes, Carbonaceous Biochemical Oxygen Demand (CBOD), Suspended Solids (SS) and Ammonia (NH3). An additional indication of wastewater strength, Chemical Oxygen Demand (COD) is used primarily at our industrial users due to the repeatability and speed in which information can be derived by testing. The average daily strength of the wastewater treated at this facility in calendar year 2015 was 8,080 pounds of CBOD, 7,646 pounds of TSS and 474 pounds of NH3. When comparing to the design of the facility, the plant is operating at 54% CBOD loading, 76% TSS loading and 54% Ammonia loading.

WRRF cost per million gallons of treated wastewater in 2015 was \$1,171 for O&M and the total cost of WRRF operations and personnel was \$1,718/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 8,080 lbs per day influent BOD and 7,646 pounds per day of TSS load to the plant, the plant is treating the equivalent waste stream of 48,389 people for BOD and 38,230 people for TSS.

The ongoing sanitary/storm water separation projects 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 6 times during 3 separate storm events in 2015. 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

The City of Wooster’s Sewer Use Ordinance and Enforcement Response Guide provide the legal authority to enforce the OEPA approved pretreatment program of the city as well as USA EPA regulations.

A conscious effort is made through training, continued education and the internet to keep current with rule changes pertaining to pretreatment, and modification requests will be submitted for EPA approval, when deemed necessary.

Pretreatment operating procedures in place are adequate and are followed to meet program goals. All sampling and reporting requirements were met in this pretreatment year. Annual inspections were completed in March 2015.

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

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 samplings are averaged for each month and a sewer surcharge for high strength waste is billed accordingly.

Wooster's Water Resource Recovery Facility received approval from Ohio EPA of new local limits on Dec. 30, 2014. Included in these new limits was a limit on Molybdenum for the first time. The concentration limit of 0.12 mg/L proved difficult to meet for multiple city industries. After doing substantial sampling of the largest dischargers among city industries, it was determined that the amount of Molybdenum the city wastewater plant was receiving was not causing issues at the plant or pass through to the land applied sludge. The average amount of Molybdenum in the final sludge was 16 mg/Kg compared to the permit limit of 75 mg/Kg.

As a result of these findings, the City of Wooster submitted a program modification request to remove Molybdenum from the city's local limits on 12/7/15. The Ohio EPA informed WRRF on 1/5/16 that our application met all requirements and would go to public notice until 2/26/16.

This year the City of Wooster published three Significant Industrial Users (EnviroClean, United Titanium, and Wooster Brush) and one Non Significant Industrial User (Buckeye Container) for discharge violations. The majority of these violations were from Molybdenum. The public notice was posted in the Daily Record on 1/12/16.

The City of Wooster Pretreatment Program is financed through the city sewer fund. No financing problems were experienced in this pretreatment year nor are they anticipated for the next pretreatment year. All financing needed for the administration of the program is available.

Approximately 60 percent of the Pretreatment Coordinators time is spent on pretreatment with the remaining time used to cover vacation time for lab technicians, maintaining

equipment, and working on the FOG (Fats, Oils and Grease) program. A van is always available for the pretreatment program to do sampling, inspections, etc.

The City of Wooster experienced no spills, interferences or pass through of toxins directly attributable to industrial discharges.

All U. S. and Ohio EPA reporting requirements for the City of Wooster's biosolids program were met in 2015.

The city entered into a contract with Quasar in July 2013 to process the city's biosolids as well as final disposal. Quasar revamped the existing digesters and related piping and installed a new cogeneration unit to make better use of gas produced by anaerobic digestion.

In 2015, the City of Wooster pumped all sludge to Quasar to process and land apply. The equivalent of 1,040 dry tons was produced from this sludge.

Special WRRF Projects Completed in 2015

- ❖ Refurbished the membrane roofs on the DAF, Switchgear and Digester buildings.
- ❖ Generated an additional \$84,769 dollars in revenue from septage receiving in 2015.
- ❖ Held multiple training sessions for water and wastewater CEUs for Wooster Staff and other outside groups.
- ❖ Wet stream improvement project was 75% complete at the end of 2015
- ❖ Replaced pump rails at most of the lift station risers.
- ❖ Ran electric line from WRRF to WTP to take advantage of the excess power produced from Quasar project.
- ❖ Filled two vacant Operator positions

**WATER RESOUCE RECOVERY FACILITY
EMPLOYEE ROSTER as of 1/1/16
(Certification level)**

MANAGEMENT:

Utilities Manager

Kevin Givins (WW III)

Plant Supervisor

Steve Carathers (WW IV)

LABORATORY TECHNICIANS:

Michael Shultz (WW III)

DJ Reichert (WWIII)

PRETREATMENT/BIOSOLIDS COORD.:

Adam Wilford (WW III)

OPERATORS:

Tony Reddix (WW I)

Rick Shilling (WW I)

Bob Parsons

Cody Bower (WWI)

ASSISTANT OPERATOR

Rory Reed

PLANT MECHANICS (shared with WTP):

Ray Windsor (WWII)

Chad Frank (WW II)

OFFICE COORDINATOR:

Pam Corbett

Water Resource Recovery Facility Goals and Objectives for 2016

- **Maintain Compliance with NPDES Permit**
 - Add additional SCADA monitoring, control and reliability as part of upcoming construction project
 - Modify process flows to improve ammonia/nitrogen treatment
 - Clean Bever St. and Elm St. Swirl concentrators
 - Reduce permit exceedances to zero
 - Improve warning/alarm system within control network

- **Continue Staff Training and Professional Development**
 - Host OTCO Basic & Advanced Wastewater Training Courses
 - Update Lock Out/Tag Out, Blood Bourne Pathogen, and Personnel Protective Equipment Training
 - Send Staff to exam preparatory class for OEPA Wastewater Certification Exam

- **Replacement of Obsolete and Worn Equipment**
 - Remove unused pressure tank in Switchgear Building
 - Rebuild Moyno sludge pumps (as needed)
 - Restore Aquionics UV unit
 - Refinish/replace pumps at older lift stations
 - Refurbish/Reseal floors in Switchgear and Administration basements
 - Finish training room remodel (add electric and network connections)

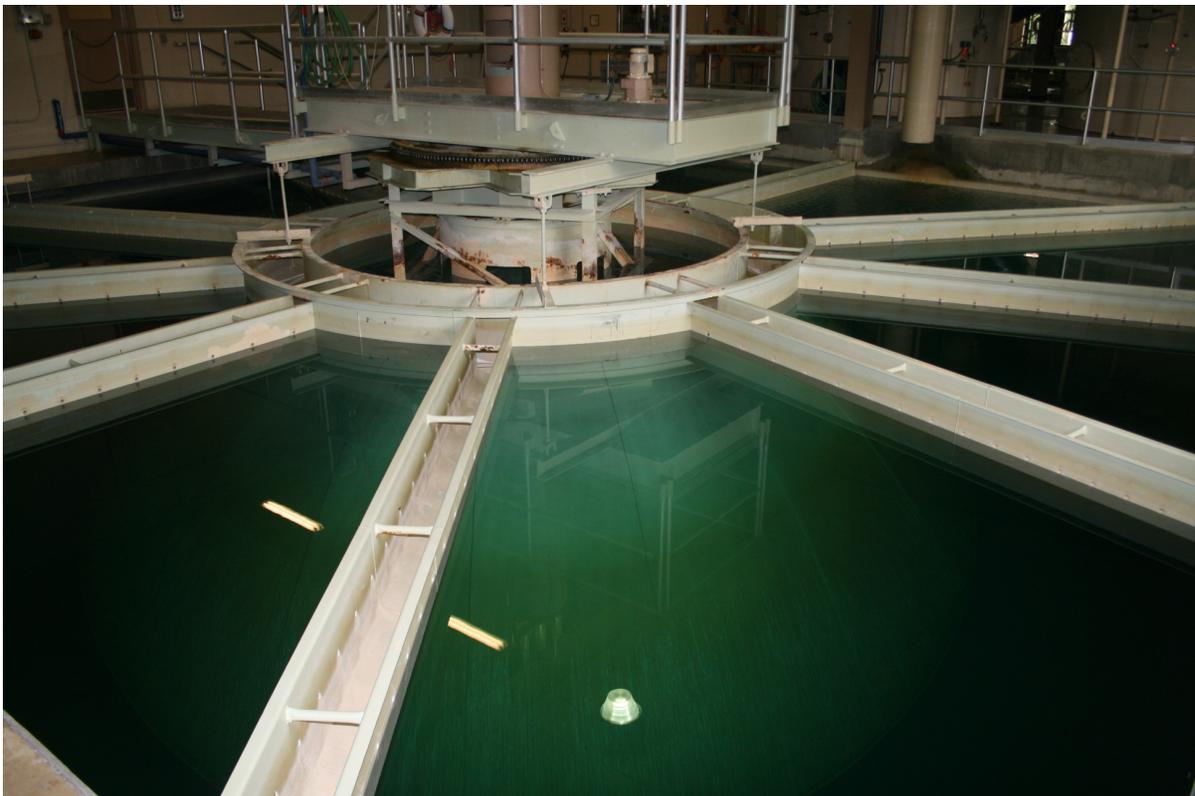
WATER TREATMENT PLANT

TREATMENT OPERATIONS

The City of Wooster's Water Treatment Plant (WTP), now in its 18th 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 2015 decreased by 84 million gallons from the previous year for a total of 1.113 billion gallons. The high duty pumps sent an average of 3.05 million gallons per day of finished water into the distribution system. The peak-pumping day occurred on July 1st when 4.95 million gallons of finished water was pumped into the city. The average per capita usage of water in 2015 was 114 gallons per day (based on population data of 26,619).

The chemical cost per million gallons of treated water in 2015 was \$231.55 while the total cost of WTP operations and personnel was \$1,867/MG.



Annual Chemical Usage (in pounds)				
Year	LIME	SODA ASH	CHLORINE (in Gallons)	CO2
2005	2,607,260	320,853	52,155	210,899
2006	2,417,440	311,940	45,883	170,141
2007	2,322,350	317,163	49,313	198,571
2008	2,482,800	330,000	44,856	261,200
2009	2,501,644	308,622	42,026	280,971
2010	2,604,814	309,347	50,066	279,712
2011	2,433,240	304,865	44,468	284,815
2012	2,411,607	306,815	43,374	285,115
2013	2,647,538	335,271	42,947	346,816
2014	2,424,685	315,308	40,206	352,278
2015	2,157,529	295,341	33,852	326,458

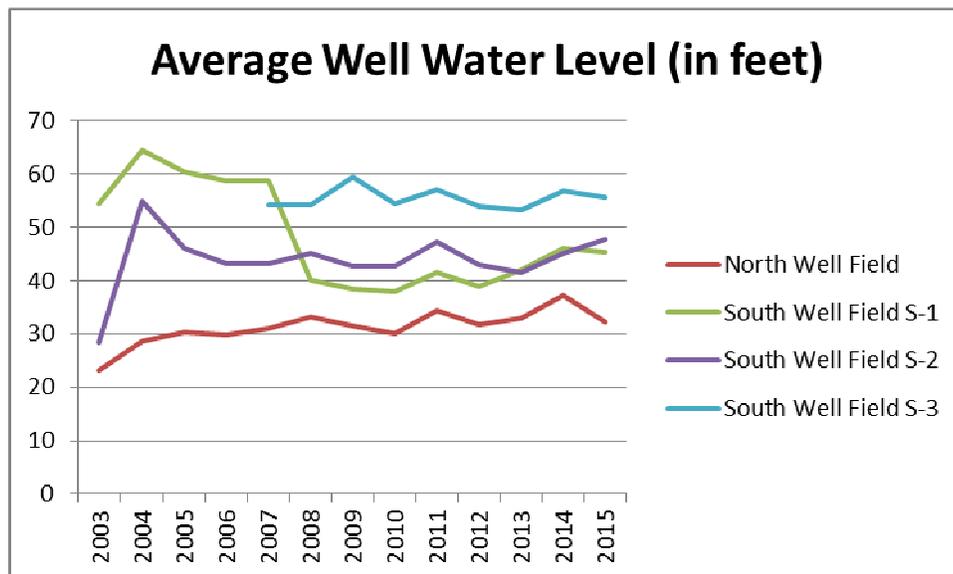
**Average Chemical Cost/Million Gallons
Finished Water**

YEAR	LIME	SODA ASH	CHLORINE	CO2	Total
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

Annual Water Plant Production 2013-2015

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
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

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 9.08 million gallons of lime and soda ash sludge pumped to the WRRF in 2015. The sludge is held in a storage lagoon until it can be transported to farm fields for agricultural use or as a smoke stack scrubber additive at the Conesville Power Plant.



The City wells are rotated monthly (with the exception of S-1 as it is used as an interceptor to prevent underground contamination to migrate into the other production wells) to allow for recharge periods and scheduled maintenance. The North Well Field average water level was 32.3 feet. Its lowest level was in May at 22.4 feet, and the high was at 42.3 feet in August. The S-1 Well in the South Well Field averaged 45.3 feet of water peaking at 53.4 feet in April and a low of 38.1 feet in December. The S-2 Well in the South Well Field averaged 47.7 feet, peaking at 57.7 feet in April, and a low of 35.4 feet in March. The S-3 Well averaged 55.7 feet, peaking at 63.4 feet in April to a low of 42.9 in August.

The OARDC reports of 2015 show 33.5 inches of precipitation in the Wooster area compared to 31.2 inches in 2014. The average rainfall is 38.9 inches for the Wooster community. For the year 2015, the area was 5.4 inches below the normal precipitation. The below average precipitation (in conjunction with lower production) had some minor effect on well levels which posted lower water levels.

Wooster Annual Precipitation (OARDC Weather Station)

YEAR	TOTAL ANNUAL PRECIPITATION (in inches)	CHANGE FROM NORMAL (38.9") PRECIPITATION
2005	34	-12.60%
2006	37	-4.90%
2007	35.4	-9.00%
2008	35.6	-8.50%
2009	34.5	-11.30%
2010	34.1	-12.30%
2011	44.9	15.40%
2012	29.5	-24.20%
2013	36.4	-6.40%
2014	31.2	-19.80%
2015	33.5	-13.90%

Production of safe and satisfactory drinking water throughout 2015 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 1,325 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. Forty test wells are measured for water depth, tested for turbidity, pH, conductivity and sampled for volatile organics.

In 2015, the packed media stripping towers treated 300 million gallons of contaminated water then discharged into the Little Apple Creek.

SPECIAL PROJECTS COMPLETED IN 2015

- ❖ Overhauled #4 Production well in North Well Field & #7 Interceptor Well
- ❖ Recoated membrane roof repairs in Administration Area of plant to extend the useful life an additional 10 years.
- ❖ Replaced 200ft of sump pump drain line in East half of plant basement.
- ❖ Insulated plant stripper tower blowers to reduce condensation build up and corrosion of piping.
- ❖ Replaced #3 pump motor at the North Well Field.
- ❖ Replaced all outside lighting with high efficiency LED bulbs to reduce operational cost and maintenance.
- ❖ Addition of new 1.5 million gallon Melrose tank and pump station to service the North High Pressure Zone and allow overdue maintenance at the Melrose Tank.
- ❖ Painted Stripper Tower pumps and piping in Clarifier Room.
- ❖ Installed new security light pole at the North Well Field.
- ❖ Replaced aviation marker lights at OARDC, Milltown and Industrial Park Tanks with new LED fixtures.
- ❖ Completed painting of Back Hall and Electrical Service Room.
- ❖ Initiated backflow device maintenance tracking with AquaBackflow.
- ❖ Created electrical tie in with WRRF to utilize power created by biogas and backup power from the WRRF's 2.2 MW diesel generator.
- ❖ Decommissioned and removed Winter Street Tank.

**WATER TREATMENT PLANT
EMPLOYEE ROSTER** (as of 1/1/2016)
(Certification level)

MANAGEMENT:

Utilities Manager

Kevin Givins (WS III)

Plant Supervisor

Robert King (WS III)

LABORATORY TECHNICIAN:

Michael Shultz (WS III)

OPERATORS:

Michael Stebelton (WS III)

Dave Mosher (WS III)

Tim Breneman (WS I)

Emma Thoricht (WS I)

Jacob White

ASSISTANT OPERATOR:

Vacant

OFFICE COORDINATOR:

Pam Corbett

Water Treatment Plant Goals and Objectives for 2015

- Improve unaccounted water by 10% (9% improvement in 2015)
 - Leak detection survey of entire system twice
 - Add AMR to booster pumping stations (2 finished in 2015)
 - Continue loss prevention utilizing system from Underground Utilities Inc.

- Increase distribution turnover and improve water quality
 - Modify System Pumping procedure to prevent water stagnation in system in North Pressure Zone until new Daisy facility goes online.
 - Initiate AquaHawk customer portal to allow ratepayers the option of setting usage triggers to be notified or monitor possible service side leaks

- Maintain Well Field Reliability
 - Overhaul and rebuild check valves at the North Well Field
 - Camera survey of Monitoring Well Network and rehab if needed
 - Abandon unused Monitoring Wells

- Increase Building Maintenance of 18 year old water plant
 - Refinish floor in Chlorine Storage Room
 - Recoat chemical storage bins and VOC Stripping Towers
 - Paint Chemical Room
 - Erect walls in Clarifier Room to reduce humidity and prevent corrosion of piping, pumps and towers.

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. In addition, this year a new system was developed using instantaneous tank flow measurements and level sensors. These data points are monitored while isolating sections of the pressure zone to correlate possible water loss.



Distribution/Collection repaired
29 water main breaks in 2015

Other highlights of the D/C/M Group for 2015;

- 577 Water Main valves cycled
- 13 Hydrants repaired
- 95 Curb boxes repaired or replaced
- 29 Main Breaks repaired
- 1383 Hydrants flushed

- 3.64 miles of sewer mains jetted
- 1.3 miles of sewer mains televised
- 3.99 miles of sewers root treated
- 565 Delinquent water shut offs
- 864 MTUs replaced
- Meters processed 2832 work orders
- Completed rehabilitation of storage building at the future D/C/M Facility (former ODOT Garage)

Distribution/Collection/Meters Goals for 2015

- Jet 10,000 feet of sewer main
- Televis 2 miles of sewer main
- Flush every hydrant in distribution system
- Cycle 20% of main water valves
- Complete 2 leak detection surveys
- Reduce water loss by 10%
- Finish design and bid new COLL/DIST/Meters Facility

Distribution/Collection/Meters EMPLOYEE ROSTER (as of 1/1/2016) (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 I & WDI)

John Bender (WD I & WC I)

UTILITY OPERATOR TRAINEES

Ben Martin (WW II)

TRADEPERSONS

Barb Hardin (WD I)

John Rutter (WD I)

Erik Ungerer (WS I & WW I)

OFFICE COORDINATOR

Pam Corbett