

## **I. Utility Profile**

The City of Cleveland Department of Public Utilities Division of Water (Cleveland Water) provides drinking water service to 1.4 million residential, commercial, and industrial customers across 80 communities in Greater Cleveland. We are the largest supplier of water in the State of Ohio and the ninth largest municipal water service in the United States.

As a division of the City of Cleveland, Cleveland Water is governed by a mayor-council form of government, with the mayor and 17 elected representatives comprising Cleveland City Council. Each council member represents a separate geographic ward of the city. As provided for in the city's Home Rule charter, the Public Utilities department reports directly to the mayor. Cleveland Water's annual operating budget for 2018 is \$361 million.

Cleveland's location on the southern shore of Lake Erie provides for our sole source of raw water and the area's climate. Typical of the Great Lakes region, Cleveland's climate has four distinct seasons with large seasonal temperature differences and precipitation usually evenly distributed through the year.

Cleveland Water owns and operates extensive infrastructure to reliably treat surface water and deliver it to customers, including four interconnected water treatment plants, five major pump stations, 11 secondary pump stations, 21 water tanks and towers, and 5,300 miles of water mains.

Cleveland Water provides direct or retail water service to 70 cities, townships, and villages; wholesale water service to 7 cities, and emergency backup water service to 3 communities. These communities are divided into four zones based on elevation relative to Lake Erie. These zones determine water rates for the more than 440,000 direct service accounts, as well as for wholesale and emergency backup customers.

## **II. Mission, Vision, Values**

### ***Mission***

To provide customers with a reliable supply of safe drinking water and great customer service at an affordable price while embracing principles of environmental stewardship, openness, equity, and accountability.

### ***Vision***

To position Cleveland Water as a leader within our industry and community helping to make Greater Cleveland a better place to live, work, and raise a family.

### ***Values***

Customer Focus – Customers are our number one priority; without customers we don't exist. Everything we do should be focused on protecting their health and safety, supporting their needs, and improving their experience with us.

Affordability – We should work on a daily basis to ensure we keep our product as affordable as possible while maintaining safety and reliability.

Transparency – As public servants, we have a responsibility to provide our services in a manner that is understandable and available to the general public. Their dollars fund our activities and they have a right to know how those dollars are used.

Accountability – In order to effectively deliver on our commitment to our customers, we need to be accountable to them and to one another. Without owning and living our commitments, we will not be able to effectively serve our customers.

Inclusiveness – We provide safe drinking water to a diverse population. We should strive to ensure all communities have access to safe drinking water and share in the economic, social and environmental benefits of our system.

#### **IV. Attributes of Effective Utility Management**

##### **1. Product Quality**

Cleveland Water is dedicated to delivering a reliable supply of safe, quality water to our customers. As documented in our annual Water Quality Reports, we meet and exceed all U.S. EPA and Ohio EPA regulatory standards. In addition, Cleveland Water participates in the Partnership for Safe Water, a voluntary program to maintain higher water quality standards than those required by law. Accordingly, we perform self-assessments of our water treatment operations, identify performance limiting factors, and take corrective actions to improve water quality. We have completed the required self-assessment and optimization programs at each of our four water treatment plants, three of which have achieved Phase III status. Our Crown Water Treatment Plant received a Phase IV award in 2015 which has been maintained.

Lake Erie is the sole source of raw water for Cleveland Water. Therefore, a healthy Lake Erie is critical to our operations. A healthy lake means that our treatment process is more consistent, which helps maintain high quality finished water and keeps treatment costs down.

To ensure a reliable supply of safe drinking water is available, Cleveland Water uses a conventional treatment process at each of our four treatment plants with raw water from far offshore in Lake Erie. Each of Cleveland Water's treatment plants is served by a separate intake system which consists of a crib structure that protects an opening to a water intake tunnel. Each intake is located between three and five miles from the shore. This distance provides an added layer of protection from land-based water quality threats. Additionally, the intakes are spread across 15 miles and pull water from different heights in the water column, thereby reducing the likelihood of multiple intakes being adversely impacted by a raw water quality issue. Combined, these factors provide an important layer of reliability.

Prior to bringing lake water in through the tunnels, we monitor Lake Erie water quality with the use of two state-of-the-art Great Lakes Observing System (GLOS) buoys. Initially deployed in 2014, these buoys monitor physical and chemical characteristics of the water from spring through late fall, providing real-time data about factors such as pH, temperature, turbidity, cyanobacteria and dissolved oxygen levels. Staff monitor the data to help identify and respond to changes in lake water quality before it is drawn into our four treatment plants. Each intake's distance from shore gives staff four to five hours to make any needed adjustments to the water treatment process.

Data and observations collected from the buoys by Cleveland Water are also being used to develop a Hypoxia Early Warning System for the Great Lakes. This five-year project began in 2016 when the Great Lakes Environmental Research Lab (GLERL) and the Cooperative Institute for Great Lakes Research received a five-year grant from National Oceanic and Atmospheric Administration's (NOAA) Center for Sponsored Coastal Ocean Research to develop a model to predict the movement of hypoxic water in Lake Erie's Central Basin. When finalized, the model will provide all public water systems who use Lake Erie as their source water with an early warning system for hypoxic waters that functions in a similar fashion to meteorological forecasts.

Inside each water treatment plant, our conventional treatment process involving flocculation, sedimentation, filtration, disinfection and finishing has multiple barriers to ensure only the highest

quality water leaves our plants. While water leaving our plants contains virtually no lead, we control the finished water's pH and add orthophosphate to limit potential corrosion in the distribution system. Test results show our corrosion control methods, which have been implemented since 1997, are very effective in protecting customers from lead and copper in their in-home plumbing.

Cleveland Water also recently completed its Plant Enhancement Program (PEP). PEP was a \$650-million, 15-year effort to modernize all four water treatment plants in the Cleveland Water system. As a result of the PEP, Cleveland Water has four state-of-the-art treatment plants to ensure safe water is available throughout our service area. Specific PEP projects included transitioning to a safer chlorine feed system for water disinfection, new in-line rapid mix, and installation and integration of plant-wide computer control systems and monitoring software that constantly measure and record data on over 20,000 parameters in the water treatment process.

Post-PEP, Cleveland Water is continuing to invest in our treatment plants. In 2017, all four treatment plants had new advanced water quality monitoring sondes installed in their intake streams. Much like the GLOS buoys, these new devices inform the treatment facilities of changes in various chemical and physical conditions of the water brought into each plant, allowing for a more consistent and reliable treatment process.

## **2. Customer Service**

Quality customer service at Cleveland Water starts by keeping our product as affordable as possible. We have worked aggressively over the last seven years to become a more efficient and, by extension, affordable utility. As a result of these efforts, Cleveland Water has held its rates constant for three years; 2016, 2017 and 2018. This is relatively unprecedented as over the past 20 years rates had increased an average of 7% annually.

Currently, we measure affordability using the U.S. EPA standard criteria of 2% of median household income. An average bill in the City of Cleveland for water service is \$26.77 and median household income in the City is \$26,179. This equates to an affordability percentage of 1.2%, well below the U.S. EPA standard. Recognizing that this measure is not ideal, Cleveland Water is investigating a more detailed analysis based on other emerging criteria which may more accurately reflect affordability considerations.

As a utility, however, we recognize that even with frozen rates, some customers may still struggle to afford our product. As a result, we have taken other actions to help control costs for customers such as offering a discounted first block rate for "life-sustaining" quantities of water, making hourly usage information available to customers via our online portal and offering interest-free payment plans.

Cleveland Water also offers two programs to assist low income customers. The first is a Special Homestead Rate. This rate is for one- to four-family residential properties owned and occupied by a person 65 years of age or older or a person permanently and totally disabled whose total annual income does not exceed the limits established. The second program is designed to assist eligible low income customers. The program offers a reduction of 40% from the water bill for residential customers who have been qualified to receive assistance through the federally funded Home Energy Assistance Program (HEAP).

We recently transitioned from quarterly to monthly billing to enable our customers to better budget and receive more timely information about usage. Monthly bills also give Cleveland Water an opportunity to more frequently deliver important messages directly to our customers as each bill

includes an informational insert as well as a message directly printed on the bill. As a result of this transition, bill volumes have tripled; however, after the initial transition occurred call volumes decreased and collections activity has remained constant.

Beginning with our Customer Service Turnaround Project in 2011, Cleveland Water has embarked on an aggressive strategy to provide reliable, responsive, and affordable service to our more than 1.4 million customers. This strategy began with a comprehensive review of Cleveland Water's customer service structure, systems, standard operating procedures, training levels, and performance measures. As a result of this, the customer service units with Cleveland Water were reorganized and elevated within the organizational structure. This reorganized section includes Permits and Sales, Meter Operations, Billing Services, the Call Center, and Credit and Collections.

The Meter Operations team is responsible for the installation, maintenance and reading of Cleveland Water's meters. Recently, all employees in the Meter Operations team were cross-trained. Prior to this effort, some employees were Meter Repairmen and others were Meter Readers. This led to instances where multiple home visits may have been necessary in order to complete service requests for customers. In order to improve efficiency and provide a better customer experience, we created a new classification, Meter Technician, to garner synergies to ensure that all work/types of field activities were handled in one geographic location and completed by one position.

Cleveland Water also has a dedicated Billing Services team responsible for reviewing, analyzing and confirming the accuracy of all water bills before releasing them to customers. Billing Services is responsible for reviewing accounts for adjustments and billing master metered accounts. Billing Services also has a team designated to manage customers whose accounts require more complex analysis and special attention. This represents an expansion of service and outreach to our higher volume commercial and industrial customers, in particular those with special, water dependent operations.

Cleveland Water's Call Center and Credit and Collections teams are both staffed with employees trained and experienced in handling and resolving a myriad of issues and questions from our customers. The Call Center team consists of Customer Service Representatives (CSR) and Customer Account Analysts (CAA). As part of the Turnaround Project, the Call Center underwent a major technological upgrade including new telephone systems, improved Interactive Voice Response (IVR) structures, and advanced data reporting tools. Call Center staff responsibilities include taking payments, scheduling service appointments, and administering affordability programs. The Credit and Collections team is responsible for providing high quality service concerning bill disputes, tenant agreements, payments issues, the collection of past due bills, commercial accounts, and review of past due balances for liens and collection.

These work units are expected to meet industry based performance targets for key service metrics. This includes sending 98% of bills based on actual meter readings, answering 80% of customer phone calls in 90 seconds or less, handling customer calls in 7 minutes 30 seconds or less, and focusing on one call resolution. Additionally, our Billing Services team is expected to produce 99.5% of all bills on time. Similarly, all calls into our call center are tracked by call type, and our goal is to maintain a maximum of 5% of all calls due to bill disputes, or billing complaints. Our Credit and Collections team are expected to maintain a collections rate of 98%.

These performance standards are communicated to customers and other stakeholders via an evolving set of communication techniques. Performance results are communicated to Cleveland

City Council and the Suburban Water Council of Governments (COG) on a regular basis via formal presentations. They are also included in our Annual Report which is made available to all customers. Performance measures are also communicated to customers by Cleveland Water's dedicated Public Education and Outreach team. This team attends more than 150 community events throughout the service area annually and manages our Speakers Bureau program.

Cleveland Water continues to expand its digital communications media. In 2014, our website [clevelandwater.com](http://clevelandwater.com) was redeveloped to include an expanded customer portal. The embedded blog functionality provides regular updates to customers on a variety of topics, including customer service programs and performance measures. Additionally, customer service performance is regularly included in our social media content.

These improvements and evolving communication have translated into improving customer satisfaction. Cleveland Water measures satisfaction through a subscription to the J.D. Power Water Utility Customer Satisfaction Study. While this Study indicates that there is still room for improvement, from 2017 to 2018 the overall index score increased nearly 4%. Additionally, Cleveland Water collects anecdotal feedback through all digital and interpersonal communication channels and is in the process of developing an in-house quantitative measurement program.

### **3. Employee and Leadership Development**

At Cleveland Water, our ability to successfully meet the needs of our customers is driven by our employees. With a budget staff of over 1,100 employees, Cleveland Water is actively working to address three critical work force areas: 1) addressing challenges presented by an aging work force; 2) ensuring employees engage in continual learning in order to prepare for organizational changes; and 3) developing and implementing a culture focused on safe work practices.

Like many utilities, Cleveland Water has many employees that will soon be eligible for retirement. There is concern that, due to retirement and normal attrition, there will be a shortage of employees to fill the critical vacancies. As a part of our overall approach to fill such future vacancies and to ensure that institutional knowledge is captured and retained, Cleveland Water has begun a formalized Succession Planning Process to develop and enhance employees' knowledge and skills. This Planning Process is focused on engaging middle and senior level managers in a knowledge capture process before they depart the organization, and pairing them with potential candidates for on-the-job training.

Cleveland Water recently implemented an Apprenticeship Program to fill critical vacancies caused by retirements and attrition while further developing a multigenerational work force that reflects the diversity of our service area. A collaborative effort between Cleveland Water, the Cleveland Metropolitan School District (CMSD) and our local unions, this program offers graduating seniors who are less likely to attend college an opportunity to receive technical training in a specialized field and full time employment with the City of Cleveland. The Program provides the requisite education and training at no cost to the participant. The Program also addresses future demand for positions within the Department as well as provides graduates of CMSD schools employment opportunities with the City of Cleveland.

Cleveland Water is also focused on preparing current employees for future organizational changes through continual learning. Cleveland Water recognizes the importance of internal and external training for employees. We contract with Kent State University to provide supplemental employee training and development through a comprehensive training program known as the Department of Public Utilities (DPU) Academy. Employees receive general, remedial, technical, job specific, and leadership training on site as well as at Kent's nearby Corporate and Professional

Development Center. This external training provides courses that support workforce skill enhancement as it relates to Cleveland Water's key business functions. To date, 510 employees have attended sessions through this program.

Cleveland Water's Training and Development Unit provides internal training to employees. These multifaceted training programs and initiatives strive to encourage accountability, transparency, professionalism, high ethical standards, and quality as the backbone for the success of the organization. Our training respects the uniqueness of every individual and their capacity to learn by tailoring instruction to accommodate various learning styles through the use of the Visual, Auditory, Kinesthetic and Tactile (VAKT) method for multisensory learning and facilitating centralized training needs analyses to identify and remedy areas of need. Cleveland Water aims to create a learning environment where employees can realize their performance potential.

Finally, maintaining a safe work environment, following safe work practices and policies, and encouraging employees to strive and maintain a healthy lifestyle is critical to our ability to successfully meet our customers' expectations. Cleveland Water has a Safety and Risk Management team that monitors workplace conditions to ensure employees' work area is free from hazards that are likely to cause harm. This team also conducts numerous safety and compliance training sessions for employees.

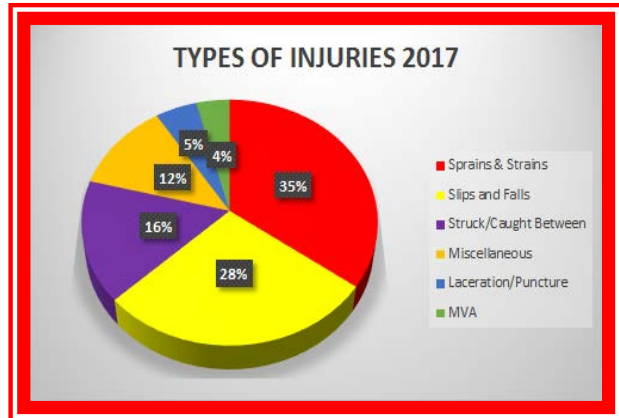
Upon hiring and annually thereafter, every employee receives a copy and training on the Employee Safety and Health Handbook. The intent of this handbook is to promote an environment of safety and health for all employees of the City of Cleveland. The handbook reviews topics from Personal Protection Equipment (PPE) to general safety rules to how to handle a Motor Vehicle Accident (MVA). Along with this training, employees receive training on various topics that apply specifically to their job responsibilities. In 2017 alone, more than 3,200 employees completed 264,990 hours of training on 51 safety training topics.

In order to help promote an organizational culture of safety, we have developed a coordinated safety education and outreach campaign comprised of written training programs and communication materials. This campaign rolls out target safety messaging each month stressing important topics such as PPE, lockout/tagout procedures, hand and eye safety, and excavation and trenching safety.

This training has translated into a safer work environment as evidenced by our safety related key performance metrics. Risk Management's goal was to achieve an annual Incident Rate of 4.2 or less, while also reducing the Days Away Restricted/or Transfer Rate (D.A.R.T) to 2.5 or less. In 2017, Risk Management met its annual Incident Rate reduction goal of less than 4.2, finishing the year at 3.59. The D.A.R.T rate goal of less than 2.5 was also achieved by finishing the year at 2.33. Risk Management has made it a priority to reduce our work place injury to less than 2.5 within the next three years.

Of the 92 incidents reported in 2017, 41 were recordable incidents and 29 resulted in lost time. 36 of the injured participated in transitional work. A comparison between 2015, 2016 and 2017 is illustrated which indicates a dramatic reduction in recordable and lost time claims.

Of the 92 injury incidences reported in 2017, 35% resulted from muscle sprains and strains; 28% were from slips and falls; 16% were from employees being struck by tools, materials or debris; 12% were a miscellaneous grouping of allergies, insect stings/bites, heat exhaustion, etc.; 5% were lacerations/punctures; and 4% resulted from Motor Vehicle Accidents (MVAs).

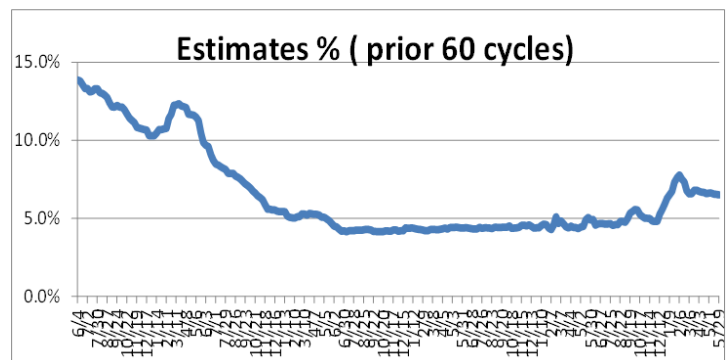


#### 4. Operational Optimization

Over the past several years, Cleveland Water has worked aggressively to optimize our operations and become more efficient and effective in meeting the economic, environmental, and health needs of our community. These optimizations span the entire spectrum of our operations, including delivering high quality customer service, ensuring the water we deliver to our customers is safe and of the highest quality, and taking proactive steps to minimize water loss and improve revenue collection.

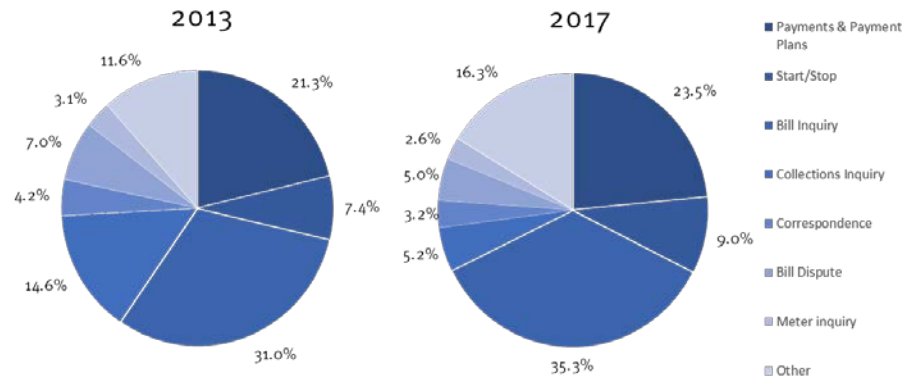
Perhaps no optimization effort has had as large of an effect on our operations as the implementation of our fixed network advanced metering infrastructure (AMI) system. To date, more than 411,000, or 98.1%, of our meters have been upgraded to the AMI technology. Prior to the beginning of this project in 2013, Cleveland Water was estimating approximately 17% of customer bills. This translates to approximately 60,000 customers who were receiving an estimated bill each quarter. This high estimation rate helped lead to a variety of billing and customer service issues. Under the legacy meter system, Cleveland Water obtained a meter reading once every 90 days. The new AMI system allows us to collect reads on an hourly basis, which has translated to improved efficiency and better service for our customers.

For example, we have virtually eliminated estimated bills. Currently, we are estimating approximately 6% of customer bills, with the overwhelming majority coming from meters that have not been upgraded to AMI.



This has translated into more accurate and timely bills, which has helped us maintain our target of sending 99.5% of bills on time and has helped us reduce the percentage of bill disputes by approximately 28% since 2013.

### Call Center Calls by Type



The hourly reads collected through our AMI system help provide an expanded level of service. This data is available to our Customer Service Representatives allowing them to help better diagnose customer issues. It also serves as the backbone of our proactive courtesy leak notification program. Under this program, if we detect a pattern of usage that suggest a customer may have a leak, we send them a proactive notice informing they may have an issue. Since activating this feature in late 2014, we have sent notices to more than 40,000 customers, approximately 90% of whom have disappeared from the “leak list” after the notice was sent. Additionally, we have taken the innovative approach of making the hourly reads available to customers through our on-line portal, empowering people with an additional tool to help them monitor their usage and control their costs.

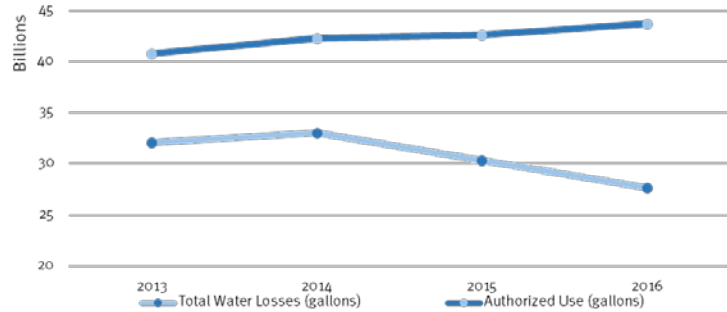
An additional benefit from the AMI upgrade program came from replacing aging water meters. Prior to the AMI project, Cleveland Water did not have a comprehensive meter replacement program. As a result, many meters were slowing down due to age, under recording some customer’s usage. By replacing all the meters that were more than 10 years old, we achieved a one-time increase in usage of approximately 6%, helping properly allocate costs across all customers.

Cleveland Water has also aggressively worked to optimize our operations in combatting water loss. Two areas of effort merit particular attention. First, we have undertaken an expanded system wide water audit and accompanying leak detection program to identify potential issues before they become large problems. This includes following the AWWA Water Balance Summary Model. According to this model, Cleveland Water has reduced its Infrastructure Leakage Index (ILI) from 8.2 to 6.7. This is being done in conjunction with system-wide leak detection efforts. We are conducting acoustic sounding on all distribution mains in the Cleveland Water system, starting with the older sections of our service area. We are more than halfway through this effort and have identified and repaired 426 leaks. As we complete the second half, we are looking into other advanced technologies including satellite detection.



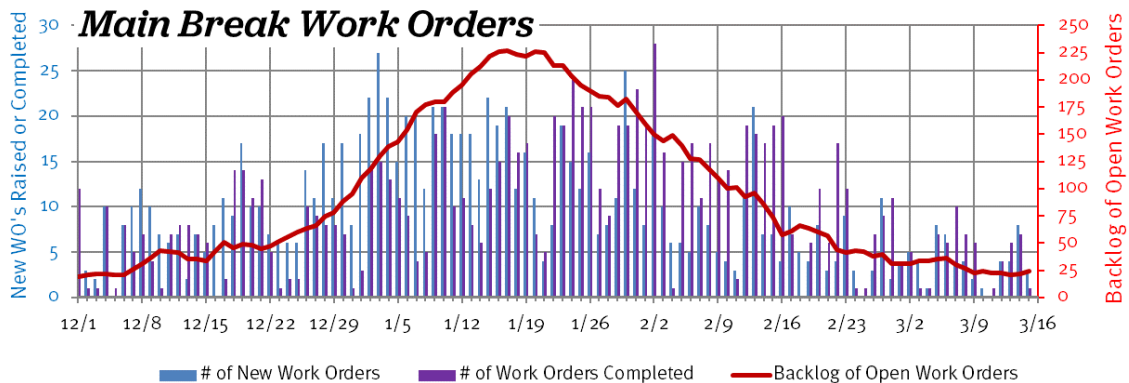
These efforts, combined with an aggressive capital replacement plan that is informed by advanced system monitoring, is having a dramatic impact on water loss. Between 2013 and 2016, billed consumption has increased by 8%. During the same time period, unmetered water has decreased by 14%. 2017 information is currently under review.

**Authorized Use vs. Water Loss**



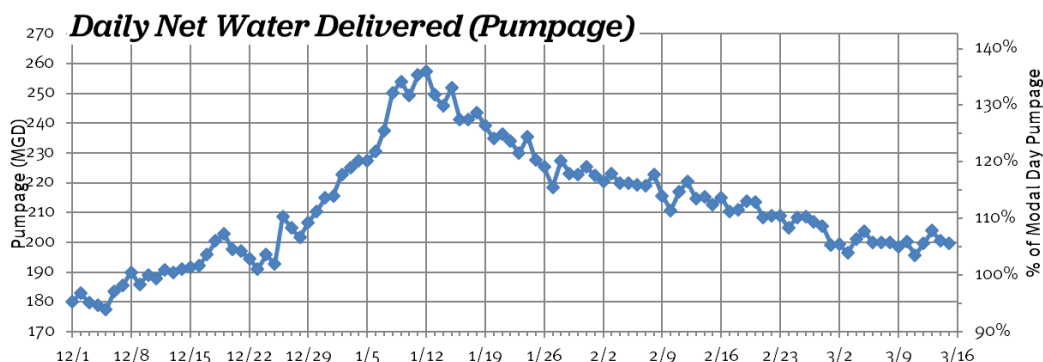
Additionally, we are using data to better address fluctuations in water main breaks caused by extreme winter weather. As fluctuations in weather patterns due to climate change become more extreme, Cleveland is experiencing more frequent periods of extreme cold which causes an increase in water main breaks. This winter, a two-week long stretch of single-digit temperatures beginning mid-December and extending into January created conditions that caused water mains to break at a high rate. On January 3 alone, we experienced 27 main breaks. In comparison, during normal winter weather, we average between 7 and 10 breaks daily.

As a result of the long stretch of low temperatures, Cleveland Water experienced the highest number of water main breaks of any month in the past 10 years, with a total of 517 breaks in the month of January. The previous record was set in February of 2007 with 390 water main breaks. Our dispatchers and pipe repair crews worked around the clock to quickly respond to the record number of main breaks. Main break repairs are scheduled according to the priority of the break, which is based on factors such as its location and severity. But during the winter, every break becomes important to address as quickly as possible since the leaking water can freeze, creating hazardous conditions.



The recent implementation of Cityworks, Cleveland Water’s data-driven work management system, was also key in helping to quickly resolve the high number of breaks. The Cityworks program is able to monitor the status of each main break in real time. It uses GIS to map each break location and logs descriptions and photos from the field to monitor each job from investigation to restoration. This detailed information kept staff constantly informed on the number of breaks, where breaks were located, and how quickly breaks were investigated and repaired.

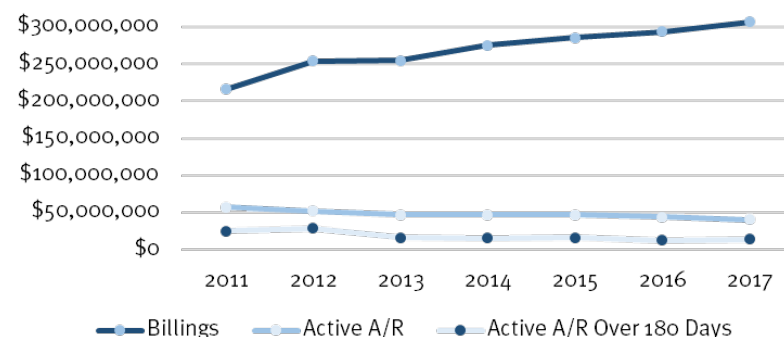
Additionally, Cleveland Water tracked changes in pumpage as an early indicator of the onset of a severe main break season. We also tracked pumpage in each of our nine pressure districts to determine which parts of our distribution system had the most main breaks.



With the winter weather over, the data collected will be used to make adjustments for the next winter season. The likely root cause for the increase in breaks is a deeper-than-usual frost line caused by the long stretch of single-digit temperatures. When this happens, the frozen ground increases the downward ground force onto the water mains to around 400 pounds or more per foot, more than double the norm. The deeper the frost line, the more pressure on the water mains and the more likely the pipe is to fracture under the pressure, particularly if it's an older cast iron pipe. Knowing this, next winter we'll be utilizing in-ground thermometers that monitor frost depth and duration in order to increase our ability to detect deep ground freezes earlier.

These optimizations have resulted not only in improved service delivery, but have also had a positive impact on our bottom line. As evidenced by the chart below, total billings for Cleveland Water have increased but outstanding accounts receivable and outstanding accounts receivable more than 180 days past due have declined.

**Active Accounts Receivable 2011-17**



This trend is critical to Cleveland Water from a predictability standpoint, helping to create the cash flow necessary to pay into our capital fund and hold rates constant for residents and businesses.

**5. Financial Viability**

Cleveland Water works hard to maintain a strong financial position. This effort begins by developing, and regularly monitoring, 10 year financial forecasts that account for long-term trends in water usage and revenue growth, changing factors that impact the day-to-day, and long-term, operations of the utility, and the necessary capital investment to continue to provide a reliable supply of safe water.

This plan starts with a revenue stream that includes different types of charges to improve predictability. Cleveland Water charges each customer a fixed charge, based on meter size, and a consumption charge. Fixed charges increase such that customers with larger meters pay a larger fixed charge. This fixed charge was implemented in 2011, better aligning revenue with

costs – the majority of which are fixed – allowing for more predictability over time. Additionally, this change was instrumental in Cleveland Water’s ability to keep our product affordable by holding rates constant in 2016, 2017 and 2018. Fixed charges account for approximately 19% of water service revenue and consumption charges make up the remaining 81%.

These combined monthly charges for water service make up 92% of Cleveland Water’s Total Charges for Services as shown on the annual financial statements. Cleveland Water has implemented fair collections practices, utilizing disconnections and liens only as a matter of last resort, while maximizing the amount of billed revenue collected. Additionally, we have pursued alternative revenue sources, primarily providing billing services to other agencies in order to diversify and expand revenue streams.

In order to ensure predictable rates, Cleveland Water sets rates in five-year cycles. Every 10 years, with the assistance of outside consultants, Cleveland Water conducts a full cost of service study and sets rates to ensure costs are allocated and recovered correctly. At the midway point of the 10 year cost of service cycle, we conduct a rate study to ensure costs are being recovered as expected, and, if necessary, rates can be changed if we are not appropriately recovering costs. When cost reallocations or rate increases are necessary, they are implemented over multiple years in order to smooth out potential rate shocks.

Rates are set in accordance with the Charter and Codified Ordinances of the City of Cleveland. According to the City of Cleveland Charter Chapter 19 Section 112, water rates “shall be fixed by the Board of Control, subject, however, to approval by (City) Council.” The Board of Control, as defined in Charter Chapter 13, Section 80, includes the Mayor and the directors of several City of Cleveland Departments. Prior to approval by the full City Council, rates are reviewed and discussed with both the City Council Public Utilities and Finance Committees. This provides a valuable check to help ensure that rates are set consistent with community expectations while also protecting the long-term financial health of Cleveland Water.

Cleveland Water utilizes a mixture of debt and cash to fund capital improvements. Currently, Cleveland Water is primarily funding our capital investments via pay-go cash financing. This has allowed us to control debt service payments having a net positive impact on customers. Before issuing any debt, Cleveland Water consults with the City’s Department of Finance and receives legislative approval from Cleveland City Council. The primary focus is ensuring Cleveland Water can hold the debt and still be in compliance with its debt covenants. The covenant requires Cleveland Water to charge such rates and fees for services to ensure a result of net revenues in each year at least equal to 125% of annual debt service requirements during the current year. For the past 3 years, Cleveland Water has had net revenues greater than 200% of the annual debt service requirements.

This approach is having a positive impact on Cleveland Water’s bond ratings. In 2017, S&P Global Ratings upgraded Cleveland Water’s bond rating to AA+ in response to the strong financial position of the organization. Currently, Cleveland Water bond ratings are Aa1 with Moody’s Investors Service and AA+ with Standard and Poor’s, the second highest tier in each, which less than 8% of utilities nationwide have achieved.

## **6. Infrastructure Strategy and Performance**

Cleveland Water uses an extensive network of infrastructure to deliver a reliable supply of safe drinking water to our more than 1.4 million customers. This includes: four interconnected water treatment plants, five major pump stations; 11 secondary pump stations; 21 water tanks and

towers; and 5,300 miles of water mains with an estimated replacement value of \$11.08 billion. Over the past 30 years, Cleveland Water has invested \$1.6 billion in these assets.

Long-term, Cleveland Water maintains and restores our treatment plants, secondary pump stations, and distribution system through our Capital Improvement Program (CIP). Cleveland Water uses the CIP to identify its infrastructure needs, prioritize projects, and schedule them for funding and implementation through a multi-year plan. Past major CIP initiatives include Cleveland Water's proactive Plant Enhancement Program (PEP) and installation of automated meter reading (AMI) meters. The PEP was a \$650-million, 15-year effort to modernize and rebuild our four water treatment plants. Specific PEP projects were designed to ensure system reliability and maintain adequate capacity in order to meet the needs of our current customer base and position the greater Cleveland region for future economic growth, including: safer chlorine feed systems, new in-line rapid mixers, new and updated finished and raw water pumps, and installation of plant-wide automation systems.

As a result of the PEP, Cleveland Water has four state-of-the-art treatment plants to ensure safe water is available throughout our service area. This is evidenced by our ability to consistently meet and exceed all state and federal water quality standards as outlined in our annual Water Quality Report. Additionally, Cleveland Water has not had a major treatment technique violation in more than 9 years.

Cleveland Water's CIP also focuses on our 21 water towers and tanks and more than 5,300 miles of underground transition and distribution mains. Water mains account for 70% of the value of our water system and historically were out of sight, out of mind. Because of this inattention, replacing and rehabilitating aging water mains has become a national initiative. With the completion of the PEP, Cleveland Water has focused, and will continue to focus, an increasing percentage of our CIP projects on underground infrastructure, investing \$26 million a year on replacing and renewing aging water mains throughout our service area.

This includes the implementation of our innovative Suburban Water Main Renewal Program (SWMRP). This program is a component of our Restated Water Service Agreement with our suburban direct service customers. In exchange for signing the Restated Water Service Agreement, and agreeing to bilateral "no-poaching" caveats, suburbs transfer smaller water mains to the Cleveland Water system and we commit to spending \$10 million replacing these suburban water mains. Over the past several years, we have voluntarily increased this spending to \$15 million annually. The program, in effect for 10 years, has resulted in almost \$130 million in main replacement that would not have occurred without this innovative approach.

But, capital replacement isn't the only avenue Cleveland Water pursues as part of its asset maintenance strategy. Additionally, Cleveland Water spends in excess of \$45 million annually on distribution system maintenance and repair. This is done with an eye on minimizing water loss and reducing the negative impacts that breaks, and the associated repairs, have on our community. The success of this repair work is measured by several performance metrics, including completing repairs to water mains in eight days, and completing full street restoration in 45 days or less. In 2017, 80% of repairs were made in eight days or less, and 94% of streets were fully restored in 45 days or less.

In order to proactively identify leaks and reduce water loss, Cleveland Water has conducted a water audit and is currently conducting a full system leak detection effort. We conducted system-wide audits for the years 2013 to 2016 in accordance with methodology developed by the American Water Works Association's (AWWA). We also completed individual water audits for

each of our nine service districts for the years 2014 to 2016, allowing for comparisons between areas of the system. The level and detail of the analyses was far beyond any water audit previously completed by Cleveland Water. The data generated from the audit shows that over the four years analyzed, authorized consumption is up by 8% and water losses are down by 14%.

Our leak detection effort began in 2016, and, when completed, will have surveyed all 5,300 miles water mains for underground leaks that have not surfaced. To date, we have completed the review on the oldest half of our distribution system, covering 2,814 miles of water mains and making up more than 50% of the system. A total of 426 leaks were identified and repaired. These efforts helps us integrate asset maintenance information into our capital planning by setting priorities for replacement prior to major infrastructure failures. Additionally, Cleveland Water is using technology to proactively identify weak spots in larger transmission mains. We use eddy current technology to detect broken reinforcing wires in prestressed concrete cyclinder pipe (PCCP), and then surgically replace or renew just those damaged sections, a far cheaper approach than wholesale replacement of the entire transmission line.

These repair and replacement projects can be incredibly disruptive to neighborhoods. In order minimize these negative impacts, Cleveland Water produces information sheets for major capital projects and makes them available to residents by mail and online. These sheets include project details, schedules, and contact information for the project manager. Additionally, emergency repairs are coordinated, as best as possible, with stakeholders based on community use and needs.

Other new technologies that are helping to improve efficiency and productivity at Cleveland Water include implementation of Cityworks software. This software enables us to integrate data about infrastructure, work orders and service requests, and equipment and material inventories into a single platform, helping us to better manage our resources and assets with digital inventories and workflows. The software overlays work order and service request details with a GIS-based inventory of Cleveland Water's distribution infrastructure. It also incorporates almost 15 years of historic repair data. This allows us to view maintenance and repair history for specific assets and use that information to better predict issues and proactively plan maintenance and capital reinvestment. Future phases of Cityworks implementation will enhance existing features, such as reporting and analysis features, and expand use to treatment plants and customer service.

## **7. Enterprise Resiliency**

Cleveland Water is actively engaged in planning for various contingencies that could impact our ability to deliver a reliable supply of safe drinking water. Cleveland Water has designated Security and Risk Management personnel focused on various aspects of enterprise resiliency. In 2017, there was a strategic focus on adding additional Safety and Environmental staff to the Risk Management Team certified in various aspects of safety and health, including a Construction Health and Safety Technician and Safety Management Specialist.

Hazard recognition and anticipation are emphasized in our daily business. Operational personnel perform regular audits of facilities and field inspections. They are able to shut down job activities if they identify a safety risk and obtain support to resolve the risk from staff personnel before resuming work.

Cleveland Water is a member of the Ohio WARN Water/Wastewater Area Response Network. The Cleveland Water Environmental Regulatory Compliance Manager leads a team responsible for overseeing environmental regulatory compliance in surface water, air emissions, spill prevention, hazardous waste disposal, and other areas at our water treatment plants and other

facilities. Safeguarding of hazardous chemicals begins by validating receipt of chemicals from haulers by designated staff personnel. Only approved suppliers and haulers are able to deliver water treatment chemicals to our facilities. Hazardous chemicals are typically offloaded to storage tanks that are located inside of buildings in chemical rooms. The storage tanks and rooms are installed with properly sized secondary containment sumps. Typically, these storage rooms are equipped with locks requiring a security badge proxy card.

Physical security at our locations includes fencing, gated access points, and designated entrance areas staffed full time by Security Officers who implement access control. All four water treatment plant properties are equipped with and monitored by various types of security monitoring, including cameras and thermal radar, that can be viewed both onsite and at the security headquarters office. Automated image processing provides intruder alerts. Motion detectors are utilized at specific locations. The majority of access doors at the plants are equipped with locks operated from proxy cards or physical locks requiring key access. Fire alarm and suppression systems are monitored both locally and by a third party supervisory monitoring service.

Cleveland Water utilizes a multi-layered cybersecurity defense strategy combining multiple mitigating security controls to protect private and public resources and data. Barracuda Networks, Akami and McAfee hardware and software products are all utilized to provide comprehensive email, web, and network security in protection against spam, phishing, malware, spyware, viruses, data loss, threats, and attacks. In addition, control system networks are isolated and segregated from business networks.

Cleveland Water actively engages in enterprise wide emergency planning. In 2016, Cleveland Water's Emergency Action Plan (EAP) was reviewed, revised and distributed. Along with the updated written plan, Emergency Response Team volunteers were identified and trained on their roles and responsibilities during evacuations and other emergency events, first aid, CPR, AEDs, and fire extinguisher operation.

A Contingency Plan has been prepared for water plant operations according to Ohio EPA requirements. This plan establishes response protocols for designated operational and security risks (scenarios) including emergency procurement and alternate water supply sources. Each of Cleveland Water's four treatment plants also has an EAP that meets federal Occupational Safety and Health Administration (OSHA) requirements. Our Vulnerability Assessment (VA) is revisited and updated at least on a five-year basis and analysis results from the VA support upgrades involving capital project planning and budgeting or expenditures from operational budgets for more immediate needs. Our most recent VA was updated in 2015.

## **8. Community Sustainability**

Community matters to Cleveland Water. We are actively engaged in multiple efforts to promote a more economically and environmentally sustainable and inclusive community. We work with multiple partners to tackle community-based challenges.

As a member of AWWA and AMWA and board member on The Water Research Foundation (TWRP), we constantly engage with other water utilities to identify best practices around sustainability and resource management. Additionally, we are active in the U.S. Water Alliance efforts around water equity. Building off of the "One Water" approach, we have looked at ways to leverage our operations to have a positive impact on our community. This includes efforts around assessing affordability, ensuring water quality for vulnerable populations, and ensuring the economic benefits of water investment are available to all populations in our service area. One key area in this effort is our efforts around small business development through our procurement

process. All contracts let by Cleveland Water have a Cleveland Small Business goal to help facilitate the growth of small businesses in our region. These goals range from 10% to 30% of contract spending based on the type of contract being let.

One of our primary partners is the City of Cleveland Mayor's Office of Sustainability (MOS). The MOS leverages Cleveland's assets by collaborating with the community to improve the economic, environmental, and social conditions of the people. Their Sustainable Cleveland 2019 program is a 10-year initiative designed to engage people from all sectors of our community to develop a thriving and resilient region. While Cleveland Water has been an active participant in all years of the program, we were particularly active in 2015 which was the "Year of Clean Water." Additionally, we worked with the MOS to promote lake health to the public via our "Don't Break the Lake" campaign. This campaign encourages the reduction of single-use plastics, a major contributor of pollution in the Great Lakes.

Similarly, Cleveland Water is part of the Cleveland Water Alliance (CWA). The CWA is a non-profit organization that joins Northeast Ohio corporations, universities and government agencies to drive economic development through water innovation and promote the value of water to our region. Established in 2014, CWA seeks to better utilize the economic and job-creating potential of Lake Erie while also urging greater care of this valuable, natural asset through public and private sector collaboration. Cleveland Water has been actively involved in all CWA efforts including studies to examine the economic value of water to our region, identifying the competitive benefit existing water infrastructure can provide to support business retention and attraction, and supporting the development of innovations around water quality through programs such as the "ErieHack" competition.

We recently began more closely integrating capital projects with other types of infrastructure work. Currently, projects in the City of Cleveland are being coordinated with street repairs to allow for full street restoration when we do a main replacement project. This creates efficiencies that can facilitate additional work for both water and street repairs. Similarly, funding for SWMRP projects can be used by suburban communities as the local match component for other state funding streams, allowing suburban communities to leverage Cleveland Water dollars to obtain additional funding for sewer work or to street repair. This efficiency has a positive impact on the financial, social and environmental health of the communities involved in these projects.

## **9. Water Resource Sustainability**

Cleveland Water is incredibly fortunate to have Lake Erie as its source of drinking water. While we are not facing the same scarcity threats as some parts of the nation, we are focused on supporting efforts that protect the health of Lake Erie and its watershed.

Representatives of the Cleveland Water participate in the Northeast Ohio Areawide Coordinating Agency (NOACA) process to update the region's Water Quality Management (208) Plan. Water Quality Management (208) plans describe and promote efficient and comprehensive programs for controlling water pollution from point and nonpoint sources in a defined geographic area. The Plan is an encyclopedia of information used to plot and direct actions that abate pollution and preserve clean water. NOACA's 208 Plan was last updated in 2000; the new planning process has been underway for more than a year.

We also actively monitor the health of Lake Erie through several partnerships, including efforts to use data collected from Great Lakes Observing System (GLOS) buoys to develop a Hypoxia Early Warning System for the Great Lakes.

Cleveland Water staff have been active participants in efforts to improve citizen's knowledge and understanding of the environmental, social and economic importance of our source water by promoting the education principles outlined in the state's Lake Erie Literacy campaign. Cleveland Water staff currently are involved in an effort to expand this education campaign and develop a watershed literacy campaign which connects how actions on land impact the quality of the lake.

#### **10. Stakeholder Understanding and Support**

Cleveland Water works hard to engage our customers and other stakeholders regarding the entirety of our operation. We have a dedicated Public Affairs team that focuses on communications, community education and outreach, and government affairs.

Cleveland Water engages in regular communication with Cleveland City Council. These communications include general presentations to the Public Utilities Committee regarding organization performance, budgeting, specific projects, and all legislation required to conduct normal operations. Additionally, we coordinate with Cleveland City Council to disseminate critical information regarding initiatives and programs impact their residents.

As a regional water supplier, Cleveland Water works with suburban mayors and officials via our regional Suburban Water Regional Council of Governments (COG). The COG is comprised of representatives from various regions within our service area. This advisory group meets regularly to discuss issues, initiatives, and programs. The COG has proven to be an effective mechanism for establishing dialogue with our suburban communities

Cleveland Water engages in an extensive customer communications strategy to raise awareness regarding how we support jobs, families and communities. These communications focus on all aspects of our operations, including water quality, reliable distribution, affordability, and customer service. Building on our core values, we use a variety of communications channels to share this information in an effort to meet all of our customers where they are.

We include inserts for key initiatives in our bills as well as promoting through on-bill messaging. We are increasing our use of digital channels to grow the frequency of communication with our customers. In addition to posting all content to our website blog, we have an active presence on Facebook and Twitter. We also engage proactively with local media to cultivate relationships and raise awareness around organizational priorities.

Cleveland Water's Education and Outreach team manages several community and youth education and awareness programs and maintains a consistent presence at community events, festivals and forums. In 2017, we attended more than 150 community events with an estimated attendance in excess of 250,000. This includes hosting a water treatment plant Open House for Drinking Water Week. The most recent Open House brought approximately 1,500 residents to tour our Garrett A. Morgan Water Treatment Plant. The Education and Outreach team manages our Speakers Bureau, which provides groups with an opportunity to learn about drinking water first hand from Cleveland Water subject matter experts; the Cleveland Student Technical Enrichment Program, a free education program open to 6<sup>th</sup> through 9<sup>th</sup> grade students located in the Cleveland Water service area that gives students interested in science, technology, engineering, and math an opportunity to learn from professionals in STEM-related fields from premier Cleveland-area businesses and institutions; and our H2O Youth Club, which teaches kids how they use water in their daily lives and how water is treated and distributed.