

# **WATER AND WASTEWATER UTILITIES**

**2019 Annual Report**



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## MESSAGE FROM THE DIRECTORS

The Water and Wastewater Utilities fund a complex urban water ecosystem that starts at the Water Treatment Plant Raw Water Intake on the South Saskatchewan River and ends at the Wastewater Treatment Plant outfall, where treated effluent is discharged into the river. Responsibility for the planning and design, treatment, operations and maintenance, and asset preservation falls within the following three divisions:

- Saskatoon Water
- Water & Waste Operations – Water & Sewer Section
- Technical Services

Management and staff from the responsible divisions are committed to providing exceptional quality water and wastewater services in the most reliable and cost-efficient way for the citizens of Saskatoon. We are pleased to present our results in the Water and Wastewater Utilities 2019 Annual Report on behalf of our divisions.

The report describes our contributions to achieving the City of Saskatoon's Strategic Plan. We take great pride in receiving one of the highest citizen satisfaction ratings of City service for the quality of our water. Several initiatives have been completed and more are underway that will further enhance service to citizens, increase efficiencies, reduce costs, and strengthen our environmental leadership.

Our financial statements show responsible stewardship of the resources that Saskatoon citizens have entrusted to us. We continue to provide excellent value to our citizens as we undertake capital and continuous improvement projects that ensure asset and financial sustainability. Our utility rates are designed to fund the needed capital and operating costs for current and future water and wastewater services.

Management and staff place a strong emphasis on safety. The combined lost-time frequency rate for the labour-intensive divisions was higher than the corporate average of 2.49.

The divisions have been focused on addressing growing demands, changing expectations, regulatory changes, and aging infrastructure for water-related services. In 2019, the utilities funded 84 active capital projects valued at \$308.5 million.

We are proud to work with a dedicated group of professionals who demonstrate an ongoing commitment to not only making quality of life great in Saskatoon, but to continue to ensure the water and wastewater infrastructure is sustainable.

Russ Munro – Director of Saskatoon Water  
Dan Willems – Director of Technical Services  
Brendan Lemke – Director of Water & Waste Operations

## EXECUTIVE SUMMARY

The Water and Wastewater Utilities fund all aspects of water services performed by the Saskatoon Water Division, Water & Sewer Section of the Water & Waste Operations Division, and the Technical Services Division that contribute to our city's quality of life by providing safe and reliable, high-quality drinking water, and wastewater collection and treatment that meets health and environmental regulatory standards.

The City of Saskatoon employs approximately 323 staff through these three divisions to operate and maintain the Water Treatment Plant, three reservoirs and pump stations, the Wastewater Treatment Plant, 26 lift stations, the Meter Shop, underground water and wastewater infrastructure, manage asset preservation for underground water and wastewater infrastructure, and provide engineering and planning services. The Utilities also fund a portion of Corporate Revenue for customer billing, meter reading, and collection services.

The Utilities provide water services to approximately 75,000 residential and commercial water meters. The Water Treatment Plant supplies water to approximately 313,000 Saskatchewan residents. Average monthly residential water-related utility bills of \$134.70 was the lowest among other major prairie cities in 2019.

In 2019, the Water and Wastewater Utilities collected \$165.6 million in revenues and incurred \$168.4 million in expenses resulting in a shortfall of \$2.8 million, which was funded by the Stabilization Reserve. Compared to 2018, total revenues in 2019 increased by 5.0% as a result of growth and development, rate increases, and the phase-in of a Return on Investment.

In 2019, 52.2% of total revenues, or \$86.4 million, was allocated to capital to fund longer-term, water-related infrastructure projects. Some of the significant capital projects in 2019 included: Water Treatment Plant enclosure and security upgrades, Water Treatment Plant transfer pumping and electrical upgrades, Water Treatment Plant and Wastewater Treatment Plant Long-term Capital Development Plans, Advanced Metering Infrastructure, Wastewater Treatment Plant digester and heating upgrades, lift station upgrades, Marquis liquid waste haulers station, North 40 Cell 8 Relining, expanded water and sewer monitoring program, long-term master planning of water and sewer servicing to a population of one million, miscellaneous land development design projects, water main lining and replacement, and lead service line replacement.



## 1.0 OVERVIEW

### 1.1 Introduction

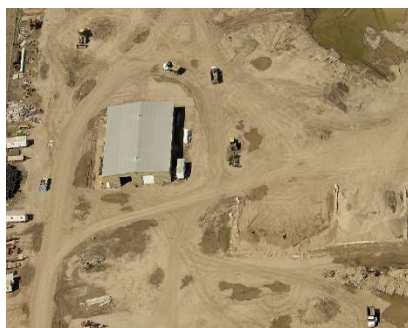
The Water and Wastewater Utilities fund the Water & Sewer Section of the Water & Waste Operations Division, portions of the Technical Services Division, and the Saskatoon Water Division who are collectively responsible for the planning, design, operation, maintenance, and capital for all water and wastewater services for existing and future citizens and businesses. The Utilities also fund a portion of Corporate Revenue for customer billing, meter reading, and collection services.

The Utilities have assets with a replacement value estimated at over \$7.6 billion (2017 assessment). See Appendix One for details.

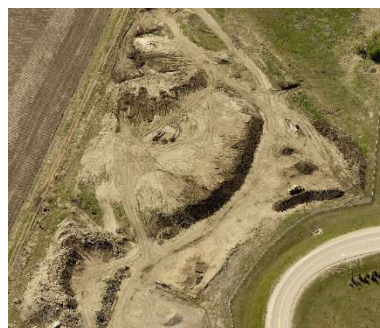
**Water & Sewer** ensures the maintenance, repair, and minor replacement of all underground infrastructure. Water & Sewer is responsible to operate, maintain, and inspect the water distribution, sanitary sewer collection, and storm water collection systems, which have a replacement value in excess of \$8.40 billion. Lined up end-to-end, the underground pipes (not including service connections) that make up Saskatoon's water distribution, sanitary sewer collection, and storm water collection systems total 3,083 km.



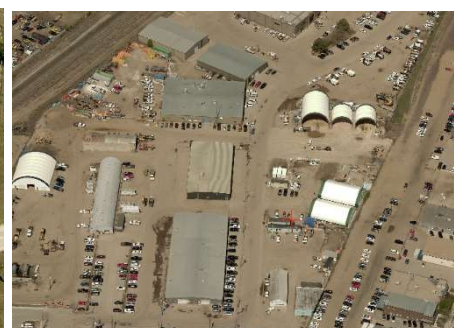
Water & Sewer material handling sites are separated into three locations: The Downtown Yards, Nicholson Yards, and Dundonald Yards. Each location houses resources for the Water & Sewer crews to maintain and repair the City infrastructure. The Dundonald Yards and Nicholson Yards both store backfill material as well as incoming wet fill which is processed so it can be repurposed and utilized. Having these two remote locations enables crews to provide faster service by accessing the nearest site to the work zone. The Downtown Yards is the reporting grounds for all employees to receive their daily assignments and tasks, as well as storing material, equipment, and parts.



Nicholson Yard (2018)



Dundonald Yard (2018)



Downtown Yard (2018)

**Technical Services** consist of three sections with the Asset Preservation section responsible for managing asset preservation for underground water distribution and sewer collection systems. The condition of the distribution and collection assets is continually evaluated, and a long-term asset management plan is in place outlining levels of service and funding for annual maintenance and rehabilitation programs. Construction & Design provides construction engineering services to deliver the required capital projects to upgrade the Water & Sewer assets.



**Saskatoon Water** consists of five sections. The following summarizes the responsibilities of each of these sections.



The **Water Treatment Plant** (WTP) supplies all consumers with safe and reliable, high-quality drinking water that meet high provincial and federal regulatory standards. Core functions include operating and maintaining the South Saskatchewan River Raw Water Intake, the WTP, and three potable water storage reservoirs with a capacity of 114 million litres.

The **Wastewater Treatment Plant** (WWTP) ensures that wastewater is treated to meet high provincial and federal regulatory standards before being returned to the South Saskatchewan River. The wastewater's system includes the WWTP, 26 lift stations, the Heavy Grit Facility, and the Biosolids Facility where solids from the treatment process are handled and disposed. Sales of the plant's slow-release fertilizer create additional revenues.





The **Meter Shop** is responsible for the purchase, installation, testing, repair, and replacement of water meters; the installation and termination of water services; as well as the installation and commissioning of Advanced Metering Infrastructure (AMI). The Meter Shop also operates the Cross Connection Control program to ensure that proper backflow prevention devices on multi-unit residential, commercial, industrial, and institutional service connections protect the City of Saskatoon's (City) potable water.



**Engineering & Planning** is responsible for the planning and design of water and sewer servicing for new land development, as well as capacity analysis and improvement within existing neighbourhoods. A city-wide network of sewer and rain gauge monitors are operated and maintained by the system modeling group to assist with water-related planning and design activities. Engineering & Planning also manages the Storm Water Utility and provides storm water

engineering expertise. The section also monitors and mitigates damage to public property from riverbank settlement and instability due to high ground water levels. The [2019 Storm Water Utility Annual Report](#) provides more information on storm water operations.

**Engineering Services** is a professional and technically diverse section that provides project management and technical advisory services to support Saskatoon Water and stakeholder departments for the development of capital programs and delivery of capital projects to maintain infrastructure life and capacity required to meet the demands of a growing City.





## 1.2 Strategic Linkages

The City's [Strategic Plan 2013-2023](#) provides the direction that guides Saskatoon Water's activities. The following section outlines our Mission, Vision, and linkages to the Corporate Strategic Goals, Leadership Commitments, and Values.

### Our Mission

Saskatoon Water and Wastewater Utilities deliver safe, reliable, and cost-effective water, and wastewater services that meet and exceed health and environmental regulatory standards.

### Our Vision

Saskatoon citizens have exceptionally high-quality water, dependable wastewater handling, and effective storm water services that sustain people, property, and the environment.

The Water & Sewer Section falls under the Water & Waste Operations Division. Their mandate is to provide delivery of potable water, removal of waste and storm water, and collection of waste materials. These include: operations, maintenance, and emergency response for the water distribution, and storm and wastewater collection systems. Municipal Engineering Services (Construction & Design) supports Water & Sewer through program design, contract management, and Continuous Improvement initiatives.

### Our Strategic Goals

*Quality of Life:* Provide citizens with affordable, reliable, and high-quality water, and wastewater treatment services.

*Continuous Improvement:* Increase workplace efficiencies and improve services through implementing innovative approaches that maximize value.

*Asset and Financial Sustainability:* Implement capital preservation and expansion plans that provide the most cost-effective, water-related infrastructure for current and future citizens and businesses.

*Environmental Leadership:* Implement leading-edge innovations for environmentally responsible water-related infrastructure and services.

*Sustainable Growth:* Work closely with other divisions to provide efficient and resilient designs for water and wastewater infrastructure for new developments.

*Moving Around:* Collaborate with all stakeholders to minimize water-related transportation disruptions.

*Economic Diversity and Prosperity:* Provide competitively priced and reliable water-related services, and cost-effective water and sewer designs for new developments.

## Our Leadership Commitments

Our employees support leadership commitments in our day-to-day work:

- Reliable and Responsible Service
- Strong Management and Fiscal Responsibility
- Effective Communication, Openness, and Accountability
- Innovation and Creativity

## Our Corporate Values

*Trust:* We build trust with citizens and colleagues by providing accurate technical information, analysis, and responses in a timely manner.

*Integrity:* We lead by example, making the best decisions and striving to work beyond the scope of the position.

*Respect:* We build on each other's strengths; respectfully acknowledging individual beliefs.

*People Matter:* In the water professions, we place the protection of the public and our staff as our highest priority.

*Courage:* We take smart risks, thinking through challenges, suggesting new approaches, and embracing change to enhance our level of service.

*Safety:* We put safety at the forefront of all decision making and never compromise on the safety or well-being of ourselves, coworkers or the public.

## 2.0 OUR CUSTOMERS

### 2.1 Number of Customers

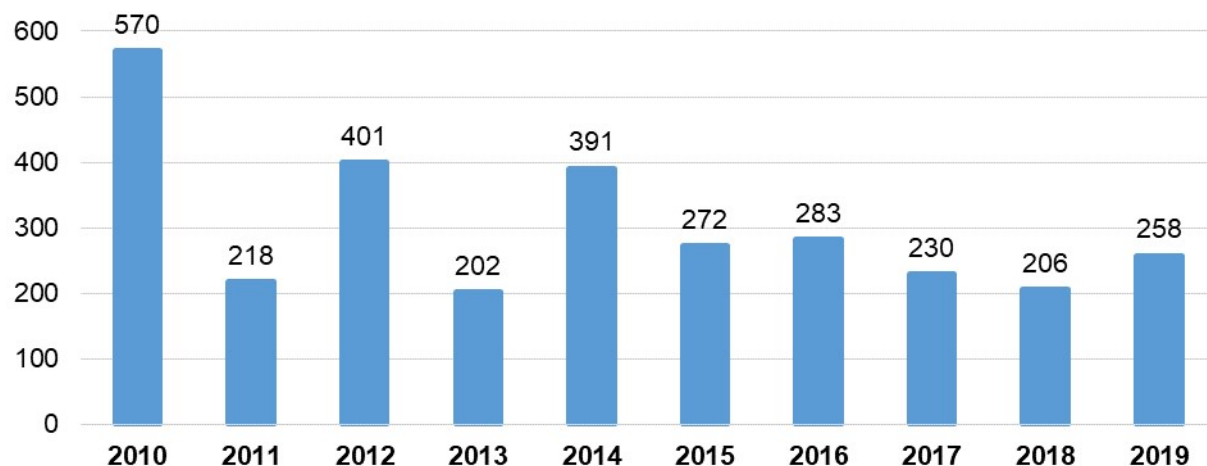
In 2019, water treatment and distribution, and wastewater collection and treatment services were provided to approximately 275,000 residents and to commercial, industrial, and institutional customers in Saskatoon. The Water Utility also sells treated water to SaskWater, which receives this water at seven supply points around the city's perimeter and redistributes it to approximately 38,000 customers outside of Saskatoon.

In 2019, Saskatoon Water provided water services to approximately 75,000 residential and commercial water meters.

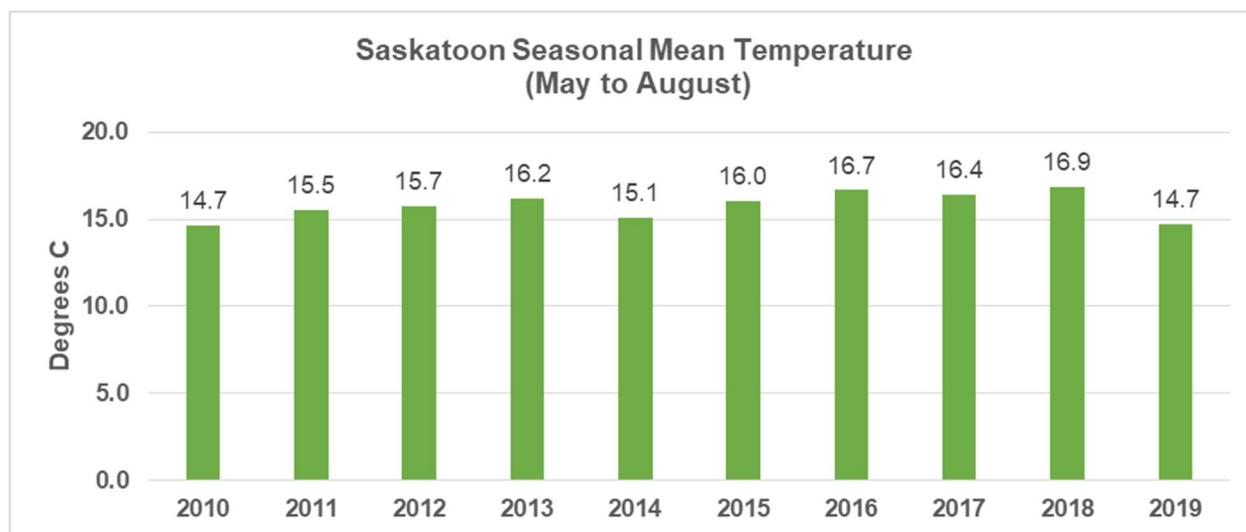
### 2.2 Rainfall and Temperature

Summer rainfall and temperatures can help explain some of the variation in annual water demand. In 2019, Saskatoon registered 258 mm of rainfall, which is lower than the ten-year average rainfall of 303 mm.

**Saskatoon Annual Rainfall  
(April to September) (mm)**

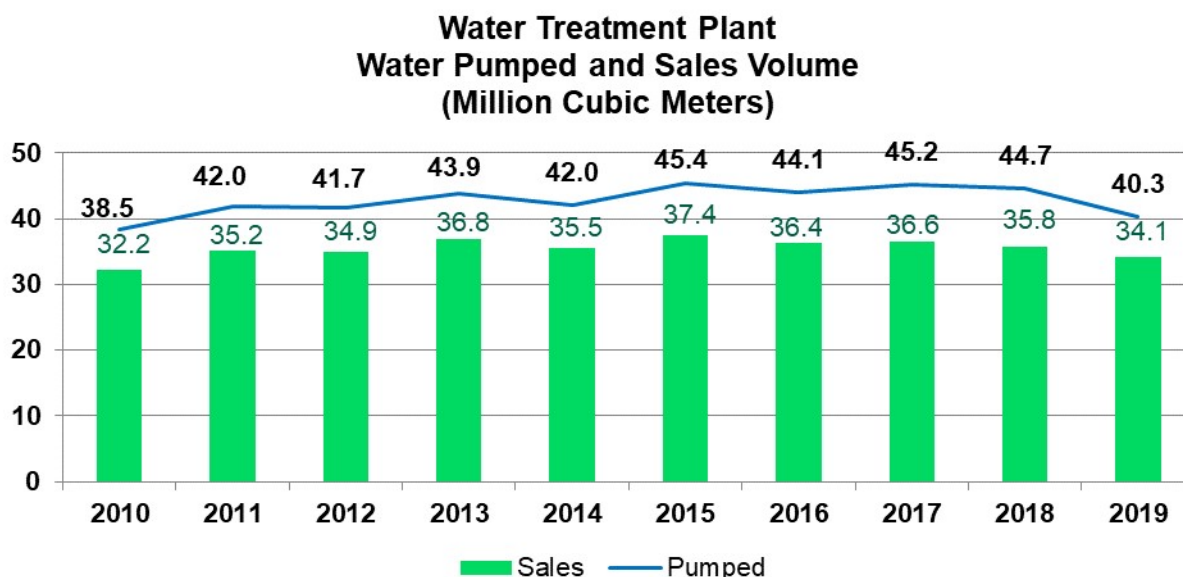


Average summer (May to August) temperatures in 2019 were 1.1° C cooler than historical summer averages.



## 2.3 Water Treatment Plant Volumes

Based on customer meter readings, 34.1 million cubic meters of water were sold in 2019, which is less than the ten-year average. Although the population has grown by 22.3% since 2010, demand has stayed relatively constant. This can be attributed to lower consumption per capita due to low-flow faucets, toilets, and washing machines; and an increased water conservation awareness. It is anticipated demand will rise in correlation with population in the future once all fixtures are converted to low-flow and conservation is fully realized.

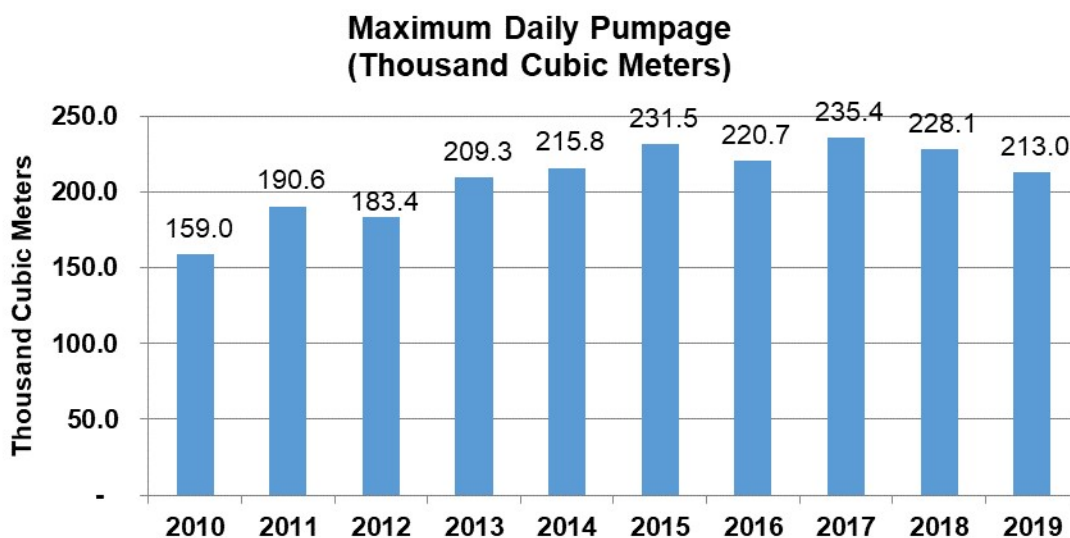




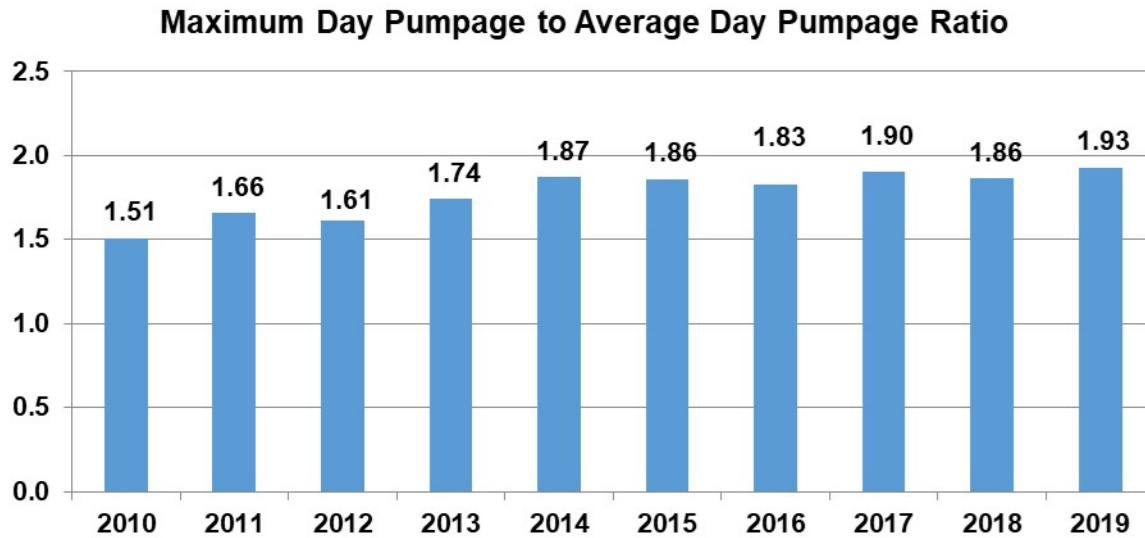
The chart above compares the annual volume of treated water pumped from the WTP into the distribution system and the volume of water sold. Due to a water meter failure, the pumpage was estimated from 2010 to 2013, based on an assumed water leakage rate of 16.2%. In 2019, unmetered water was 15.4% of total water pumpage. The difference between the volume of treated water pumped and sold was due to the following:

- Water loss through leaks
- Water main breaks
- Unauthorized water use
- Authorized but unmetered consumption (e.g. flushing water mains and fire flow)
- Estimated consumption and year-end unbilled volumes
- Water meter accuracy

Maintenance and investment in the water distribution system and the new water audit program, introduced in 2018, will reduce water loss and lower water treatment operating costs.



The current level of service is for the WTP's capacity to meet or exceed the maximum daily water demand, which is the average of four consecutive days of highest demand each year. The large volatility in the maximum daily demand is mostly due to weather conditions and population growth. Conservation initiatives have helped to mitigate maximum daily pumpage, even with population growth.



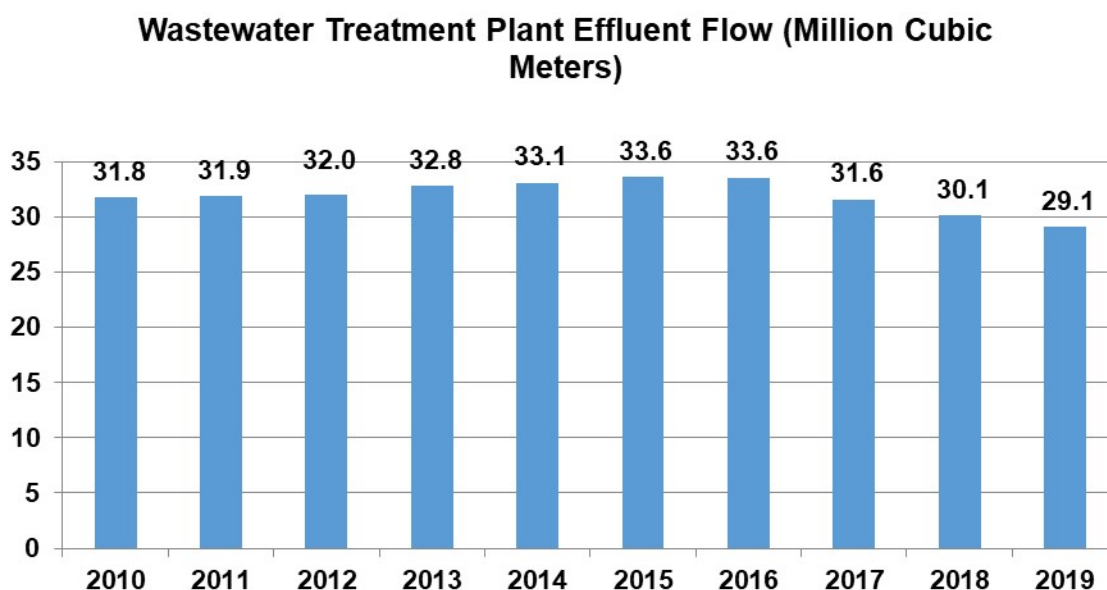
The chart above reflects the extra capacity required for the maximum daily volume of water consumption at the height of summer irrigation relative to average daily water consumption throughout the entire year.

In 2019, the maximum day pumpage to average day pumpage ratio of 1.93 was higher than the ten-year average of 1.78. This variable is used for long-term demand forecasting; however, due to its volatility, it is difficult to provide accurate forecasts.

As demand approaches plant capacity, the level of service to always meet maximum daily demand must be reassessed and possible peak demand management initiatives implemented.

## 2.4 Wastewater Treatment Plant Volumes

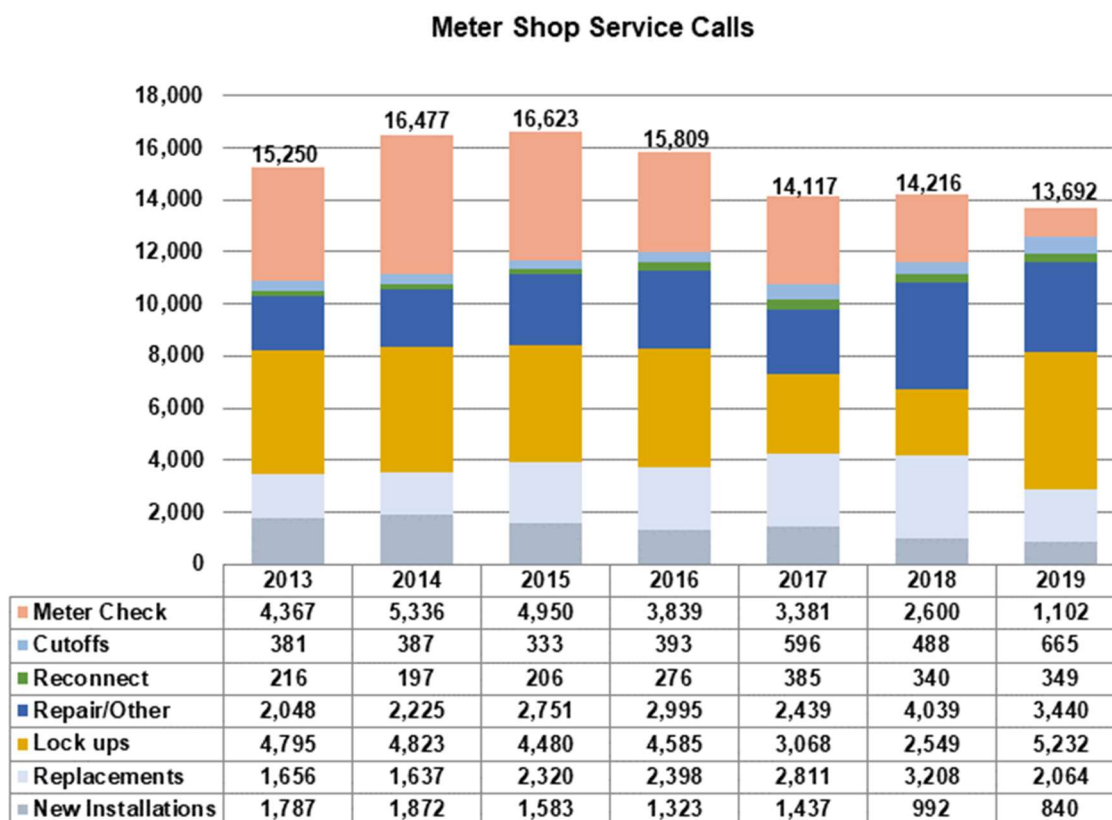
In 2019, WWTP effluent was lower than the ten-year average of 32.0 million cubic meters. WWTP effluent flow increases as the population grows and decreases when households install water-saving appliances, such as low-flush toilets, resulting in relatively constant demand over the last decade. Wet weather or intense storm conditions also influence effluent flow due to inflow (e.g. weeping tiles) and infiltration (e.g. leaky pipe joints and manholes) into the wastewater collection system; therefore, less effluent is expected in dry years. The work on lining sewer mains also reduces inflow and infiltration reducing the demand on WWTP equipment.



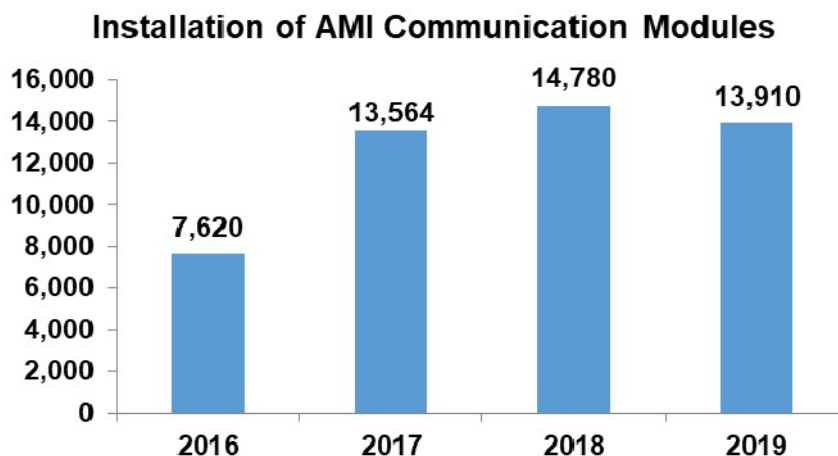
\*2011 was estimated due to missing flow data. The monitoring instrumentation was replaced.

## 2.5 Meter Shop Customers

In 2019, the Meter Shop undertook 13,692 total jobs, a decrease of 3.7% compared to 2018. See the below graph for a breakdown of the total jobs, which result from work orders generated by Corporate Revenue to check malfunctioning meters or for cut-offs and reconnects.



At the end of 2019, 13,910 AMI communication modules were installed, totaling 49,874 since the program started in 2016. This represents 66.2% of total water meters within Saskatoon.

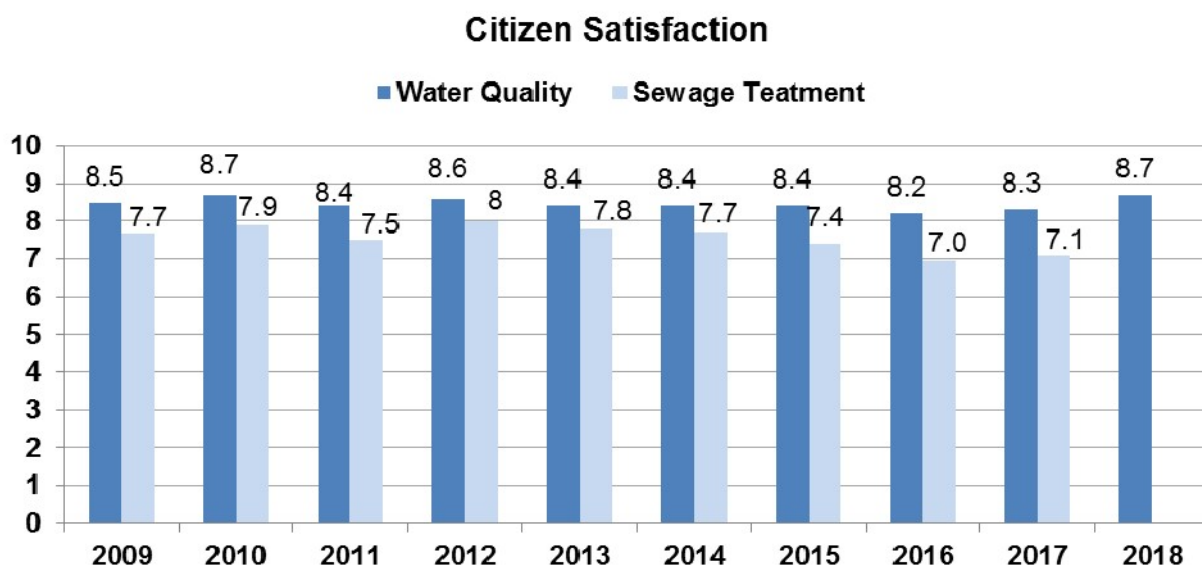




Presently, there are 9,870 active backflow prevention devices that are required to be tested annually. In 2019, 583 new devices were installed and 91.87% of all devices were tested. Most of the 8.13% of devices not tested were inactive due to construction or City parks seasonal connections not completed on time.

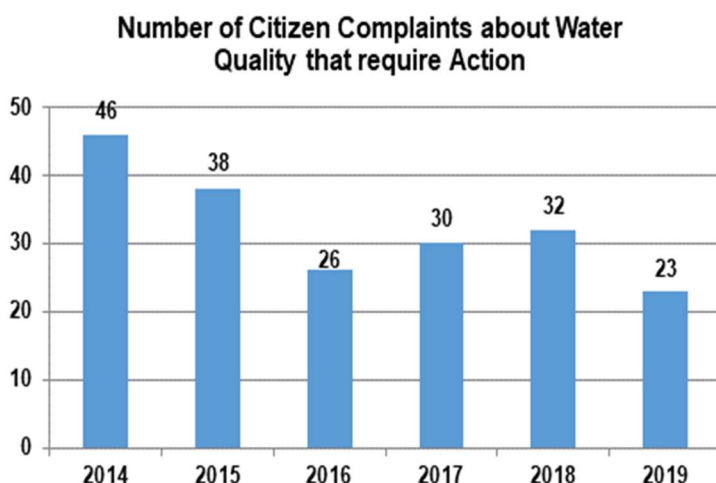
## 2.6 Customer Satisfaction

A citizen satisfaction survey was not undertaken in 2019 so the 2018 Citizen Satisfaction & Performance Survey was used for this report. Saskatoon citizens were asked to rate services provided by the City on a 10-point scale where a score of ten means “excellent” and five means “average”. In 2018, the average citizen satisfaction for quality of drinking water was 8.5 and speed of repair to water main breaks was 7.5, both being in the top three services. Water quality has consistently received the highest or second highest Saskatoon citizen satisfaction rating of all civic services.



*In 2018, the survey on removing contaminants from wastewater to make it suitable for disposal in the natural environment was not performed by relevant department.*

## 2.7 Citizen Calls



In 2019, citizen calls resulted in lab personnel making 23 on-site visits to conduct water-quality testing for bacteria and inorganic material to ensure safe, high-quality water is maintained.

Zero calls regarding WWTP odour were received in 2019. One noise complaint call was received.

## 2.8 Clearance and Records

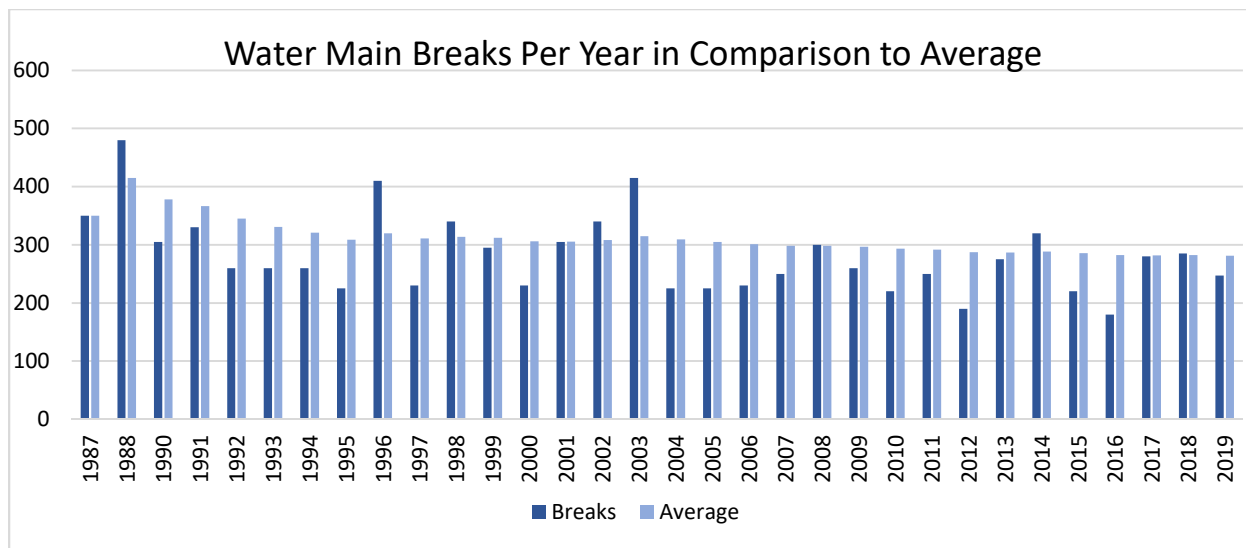
Clearance and Records is a workgroup that provides communication to the public through the delivery of maintenance notices. The group sees that all records and data for work done to the underground infrastructure are managed and maintained, as well as providing locates for internal and external contractors.

Providing location to a work group enables crews to work safely and effectively, with the reassurance that when digging, there will be no obstructions or concerns for their safety or safety of those around.

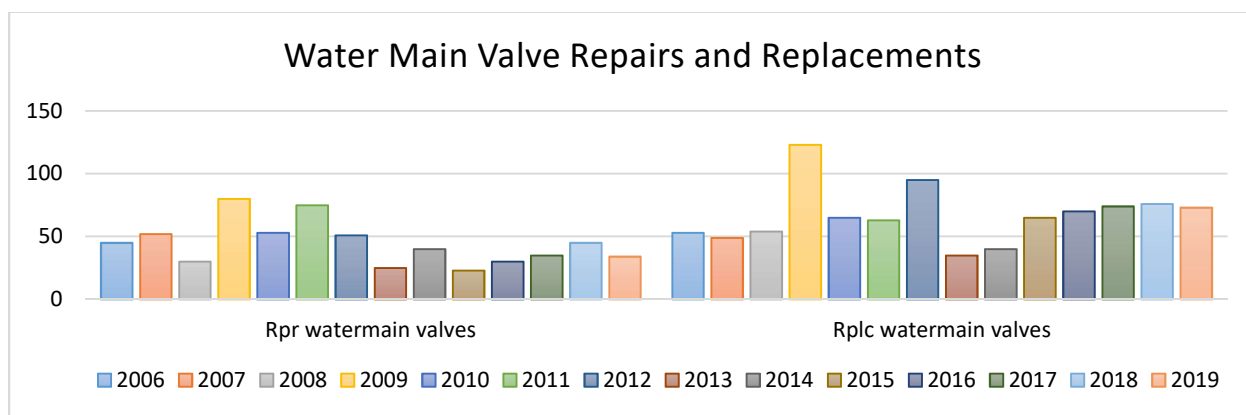
In 2019, Clearance and Records continued to see an increase in workload with the introduction of the Planning and Scheduling Group. By pre-planning work, they increased the day-to-day demand of locates.

## 2.9 Maintenance

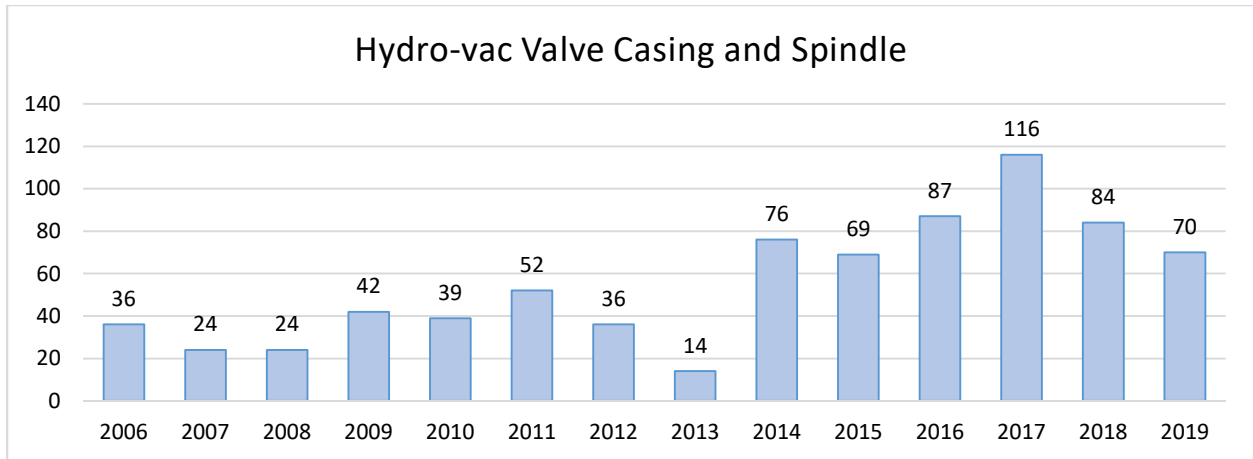
Maintaining utility service for residents is important so a high-level of customer service was established. In 2019, there were 247 water main breaks and approximately 59% of those were repaired and water restored within 24 hours. The average water main break repair cost is approximately \$13,500. Maintenance crews repaired 1,539 locations last year, of which, only 16% were water main breaks. When a water main breaks, the level of service states that it will be repaired within 48 hours. In 2019, the average repair time was 28.5 hours per break and the service level time was exceeded on 24 occasions, 21 of which were due to extreme weather.



The chart above shows the number of water main breaks in each year compared to the average number adjusted with each year of new data. As can be seen in the chart, the number of breaks varies every year due to weather and frost depth; however, the trend of the average number is going down. This means, that while there are spikes in water main breaks, the Planned Maintenance Program and the Capital Rehabilitation Program, supported by Technical Services and Construction & Design, are having an overall positive impact on the reliability of the distribution system.



The chart above shows the number of completed water main valve repairs and replacements throughout the system. These repairs are part of the over 1,500 locations maintained by Water & Sewer staff in 2019.

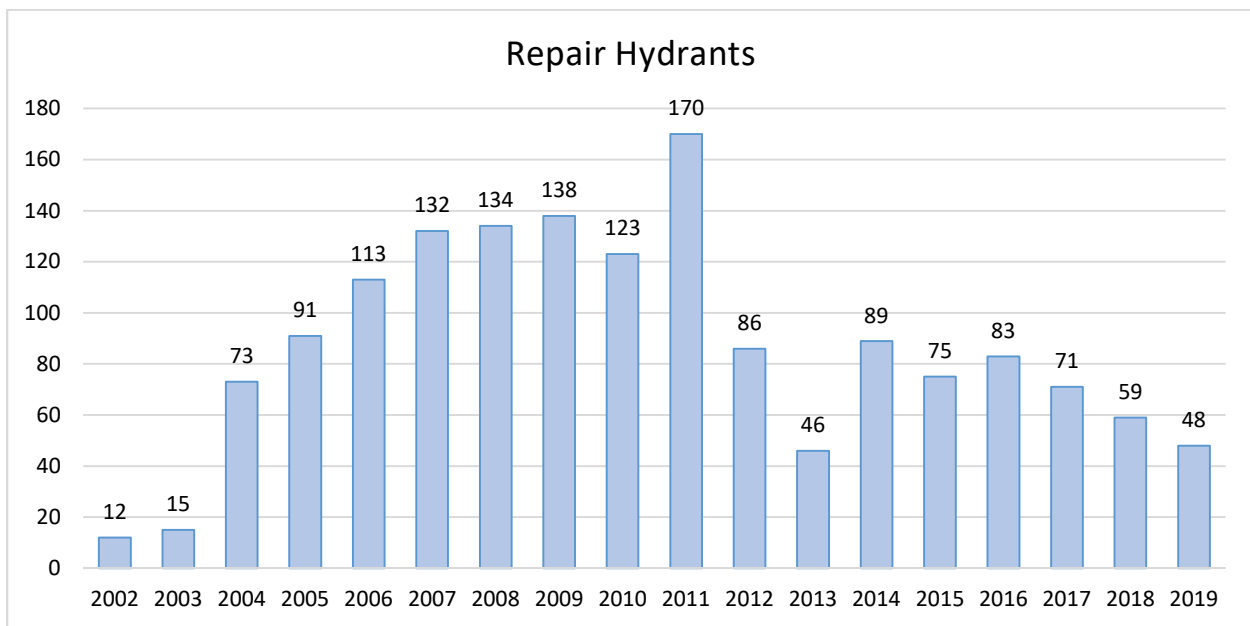
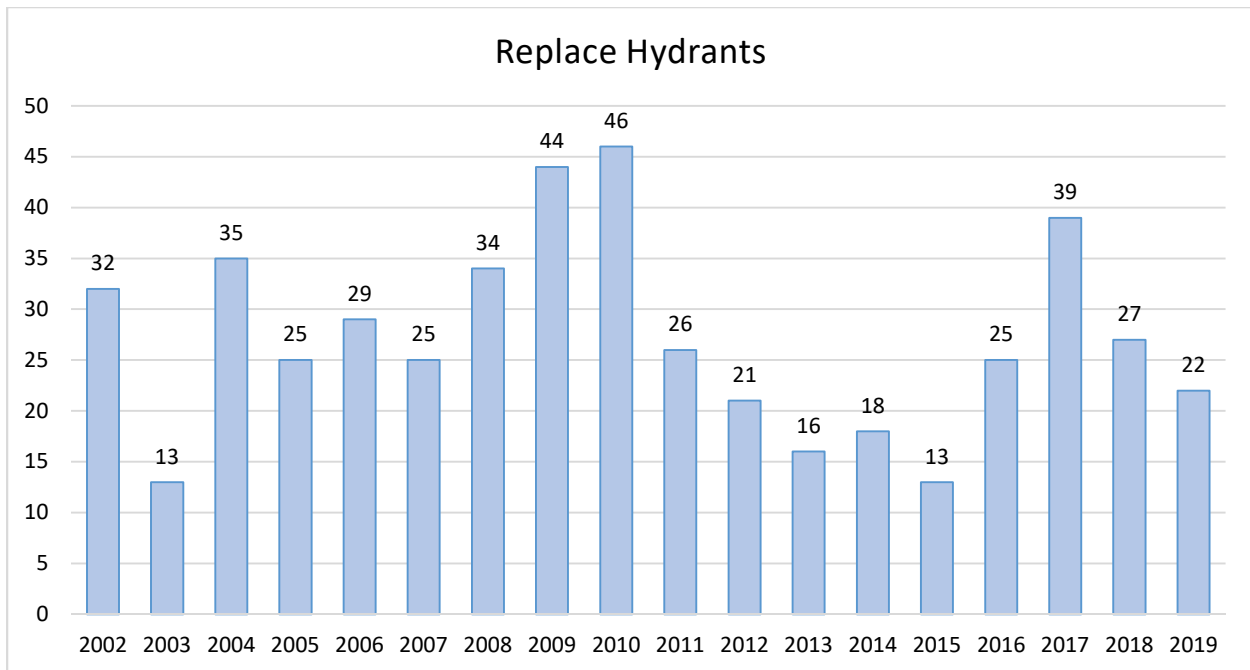


The chart above shows the number of locations in each year where valve casings or spindles can be repaired by using hydro-excavation. This method is less damaging to the road infrastructure and is used where possible.



Water Main Break Repair Work





The two charts above show the number of fire hydrants replaced and repaired by Water & Sewer in each year. The decision to replace or repair a non-functional or damaged hydrant is made based on the most cost effective option. Each hydrant is also inspected and tested annually to ensure high reliability for firefighting.

## 2.10 Sewer Operations

The Sewer Operations workgroup is responsible for maintaining almost 21,400 sanitary and storm sewer manholes. In 2019, Sewer Operations flushed 185 km and brushed 27 km of sanitary and storm sewer segments. The Closed Circuit Television crews televised 26.4 km of pipe.

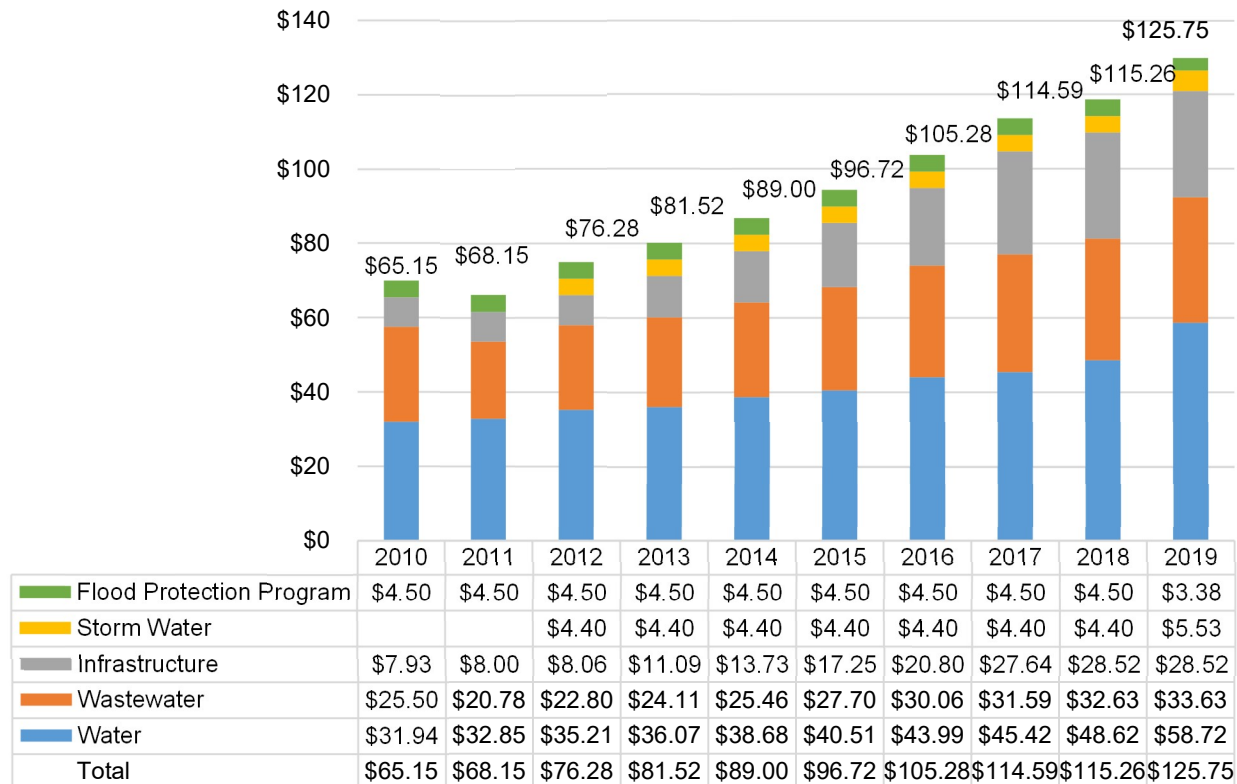


Closed Circuit Television Work

## 3.0 OUR FINANCES

### 3.1 Utility Bills

**Average Residential Monthly Water-Related Utility Charges  
(3/4 inch Meter and Volume of 900 ft<sup>3</sup> / 25.5 m<sup>3</sup>)**



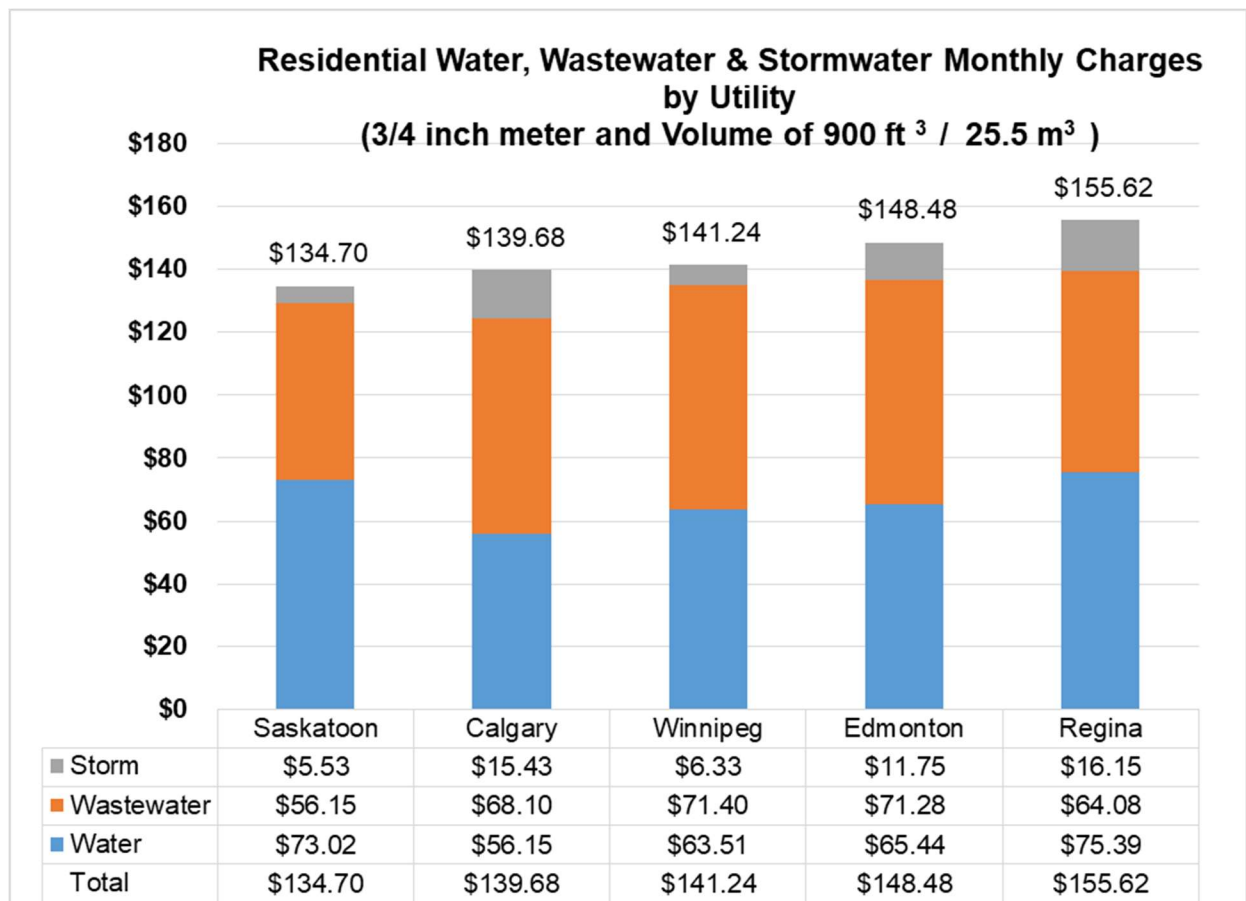
Total residential water-related utility charges were \$125.75 per month in 2019, based on a standard 3/4 inch meter connection and a monthly water volume of 25.5 m<sup>3</sup>. Saskatoon residents with smaller 5/8 inch water meters, which are common in core neighbourhoods, pay \$11.90 less per month on the fixed portion of their utility bill. In 2019, 53% of meters for single residential homes were 5/8 inch and 46% were 3/4 inch. All new homes are fitted with 3/4 inch meters, which meet citizen expectations for higher water demand, such as watering larger lawns.

Infrastructure Levies include the Roadway Levy and Redevelopment Levy, which were phased in between 2014 and 2016, and its funding is split between the Water and Wastewater Utilities. See Appendix Two for more information about utility bill charges.

In 2016, the City implemented a \$3.0 million Return on Investment (ROI) that will be phased in to an estimated \$11.19 million so that ROI plus Roadway Levy equals 10% of revenue by 2020. In 2019, the ROI was increased to \$9.15 million.

Saskatoon's total water, wastewater, and storm water utility bill remains significantly less at average residential water volumes than other cities in Alberta, Manitoba, and

Saskatchewan. Based on the standard water meter size and monthly water volume of 25.5 m<sup>3</sup>, the utility bill in Saskatoon was 3.7% less than in Calgary, the second lowest utility.



Under Saskatoon's inclining block rate system, water and wastewater rates increase at volumes of 17 m<sup>3</sup> (600 ft<sup>3</sup>) and 34 m<sup>3</sup> (1,200 ft<sup>3</sup>). Of the western benchmark cities, only Calgary has lower charges for water volume, less than 17 m<sup>3</sup> (600 ft<sup>3</sup>) per month.



### 3.1 Financial Summary

The Water and Wastewater Utilities are based on a user-pay principal and are fully funded through their rates. In 2019, the two utilities collected \$165.6 million in total revenues and had \$168.4 million in total expenses for a negative variance of \$2.8 million.<sup>1</sup>

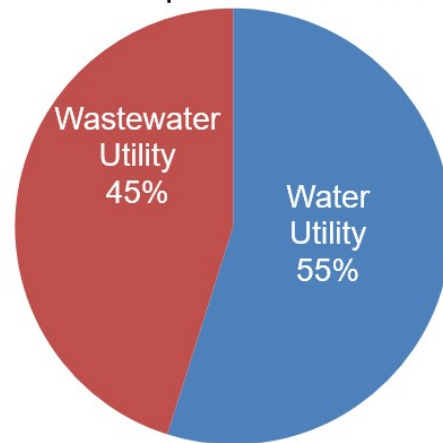
<b>Water and Wastewater Utilities</b>				
<b>Statement of Revenues and Expenditures</b>				
<b>(\$1,000s)</b>				
	<b>Water Utility</b>	<b>Wastewater Utility</b>	<b>Consolidated</b>	<b>Consolidated</b>
	<b>2019</b>	<b>2019</b>	<b>2019</b>	<b>2018</b>
<b>Total Revenues</b>	<b>90,859</b>	<b>74,712</b>	<b>165,571</b>	<b>157,619</b>
<b>Expenditures</b>			-	-
Utility Operations	14,591	11,537	26,128	26,873
Water & Waste Operations	14,772	7,434	22,206	22,027
Admin & General	1,700	1,151	2,851	2,533
Corporate Services & Billing	3,398	2,303	5,701	5,878
Capital charges	32,787	20,242	53,029	43,293
Flood Protection Charges		3,975	3,975	3,975
Infrastructure Services Capital Reserves	14,441	18,975	33,416	35,924
Grants-in-lieu of Taxes	7,159	4,770	11,928	10,662
Return on Investment	5,307	3,843	9,150	7,850
<b>Total Expenditures</b>	<b>94,154</b>	<b>74,232</b>	<b>168,386</b>	<b>159,015</b>
<b>Revenues less Expenditures</b>	<b>(3,296)</b>	<b>480</b>	<b>(2,815)</b>	<b>(1,395)</b>
<b>(To)/From Stabilization/Capital reserves</b>	<b>3,296</b>	<b>(480)</b>	<b>2,815</b>	<b>1,395</b>

<sup>1</sup> Positive Water and Wastewater variances fund the Water and Wastewater Revenue Stabilization Reserve which is utilized in years when there is an operating deficit (negative variance). The Stabilization Reserve has a maximum allowable balance of 5% of the current year's budgeted metered revenue and Infrastructure Levy. Any amount that exceeds the maximum is transferred to the Waterworks Capital Projects Reserve, the Sewage Treatment Capital Reserve, or the Infrastructure Replacement Reserve.

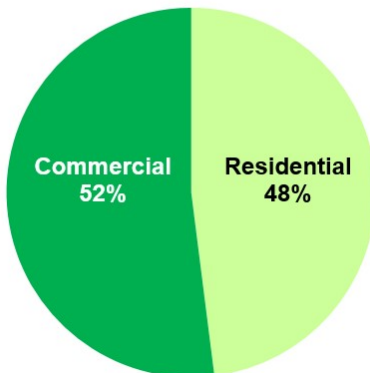
Total utility revenues increased by 5.0% in 2019 as a result of the infrastructure levy and ROI phase-in, rate increases, population growth, and increased other revenue, which offset the decrease in volumetric and fixed revenue.

The Water Utility accounts for 55% and Wastewater for 45% of revenues.

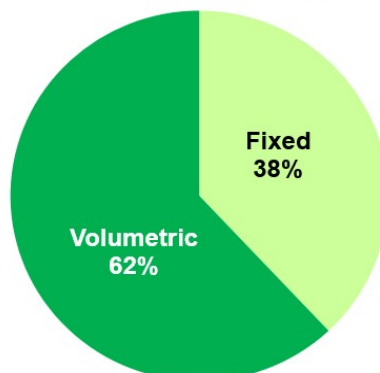
### Total 2019 Revenues \$165.5 Million



### Water and Wastewater Revenue by Customer Class



### Water and Wastewater Revenue by Rate Type

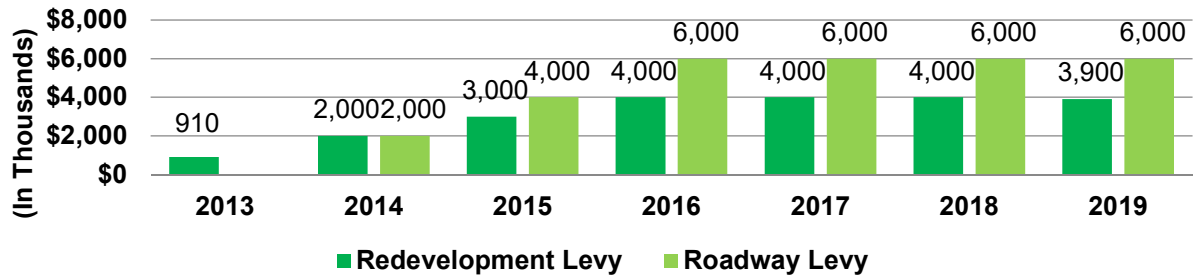


Commercial customers account for just over half of Water and Wastewater's total revenues.

About 62% of revenues are based on volumetric charges and 38% are from fixed charges.

In 2019, total expenditures were 0.9% higher than 2018, due to inflation, expanded capital programs, and increased contributions to Grants-in-Lieu of Taxes and ROI. Decreased fixed asset purchases, maintenance work, and less than anticipated chemical usage due to lower demand, resulted in actual expenses 3.7% less than budgeted. Total 2019 revenue was 5.3% less than budgeted, resulting in a negative balance of \$2.8 million, which was funded by the Water and Wastewater Revenue Stabilization Reserve.

### Redevelopment and Roadway Levy Phase-In Budget (In \$1,000s)

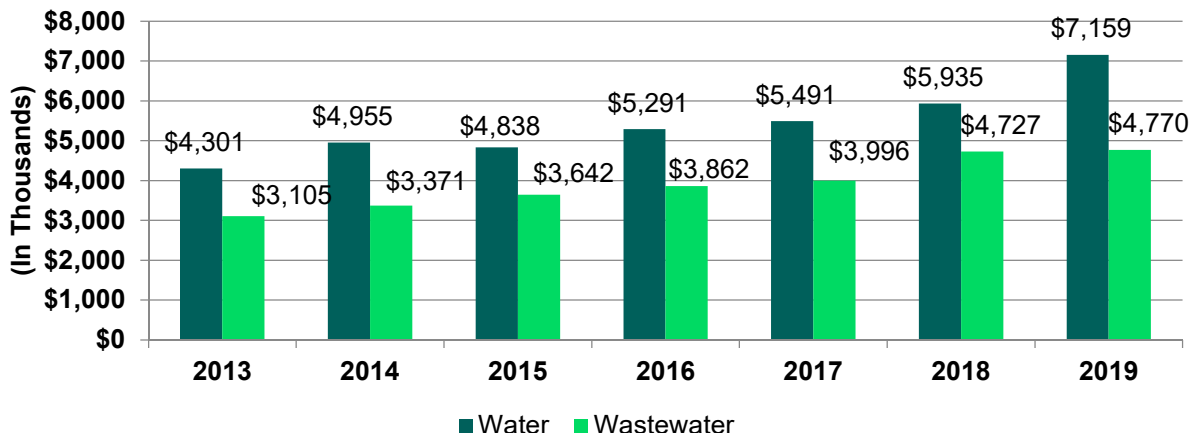


Funding to Roadways & Fleet Support and Water & Waste Operations to deliver the day-to-day operation and maintenance of the water distribution, collection, and drainage systems accounted for 13.1% of total expenditures. Funding for the Infrastructure Services Capital Reserve accounted for another 19.8% of expenditures, and in 2019, Saskatoon Water paid \$9.15 million (5.4%) ROI. 2019 is the fourth year of a five-year, phase-in plan to establish an ROI, plus Roadway Levy, from the Water and Wastewater Utilities to 10% of metered and fixed revenue.

The Infrastructure Levy was originally implemented to fund the Infrastructure Services Capital Reserve for water distribution and wastewater collection system rehabilitation and replacement projects needed to address aging infrastructure (e.g. eliminate the water main replacement backlog to meet current service levels). In 2013, a Redevelopment Levy was added to the Infrastructure Levy, with a four-year, phase-in period to generate \$4.0 million annually by 2016. In 2014, a Roadway Levy was added to the Infrastructure Levy with a three-year, phase-in period to generate \$6.0 million annually by 2016. The new levies accounted for \$9.9 million in 2019.

The Water and Wastewater Utilities paid \$11.92 million in 2019 to the City as a Grants-in-Lieu of Taxes.

### Water and Wastewater Utility Grants-in-Lieu of Taxes (In \$1,000s)



## 3.2 Water Utility

### Revenues

The Water Utility's 2019 total revenues of \$90.8 million were \$5.0 million or 5.25% less than budgeted. Revenues increased by 12.8% from 2018, while Infrastructure Levy revenues, a volumetric charge, decreased by 4.4%.

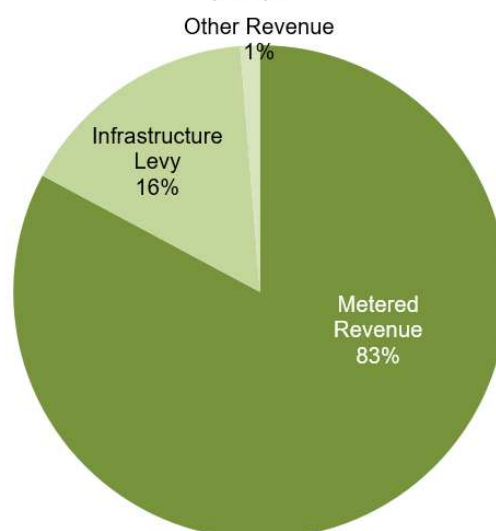
Other revenues included the fire protection charge, late payment penalties, and some miscellaneous revenue.

### Expenses

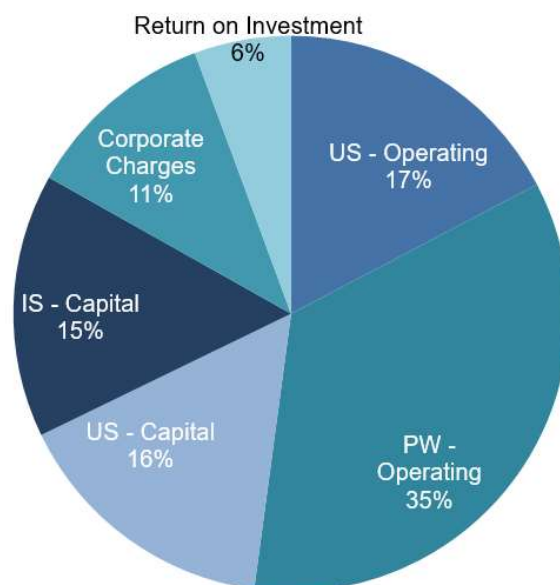
The Water Utility's 2019 expenses of \$94.1 million included the following:

- Saskatoon Water Operating expenses, of \$16.2 million, include water treatment, pumping, storage, Meter Shop, administration, and general expenses incurred by Saskatoon Water.
- Water & Waste Operations operating expenses, of \$14.7 million, include funding to Water & Waste Operations to operate and maintain the water distribution system.
- Saskatoon Water Capital, of \$32.7 million, funds all capital work related to the WTP and reservoirs, including debt servicing costs.
- Infrastructure Replacement Reserve – Water and Wastewater, of \$14.4 million (funded by the Infrastructure Levy), includes capital replacement of the water distribution systems, roadway damage associated with the utility, and water upgrades for core area developments.
- Corporate Charges, of \$10.5 million, include the Grants-in-Lieu of taxes, cross-charges for customer billing and collections, and corporate administration.
- ROI, of \$5.3 million. 2019 is the fourth year of a five-year phase-in plan to establish an ROI from Water Utility based on 10% of metered and fixed revenue.

**Water Utility  
2019 Revenues  
\$90,859,000**



**Water Utility  
2019 Operating Expenses  
\$94,154,000**



The Water Utility's 2019 total expenses were 1.8% under budget. This is due to deferred fixed asset purchases and maintenance work during transfer pumping electrical work; less than anticipated chemical usage due to lower demand; staffing vacancies; and were 14.9% more than in 2018, caused by inflation, higher costs for additional new treatments, increased maintenance, ROI and Grants-in-Lieu of Taxes increases, and increased contribution to the Infrastructure Services Capital Reserve.

## Financial Statement

Water Utility Operating Revenues and Expenses (\$1,000s)				
	2019 Budget	2019 Actual	2018 Actual	
<b>Revenues</b>				
Metered revenue	\$ 79,542	\$ 75,246	\$ 64,251	
Infrastructure Levy	15,217	14,441	15,105	
Other revenue	1,139	1,172	1,191	
<b>Total Revenue</b>	<b>\$ 95,897</b>	<b>\$ 90,859</b>	<b>\$ 80,547</b>	
<b>Expenses</b>				
Water Treatment, Pumping, Storage	\$ 13,742	\$ 12,795	\$ 12,940	
Water Meters	1,991	1,796	1,669	
Water Administration & General	1,855	1,700	1,582	
Corporate Services	3,485	3,398	3,579	
Distribution (Water & Waste Operations)	14,042	14,772	14,328	
Capital Charges	33,101	32,787	22,269	
Provision to Infrastructure Services Capital	15,217	14,441	15,105	
Grants-in-lieu of Taxes	7,159	7,159	5,935	
Return on Investment	5,307	5,307	4,553	
<b>Total Expenses</b>	<b>\$ 95,897</b>	<b>\$ 94,154</b>	<b>\$ 81,960</b>	
<b>Revenues less Expenses</b>	<b>\$ -</b>	<b>\$ (3,296)</b>	<b>\$ (1,413)</b>	
<b>(To)/From Stabilization/Capital Reserves</b>	<b>\$ -</b>	<b>\$ 3,296</b>	<b>\$ 1,413</b>	

The negative balance of \$1.41 million was funded by Water and Wastewater Revenue Stabilization Reserve.



### 3.3 Wastewater Utility

#### Revenues

The Wastewater Utility's 2019 revenues, of \$74.7 million, were about 5.3% less than budgeted.

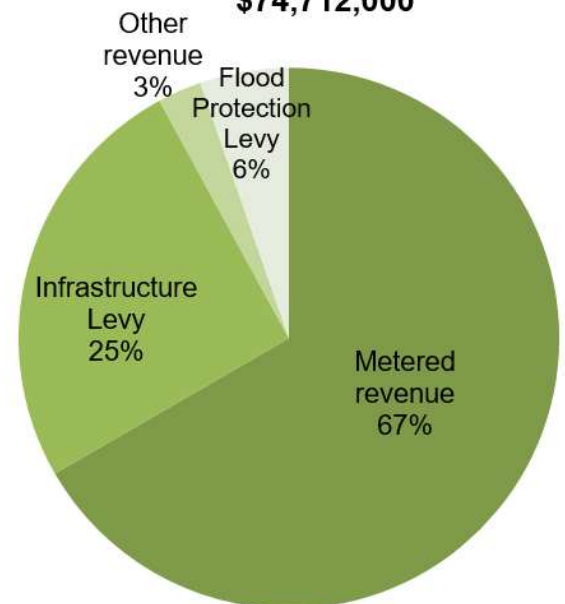
Revenues decreased by 3.1% from 2018 due to rate increases including the Roadways and Redevelopment Levies, less than anticipated growth in metered revenues and Marquis Liquid Waste Hauler Facility was not operational.

#### Expenses

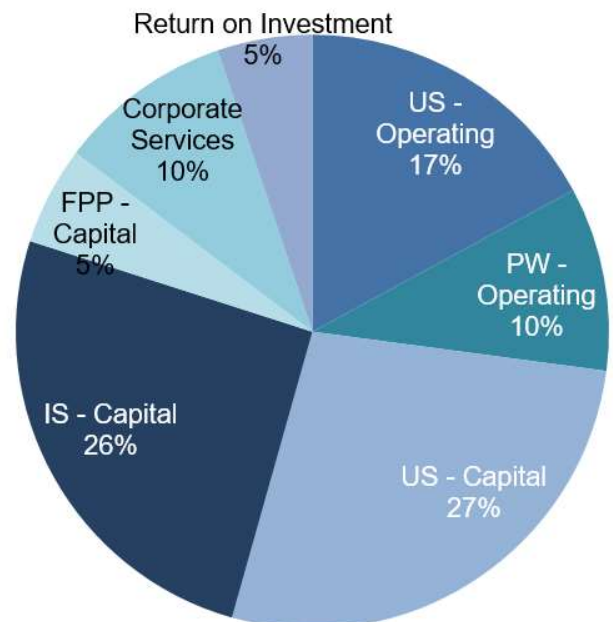
The Wastewater Utility's 2019 expenses, of \$74.2 million, included the following:

- Saskatoon Water Operating expenses, of \$12.68 million, include wastewater treatment, pumping, sludge handling and disposal, administration, and general expenses incurred by Saskatoon Water.
- Water & Waste Operations operating expenses, of \$7.4 million, include funding to Water & Waste Operations to operate and maintain the wastewater collection system.
- Saskatoon Water Capital, of \$20.2 million, funds capital work related to the WWTP.
- Flood Protection Program Capital, of \$3.975 million, funds projects that reduce sewer back-ups during major storms.
- Infrastructure Replacement Reserve – Water and Wastewater, of \$19.0 million, funds capital replacement of the wastewater collection systems, roadway damage associated with the utility, and wastewater upgrades for core areas.
- Corporate Charges, of \$7.0 million, include the Grants-in-Lieu of Taxes, cross-charges for customer billing and collections, and corporate administration.
- ROI, of \$3.8 million. 2019 is the fourth year of a five-year, phase-in plan to establish an ROI from Wastewater Utility based on 10% of metered and fixed revenue.

**Wastewater Utility  
2019 Revenues  
\$74,712,000**



**Wastewater Utility  
2019 Operating Expenses  
\$74,232,000**



The Wastewater Utility's 2019 expenses were 5.9% less than budgeted and about 3.7% less than in 2018. This is due to delayed capital and maintenance work, staffing vacancies, and the Marquis Liquid Waste Hauler Facility was not operational as budgeted.

## Financial Statement

<b>Wastewater Utility Operating Revenues and Expenses (\$1000s)</b>			
	<b>2019 Budget</b>	<b>2019 Actual</b>	<b>2018 Actual</b>
<b>Revenues</b>			
Metered revenue	\$ 52,997	\$ 49,800	\$ 50,317
Infrastructure Levy	20,071	18,975	20,860
Other revenue	1,853	1,961	1,920
Flood Protection Levy	4,000	3,975	3,975
<b>Total Revenues</b>	<b>\$ 78,921</b>	<b>\$ 74,712</b>	<b>\$ 77,072</b>
<b>Expenses</b>			
Wastewater Treatment	\$ 9,543	\$ 7,967	\$ 8,979
Wastewater Lift Stations	2,009	1,892	1,823
Wastewater Sludge Handling & Disposal	2,002	1,678	1,462
Wastewater Administration & General	1,197	1,151	950
Corporate Services	2,366	2,303	2,299
Collection (Water & Waste Operations)	8,696	7,434	7,699
Capital Charges	20,425	20,242	21,024
Flood Protection Program	4,000	3,975	3,975
Provision to Infrastructure Services Capital	20,071	18,975	20,819
Grants-in-lieu of Taxes	4,770	4,770	4,727
Return on Investment	3,843	3,843	3,297
<b>Total Expenses</b>	<b>\$ 78,921</b>	<b>\$ 74,232</b>	<b>\$ 77,055</b>
<b>Revenues less Expenses</b>	<b>\$ -</b>	<b>\$ 480</b>	<b>\$ 17</b>
<b>(To)/From Stabilization/Capital Reserves</b>	<b>\$ -</b>	<b>\$ (480)</b>	<b>\$ (17)</b>

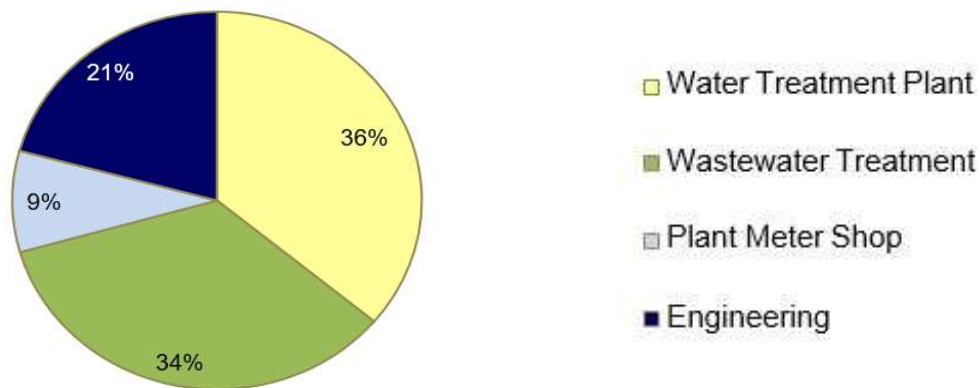
The Flood Protection Program funding was allocated to a capital project for future construction to increase storm water capacity in priority flood risk areas. The positive balance of \$0.48 million was transferred to the Infrastructure Replacement Reserve – Water & Wastewater.

## 4.0 OUR PEOPLE

### 4.1 Number of Employees

Saskatoon Water had 166 employees as of December 2019. The graph shows the distribution in major areas. (Engineering includes Engineering Services and Engineering & Planning sections.)

**Employee Distribution within  
Saskatoon Water**



At its peak, Water & Sewer had 141 employees, Technical Services had five, and there were eleven additional support staff.

### 4.2 Representative Workforce

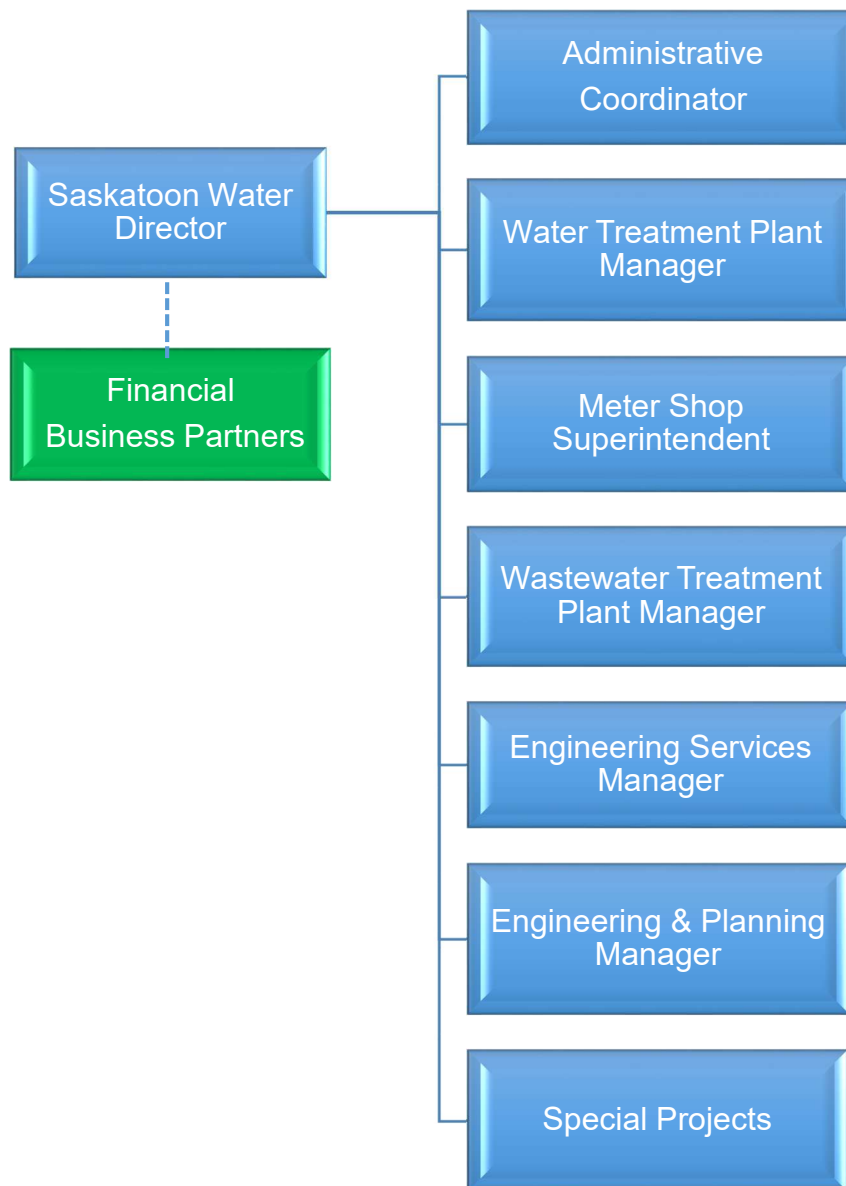
Saskatoon Water continues to participate in diversity programs with Human Resources and other organizations to increase awareness among under-represented groups of career opportunities with Saskatoon Water.

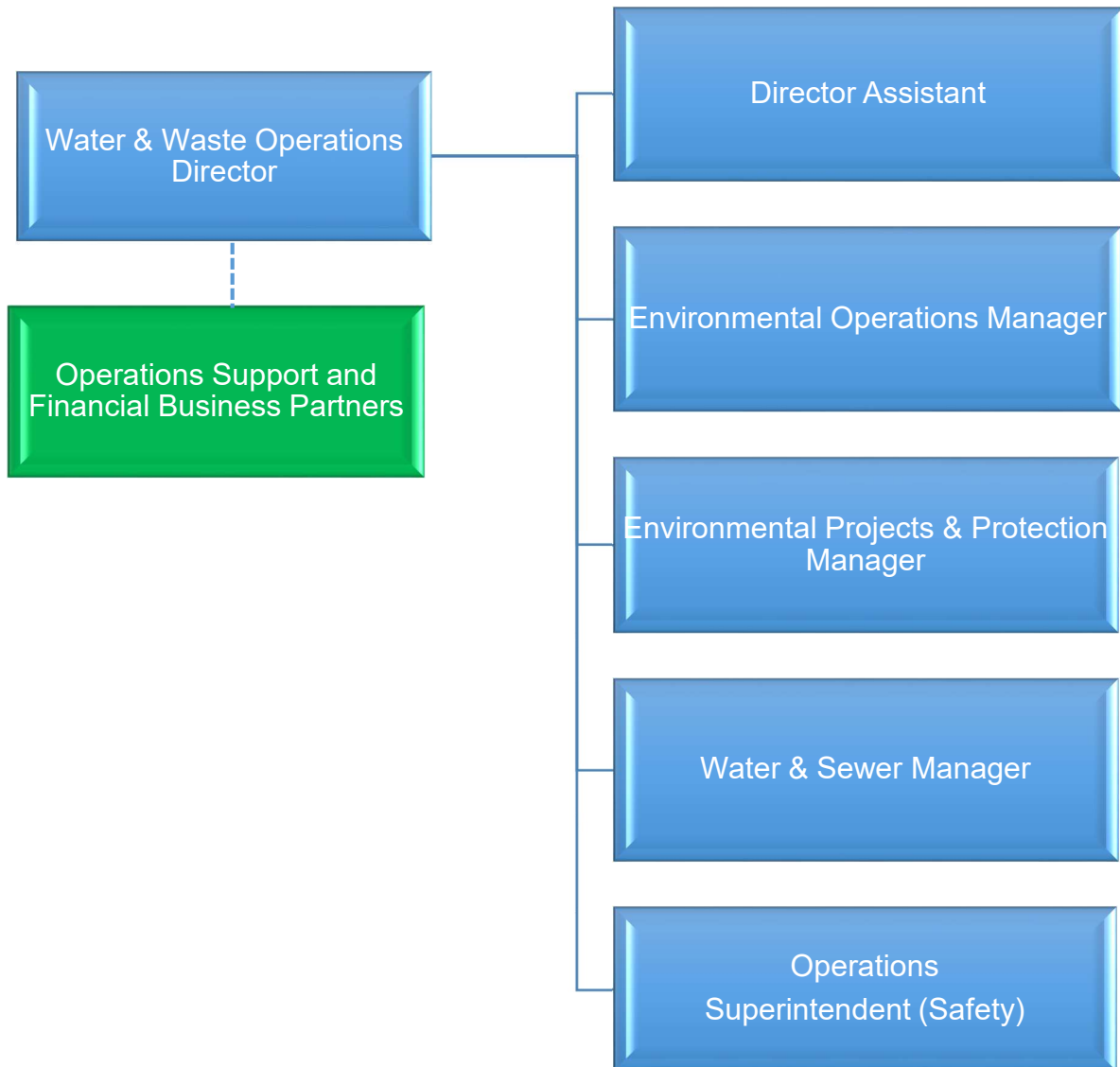
Relative to goals set in 2014 by the Saskatchewan Human Rights Commission (SHRC) and adopted as corporate targets by the City, Saskatoon Water had a higher proportion of self-declared visibility minority employees and lower proportions of employees who self-declared as Aboriginal, female, or with a disability as of December 2019. Water & Waste Operations had a higher proportion of employees self-declared as Aboriginal and lower proportions of employees who self-declared as visibility minority, female, or with a disability as of December 2019.

Percentage of Employees Self-Declared as an Equity Group Member December 2019			
Equity Group	Saskatoon Water	Water & Waste Operations	SHRC Goal
Self-Declared as Aboriginal Ancestry	4.7%	14.1%	14.0%
Self-Declared as Visible Minority	16.0%	9.4%	11.0%
Self-Declared as Person with Disability	2.8%	3.5%	12.4%
Self-Declared as Female	18.9%	7.1%	46.0%

### 4.3 Organizational Charts

The following organizational charts provide a high level overview of how Saskatoon Water and Water & Waste Operations are organized and key positions in 2019.



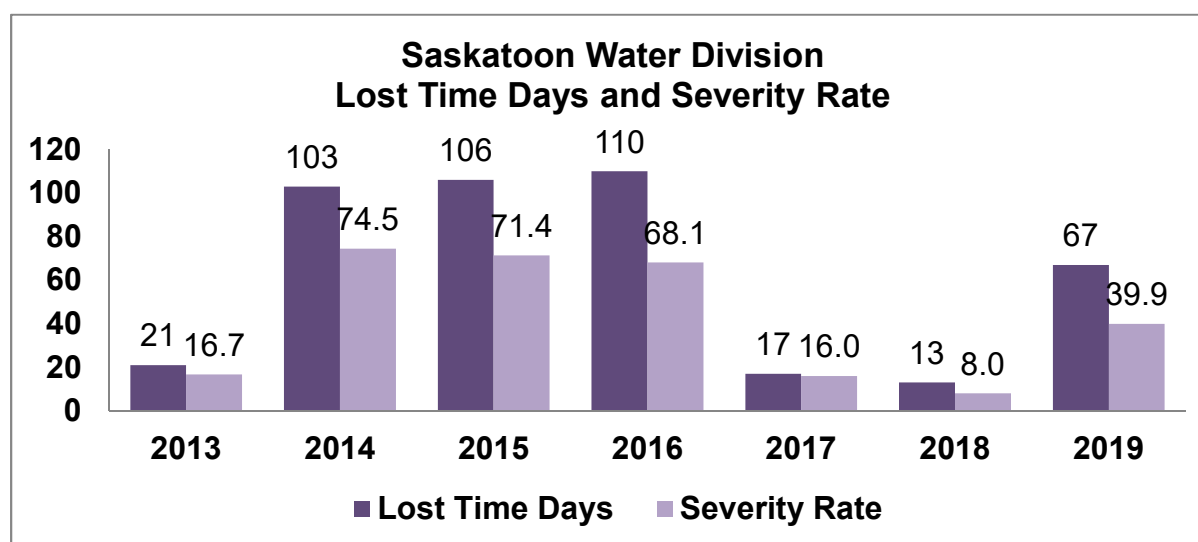
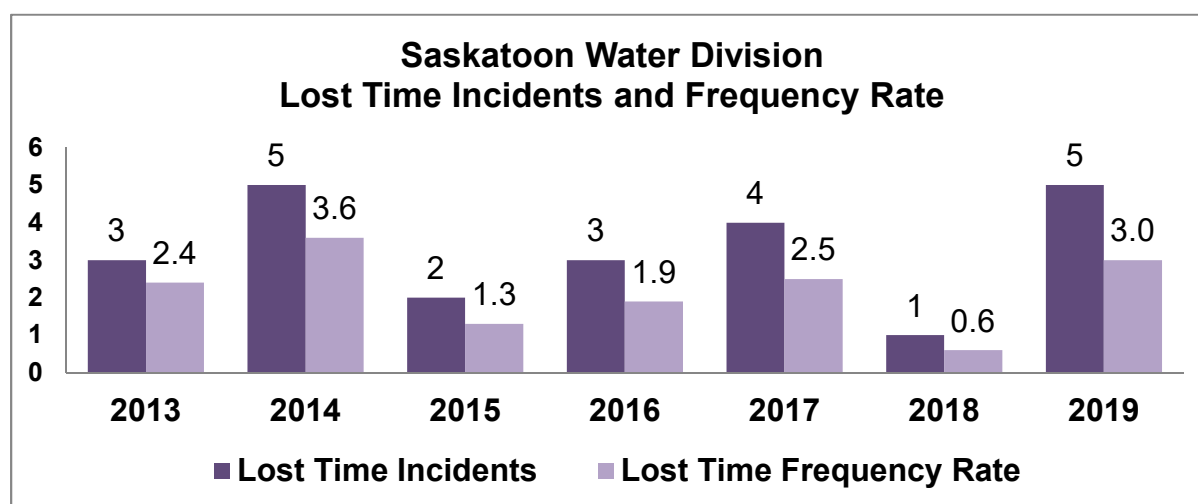




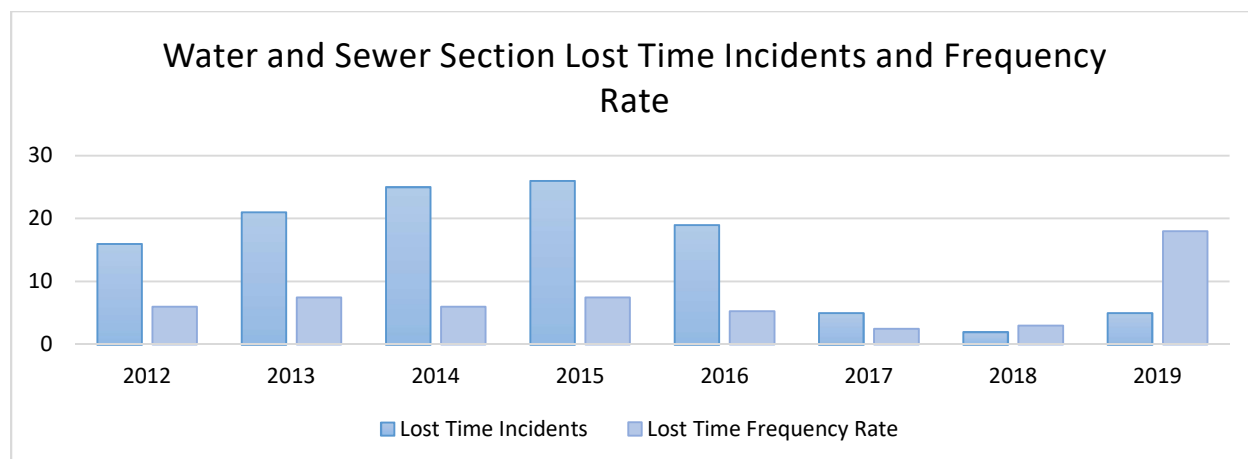
## 4.4 Employee Safety

Management and staff place a strong emphasis on safety in the workplace to strive to meet the corporate target of zero lost-time injuries. Water & Sewer has implemented safety initiatives over the last few years and lost-time injuries have been decreased but not eliminated. Saskatoon Water is currently implementing recommendations from a 2014 safety audit through engagement from management and staff, with the goal of eliminating work-place incidents/injuries. A new health and safety audit was conducted in late 2019, which will help inform future safety strategy. The divisions will continue to follow the Health Management and Safety Program and Disability Assistance Program to support employees from the first day of injury or illness to their pre-injury job or an accommodation.

In 2019, Saskatoon Water experienced five lost-time incidents, compared to one in 2018, resulting in a frequency rate of 3.0, which is higher than the corporate average of 2.49. Technical Services had zero lost-time incidents.



In 2019, Water & Sewer experienced five lost-time incidents, compared to two in 2018, resulting in a lost-time frequency rate of 17.98.



Water & Sewer is committed to reaching the target goal of zero lost time and zero incidents. To reach this, the group will be implementing the below initiatives:

- Show leadership by setting clear targets for leadership commitments by specific sections, hold managers and their subordinates accountable for meeting safety goals.
- Revitalize the staff engagement plan after the review of staff survey data, and find methods of having senior managers more engaged with front line staff.
- Continue with efforts in hazard identification, assessment, and control. This will be accomplished through the ongoing development and implementation of Job Safety Analyses, Standard Operating Procedures for critical tasks, field level hazard identification procedures (tailgate/site hazard assessment), and the continuation of the hearing conservation program. Additionally, all high and medium risk safety documents will be entered into the Document Control System, Field Access Plans for all safety, policy, and training records will be developed, and the incident reporting process will be improved.
- Ensure all employees receive the necessary education required to perform their job safely and effectively by providing division wide training on the HSMS and ensuring all supervisors complete Leadership for Safety Excellence.
- Finalize the process for eliminating construction conflicts with Construction & Design.

## 5.0 OUR WORK

### 5.1 Community Awareness and Engagement

**Water Quality Reporting:** The Water Security Agency (WSA) requires that at least once each year, Saskatoon Water provide notification to consumers of the quality of water produced and supplied, as well as information on the performance of the waterworks in submitting samples as required by a Minister's Order or Permit to Operate a Waterworks. In compliance with this order, Saskatoon Water produces the [Drinking Water Quality and Compliance](#) report annually.

For general information on water quality, water and wastewater treatment processes, environment, major capital projects, and water conservation, Saskatoon Water posts [Saskatoon Water's Annual Water Quality Report](#) on the City's website.

**Guided Tours of Water Treatment and Wastewater Treatment Plants:** Guided tours are available to the public, ages 16 and older, to increase awareness of how the utilities operate in providing safe, reliable water and in returning quality effluent to the South Saskatchewan River. In 2019, the WTP had 183 people booked on 19 tours and the WWTP recorded 297 participants on 27 tours. Due to heavy construction on site, the WTP did not conduct tours for the second half of 2019 and will resume once the transfer pumping project is complete.

**Water Week:** Saskatoon's City Council declared March 18 to March 24, 2019, Water Week in Saskatoon, as an opportunity to recognize all of the City staff who each play important roles to keep the drinking water, storm water, and sanitary sewer systems running smoothly and citizen satisfaction high. The 2019 theme was Water Quality & Sustainability. The City shared videos on social media and on the City's website showing how the Urban Water Cycle moves through our City's infrastructure, following the water's journey from the river to residences/businesses, and back to the river. The videos educated residents on the role they and the City together play in protecting these resources and maintaining our infrastructure.



**Advanced Metering Infrastructure System:** Water meters with a new communication module installed will improve billing for customers utilizing remote meter reading and monthly billing based on current usage, not estimates. Installations are occurring by neighbourhood and citizens can book an appointment online or by calling the AMI Customer Service Centre once they receive a notification letter. Improvements have been made to staff productivity by securing adequate field programming equipment required for staff to complete installations of AMI modules independently. This coupled with proactive calling of residents to schedule appointments resulted in higher installation rates within targeted neighborhoods.

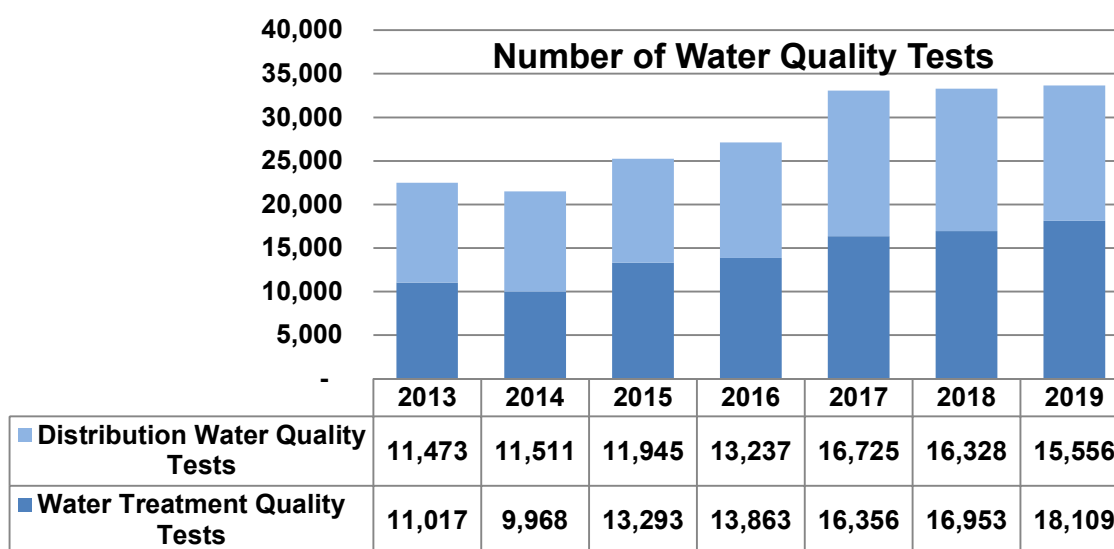
**Prevent Irritable Sewer Syndrome:** When individuals put harmful things down the drain, it can quickly become a significant problem in the sewer system. To shift behaviors, the City developed an education campaign that is targeted towards residential users of the sanitary sewer. The goal behind Prevent Irritable Sewer Syndrome is to build awareness of what is and is not to be flushed down toilets and rinsed down sinks, and to reduce the number of blockages experienced throughout the community. Sanitary sewer education materials are being developed to be delivered to students, possibly alongside the Yellow Fish Road program in 2020.



## 5.2 Operating Highlights

**Water Quality:** The City's water treatment and distribution systems are regulated by a "Permit to Operate a Waterworks" issued by the WSA. Our drinking water quality is further regulated by Health Canada's *Guidelines for Canadian Drinking Water Quality* and Saskatchewan Environment's *The Water Regulations, 2002*. Water quality is closely monitored 24 hours a day, 365 days a year.

The WTP's Laboratory comprehensive Inspection Program meets the highest standard in North America. In 2019, a total of 18,109 water treatment quality tests and 15,556 distribution water quality tests were conducted by our WTP Laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to meet ISO/IEC 17025:2017.



The following table shows the results of some of the many types of testing completed by the WTP, which are well within acceptable limits under the Permit to Operate a Waterworks.

Water Distribution Systems Values								
	2013	2014	2015	2016	2017	2018	2019	Allowable Values
Yearly Total Chlorine Median (mg/L)	1.8	1.78	1.83	2.00	1.93	1.99	2.00	> 0.5
Yearly Turbidity Median (NTU) <sup>2</sup>	0.12	0.14	0.18	0.13	0.11	0.09	0.1	< 1.0
Total Coliforms >0 (CFU/100mL) <sup>3</sup>	0	0	0	0	0	0	0	0

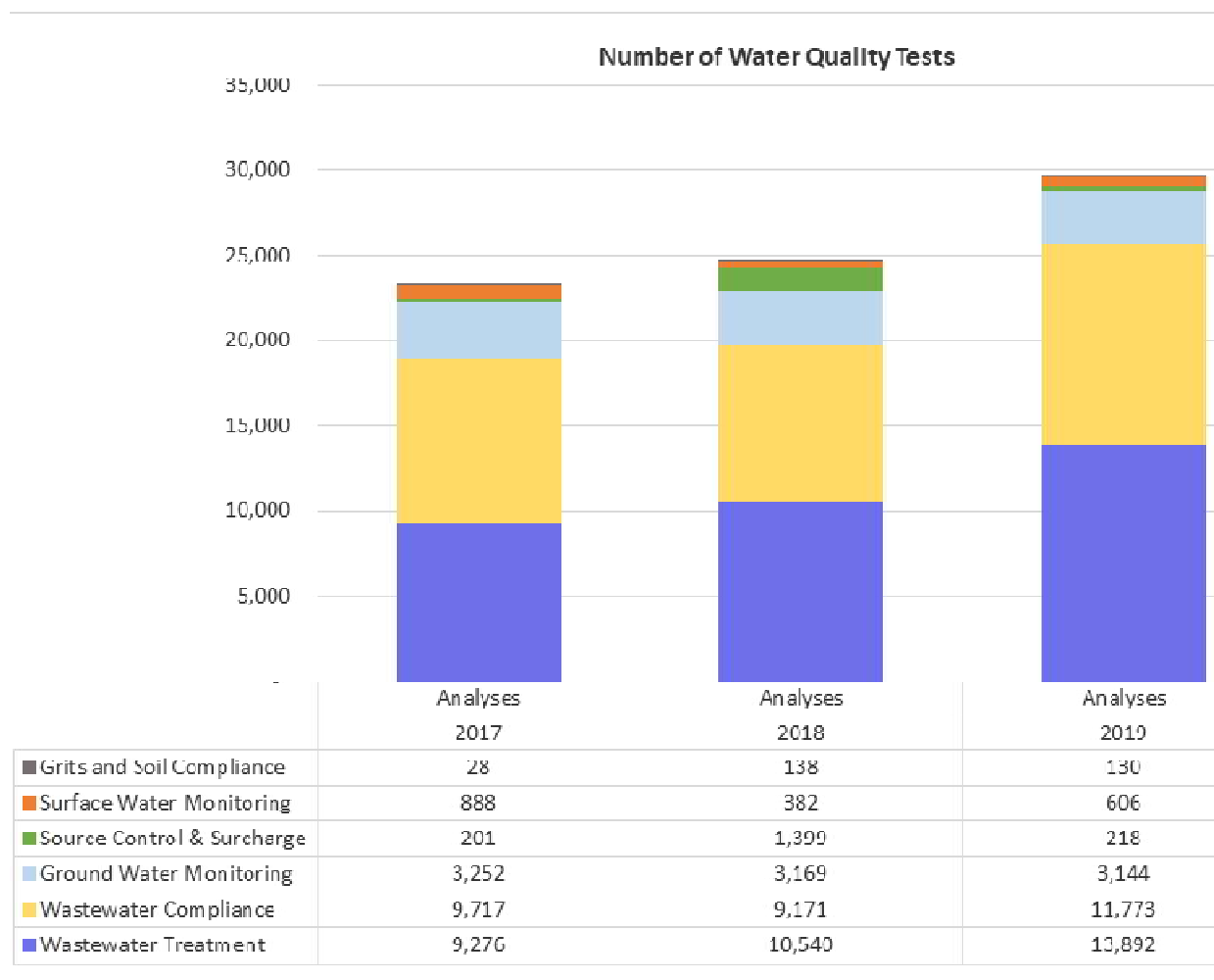
<sup>2</sup> Nephelometric Turbidity Units (NTU) is a measure of scattered light. A high turbidity level is caused by organic matter which can promote the growth of pathogens as well as being aesthetically unappealing.

<sup>3</sup> Colony Forming Unit (CFU) is a measure of viable bacterial cells.



**Wastewater Quality:** The City's wastewater collection and treatment systems are regulated by a "Permit to Operate a Sewage Works" issued by the WSA. Our final effluent water quality is further regulated by Saskatchewan Environment's Sewage Works Regulations, 2010, Saskatchewan Environmental Code, 2015, and the Federal Wastewater System Effluent Regulation, 2012. Final effluent water quality is closely monitored 365 days a year along with South Saskatchewan River water quality upstream and downstream of the effluent discharge location.

The WWTP's comprehensive Maintenance and Equipment Inspection Program meets the highest standard in North America. Environmental Laboratory is a CALA accredited laboratory to ISO/IEC 17025:2017 standard. In 2019, a total of 11,773 tests were conducted in relation to the WWTP Permit to Operate a Sewage Works and over 13,000 tests for the WWTP process control. The Environmental Laboratory also conducted over 4,500 water quality tests for other monitor and sampling programs, such as groundwater, ponds, storm water outfalls, bylaw compliance, industries, and the river.



The following table shows the results of some of the many types of testing completed by Saskatoon Water, which are well below the maximum allowable values under the Permit to Operate a Sewage Works.

Wastewater Distribution System Values						
	2015	2016	2017	2018	2019	Wastewater Effluent Standard
Yearly Median CBOD <sup>4</sup>	3.9	3.4	3.5	4.0	3.0	<25 mg/L
Yearly Median TSS <sup>5</sup>	8	7.2	7.3	10	7.8	<25 mg/L
Yearly Median Total Phosphorous (TP)	0.2	0.247	0.31	0.425	0.364	<0.75 mg/L
Yearly Median E.coli <sup>6</sup>	<10	<10	<10	<10	<10	<200 mpn/100mL

**Sewer Main Maintenance Operations:** Performs two types of maintenance activities. The first technique utilizes high pressure water jetting called “flushing”. The second technique is called “brushing” and involves pulling stiff brushes through sewer mains. Approximately 27.7 km of sanitary sewer mains were brushed, and 183 km of sanitary sewer mains were cleaned using flushing. Approximately 1.8 km of storm sewers were flushed.

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<sup>4</sup> Measures the oxidation of carbons in water

<sup>5</sup> Total Suspended Solids

<sup>6</sup> E.coli is a common indicator of fecal contamination and is quantified using the Most Probable Number (MPN) method. MPN is a probabilistic test which assumes coliform bacteria meet certain criteria.

## 5.3 Capital Projects

The Water and Wastewater Utilities funded 84 capital projects in 2019, budgeted at \$308.5 million, of which, \$128.7 million is unspent. The following table summarizes the active capital projects by section:

Active Capital Projects as of December 31, 2019			
Section	# of Active Projects	Approved Funding	Unspent Funding
Water Treatment	40	\$168,038,000	\$61,874,000
Wastewater Treatment	36	\$120,139,000	\$66,173,000
Technical Services	8	\$ 20,330,000	\$ 750,000
<b>Total</b>	<b>84</b>	<b>\$308,507,000</b>	<b>\$128,797,000</b>

The following section describes some of the major capital projects funded by the water-related utilities.

**Water Treatment Plant Enclosure and Security Upgrades:** This project includes the permanent closure of Spadina Crescent, 11<sup>th</sup> Street West, and Avenue H access points; construction of a perimeter security fence, including gates to enclose the plant; a guard house; and instrumentation and controls. This project is a result of the recommendations received in the Critical Infrastructure Resilience Tool assessment report undertaken by Public Safety Canada. Award for engineering services to develop and execute the project was given to PBX Engineering Ltd. Construction was awarded to Graham Construction and Engineering LP for \$3.1 million in June 2019. Completion is expected in the fall of 2020.

**Water Treatment Plant Transfer Pumping and Electrical Upgrades:** This project will replace the short-term transfer pumping system, increase efficiency, and address single points of failure while replacing much of the electrical systems on site. Detailed design and contract tendering were completed in 2018. Construction was awarded to Westridge Construction Ltd. for \$40.7 million in March 2019. Completion is expected in 2022.

**Water Treatment Plant Long-term Capital Development and Expansion Plan 2020:** A comprehensive long-term capital planning process was introduced for the City's WTP in 1980. The process allows Saskatoon Water to identify a tentative schedule for WTP development and modernization that meet the demand of the City and the Drinking Water Quality Standards. The most recent Long-Term Capital Development Plan was prepared in 2009. Due to the current expansions and process modifications, the plan requires review. The plan is also expected to evaluate the need for the second WTP. Engineering Services were awarded to AECOM Canada Ltd. for \$329,000. Completion is expected in the winter of 2020.

**Water Treatment Plant Acadia Pump Replace:** This project provides funding for the manufacture and supply of two horizontal split case pumps and associated motors to be installed at the Acadia Drive Reservoir Pump Station. The current pumps installed at the Acadia Drive Reservoir Pump Station are past the effective service life. The proposed pumps will

provide reliable pumping in order to meet the current and future needs of the service area. Award of the supply contract went to Power and Mine Supply Co. Ltd. for \$442,000. Installation of the pumps will be completed using in-house services. Completion is expected in the fall of 2020.

**Advanced Metering Infrastructure:** AML is used to transmit electrical and water consumption data directly from individual meters to the utilities. The data will assist in obtaining more accurate revenue projections throughout the year. The most immediate benefit to consumers is their monthly bill is based on actual consumption as opposed to estimates. The water portion of the project is currently funded at \$11.7 million and is 70% complete as of 2019 year-end.

**Wastewater Treatment Plant New Water Service Line:** Construction work was awarded to ABS Excavating Ltd. and completed in fall 2019 for \$150,000. The work included upgrades to plant water servicing to replace the existing water main consisting of aging cast iron pipe prone to failure.

**Marquis Liquid Waste Haulers Station:** Construction work continues in 2019 on this \$8.5 million project. The work includes construction of a waste hauler receiving facility containing liquid and solids receiving bays, PLC infrastructure and HVAC equipment. This project will be integrated with the existing Marquis Odour Control Facility. Project completion is expected in the fall of 2020.

**Wastewater Treatment Plant Digester and Heating Upgrade:** This project includes the design and construction of a fourth digester tank, as well as heating system upgrades at the WWTP. Design was awarded to CH2M HILL Canada Limited in 2017 and completed in 2018. Construction was awarded to Graham Construction and Engineering LP for \$33.2 million in July 2019. Completion is expected in 2022.

**Lift Station Assessments:** In 2017, lift station assessments were undertaken on the City's 27 active lift stations and 4 decommissioned lift stations to set a baseline on condition and assist in identifying upgrade work and priority. The final report was completed by MPE Engineering Ltd. in March 2019 for \$376,000.



Spadina Lift Station

**North 40 Cell 8 Relining:** Relining of Cell 8 at the WWTP North 40 was designed and tendered by Saskatoon Water Engineering Services, and construction was completed by Brodsky Construction in September 2019 for \$2.3 million. Construction consisted of the removal of sludge; repair and reshaping of existing clay subgrade; and installation of geosynthetic clay liner, woven geotextile, and reinforced concrete liner.

**Wastewater Treatment Plant Long-term Capital Development Plan 2020:** The scope of this project includes an internal review and further development of the Long-term Capital Development Plan for the WWTP prepared in 2012. The review will consider current expansions, process modifications and technology options, with respect to population projections for Saskatoon's growth. The new plan, covering a 30-year period from 2020 up to 2050, will provide a capital expenditures schedule and costing, which will align with expected capacity, redundancy, and regulatory treatment objectives. Completion is expected for the fall of 2020.

**Water and Sewer Monitoring Program:** The Monitoring Group of Engineering & Planning develops, implements, and reports on environmental and hydraulic monitoring programs in five categories:

- Sanitary and Storm System
- Hydraulics
- Hydrology
- Water Distribution Hydraulics
- Water Quality

2019 Monitoring Locations	
Program	Number of Monitoring Locations
Sanitary System	37
Storm System	15
Sanitary Tank	6
Rain Gauge	8
Hydrant Pressure	90
Hydrant Flow	19
PWM Pressure and Flow	6
Water Quality	3

The table above provides an overview of the number of monitoring locations in 2019.



Fire Flow Testing



Rainfall and Wind Measurement

**Long Term Capital Development and Expansion Planning:** Master planning work for the water distribution system, sanitary sewer collection and storm sewer collection systems was updated in 2019. This work included network expansion planning to city limits and high level planning into the "Planning for Growth" region.

**City-Wide Water Distribution Model:** A new City-wide water distribution model was developed to include the latest water system geometry and water consumption data. This model is the basis of all related water distribution planning, design, system capacity check, operational analysis, etc.

**Nodes and Corridors Capacity Study (Growth Plan):** A water and sewer capacity analysis was completed for the major nodes and corridors along Bus Rapid Transit routes identified within the Growth Plan. The Corridors Growth report included a summary of the work, associated maps and design drawing package for locations requiring improvements.

**Water Distribution and Sewer Collection Assets:** Water & Sewer preservation programs are selected annually based upon the condition of assets (water and sewer mains and service lines) as well as approved levels of service and funding plans. Funding for these programs comes from the Water and Wastewater Infrastructure Levies and the Storm Water Utility.

The City has the following annual programs for preservation of Water & Sewer assets:

- **Water Main Replacement:**
  - **Capacity Program:** Focuses on areas where water main capacity needs to be improved and there is a high density of lead service lines. Replacement of the water main is done via open trench excavation. Water main diameters are increased to improve flow capacity, typically from 150 mm diameter to 200 mm diameter, and lead service lines are replaced at the same time as the water main.
  - **Preservation Program:** Targets water mains that have had high amounts of water main breaks, prioritizing locations that have been breaking frequently in recent years. Since this program relies on water main break rates that are constantly changing and being updated, locations are prioritized and selected each year.
- **Sewer Main Lining:** Sanitary and storm sewer mains are visually inspected and assigned condition ratings. Based on these ratings and other risk factors, a long-term rehabilitation strategy has been developed. Lining for sewer mains is the same method as water mains except that no excavation is required. Sanitary and storm mains have access points (manholes) approximately every 150 m to 200 m that allow for installation of the liner. This method of rehabilitation for sanitary and storm mains has been used in Saskatoon since the 1990s and has been so effective that open trench replacement of sewer mains has been phased out, except for an extreme circumstance where a liner cannot be installed.
- **Lead Service Line Replacements:** At current funding levels, the remaining lead line inventory in the city will be completely replaced by the end of 2026. In conjunction with the long-term strategy that is being developed for water main replacement, a strategy for all remaining lead line replacements is being developed so that residents will have information on when they can expect their lines to be replaced.



Water service lines and tar fiber sewer service lines are replaced:

- In conjunction with open trench water main replacement.
- Prior to certain roadway preservation treatments.
- On emergency basis.

### 2019-2022 Projected Budgets – Technical Services

Program	2019 Budget (\$M)	2020 Budget (\$M)	2021 Budget (\$M)	2022* Budget (\$M)
Water Preservation	\$6.23	\$6.64	\$7.07	\$7.53
Water Capacity	\$5.82	\$5.96	\$7.64	\$6.26
LSL Replacements	\$3.71	\$4.92	\$3.90	\$4.57
Sewer Preservation	\$3.38	\$3.47	\$3.07	\$3.56
Sewer Service Lines	\$1.26	\$1.29	\$1.33	\$1.36
<b>Totals</b>	<b>\$20.40</b>	<b>\$22.28</b>	<b>\$23.01</b>	<b>\$23.28</b>

\*Projected

**Green Network Pilot Project:** The maximum water depth, overall flow, and related hazards were assessed for a one-hundred year rain event for the area identified in the Saskatoon North Partnership for Growth (P4G) Regional Land Use Plan. A final report including the summary of work and associated maps was prepared and sent to the P4G project partners.

**Northeast Swale Hydrology, Hydraulics and Water Quality Monitoring Report:** Water quality and quantity monitoring and reporting of Aspen Ridge neighbourhood development impact on the Northeast Swale continued in 2019.

**Blairmore Primary Water Main Report:** An assessment of the existing system's capacity to service the City's plans for growth in the west side was completed. A new primary water main extension is needed from the Water Treatment Plant to Neault Road, with possible connection to the proposed Blairmore reservoir.

### Land Development Capital Projects:

**McOrmond Drive Trunks and Primary Water Main:** The design of 2100 mm storm sewer trunk, 1200 mm sanitary sewer trunk, and 1050 mm primary water main along McOrmond Drive was completed. The trunks and primary water main extension are required to service future phases of land development within the Holmwood Sector.

**Aspen Ridge Phase D1B Water & Sewer Design:** The design of the local water distribution system, storm and sanitary sewer collection system, 600 mm primary water

main, 450 mm to 600 mm sanitary trunk sewers, and 1350 mm – 1600 mm storm trunk sewers was completed.

**Water Mains Rehabilitation (Multiple Locations):** The design of water mains that needed to be replaced and/or upsized in multiple locations throughout the city was completed as part of the capacity upgrade program.

## 5.4 Continuous Improvement Initiatives

Saskatoon Water, Water & Sewer, and Technical Services are committed to Continuous Improvement through improved customer service and continually implementing innovations to improve efficiencies and reduce costs. In addition to the operating and capital projects described above, the divisions have undertaken the following Continuous Improvements initiatives:

**LED Lighting:** LED lighting is replacing conventional lighting systems on a continual basis at both the WTP and WWTP. Energy efficiency incentives offered by SaskPower are being utilized to ensure the changes are cost effective and provide low cost maintenance throughout the life cycle.

**Lighting Motion Sensors:** WTP Staff continue to replace light switches with motion sensors and low power LEDs throughout the plant, reducing power consumption and maintenance requirements.

**Water Treatment Plant Electrical Upgrades:** WTP electricians continue to work on electrical upgrade requirements throughout the WTP. Plant staff have identified potential risks within the electrical system and have ensured the issues have been addressed in the upcoming Transfer Pumping and Electrical Upgrades Project.

**Water Treatment Plant Filter Plant Upgrades:** The WTP is upgrading the 1964 filter plant actuators to allow for enhanced control and feedback. The 1964 plant filters are also receiving upgraded turbidity meters with precision particle counters. A trial run of new media in one filter was initiated to start at the beginning of 2020 and will determine the potential increased capacity for the filters.

**The Planning and Scheduling Group:** The goal of this group is to support the Water & Waste Operations and Roadways & Fleet Support Divisions in planning, scheduling, and coordination of jobs, resulting in more efficient and organized operations. Along with assisting with the planning and scheduling of planned maintenance programs, the group also took control of the work management of some Water & Waste Operations work groups and activities, such as Water System operators, overtime call out for W&S Maintenance, and providing regular progress tracking reports with Key Performance Indicators for these operations. The work completed by the Planning and Scheduling Group has allowed supervisors and superintendents to spend less time in the office and more time in the field.

**Water and Sewer Maintenance Backlog Restructure:** A review was completed and some improvements were made to the backlog. The Planning & Scheduling Group took control of and restructured the maintenance backlog to include more relevant and up to date information needed for job planning. The purpose of this restructuring was to help improve the efficiency of scheduling maintenance jobs by providing a list of ready-to-plan jobs with the necessary information. Restructuring the backlog also ensures that backlog jobs will consistently be completed and removed from the list, and allows for a preventative maintenance project to begin. The next step in this process is to inspect every item on the backlog to remove those that have become obsolete or no longer a repair item.

**The Valve App Project:** New application that was rolled out in 2018 for internal and external use that provides live information about the status (“on”/“off”) of water infrastructure valves. Using this app reduces miscommunication and saves time for both staff and contractors completing important repair and installation work in the field. When the app was introduced, the position of all valves was unknown. Every time a valve is turned, the valve app is updated and the number of valves with unknown positions is reduced.

## 6.0 OUR ENVIRONMENT

### 6.1 Stewardship

Protecting the river and its surrounding watershed is vital to the long-term sustainability of our water supply. The public expects, and the City is committed to, responsible watershed management and stewardship. The City is a member of the South Saskatchewan River Watershed Stewards Incorporated, a community-based organization that was formed to implement the South Saskatchewan River Watershed Source Water Protection Plan.

The WWTP consistently meets or exceeds all regulatory limits for effluent discharged to the river under the WSA's Permit to Operate a Sewage Works, except for two exceedances due to anomalies resulting from continual optimization of the treatment process. Construction of the Digester #4 will significantly reduce the risk of this reoccurring. The new Digester and Heating Upgrades Project is set to commission in the second quarter of 2021, which will greatly increase the reliability of the solids treatment process, while also increasing the ability to utilize biogas from the digestion process. The WWTP is currently conducting an internal energy management study through the NRCan program with the objective of identify energy saving opportunities and benchmarking Saskatoon against similar facilities in Canada.

ISO/IEC 17025:2017 accreditation from CALA was maintained at both the WWTP Environmental Laboratory and the WTP Laboratory.

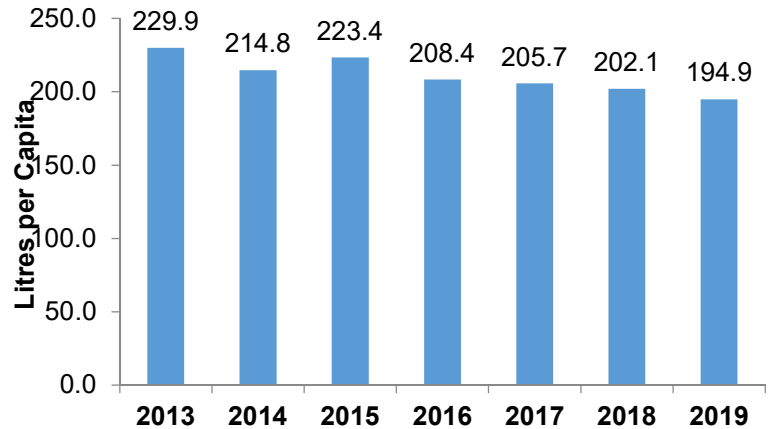
Saskatoon Water and Water & Sewer support the Provincial Operator Certification Program for both the Water and Wastewater Treatment Plants, and the water distribution and collection systems, which help protect both the public and the environment.

## 6.2 Conservation

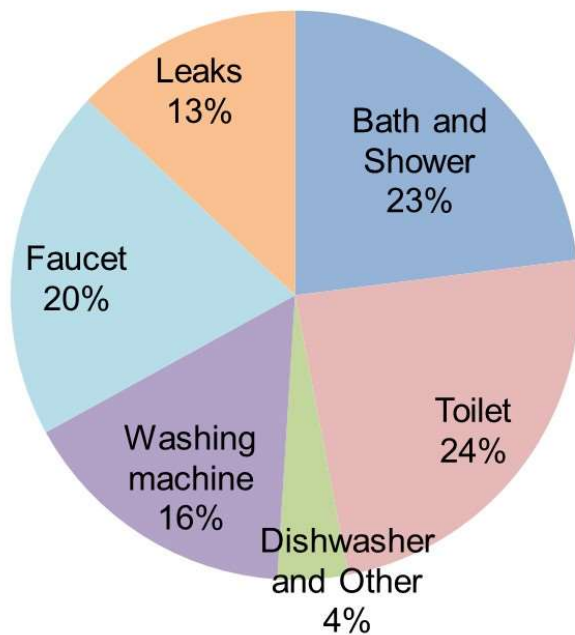
Saskatoon water rates are designed to encourage water conservation in order to defer the need for high capital intensive capacity projects. Customer education to reduce the summer maximum day volume (peak demand management) can also assist in deferring some capital expenditures.

Due to fluctuating seasonal irrigation demands, Saskatoon's total average annual daily consumption varies significantly from year to year.

**Annual Residential Average Daily Consumption  
(Litres per Capita)**



**Residential Indoor Water Use**



A study conducted by the Water Research Foundation shows that indoor household water use in a single family home has decreased by 22% from 1999 to 2016. The City has experienced a similar downward trend as citizens implement low-flow fixtures.

The chart provides an indication of how indoor water is consumed in average residential homes in Canada and the United States.

Source: Water Research Foundation, April 2016

## 7.0 OUR CHALLENGES

Saskatoon Water, Water & Sewer, and Technical Services have been proactive in anticipating and managing the following ongoing challenges it faces:

***Keeping Up with Growth:*** Saskatoon's growth in population and development has required additions to water infrastructure with large up-front capital expenditures. Construction costs have been higher because of competing demands for contractor services. Saskatoon Water coordinated multiple capital projects, trained staff for new facilities, and identified ways to defer capital expenditures.

***Addressing Water Efficiency, Climate Change, Greenhouse Gases, Energy Efficiency, and Carbon Footprint:*** Saskatoon Water has taken steps to address energy use and optimization for the best interest of the division. That focus is underlined in the recent carbon tax and the City's agreed reduction in Green House Gas emissions based on the Paris Accord. Saskatoon Water has undertaken updating the Long-term Capital Development Plans to include the reduction and optimization goals while working towards better water efficiency.

***Infill Development:*** Cumulative impacts of infill development are placing higher demands on the carrying capacity of existing water and sewer infrastructure. More infill reduces greenspace and increases surface runoff so appropriate policies are needed to minimize surface flooding.

***Age and Condition of Existing Infrastructure:*** Aging infrastructure has entered into a "replacement era" where asset sustainability and reliability will be at risk if not properly managed. Some of the infrastructure is over 100 years old and does not meet design standards for new development areas. Monitoring and assessing the physical condition and capacity of the infrastructure has been initiated as a foundation for an asset management program to better maintain our assets, prolong life, and increase resiliency.

***Climate Change and Rainfall:*** Changing rainfall patterns impact demand for water, with high peak demands during dry stretches. Wet weather conditions also have created drainage issues throughout the city. High groundwater levels have impacted neighbourhood drainage and resulted in east riverbank slumping and slope failure that damaged infrastructure.

***Regulatory Requirements:*** The provincial Permit to Operate impacts the required processes and standards for the WTP and WWTP. Further evolving federal and provincial regulations have the potential to impact discharges to the river. Saskatoon Water and Water & Sewer will continue to monitor regulatory trends and opportunities to be a leader in protecting our watershed.

***Inflow and Infiltration:*** Identifying and removing the amount of inflow and infiltration entering the sanitary sewer system will help to protect the environment, reduce sewer



back-ups, and reduce costs for collection and treatment. Partial treatment of high flows, which are mostly rain or groundwater, will be considered as the WWTP reaches capacity.

**Growth Pays for Growth:** As Saskatoon continues to grow, Saskatoon Water continues to explore alternate sources of funding. One such initiative, is “Growth Pays for Growth” in response to the Financial Growth Study. This initiative assigns capital costs that can be directly attributed to the off-site levies paid by developers. Obtaining appropriate funding for infill development, where off-site levies do not apply, will be a challenge for future nodes and corridor growth.

**Inadequate Space for Personnel, Materials, and Equipment:** Water & Waste Operations will continue to work towards creating secure and functional space that accommodates people, material, and equipment while still meeting Occupational Health & Safety standards and a growing city. Will continue to renovate existing spaces or use creative alternatives to meet standards until a long-term facility is found. Find effective communication tools to communicate between multiple remote sites. Work with Saskatoon Land and Facilities & Fleet Management to ensure that long-term plans fit with Water & Waste Operations’ service delivery under the growth plan to 500,000.

**Handling Sites:** Water & Sewer operates out of three handling sites, two of which are being reallocated to other groups, and one was lost in the 2018 year. The lack of handling sites on the west side of the city will lower production rates, as well as put us at risk for failure due to lack of material. Equipment will have to be moved and stored elsewhere and there is currently no room for this to be placed at the other two yards, which are shared with another division. Material storage sites are significantly smaller and under protected than they should be.

**Employee Retention:** As a section, the majority of Water & Sewer’s employees are unionized by CUPE 859, which provides a lot of opportunity for movement and growth within the corporation. It does; however, cause stress to individual groups with the constant shift of employees. The change in dynamics between a work group with a new supervisor or the time and expenditures that have to be taken into account when it comes to training an employee in a new role.

**Reaching the City of Saskatoon’s Level of Service:** Water & Sewer aims to reach their level of service of no more than 24 to 48 hours of water outage after a main break. This goal, combined with the new planned work program, is harder to reach with the current resources allocated to Water & Sewer.

**Lack of Integrated Asset Management Approach:** Water & Waste Operations will continue to develop an interim strategy for Water & Waste Operations to manage activities, assets, and inventory and train staff using existing tools so the eventual transition to an Enterprise Resource Plan is easier and there is already life cycle and asset data ready for the system. Will continue to support the corporate development of an Asset Management Strategy and Policy.

***Lack of Integrated Water & Waste Operations Annual Maintenance Plan:*** Will complete the development of an annual Water & Waste Operations work plan for each section, including labour, materials, equipment (excluding fleet services vehicles), and schedules that are integrated with the other sections.

***Non-standard Equipment and Lack of Funding, Replacement Strategies, and Training:*** Water & Waste Operations will continue to participate in the life-cycle decision making process, specifications, and procurement. Will continue to identify what our equipment needs are, standardize equipment and identify what funding is required to meet levels of service. Will continue to update, improve, and expand all equipment training and maintenance programs. Will continue to develop service agreements with service providers where appropriate. Develop a fleet life cycle management plan, including expansion, proactive maintenance, and optimized replacement.

***Inability to Track Work Done to Assets and Difficulty in Determining Success:*** Complete the interim asset management solution as defined above, including cleanup of outstanding items and maximize effective reporting of benchmarking data through Key Performance Indicators programs.

***Extreme Weather:*** Saskatoon experienced extremely cold weather in February and March, which resulted in an abundance of frozen water connections and multiple main breaks that were not repaired in under 48 hours. The average temperature during this time was 7°C lower than the previous year.

## 8.0 CONCLUSION

Saskatoon Water has long-term strategic capital development and expansion plans. Water & Sewer and Technical Services have long-term maintenance and asset management plans in place outlining levels of service and funding for annual maintenance and rehabilitation programs. Through its approved 2019 Operating Budget and the approved five-year Capital Plan, the City was able to maintain operations and fund capital projects related to treated water and wastewater quality, city growth, and regulatory matters.

The success of Saskatoon Water, Water & Waste Operations, and Technical Services is dependent on the dedication and skills of our employees, and their efforts are greatly appreciated. Our competent team of plant operators, tradespersons, maintenance staff, engineers, technologists, technicians, chemists, and administrators play a crucial role. The guidance and support of the General Manager, City Manager, and City Council is appreciated.

The staff of these divisions look forward to the challenges and the opportunities that the future will provide.

## 9.0 APPENDICES

### Appendix One: Water and Wastewater Infrastructure

The replacement value of all water and wastewater infrastructure was estimated at over \$7.6 billion (2017 assessment). An update to the valuation of the WTP, water intakes, and reservoirs is planned in the near future.

The WTP and assets associated with water distribution have an estimated value of \$3.8 billion.

The WWTP and assets associated with the sanitary sewer collection system has an estimated replacement value of \$3.8 billion.

The **Water Distribution System** is used to deliver potable water from the WTP to the customers. The system is composed of approximately 1,176 km of water mains, 15,020 valves, 8,165 hydrants, and 71,462 service lines.

Water Utility Assets		
Asset	2017 Inventory	Replacement Value (\$M)
Water Treatment Plant, Water Intakes and three reservoirs		\$ 600
Water Pipes	1,176 km	2,154
Valves	15,020	213
Hydrants	8,165	146
Service Connections	71,462	666
<b>Total</b>		<b>\$ 3,779</b>

The **Wastewater Collection System** is used to collect wastewater from customers and deliver it to the WWTP. The system is composed of approximately 1,062 km of gravity sewer mains, 51 km of pressurized force mains, 11,956 manholes, and 70,293 service lines.

Wastewater Utility Assets		
Asset	2017 Inventory	Replacement Value (\$M)
Wastewater Treatment Plant		\$ 500
Lift Stations	24	132
Wastewater Pipes	1,062 km	2,408
Manholes	11,956	141
Force main	51 km	105
Service Connections	70,293	551
<b>Total</b>		<b>\$ 3,837</b>

The condition of distribution and collection assets is continually evaluated and a long-term asset management plan is in place outlining levels of service and funding for annual maintenance and rehabilitation programs.

## Appendix Two: Understanding Your Residential Water-Based Utility

In 2019, the bill was simplified and the details can be viewed on the City's website. The rate structure remains the same as for 2018.

WATER, SEWER & INFRASTRUCTURE			Billing Period Mar 7, 2019 - Apr 7, 2019
Meter No. 123456789			
<b>Current Billing Read</b>	<b>Previous Billed Read</b>	<b>Multiplier</b>	<b>Usage</b>
Apr 7	Mar 7		
Actual 992.2	Actual 991	35.317	42.38 ft <sup>3</sup>
			<b>Amount</b>
Water			\$1.85
Water Service Charge for 31 days			\$18.18
Sewer			\$0.94
Sewer Service Charge for 31 days			\$18.18
Infrastructure			\$1.34
<b>Total Water, Sewer &amp; Infrastructure</b>			<b>\$40.49</b>
<b>TEMPORARY FLOOD PROTECTION CHARGE</b>			<b>\$3.44</b>
<b>STORM WATER MANAGEMENT CHARGE</b>			<b>\$5.63</b>
<b>RECYCLING CHARGE</b>			<b>\$5.77</b>

### Bill

**Water Service Charge:** The fixed monthly charge for a 5/8 inch water meter is \$11.89, and for a 3/4 inch meter is \$17.84. The fee is prorated by the number of days in the month.

A second water service charge is based on water usage (volumetric): \$4.376 per 100 ft<sup>3</sup> for the first 600 ft<sup>3</sup>, \$4.873 per 100 ft<sup>3</sup> for the second 600 ft<sup>3</sup> and \$6.416 per 100 ft<sup>3</sup> for over 1,200 ft<sup>3</sup>. The water service charges are used to fund water utility operations and capital projects.

**Sewer Service Charge:** The fixed monthly sewer service charge is based on the size of the water meter and is the same amount as the fixed water service charge.

The sewer volumetric charge is 51.75% of the water volumetric charge. Rates are set on a cost recovery basis and recognize that not all water returns to the sanitary sewer: \$2.213 per 100 ft<sup>3</sup> for the first 600 ft<sup>3</sup>, \$2.464 per 100 ft<sup>3</sup> for the second 600 ft<sup>3</sup> and \$3.244 per 100 ft<sup>3</sup> for over 1,200 ft<sup>3</sup>. Sewer service charges fund wastewater operations and capital projects.

**Temporary Flood Protection Charge:** The charge is a fixed fee of \$3.375 per month, prorated by the number of days in the month. The fee is charged on each water meter and will be phased out by December 2021.. The charge is being used to reduce flooding in high risk areas during severe rain events.

**Residential Infrastructure:** The fee is \$3.169 per 100 ft<sup>3</sup> of water usage. This fee is used for the capital replacement and upgrade of the water distribution and wastewater collection systems. The Redevelopment Levy to increase capacity of existing infrastructure to accommodate infill developments and the Roadways Levy that funds remediation of roadway damage associated with the utilities are included in the charge.

**Storm Water Management Charge:** The monthly charge for residential properties is a fixed amount of \$5.525 prorated by the number of days in the month. This fee is used to fund operations and capital projects for storm water and for stabilizing riverbank slumping.

## Appendix Three: Abbreviations

AMI – Advanced Metering Infrastructure

CALA – Canadian Association for Laboratory Accreditation Inc.

CBOD - Carbonaceous Biochemical Oxygen Demand

CFU – Colony Forming Unit

City – City of Saskatoon

IEC – the International Electrotechnical Commission

ISO – the International Organization for Standardization

MPN – Most Probable Number

NTU - Nephelometric Turbidity Units

ROI – Return on Investment

TP - Total Phosphorous

WSA – Water Security Agency

WTP – Water Treatment Plant

WWTP – Wastewater Treatment Plant



## Appendix Four: Glossary

**Abatement:** To reduce the amount or lessen the effect of.

**Backflow Prevention Device:** A backwater valve is a device that prevents sewage from backing up into basements.

**Biosolids:** Organic matter recycled from sewage.

**Capital Reserve:** Funding that is reserved for long-term infrastructure projects to be undertaken in the future.

**Colony Forming Unit (CFU):** A measure of viable bacterial cells.

**Commercial customers:** For this report, refers to all non-residential customers and includes retail, wholesale, industrial, and institutional customers.

**Cross Connection Control Program:** A cross connection is any link between the water supply and potentially contaminated sources. The Cross Connection Control Program ensures that proper backflow prevention devices are installed to prevent foreign substances from entering the water distribution system.

**Digester:** One step of the wastewater treatment process used to decrease the amount of organic matter present.

**Effluent:** Treated water discharged back into the river.

**Ferric:** Iron-containing materials or compounds.

**Grants-In-Lieu of Taxes:** Money paid by the Water and Wastewater Utilities in place of taxes.

**Infill (Development):** Development of land within already developed areas.

**Infiltration:** Groundwater seeping into sanitary sewers through cracks and crevices, such as defective pipe joints and broken pipes.

**Inflow:** Water flowing into the sanitary sewer through large openings, such as cross connections and weeping tile.

**Injury Frequency Rate:** The number of injuries relative to the annual amount of time worked by 100 full time employees used to compare safety performance over time or between organizations. The formula is as follows:

(Number of lost time injuries x 200,000) divided by total hours worked)

**Injury Severity Rate:** The number of lost work days per 100 employees used as a proxy to measure the criticality of injuries and illnesses. The formula is as follows:

(Number of days off due to injury or illness x 200,000) divided by Total hours worked)

**Irrigation:** Artificial application of water typically due to low amounts of rainfall.

**Lift Station:** Facility designed to move wastewater or storm water from lower to higher elevations with pumps.

**Low-Flow Fixture:** Fixtures that use water efficiently to reduce overall water usage.

**Nephelometric Turbidity Units (NTU):** A measure of scattered light. A high turbidity level is caused by organic matter that can promote the growth of pathogens, as well as being aesthetically unappealing.

**Potable:** Safe to drink.

**Procurement:** The process of obtaining or purchasing.

**Residual Handling Facility:** Removes chlorine and solids, mostly consisting of sand and inert ferric material, from the Water Treatment Plant effluent that is discharged to the South Saskatchewan River.

**Stabilization Reserve:** Water utility revenues fluctuate due to rainfall and demand for irrigation. Annual operating surpluses, which are more likely during drier years, are allocated to the Stabilization Reserve that can be used in years with an operating deficit. The Stabilization Reserve is capped at 5% of the current year's budgeted metered revenue, and any additional surplus is allocated to the Capital Reserve.

**Surface Runoff:** Rainfall flowing overland and into the storm sewer without being absorbed into the ground.

**Turbidity:** The cloudiness or haziness of a fluid caused by a large number of individual particles that are generally invisible to the naked eye.