

Wastewater Collection & Treatment

Led by: Director of Water Services

Service Description

We're a big, growing city on a small river. This is a highly regulated, essential and public health focused service that ensures over 1.4M Calgarians and regional customers can trust that their wastewater is removed and treated to protect the health of the river. The Wastewater Collection & Treatment service collects wastewater from toilets, sinks and drains, treats it, and returns it to the river. We ensure necessary investments are made in treatment plants, pipes and people to keep pace with the needs of a growing population and so that service is available 24/7, 365 days a year during evenings, weekends, and emergencies.

Service Updates

Key Service Results

Awards

Emerald Award

Investments were made to upgrade linear infrastructure and increase treatment plant capacity to maintain customer levels of service. Significant projects include the Bonnybrook Plant D Expansion and Fish Creek West Sub Trunk.

The Water Utility renewed its commitment to better understand our customers and their needs. Customer research insights gathered from 2023 surveys and focus groups will help shape service level delivery improvements and long-term planning. Calgarians remain satisfied with this service and feel they receive good value for the cost.

We also expanded our Unflushables campaign this year to include FOG (fats, oil, grease) which is detrimental to our wastewater collection system (pipes) and can create wastewater backups for citizens. By increasing awareness around FOG, The Water Utility and our customers will be able to work better together to minimize wastewater back-ups, as well as, blockages in the linear system.

With Calgary's hot, dry summer, and lower than normal river flows, effluent from our treatment plants presents in higher concentrations in our rivers. Despite these drought conditions, the Water Utility was able to meet our regulatory requirements.

Service Challenges

This service protects public health and our watershed by ensuring the necessary investments are made in treatment plants, pipes, and certified and trained staff. The service strives to maintain service levels while mitigating safety risks like H₂S as well as regulatory and environmental risks. While Calgary continues to grow, our resources to address this growth have not grown proportionately.

The City's wastewater system requires highly skilled and technical expertise to deliver this service. For some, this requires achieving or maintaining certification levels that keep The City in regulatory compliance. It requires ongoing efforts to ensure a sustainable workforce.

There is significant operating and capital investment required to maintain a reliable wastewater system, meet regulatory requirements, while addressing Calgary's current pace of growth. Inflationary pressures resulted in the need to strategically re-prioritize and push out some 2023 capital projects to future years.

Trends & Potential Uncertainties

We know that population growth in Canada has been significant over the last few years. Civic censuses are needed to provide the most reliable population estimates and help develop the most accurate infrastructure upgrade schedules. With respect to this service line, wastewater treatment plants for example, take 10 years to plan, design and build. Given that the last census data from Calgary is from 2019, we need to ensure sufficient planning and investment in order to meet Calgary's growth demands.



Measuring Our Performance

Legend

— Actuals

■ Expected Future Performance

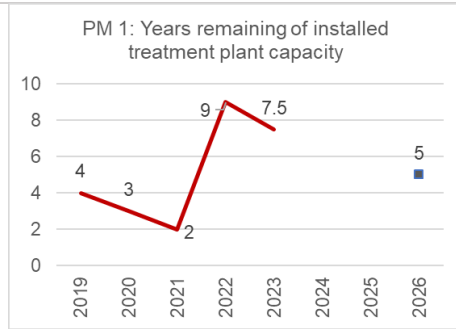
➔ Progressing as planned

⊖ Not progressing as planned

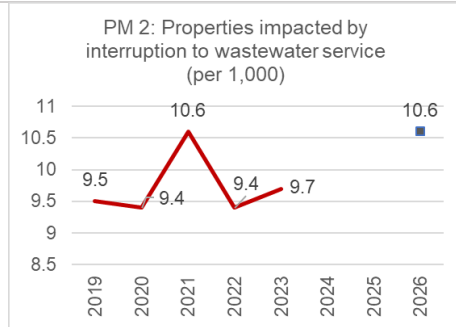
Performance Measures

Story behind the numbers

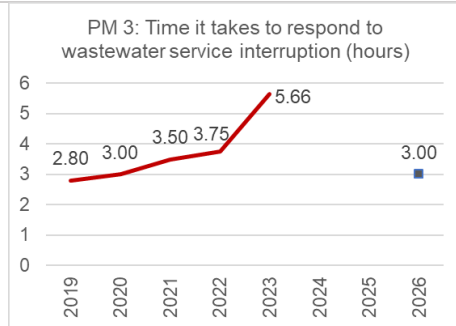
Status



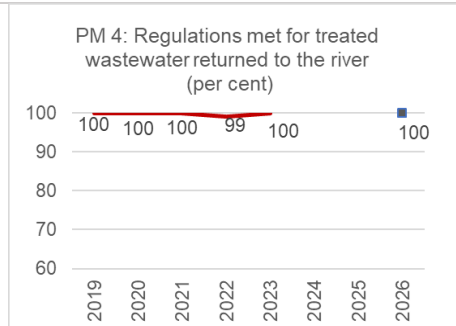
Customers in Calgary and the region expect assured wastewater treatment capacity now and into the future. Current and future infrastructure investment needs are assessed on an ongoing basis and are based on population forecasts, wastewater quality monitoring, environmental regulations, health of the watershed, and needs of the wastewater treatment plants. The current combined installed treatment capacity of Calgary's wastewater treatment plants will accommodate 7.5 years of growth.



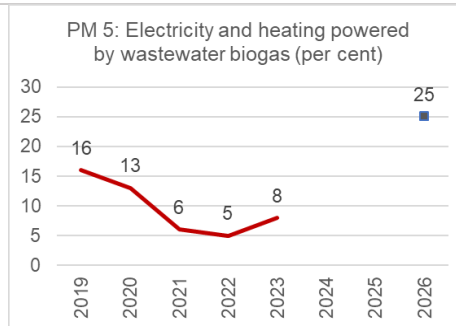
Customers can experience a wastewater backup due to factors such as tree roots, collapsed pipes or clogs from wipes, hair, grease and other unflushable items. In 2023, properties impacted remain below the future expected performance of 10.6. Total public issue SR counts remain similar to 2022 of approximately 3,300. In order to maintain service levels over the next four years, a key focus will be to build understanding of the most effective risk reduction levers and invest in condition assessments to inform targeted infrastructure upgrades.



Citizens value quick response times to sewer backups. This measure reflects the time it takes the Water Utility to respond to a customer that is experiencing a wastewater backup. In 2023, response times increased. Opportunities to improve response times and address risks in the collection system, such as infrastructure assessments, are being investigated.



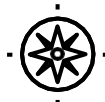
Wastewater is a highly regulated, essential, and public health focused service. The service is greatly valued by customers, and they expect their wastewater is cleaned to protect the health of the river. Calgary's three wastewater treatment plants continue treating wastewater better than the quality specified by Alberta Environment & Parks, 100% of the time. In order to maintain this high standard, a key focus will be to prioritize significant wastewater plant and collection system upgrades.



In 2023, the Bonnybrook Wastewater Treatment plant generated 25,565 MWh or 45% of its internal electrical need. This is an increase of almost 50% between 2022 and 2023.

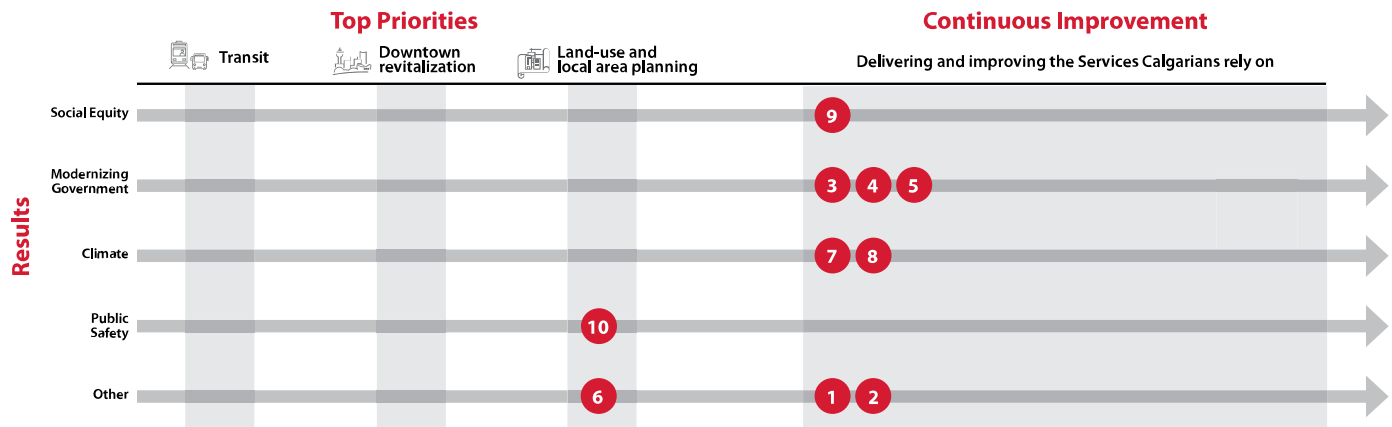
The Bonnybrook Cogeneration facility continues to operate through the commissioning phase and savings are expected to increase. By utilizing biogas in boilers, our other wastewater treatment plants, Fish and Pine Creek, saw a savings of \$38,600 in natural gas. Together, all three wastewater treatment plants generated 8 per cent of their total electricity and heating needs.










Progress on Service Delivery

Alignment with Council Refined Priorities and Result Areas



- Legend**
- Completed
 - Progressing as planned
 - Not progressing as planned
 - Not started
 - Initiative number

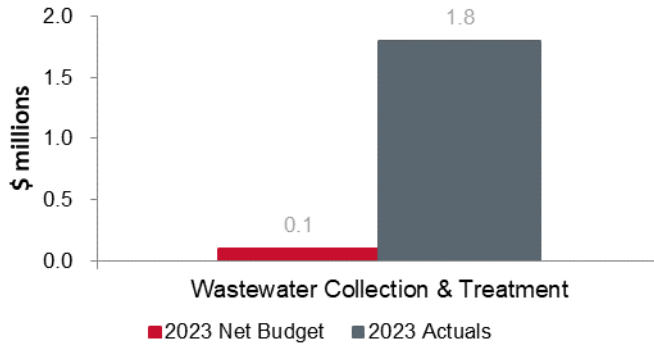
Initiative	Initiative Update	Status
1 Reduce risk of wastewater backups for customers by building understanding of the most effective risk reduction levers and investing in condition assessments to inform targeted upgrades and replacements for critical infrastructure.	We have allocated additional capital for condition assessments and are working to review and improve the condition assessment process. This work will help us target infrastructure upgrades and replacements for critical infrastructure.	
2 Establish clear levels of service for customers who experience wastewater backups by reviewing options with a lens of sustainability, customer expectations and industry best practices.	Citizens value quick response to wastewater back-ups. The Utility is exploring continuous improvement strategies to service levels and innovating solutions to address customer expectations	
3 Explore opportunities to improve system monitoring and enable proactive response to issues such as choked wastewater mains and system risks that emerge.	The Utility is conducting process reviews and ongoing investigation into using remote technologies to monitor various locations in our wastewater collection system. These remote sensing technologies would allow Water Services to better monitor, plan and respond to incidents. Ongoing conversations are focused on the availability of technology and the potential of cross-corporate collaborations	
4 Maintain service resilience through ensuring appropriate resources including competent and certified operators to maintain regulatory compliance and operate a growing wastewater collection and treatment network (three treatment facilities, 43 lift stations and over 5,000 km of underground pipes).	<p>The certification pilot program is ongoing as planned and Water Services has already added additional Level III Wastewater certified operators.</p> <p>The sewer backup dashboards are being monitored regularly and have allowed us to make some adjustments to work assignments. A more focused effort to reduce response times will be initiated in 2024.</p>	
5 Protect the river and reduce impacts to the system by working together with high-strength wastewater customers to ensure rate equity and bylaw compliance.	<p>We recently engaged wastewater surcharge program customers to collect information on their current practices, knowledge of the wastewater bylaw and to assert how we can best assist customers as we make changes to the surcharge program.</p> <p>The procurement process to secure software for this program was approved. A Request for Proposal will be issued in Spring 2024.</p>	

Initiative	Initiative Update	Status
6 Meet growth demands and reduce risks of customer backups, releases to the environment and regulatory non-compliance by evaluating and prioritizing significant upgrades at Bonnybrook Wastewater Treatment Plant, Fish Creek Wastewater Treatment Plant and the wastewater collection system.	Key investments in Fish Creek WWTP upgrade planning and completion of the Bonnybrook WWTP Plant D Upgrades are on track. Looking forward to future business cycle, the Wastewater Service has initiated planning projects which will inform infrastructure investments for the 2031-2034 and 2035-2038 business cycles. These planning initiatives will determine the necessary upgrades and expansions to The City's wastewater collection and treatment infrastructure to support future demands of growth, regulatory compliance, and protection of the environment.	
7 Improve energy efficiency and reduce Greenhouse Gas (GHG) emissions from wastewater operations.	In 2023, Bonnybrook generated nearly 45 per cent of its internal electrical need. Generation increased almost 50 per cent between 2022 and 2023. The Bonnybrook Cogeneration facility continues to operate through the commissioning phase and savings are expected to increase.	
8 Reduce the exposure and vulnerability of the wastewater service to changes in influent strength, shifting seasonality, extreme weather events and higher temperatures related to climate change by supporting, prioritizing and enabling mitigation actions.	2023 brought drought to Calgary. This afforded an opportunity to experience a number of the features of the future climate scenarios being explored and to implement adaptive actions to ensure river health and regulatory compliance under such conditions. Low river levels can impact wastewater compliance. River water quality modelling work will include corporate climate alignment and builds on our understanding of what future investments are required to successfully adapt.	
9 Establish levels of service, optimize value, and deliver service equity by leveraging innovation, data, technology, and customer insights.	Water Services rolled out a rigorous customer research program which has increased understanding of customer needs and experience. Insights gathered are being used to deliver service and drive future conversations around our service delivery. Work is also underway to strategically assess levels of service in order to deliver a consistent and reliable approach to service delivery.	
10 Reduce safety risk for employees and Calgarians caused by Hydrogen Sulfide (H2S) gases through improved modeling, monitoring and mitigation initiatives.	<p>A comprehensive heat map of H2S in the wastewater system would require a significant effort from the planning infrastructure group. We are looking for a less data intensive way to identify potential locations of H2S release. The implementation of new technology (Maximo-mobile) employed by the Utility aims to support this work.</p> <p>Adjusted work practices and enhancements to our personal protective equipment (PPE) continue to evolve to create a safer work environment for our staff. Our lift stations are an area of focus at this time.</p>	



Service Updates on Financial Performance

Net Operating Budget and Actuals as of December 31, 2023



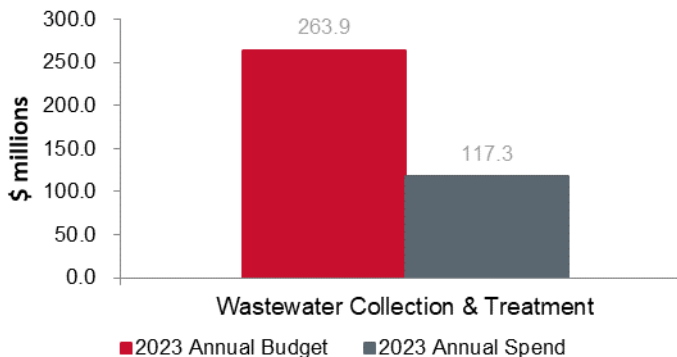
Operating Budget Updates - 2023 net operating budget vs actuals:

The service line is self-supported and has an unfavourable operating variance of \$1.7 million. Variances occur due to the process of reporting self-supported expenditure in different areas that contribute to delivering service.

The operating transfer to reserve was \$153.5 million which is higher than the budgeted transfer to reserve of \$134.9 million. This primarily resulted from higher than budgeted revenue due to hot, dry summer weather as well as higher than expected development agreements resulting in higher Off-Site levy revenues. Wastewater had higher than budgeted salary and wage expenditure from higher usage of seasonal workers along with higher overtime offset by favorable sickness & accident claims and other miscellaneous salary recoveries. There were also higher costs for materials, chemicals, parts, and internal and external contracted services offset partially by lower electricity charges.

The budgeted transfer to reserve is planned to fund capital expenditure including replacements, upgrades and investments that occur year after year. Large capital investments are planned to be financed with debt. When the actual transfer to reserve is higher than planned, the borrowing for large capital investments will be lower than anticipated.

Capital Budget and Spend as of December 31, 2023



Capital Budget Updates - 2023 total capital budget vs 2023 spend:

The 2023 capital budget is \$263.9 million with a year end spend of \$117.3 million (44.5 per cent spent). Investments were made to upgrade linear infrastructure to maintain levels of service and to increase treatment plant capacity. Inflationary pressures on capital investment resulted in the need to strategically re-prioritize and push out some of the 2023 projects to future years. Stage gating decisions were made based on optimal timing, impact and spend, while also considering future bundling opportunities that align with other major projects. Examples of major investments include:

Bonnybrook (BB) Plant D Expansion (\$22.4 million invested in 2023). An overall investment of more than \$1 billion in extensive upgrades and expansions to the BB WWTP will protect the environment, increase energy efficiency, and accommodate future growth until the mid-2030s.

Fish Creek West Sub Trunk (\$29.5 million invested in 2023). The sub trunk will transport sanitary flows from the Tsuu T'ina First Nation and improve capacity and reliability of the existing sanitary systems for the Woodbine, Woodlands, and Canyon Meadows communities.