



STORM WATER UTILITY

2023 Annual Report



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MESSAGE FROM DIRECTORS

The Storm Water Utility funds the complex system of the storm water infrastructure network, which starts from the collection ditches, storm ponds, and sewer infrastructure and ends at the South Saskatchewan River by discharge through the city's 91 active outfalls. The Storm Utility is responsible for the planning and design, management, storage, operation and maintenance, asset preservation programming, and system engineering, which is managed by the following departments:

- Saskatoon Water
- Water and Waste Operations
- Technical Services

The Storm Water Utility also funds the Drainage Inspector and management of the Bylaw and Compliance section in Community Standards and the oversight of the riverbank stability by the Geotechnical Specialist in Saskatoon Water.

Management and staff from the responsible departments are committed to providing exceptional storm water management and flood protection services, including operations and maintenance of assets in the most reliable and cost-efficient way for the citizens of Saskatoon. We are pleased to present our results in the Storm Water Utility 2023 Annual Report on behalf of our departments.

The report describes our contributions to achieving the City of Saskatoon's (City) Strategic Plan. We take great pride in efficient storm water management and reducing the flood risk for the citizens of Saskatoon. Several initiatives have been completed and more are underway to further enhance service to the citizens, increase efficiencies, reduce costs, and strengthen our environmental leadership.

Our financials 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, asset preservation, operation and maintenance costs for current and future storm water management, and flood protection considering climate change. The Departments have been focusing on customer service, storm water management for current and new neighbourhoods, flood protection for the most at-risk areas, and addressing aging infrastructure for storm water related services.

We are proud to work with a dedicated group of professionals who demonstrate an ongoing commitment to storm water management and flood protection, as well as ensuring the storm water infrastructure is sustainable. The work of the Storm Water Utility departments is greatly appreciated.

Russ Munro – *Director of Saskatoon Water*

Brendan Lemke – *Director of Water and Waste Operations*

Dan Willems – *Director of Technical Services*

EXECUTIVE SUMMARY

The Storm Water Utility funds storm water management and flood protection services, including ongoing operations and maintenance of assets with an estimated replacement value of \$3.1 billion. The Storm Utility also monitors and stabilizes the East Riverbank to protect strategic public infrastructure. In 2023, the Storm Water Utility had revenues of \$14.2 million, with \$14.6 million for operating expenses, which includes \$9.5 million transferred to Capital and Infrastructures Reserves. Approximately \$0.4 million was transferred from the Storm Water Stabilization Reserve to offset the increased operating costs in 2023.

In 2023, progress was made implementing the Storm Water Utility Business Plan, with the following highlights:

- Continued to progress the nine-project Flood Control Strategy that will reduce the flood risk for at least ten top flood prone locations within the city before 2028. The second project (Churchill Neighbourhood Park Dry Storm Pond) was completed, and the third project (Weaver Park Dry Storm Pond) reached substantial completion. The detailed design, public engagement, and tendering phases for the fourth project (Brevoort Park South Underground Storm Water Storage) were completed. Additionally, the feasibility assessment and preliminary design began for the fifth and sixth projects (Cumberland Avenue and Main Street and Cumberland Avenue and 14th Street locations).
- Partial construction of Phase 2 of the Montgomery Place Drainage Improvement Project was completed. Phase 2 construction is planned to be completed in 2024. Detailed design of Phase 3 is planned for 2024, with construction occurring in 2025 and 2026.
- Applied for \$16 million in funding through the Disaster Mitigation and Adaptation Fund from the Government of Canada. This application would fund the construction of five storm water management facilities in areas with historic flooding. Results of the funding application are expected to be received in 2024.
- Responded to 967 storm water and drainage inquiries through our Customer Care Team. Bylaw and Compliance also responded to 152 drainage related complaints and the Storm Water Utility responded to 327 inquiries.
- Roadways, Fleet and Support completed the fall sweep, which included 81 kms of streets and 1,060 tonnes of debris collected. Water and Waste Operations completed 579 catch basin inspections and completed 151 repair or replacements based on the inspection findings. Operations also completed 319 manhole inspections and executed 102 manhole repairs.
- Continued asset management planning of infrastructure, including updating the Storm Water Asset Management Plan.
- Installed welcome signs at three storm ponds that provide messaging regarding safety and permitted recreational use of storm ponds.
- Monitored sediment levels of storm ponds, including the bathymetric surveying of one wet storm pond.
- Completed the annual Spring Reconnaissance comprising of a visual inspection of the slopes and monitoring of instrumentation of the East Riverbank to assess

and rate specific sections. Monitoring programs were completed near 16th Street and 11th Street.

- Continued collaboration with the University of Saskatchewan, Meewasin, and others to monitor and research storm water quality and related concepts of the storm water system and South Saskatchewan River.
- Completed the first year of data collection from two outfall trash collection bags in collaboration with the University of Saskatchewan in a successful Natural Sciences and Engineering Research Council of Canada Alliance grant application.
- Completed billing reassessments of 184 industrial, commercial, institutional, or multi-residential sites in the annual storm water utility billing process.

Saskatoon had a below average rainfall year with 213 mm of rainfall recorded. This accumulation is below the historical average of 263 mm and the 33rd lowest seasonal rainfall since 1900. Measured rain events did occur on May 24 – 25, 2023 (2 – 5 year return period), June 3, 2023 (2 – 5 year return period), and June 18, 2023 (2 – 5 year return period).

1.0 OVERVIEW

1.1 Introduction

The Saskatoon Storm Water Utility provides storm water management and flood protection through funding the storm water system’s operations and maintenance, asset preservation, capacity enhancements, and drainage inspections. The Storm Water Utility also monitors and mitigates damage to strategic public infrastructure along the riverbank.

Storm water services are provided to residential and industrial, commercial, and institutional (ICI) properties. In 2023, storm water charges were applied to approximately 67,605 single-family residential properties, 1,118 multi-family residential, and 3,757 ICI properties including City-owned sites.

Saskatoon’s storm water infrastructure includes over 24,392 manholes and catch basins; 986 km of linear infrastructure, such as storm sewer pipes and culverts; 44 storm ponds; and other drainage infrastructure with a replacement value of approximately \$3.1 billion.

A list of key definitions and abbreviations for the report is provided in Appendix 1.

1.2 Strategic Linkages

The City’s [2022-2025 Strategic Plan](#) provided the direction that guided the activities of the Saskatoon Water Utilities. The following section outlines our Vision, Mission, linkages to the Corporate Strategic Goals, and Guiding Values.

Our Vision

The City is a leader in storm water design and asset management. We effectively collaborate with citizens and partners to utilize storm water as a resource and mitigate the risk of flooding.

Our Mission

The Storm Water Utility provides safe, efficient, and cost-effective storm water management to Saskatoon citizens through teamwork and innovation. We develop proactive strategies that ensure the effective long-term performance of our storm water systems, supported by sustainable, accountable, and responsive funding structures. Storm water management charges entrusted by citizens are used as effectively as possible to minimize storm water and snow melt impacts.

Our Corporate Purpose

Our Purpose

Our Purpose describes the reasons we come to work every day.

- **We are making** Saskatoon a great place to live, work, learn and play every day.
- **We are creating** a welcoming workplace where each of us are encouraged to realize our full potential.
- **We are building** a sustainable future upon our predecessors' legacy and history of success.
- **We are exceptional** in delivering public services.
- **We are innovative** and unleash creative solutions and investments that contribute to a great city.
- **We adopt and support** behaviours that reduce the environmental footprint of the city.



Our Guiding Values



Our Values

Our values are part of who we are, what we stand for and how we behave towards each other.

PEOPLE MATTER

We work together as one team, seek input when it matters, support each other to grow and be our best selves, and foster a culture where we use our voices to drive change.

RESPECT ONE ANOTHER

We value the diversity each of us brings, celebrate our successes - big or small, and take the time to listen, understand and appreciate each other.

ACT AND COMMUNICATE WITH INTEGRITY

We are honest and take ownership of our actions, transparent in our decision-making, and question actions inconsistent with our values.

SAFETY IN ALL WE DO

We never compromise on the safety, health and well-being of ourselves and those around us, we put safety at the forefront of all decisions, and take responsibility to act on unsafe or unhealthy behaviours.

TRUST MAKES US STRONGER

We depend on each other and know we will do what we say, we assume the best of others, and support, inspire and empower each other every day.

COURAGE TO MOVE FORWARD

We lead and embrace change, think outside the box, and ask the tough questions.



Our Strategic Goals

The Strategic Goals are based on areas that the community, Administration, and City Council identified as important to realize the long-term vision of Saskatoon as a great place to live, work, learn and play.



ASSET & FINANCIAL SUSTAINABILITY

Saskatoon invests in what matters.



CULTURE OF CONTINUOUS IMPROVEMENT

Saskatoon is the best-managed city in Canada.



ENVIRONMENTAL LEADERSHIP

Saskatoon grows in harmony with nature.



MOVING AROUND

Saskatoon is a city on the move.



QUALITY OF LIFE

Saskatoon is a warm and welcoming place for all.



SUSTAINABLE GROWTH

Saskatoon is known for smart, sustainable growth.



ECONOMIC DIVERSITY & PROSPERITY

Saskatoon thrives thanks to a diverse local economy.

Quality of Life: Provide citizens with cost effective, reliable, and high-quality storm water management 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, storm water-related infrastructure for current and future citizens and businesses.

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

Sustainable Growth: Work closely with other departments to provide efficient and resilient designs for storm water infrastructure for new developments.

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

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

2.0 OUR STORM WATER UTILITY TEAM

The Storm Water Utility is part of the Saskatoon Water Department in the Utilities and Environment Division. The Utility had three full-time employees and two engineering interns in 2023.

Saskatoon Water's Engineering and Planning section is responsible for overseeing the Storm Water Utility and providing storm water engineering expertise. Saskatoon Water provides the following storm water management services:

- Flood Control Strategy (FCS) design and project management.
- Montgomery Place Drainage Improvement Project (MPDIP) design and project management.
- CN Industrial Drainage Improvement Project design and management.
- Montgomery Place driveway ditch crossing permitting.
- Rainfall monitoring and storm water quality monitoring.
- Assessing runoff factors of multi-residential and ICI properties for billing purposes.
- Analyzing and administering storm water billing credit applications.
- Engineering support for drainage projects.
- Community liaison for storm water issues.
- Modelling storm system capacity relative to rainfall volume and intensity.
- Planning and design of storm water infrastructure for new land development.
- Asset management of the city's storm ponds and outfalls.
- Monitoring the stability and condition of the riverbank and coordinating remediation of slope failures and/or erosion in the area.

The Utility also funds services provided by the following Departments:

Construction and Design: Operates the “Connection Desk” and provides project management services, including survey work and inspection, for storm water infrastructure construction projects.

Communications and Public Engagement: Assists in initiatives to enhance citizen awareness and engagement to improve flood resiliency.

Community Standards: provides drainage inspections, drainage advice to residents and developers, [Drainage Bylaw](#) updates, and Drainage Bylaw enforcement.

Corporate Revenue: Provides storm water billing and collection services.

Finance: Provides accounting and administrative support.

Parks: Provides landscape design services for the FCS projects and provides ongoing day-to-day operations and maintenance of areas surrounding some storm ponds.

Roadways, Fleet and Support (RFS): Maintains above ground drainage, including culverts, and completes a fall street sweep.

Sustainability: Provides leadership in activities that contribute to storm water practices that protect our watershed and natural resources.

Technical Services: Tracks the inventory, completes condition assessment, and oversees asset preservation for storm sewer infrastructure.

Water and Waste Operations (WWO): Provides the ongoing day-to-day operations and maintenance of storm water ponds, outfalls, and below ground (sewer) storm water drainage infrastructure.

3.0 OUR INFRASTRUCTURE

Table 1 summarizes the City’s storm water infrastructure with a replacement value of \$3.1 billion.

The Storm Water Utility’s **minor system** consists of sewer pipes, manholes, catch basins, and outfall structures that convey runoff from more frequent, lower intensity storm events (up to a “1-in-2-year” storm). The system includes 986 km of linear infrastructure, such as storm sewer pipes and culverts, 8,600 manholes, 15,800 catch basins, 2,900 service connections, 91 functioning river outfalls, and minor ditches.

The **major system** consists of overland street drainage, 11 dry ponds, 33 wet ponds (including nine naturalized wetlands) major ditches, swales, and any other land that is required to convey runoff from less frequent, higher intensity storms that produce runoff in excess of what the minor system typically handles.

Table 1: Storm Water Inventory

Asset	Type	2023 Inventory
Sewer Mains	Collectors	691 km
	Trunks	72 km
Manholes	-	8,597 ea.
Force mains	-	4 km
Service Connections	-	2,877 ea.
Catch Basins	-	15,795 ea.
Leads	-	162 km
Storm Ponds	Dry	11 ea.
	Wet	33 ea.
Culverts	-	13 km
Outfalls	-	91 ea.
	-	-
Sub-drainage	Roadways	42.0 km
	Riverbank	1.7 km
Oil & Grit Separators	-	1 ea.
Lift Stations	-	2 ea.
Replacement value		\$3.1 billion



Figure 1: Storm Water Inlet/Outlet Structure in Churchill Park Dry Pond

4.0 OUR RESULTS

4.1 Climate and Precipitation

Annual Rainfall

Eight rainfall gauges were regularly monitored between April 1, 2023, and September 30, 2023, while three rain gauges were added to the City’s network and were monitored from August 1, 2023, to September 30, 2023. A summary of Saskatoon’s 2023 rainfall season is provided in the [2023 Annual Rainfall Report](#). Overall, Saskatoon had a below-average rainfall year with 213 mm of rainfall accumulating. This was below the historical average of 263 mm, with it being the 33rd lowest seasonal rainfall total in the last 124 years. Rainfall increased from 2022, when the city received 203 mm of rainfall.

Despite the low seasonal rainfall, four rainfall events occurred throughout the year, all with a return period of 2 to 5 years. Table 2 provides the rain event details for all rain events recorded by eight rain gauges.

Table 2: Rain Events in 2023

Date	Rain Event Statistics	Acadia	Aden Bowman	Attridge Fire Hall	City Hall	Light and Power	Shaw Centre	Wastewater Treatment Plant	Woodlawn
May 24-25, 2023	Peak Intensity (mm/hr)	67	55	69	84	57	45	69	57
	Total Rainfall (mm)	43	23	26	28	22	43	32	27
	Return Period (yr.)	2	< 2	< 2	2	< 2	2	< 2	< 2
June 3, 2023	Peak Intensity (mm/hr)	65	60	14	70	36	38	53	91
	Total Rainfall (mm)	22	22	7	23	15	12	17	24
	Return Period (yr.)	2	2	< 2	2	< 2	< 2	2	2
June 18, 2023	Peak Intensity (mm/hr)	48	14	43	14	14	12	38	36
	Total Rainfall (mm)	28	18	29	18	17	18	28	21
	Return Period (yr.)	2	< 2	2	< 2	< 2	< 2	2	< 2
June 30, 2023	Peak Intensity (mm/hr)	142	0	26	0	34	0	7	0
	Total Rainfall (mm)	15	0	4	0	3	0	1	0
	Return Period (yr.)	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

The greatest rain event occurred between May 24 and May 25, 2023, where a total average of 31 mm of rainfall occurred, which represented approximately 15% of the total 2023 rainfall. During this rain event, the west and southeast areas of the city received the highest rainfall amount, with 43 mm of rain over the course of the rain event. The storm in these areas was classified as a “1-in-2 year” storm, as per the current City Intensity-Duration-Frequency curves.

4.2 Capital Programs

Flood Control Strategy

The \$54 million FCS includes nine projects to reduce the flood risk for at least ten flood zones before 2028. The FCS construction is funded by the Storm Water Utility (60%) and the Government of Canada (GoC) Disaster Mitigation and Adaptation Fund (40%).

Final completion was reached for the dry pond and related storm sewer infrastructure at Churchill Park in October 2023. The dry pond was in service for storm water management to reduce flooding throughout 2023. Storm water entered the dry pond once in 2023 (June 3, 2023), preventing nearby flooding.

“My apartment faces Churchill Park dry storm pond. [The park] now has winter sliding hills, giant snowmen, walking trails and cross country skiing around the ‘dugout’. Churchill Park is used more now than it was before the storm pond was constructed.”

Resident near Churchill Park



Figure 2: Churchill Park Dry Storm Pond

Substantial completion was reached in November 2023 for the dry pond and related storm sewer infrastructure at Weaver Park. The dry pond is in service to reduce nearby flooding for the 2024 rainfall season.

“Helps with flooding, and is aesthetically cool. Practical and Beautiful.”

Resident near Weaver Park



Figure 3: Weaver Park Dry Storm Pond

Public engagement and final detailed design plans were completed for the underground storage to be constructed at Brevoort Park South. City Council approved the feasibility assessment for this project in May 2023. Construction for this project will start in 2024 and will mitigate flooding for the Early Drive and Tucker Crescent intersection.

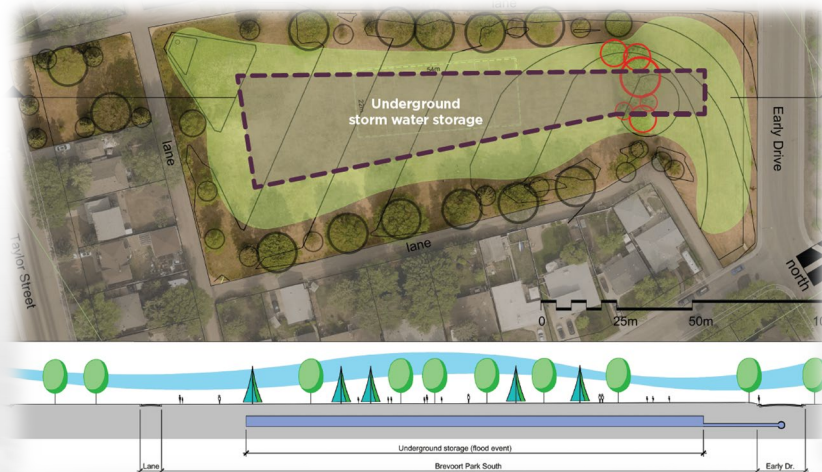


Figure 4: Rendering of Brevoort Park South Underground Storage

The feasibility assessment and conceptual plans for the fifth and sixth projects within the FCS began in 2023 to mitigate the flood risk at properties near the intersections of Cumberland Avenue and Main Street and Cumberland Avenue and 14th Street. The feasibility assessment for both projects will be presented to City Council in 2024.

Flood Control Strategy Extension

In 2023, the Storm Water Utility applied to the GoC's Disaster Mitigation and Adaptation Fund (DMAF) for the construction of five storm water management facilities that would be constructed between 2028 and 2032. Of the \$40.1 million in estimated construction costs, the City applied to have 40% of the project costs to be funded by the DMAF. It is expected that the results of the funding application will be announced in 2024.

Montgomery Place Drainage Improvement Project

Construction was partially completed for Phase 2 of the three-phase MPDIP in 2023. The project is expected to cost \$8 million and is partially funded through the Investing in Canada Infrastructure Program (ICIP) where 40% is contributed by the GoC and 33.33% is contributed by the Government of Saskatchewan (GoS).

Construction of Phase 2 is planned to be completed in 2024. Phase 3 is tentatively scheduled to be completed in 2025 and 2026, with detailed design occurring in 2024. The drainage improvement phases will be completed in collaboration with roadway preservation work for an efficient, cost-effective, and one-City approach for the neighbourhood.



Figure 5: Completed Ditch Improvements in Montgomery Place

CN Industrial Neighbourhood Drainage Improvements

In collaboration with the Sustainability Department, Saskatoon Water received \$3.9 million in GoC funding through the Natural Infrastructure Fund in 2021. The ditch/swale reconstruction and culvert additions along Melville Street, Jasper Avenue, and Portage Avenue began in 2023 and will be completed in 2024. The drainage

improvements for this neighbourhood are being coordinated with other capital projects that will include water-main upgrades, road preservation, and storm system expansion.



Figure 6: Completed Ditch Improvements in CN Industrial

4.3 Maintenance and Operations

Citizen Inquiries

In 2023, the Customer Care Centre responded to 967 inquiries from citizens regarding culverts, drainage, storm sewer, and storm water flooding issues, which was down from 1,510 inquiries in 2022. The type of inquiries received are shown below in Table 3.

The Storm Water Utility group responded to 327 citizen inquiries, up from 325 in 2022. Of these inquiries, 69 inquiries were related to storm water billing, 51 were internal inquiries requested by other City staff, while eight required a site visit. Table 4 below summarizes the completed inquiries.

Note that complaints received by the Bylaw and Compliance group are not included in Table 3 and Table 4. This information is provided later in the report in Section 4.7.

Table 3: 2022 and 2023 Customer Care Summary of Inquiries

Description	2022	2023
CB Plugged/Clogged/Frozen	545	200
Street Drainage	40	25
Lane and/or Lot Drainage	17	1
CB Damaged	81	72
CB Lead Damaged	10	7
Manholes	85	88
Spring Drainage	689	502
Storm Sewer Blockage	13	6
Storm Ponds	9	39
Other	17	27
Total	1,506	967

Table 4: 2022 and 2023 Storm Water Group Customer Inquiries

Description	2022	2023
Alley Drainage	3	1
Surface Drainage	36	19
Sewer Drainage	7	7
Montgomery General	10	11
Montgomery Drainage Strategy	20	34
Montgomery Ditch Crossings	8	2
Flooding	24	5
Flood Control Strategy	43	50
Storm Water Utility Billing	60	69
General	59	75
Bylaw	2	2
Catch Basin Drainage	46	37
Councillor Requests	3	13
Storm Water Credit	4	2
Total	325	327

Roadways, Fleet and Support Fall Sweep

The 2023 fall Street Sweep Program utilized a tree density and flood risk approach similar to the methodology used in previous years. A total of 81 km of streets were swept, with 1,060 tonnes of debris collected. The tonnage of debris removed was down from 1,738 tonnes collected in 2022, as shown in Figure 7. By designing the program based on higher tree density, increased debris captured during the sweep provides better flood protection per kilometer swept. The RFS team completes many of the overland drainage inquiries received by the Customer Care Centre.

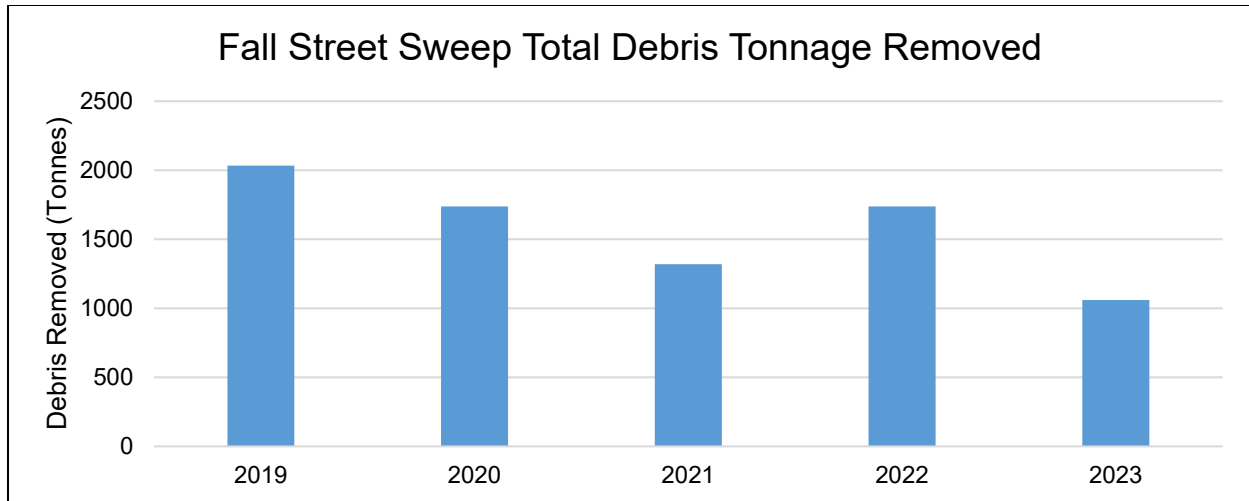


Figure 7: Fall Street Sweep Total Debris Tonnage Removed

Water and Waste Operations Maintenance

WWO operates and maintains below ground storm water infrastructure including sewer mains, manholes, and catch basins. Table 5 below summarizes WWO’s 2023 storm water related maintenance activities including flushing and televising storm water sewers, and cleaning and inspecting infrastructure.

Table 5: WWO's Storm Water Infrastructure Maintenance

Activity	2022	2023	Units
CCTV of Storm Mains	14,964	15,036	Meters
CCTV of CB Leads	55	3,417	Meters
Storm Sewer Meters	4,737	56,581	Meters
Catch Basin Leads	N/A ¹	311	Each
Inspect Catch Basins	591	579	Each
Clean Catch Basins	6,231	16,174	Each
Repair Catch Basins	163 repaired, 17 replaced	109 repaired, 42 replaced	Each
Inspect Storm Manholes	292	319	Each
Repair Storm Manholes	102	102	Each
Grout MHs/CBs	8	15	Each
Outfalls	8	84	Each
Storm Ponds	N/A ¹	57	Each

Table Definitions

- “Storm Sewer Meters” refers to the storm segment meters flushed.
- “Catch Basin Leads” is the number of leads flushed or cleaned.
- “Outfalls” is the number of total times outfalls inspected and/or cleaned.
- “Storm Ponds” is the number of trips made to maintain storm ponds.

¹Not reported in 2022

A total of 109 catch basins, 102 manholes, six segments of catch basin leads, and seven segments of storm sewer were repaired, while 42 catch basins and 63 segments of catch basin leads were replaced in 2023. Additionally, 57 maintenance visits to storm ponds were completed in 2023. Figure 8 displays the 2023 WWO repairs and replacements of storm water infrastructure compared to the previous five years.

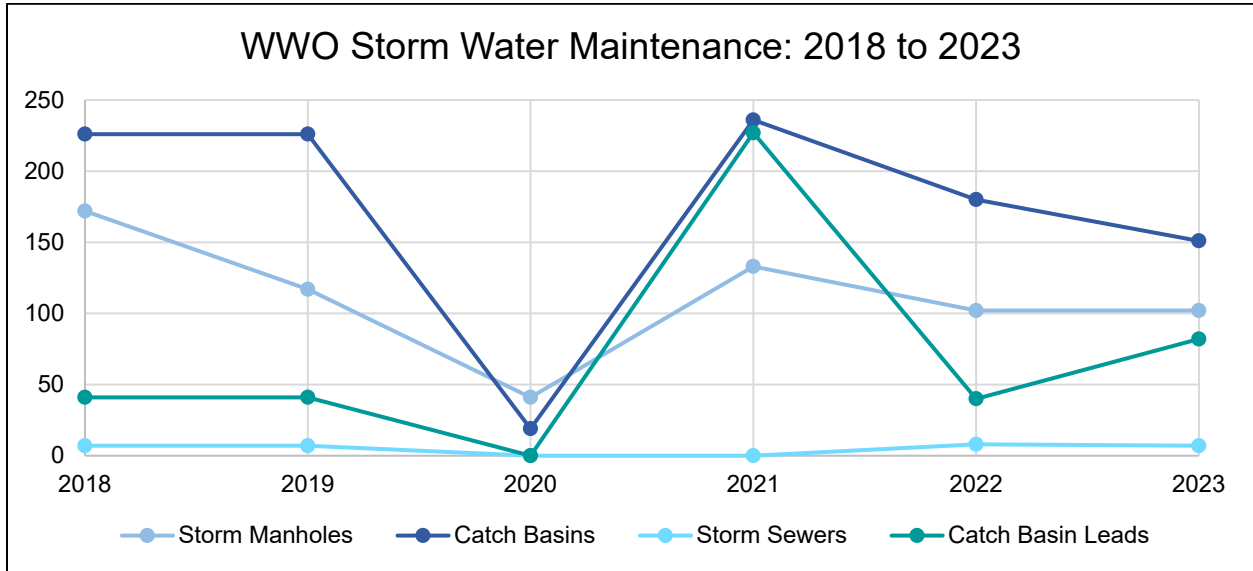


Figure 8: WWO Storm Water Maintenance Repairs and Replacements: 2018 to 2023

4.4 Asset Management

Storm Sewer Inspection, Cleaning and Lining

In 2023, the Storm Water Utility funded the cleaning and inspection of approximately 15 km of storm sewers. As of the end of 2023, over 195 km of storm pipes have been inspected (20% of linear storm sewer pipe system), and 146 km of these have been rated (15% of linear storm sewer pipe system). The inspected storm sewers were rated using a five-point scale:

- A: No structural problems evident
- B: Some structural deficiencies noted
- C: Sewer main showing deterioration
- D: Physical condition is near failure
- F: Physical condition has failed

The rating for 146 km of inspected sewer mains is provided in Figure 10.



Figure 9: Image of Sediment within Storm Sewer Pipe

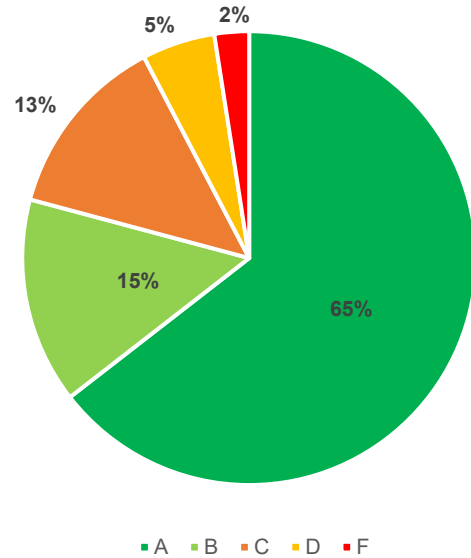


Figure 10: Image of Storm Sewer Main and Trunk Ratings

Storm Water Asset Management Plan

The current inventory of storm water infrastructure has a replacement valuation of \$3.1 billion. As of the end of 2023, approximately 21% of the storm infrastructure network (storm sewer, outfalls, manholes, catch basins, culverts, ponds, etc.) has been inspected. Future work will be to continue inspections of the storm water infrastructure network, so conditions are known for the entire system. Other priorities include documenting service expectations and accounting for climate change in future infrastructure projects.

Storm Water Infrastructure Corporate Asset Management Update

In 2023, the Storm Water Utility presented an update to City Council regarding the City's [Corporate Asset Management Plan for Storm Water Infrastructure](#). The document provides information about the current asset inventory, condition, lifecycle programs, operation and maintenance programs, service levels, and future planning work.

Storm Water Cleaning and CCTV Pilot Project

In response to the June 20, 2022 rain event, where upwards of 75 mm of rain was received in some areas of the City over the course of an hour, the City launched a targeted storm sewer infrastructure investigation in areas where flooding causing damage was reported. The investigation continued through 2023, with Saskatoon Water utilizing the results to identify areas where preventative inspection and cleaning of the storm sewer may reduce the risk of potential surface flooding. In October 2023, City Council approved a two-year cleaning and CCTV inspection pilot project to be completed in 2024-2025, which will focus on inspecting and cleaning storm sewers at known high-risk flood locations. If proven effective through the pilot project, changes to service levels will be documented, and be incorporated into the 2026-2027 business plan and budget process.

4.5 Storm Water Outfalls

Outfall Inventory

The City currently has 91 owned and maintained storm water outfalls. The Storm Water Utility formally inspects the outfalls every three years as part of the Storm Water Asset Management Plan, with the next comprehensive inspection program scheduled for 2025. WWO also completes inspections at select outfall locations annually, as well as inspections on an emergency or inquiry basis.

4.6 Storm Water Ponds

Storm Water Ponds Inventory

The City currently has 33 wet ponds and 11 dry ponds within the storm water management network. The Storm Water Utility formally inspects the storm water management ponds every three years, with new ponds inspected the year they are in service, as part of the Storm Water Asset Management Plan. The next comprehensive inspection program is scheduled for 2024. WWO also completes inspections at select pond locations annually, as well as inspections on an emergency or inquiry basis.

Storm Water Ponds and Recreational Use

The City permits use of storm water ponds for recreational use through Policy C10-024. A storm pond recreational use committee that meets quarterly includes members from Saskatoon Fire, Recreation and Community Development, Communications, WWO, Technical Services, and Saskatoon Water to discuss safety of the storm pond system. Saskatoon Fire completes ice thickness testing in the winter to permit recreational use of the storm ponds for the season. Additional seasonal testing is completed by Saskatoon Fire as required based on weather conditions. Only select storm ponds are permitted for recreational use based on infrastructure and site inspections.

New Welcome Signage

In 2023, Saskatoon Water continued to install new welcome signage at select storm ponds, including the installation of two new welcome signs at Churchill Park Dry Storm Pond, one new sign at Blairmore (yahkōhtēwin) Storm Pond, and a replacement sign at Bev M Dyck Storm Pond. Additionally, sign face replacements were completed for the two existing welcome signage at Lakeview Storm Pond. The new signage is consistent with current City visual identity guidelines and provides messaging regarding safety and permitted recreational use of the storm ponds. An image of the sign installed in 2023 at Blairmore (yahkōhtēwin) Storm Pond shown in Figure 11.



Figure 11: New Welcome Sign Installed at Blairmore (yahkōhtēwin) Storm Pond

Storm Pond Bathymetric Survey Program

In 2023, Saskatoon Water continued its bathymetric survey program, identifying sediment infill volumes and determining if sediment is affecting the operation of the City’s wet storm ponds. One wet pond was surveyed in 2023, of which the pond contained sediment build-up equivalent to over 46% of the pond’s dead storage. Since 2017, 50% of the City’s wet storm ponds have been surveyed, including 60% of ponds greater than 20 years of age. To monitor sediment levels, Saskatoon Water plans to continue annual surveys with the program to be incorporated into the Storm Water Asset Management Plan.

4.7 Bylaws and Compliance

The Storm Water Utility funds a dedicated drainage inspector position and partially funds three other positions in the Community Standards Bylaw Compliance section. The drainage inspector helps citizens and developers ensure compliance to Saskatoon’s [Drainage Bylaw](#) through a model of education and enforcement. In 2023, Community Standard’s Bylaw Enforcement Network software tracked 152 property drainage-related complaints, down from 168 in 2022. Table 6 displays the number of drainage-related complaints in 2023 compared to 2022.

Table 6: Drainage Complaint Numbers

Complaint Type	2022	2023
Lot Grading Advice & Education	37	32
Sump Pump Discharge	14	21
Sump Pump Winter Bypass	19	16
Lot Grading Plan Requests & Questions	10	12
Rear Property Line Drainage	7	9
Eaves Trough & Downspouts	36	36
ROW Closure Approvals	0	0
Side Yard Drainage Concerns	22	5
Garden/Garage Suite Plan Approvals	-	-
Commercial Property Development	2	5
Retaining Wall Concerns	-	-
Groundwater Issues	-	1
Infill Development	17	8
Multi-Family Development	-	1
Garage Pad Elevations	1	0
Water Retention Structure	3	4
Concrete Swale	-	2
Total	168	152

The Storm Water Utility provided funding for a capital project led by Community Standards to improve Drainage Bylaw compliance. An in-progress initiative under this project is Back of Lot Grading, with stakeholder engagement continuing for potential specifications to regulate grading in new low-density suburban development, including the possibility of concrete swales.

4.8 Riverbank Slope Stability

The Storm Water Utility funds riverbank slope stability projects due to the impact of snow melt and rainfall on groundwater levels and erosion. The City's goal is to manage the riverbank slope stability more proactively for increased efficiency and lower long-term costs.

East Riverbank Spring Reconnaissance

Since 2009, an annual Spring Reconnaissance has been completed on the East Riverbank for areas considered most susceptible to slope instability, between the North and South Railway Bridges. This reconnaissance comprises visual inspections of the slopes and monitoring of slope inclinometers and standpipe and vibrating wire piezometers. The reconnaissance aims to provide a yearly review of the riverbank status from a geotechnical and risk of slope instability perspective. In 2020, the inspection extents were expanded to the south to the east Raw Water Intake and Pumping Facility, and in 2021 to the north to Peturrson's Ravine.

In addition to the monitoring completed as part of the Spring Reconnaissance, Saskatoon Water staff visually monitored East Riverbank sites near 15th and 16th Streets and 11th Street, with monitoring being more frequent when risk of slope movement was higher.

Nutana Slope Area

Geotechnical instrumentation in the Nutana Slope Area was monitored twice in 2023 by WSP (formerly Golder) with the results communicated to residents of the area. Visual inspections were completed monthly between April and October and bi-monthly during the winter. Instrumentation monitoring was also completed by City staff in Spring, Summer and Fall.

Geotechnical Support

In addition to managing the riverbank, the City Geotechnical Engineering Specialist is a resource for all City departments, and in 2023, was involved in several projects, providing geotechnical support. Some of these projects included the following:

- Brevoort Park Underground Storage Design
- Trenchless CN track crossing for the CN Industrial Neighbourhood Drainage Improvements Project
- Melville Street Sanitary Sewer Replacement design
- Land Development Review
- Riel Industrial Sector Planning
- SL&P Solar Farm
- Updating Construction and Design construction contracts for trench stability requirements

4.9 Community Awareness and Engagement

Flood Control Strategy

Communications and engagement for the FCS is a priority for the Storm Water Utility. The following communications were mailed to area residents and stakeholders regarding the Brevoort Park South dry pond project in 2023, which is the fourth FCS project:

- Early notification of project planned for 2024 (January 2023)
- Notification of City Council meeting requesting project approval (April 2023)
- City Council approval of Project & Engage webpage (June 2023)
- Video Presentation on Engage webpage (September 2023)
- Geotechnical Investigation Construction Notification (October 2023)
- Public Engagement Event Invitation (November 2023)

Two FCS news releases were completed in 2023 including one for Churchill Park and one for Weaver Park, which are shown in Appendix 2 and described below:

- September 7, 2023: City's second flood mitigation project complete: Churchill Park
- December 7, 2023: Weaver Park dry storm pond substantially complete

The City hosted a grand opening event on September 7, 2023 at Churchill Park. Engage pages were created for each FCS project and can be found on [Saskatoon.ca/engage](https://saskatoon.ca/engage).



Figure 12: September 2023 Opening Event at Churchill Park Dry Storm Pond

Montgomery Place Drainage

The construction notices and updates for Phase 2 of the MPDIP were completed by the construction management team of Construction and Design. The engage page for the MPDIP can be found at [Saskatoon.ca/engage](https://saskatoon.ca/engage).

CN Industrial

The construction notices and updates for the CN Industrial Drainage Improvement Project were completed by the construction management team of Construction and Design. The Engage page for this project can be found at [Saskatoon.ca/engage](https://saskatoon.ca/engage).

Nutana Slope

Two flyers were distributed to residents in spring and fall near the Nutana Slope to inform them of instrumentation monitoring results. A “Notice to Residents” was also delivered in the spring to provide information on what to expect from the City and what citizens can do to reduce risk from slumping.

Yellow Fish Road™ Program

The Storm Water Utility, in collaboration with Sustainability and WWO, supported the Meewasin Valley Authority in delivering the Yellow Fish Road™ Program to make students and citizens aware that water goes through the storm water system untreated to the South Saskatchewan River. In 2023, in-person presentations were offered to schools and other community groups in the city. Twenty schools/groups and 501 students and teachers participated in the Yellow Fish Road™ Program. Yellow fish were painted on 157 storm drains in 13 neighbourhoods, and 193 door hangers were distributed.

Storm Water Charges

Bill inserts were prepared to provide information to ICI property owners about the storm water management charges, including information about the Storm Water Management Credit Program.

Saskatoon.ca Website Updates

The Storm Water website is reviewed as needed to ensure up-to-date information is provided to Saskatoon residents. In 2023, the following webpages were updated:

- Flood Control Strategy
- Home Flood Protection
- Storm Water System
- Storm Water Credit Program
- Storm Ponds

4.10 Storm Water and the Environment

Storm Water Quality Monitoring

Saskatoon Water monitors 16 major outfalls for storm water quality. These outfalls are sampled and tested for temperature, chlorine, E.coli, and total coliforms every alternate week.

The monitoring program also tracks changes in water quality and quantity for the Northeast Swale. The monitoring measures basic water quality parameters, and monthly water samples provide for more detailed analysis. Annual reporting includes trend analysis of samples and comparisons to guidelines and historical data.

Natural Infrastructure

Pathways for an Integrated Green Network (approved in principle by City Council in 2022) is a ten-year implementation plan that outlines actions to enhance, grow, and conserve green space and natural infrastructure in Saskatoon. Work is underway on several initiatives to support storm water management using natural infrastructure, including bioswales, structural soil cells, storm pond enhancements, and park upgrades. A list of active projects can be found [here](#).

Natural infrastructure includes natural areas and planted features, such as parks, trees, gardens, storm ponds, and other green spaces. Natural infrastructure provides several benefits, such as storm water management and flood protection, and can be used in place of or in combination with grey infrastructure to enhance the resilience, performance, and/or lifespan of infrastructure.

Outfall Debris Catchment Bags

The City has partnered with the University of Saskatchewan on a research project (which also received funding through the Natural Sciences and Engineering Research Council of Canada) that included the installation of trash trap nets on two of the City's storm water outfalls. The nets, shown in Figure 13, hold trash and other pollutants that would have otherwise reached the South Saskatchewan River through the storm water system. The nets were ordered from the manufacturer in late 2022 and were installed in spring 2023. Data collection will continue in 2024 from both the outfall nets. Results of the pilot project will determine whether the installation of trash trap nets at other outfalls throughout the city are an efficient way to prevent debris from entering the river.



Figure 13: Image of Outfall Net

4.11 Utility Billing

Equivalent Runoff Unit Assessment Updates

In 2023, the Storm Water team reassessed a total of 184 ICI and multi-residential properties. Of these sites, 89 assessments were due to internal observations of recent construction, 73 assessments were due to new sites being created, and 19 assessments were due to customer inquiries.

Storm Water Management Credit Program

The [Storm Water Management Credit Program](#) took effect January 1, 2019, providing the opportunity for a reduction in Storm Water Management Charges for ICI and multi-residential property owners who have implemented onsite storm water management measures. Properties are eligible for a credit in the three categories up to a maximum total combined credit of 50%. The details of the three categories are provided in Table 7.

Table 7: Storm Water Management Credit Categories

Category	Evaluation Criteria	Total Credit (50% Maximum)
Water Quality Improvements	Based on the percentage of storm water directed through a quality control infrastructure that meets the minimum standard of 80% total suspended solids removal for particles sizes 50 micron or larger.	Up to 20%
Peak Flow Reduction	Based on the proportion of storm water for a standard “1-in-2 year” rain event held onsite and released slowly to the City’s storm water system. The credit is equal to 0.4 multiplied by the peak flow reduction percentage up to 75%.	Up to 30%
Onsite Retention (Runoff Volume Reduction)	Based on 2% per millimeter of storm water up to 25 mm that is retained onsite and not released to the City’s storm water system.	Up to 50%

The Storm Water website includes Frequently Asked Questions, a fillable application form, a user-friendly credit calculation calculator, an inspection and maintenance template, and a comprehensive guidance manual. Information about the credit program was sent with all 2023 ICI Storm Water Utility bills. The City received two formal applications for the storm water credit program from property owners. The Storm Water Utility will continue to explore options in 2024 to increase awareness of the credit program for ICI and Multi-residential property owners.

4.12 Continuous Improvement

The Storm Water Utility has undertaken a Continuous Improvement approach to increase service levels, improve efficiencies, and reduce costs in 2023:

- The FCS cost-shared with the GoC, to help the City adapt to the risk of more intense storms associated with climate change. Project 2 (Churchill Neighbourhood Park Dry Pond) construction reached final completion and Project 3 (Weaver Park Dry Pond) reached substantial completion. As of December 31, 2023, the GoC contributed approximately \$6.0 million as part of the Disaster Mitigation and Adaptation Fund agreement.
- The MPDIP cost-shared with the GoC and GoS, to help restore the drainage routes in the Montgomery Place neighbourhood through the Investing in Canada Infrastructure Program continued in 2023. As of December 31, 2023, approximately \$2.0 million has been contributed by the GoC and GoS. Phase 2 and 3 will be completed before the end of 2026.
- The restoration of drainage routes in the CN Industrial Neighbourhood was cost-shared with the GoC. As of December 31, 2023, approximately \$0.3 million has been contributed by the GoC Natural Infrastructure Fund. Construction of this project will be completed in 2024.
- Cost-effective research was leveraged through a partnership with the University of Saskatchewan for debris prevention from the storm sewer system to the South Saskatchewan River and storm water treatment applications.

- Storm sewer asset inventories were updated in 2023. Updates to the storm sewer outfall inspection template and report were completed to improve the management and engineering aspects of the inspections.
- Participation in the Canadian Infrastructure Benchmarking Initiative provided access to best practices and lessons learned from other Canadian municipalities regarding storm water management. Saskatoon Water presented the FCS at the annual conference.

5.0 OUR FINANCES

The Storm Water Utility is funded through a user-pay principle with charges proportional to storm water runoff generated according to property size and surface imperviousness (i.e., green space is charged less than buildings and pavement). A single-family residential dwelling is deemed to produce one Equivalent Runoff Unit (ERU) of storm water, which forms the unit for charging other property types. The Storm Water Management Charge for single residential properties in 2023 was \$8.90 per month (\$106.80 annually). In 2023, 67,605 single family dwellings were charged storm water management fees (one ERU each).

Commercial properties can generate significantly more storm water than single unit residential properties; therefore, they are charged multiple ERUs from a minimum of two annual ERUs (\$213.60) to a maximum of 100 ERUs (\$10,680) in 2023. In 2023, the Storm Water Utility billed 4,875 properties, including 3,757 ICI properties and 1,118 multi-residential properties.

5.1 Revenues

In 2023, total Storm Water Utility revenues were \$14.2 million, an increase of 0.9% from 2022. Storm Water Management revenues based on ERUs included \$5.4 million from ICI properties (38% of total revenues and 5% of customers of the storm water management charge), and \$8.8 million from residential properties (62% of total revenues and 95% of customers of the storm water management charge). Figure 14 displays the revenues in percentage by category.

Variances: Actual total Storm Water Utility revenues were \$314,000 (2.3%) higher than budgeted in 2023 because of new properties and site developments.

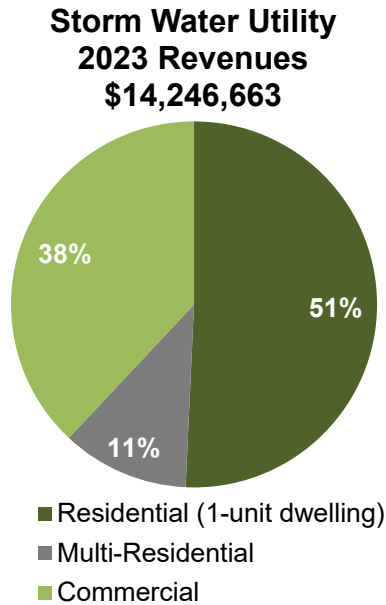


Figure 14: 2023 Revenues by Category

5.2 Operating Expenditures

The Storm Water Utility's 2023 operating expenditures were \$14.6 million, including \$9.5 million (65%) allocated to Capital reserves.

WWO and RFS (Public Works) expended \$4.2 million (29% of total operating expenses) to operate and maintain the storm water system, including handling citizen drainage inquiries, keeping storm drains clear, replacing and repairing infrastructure, and sweeping streets in the fall. Of the \$4.2 million, \$3.4 million was spent on sewer maintenance by WWO, while \$0.9 million was spent on drainage by RFS.

Administration costs (corporate charges) included billing services by Corporate Revenue, financial and administration services from Finance, and insurance.

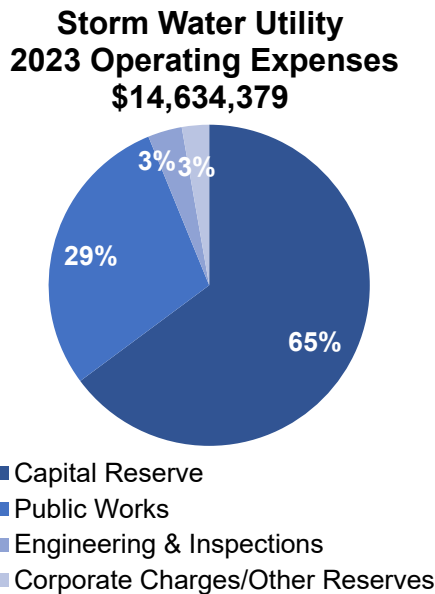


Figure 15: 2023 Operating Expenses by Category

Engineering and inspections, including overall utility management, accounted for \$0.5 million.

Variances: Operating expenditures in 2023 were \$0.7 million (5.0%) above budget due storm sewer maintenance (WWO) being \$1.1 million (45.7%) over budget. Expenses also included a \$107,300 transfer to a capital reserve for the City’s enterprise resource program (Fusion). Due to higher than budgeted revenue, \$0.4 million from the stabilization reserve was utilized to offset the operating variance.

Table 8 displays the actual 2023 Operating Revenues and Expenditures compared to the 2023 budgeted and 2022 actual amounts.

Table 8: 2023 Storm Water Operating Revenues and Expenditures

Storm Water Utility Operating Revenues and Expenses (\$1000s)			
	2023 Actual	2023 Budget	2022 Actual
Revenues			
Storm Water Charges	\$ 14,231	\$ 13,921	\$ 14,113
Late Charges	\$ 15	\$ 12	\$ 14
Ditch Crossing Permits	\$ 0	\$ -	\$ 0
Total Revenues	\$ 14,247	\$ 13,933	\$ 14,127
Expenses			
Engineering & Inspections Operations	\$ 503	\$ 611	\$ 466
Maintenance (Public Works)	\$ 3,383	\$ 2,322	\$ 2,072
Drainage (Public Works)	\$ 859	\$ 1,131	\$ 925
Customer Billing	\$ 135	\$ 140	\$ 129
Corporate Services	\$ 59	\$ 60	\$ 67
Licenses & Insurance	\$ 129	\$ 129	\$ 109
Other Admin Expenses	\$ 5	\$ -	\$ 147
Interest Expense/(Revenue)	\$ (29)	\$ (54)	\$ (54)
Provision to Capital Reserve	\$ 9,489	\$ 9,489	\$ 9,500
Provision to Other Reserves	\$ 107	\$ 107	\$ 107
Total Operating Expenses	\$ 14,639	\$ 13,933	\$ 13,470
Revenues Less Expenses	\$ (392)	\$ -	\$ 657

5.3 Storm Water Stabilization Reserve

The Storm Water Stabilization Reserve has been established to provide for normal fluctuations in storm water expenses because of differences in weather conditions, such as widespread severe rain events that impact requirements for storm water maintenance services. Changes in the stabilization reserve since 2021 are shown in Table 9. The reserve cap is 50% of the one-year operation budget of WWO and RFS. The stabilization reserve reached its cap in 2022 at \$1.7 million and at the end of 2023 has balance of \$1.3 million.

Table 9: 2023 Change in Stabilization Reserve

Change in Storm Water Stabilization Reserve (\$1000s)			
Description/Year	2023	2022	2021
Stabilization Reserve Beginning of Year	\$ 1,669	\$ 1,356	\$ 3,144
Balance From Year	\$ (392)	\$ 657	\$ 345
Transfer out to Capital Project	\$ -	\$ (345)	\$ (2,134)
Storm Stabilization Reserve End of Year	\$ 1,277	\$ 1,669	\$ 1,356

5.4 Capital Funding

In 2023, \$9.5 million was allocated to the Storm Water Capital Reserve. In addition to revenue allocated to capital from the Storm Water Operations, \$2.0 million from the GoC’s Disaster Mitigation and Adaptation Fund program was utilized for the FCS (Churchill Park and Weaver Park Dry Storm Pond eligible expenditures), while \$1.1 million from the GoC’s and GoS’s Investing in Canada Infrastructure Program was utilized for the drainage improvement project in Montgomery Place. The GoC’s Natural Infrastructure Fund also contributed \$0.3 million for the drainage improvement project in the CN Industrial Neighbourhood.

5.5 Capital Expenditures

In 2023, Storm Water Utility capital expenditures were approximately \$8.0 million (Figure 16). Approximately 93% of capital expenditures were for storm sewer network management, asset preservation, and capacity improvements (\$7.5 million).

East Riverbank Stabilization expenditures were \$217,000 including the internal Geotechnical Engineer salary, slope instrumentation monitoring, and other riverbank monitoring costs.

**Storm Water Utility
2023 Capital Expenses
\$8,027,177**

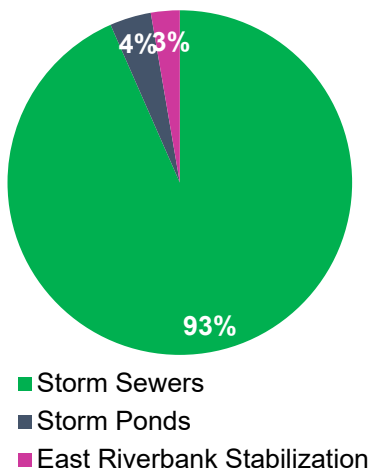


Figure 16: 2023 Capital Expenditures by Category

Storm pond preservation expenditures were \$311,855 and included inspections, monitoring, asset management, and minor capital repair costs. Significant capital expenditures are expected for storm pond maintenance in the future.

Variances: Table 10 displays the actual 2023 Storm Water Capital Expenditures compared to the 2023 budget and 2022 actuals. The amounts shown in Table 10 does not factor in reimbursement from the Disaster Mitigation and Adaptation Fund, Investing in Canada Infrastructure Program, and Natural Infrastructure Fund contribution agreements. These reimbursements factor in the 'Storm Trunk and Collection Sewer' capital expenditures. Total net capital expenditures is reduced from \$8.0 million to \$4.6 million, factoring the external funding.

At the end of 2023, ongoing capital projects extending over more than one year had unspent capital balances of \$27.3 million. This does not include funding that has been allocated from external sources (GoC and GoS) for funding agreements.

Table 10: Storm Water Capital Expenditures from Capital Reserve Fund

Storm Water Capital Expenditures (\$1000s)			
	2023 Actual	2023 Budget	2022 Actual
Storm Trunk and Collection Sewers	\$ 7,499	\$ 14,070	\$ 9,261
Storm Sewer Pond Preservation	\$ 312	\$ 718	\$ 174
East Riverbank Stabilization	\$ 217	\$ 238	\$ 221
Watershed Mgmt and Assessment Program	\$ -	\$ 75	\$ -
Total Capital Expenditures	\$ 8,027	\$ 15,101	\$ 9,656

5.6 Storm Water Capital Reserves

The Storm Water Capital Reserve provides funding for future large-scale capital projects. The capital reserve at the end of 2023 was \$4.7 million. Table 11 displays the comparison of the 2023 Capital Reserves of this year to those of 2022 and 2021.

Table 11: 2023 Change in Storm Water Capital Reserve

Change in Storm Water Capital Reserve (\$1000s)			
Description/Year	2023	2022	2021
Capital Reserve Beginning of Year	\$ 5,550	\$ 4,638	\$ 2,557
Provision to Capital Reserve	\$ 9,489	\$ 7,465	\$ 7,725
Capital Budget	\$ (10,389)	\$ (8,990)	\$ (9,033)
Redevelopment Levy Adjustment	\$ -	\$ 2,036	\$ 2,384
Transfer in from Stabilization	\$ -	\$ 345	\$ -
Closures and Adjustments Returned to Capital Reserve	\$ -	\$ 57	\$ 1,005
Capital Reserve End of Year	\$ 4,650	\$ 5,550	\$ 4,638

At the conclusion of 2023, the total balance of the three storm water related reserves (Stabilization Reserve, Capital Reserve, and Infrastructure Reserve) was \$6.0 million, which is shown in Table 12.

Table 12: 2023 Year End Balance of Storm Water Reserves

All End of Year Storm Water Reserves (\$1000s)			
Description/Year	2023	2022	2021
Storm Stabilization Reserve	\$ 1,277	\$ 1,669	\$ 1,356
Capital Reserve	\$ 4,650	\$ 5,550	\$ 4,638
Infrastructure Reserve	\$ 57	\$ 57	\$ 2,020
Total Storm Water Reserves End of Year	\$ 5,983	\$ 7,275	\$ 8,014

5.7 Storm Water Utility Benchmarking

In 2023, the Storm Water Utility compared its utility rates to 12 other cities with utilities across Canada using publicly available information on the Cities' websites. For single residential properties, Saskatoon's overall charge was \$106.80. This fee is the fourth lowest compared to the 12 other comparison cities, and the second lowest among the seven comparison cities located in the prairies. An image of the comparison to prairie cities is shown in Figure 17.

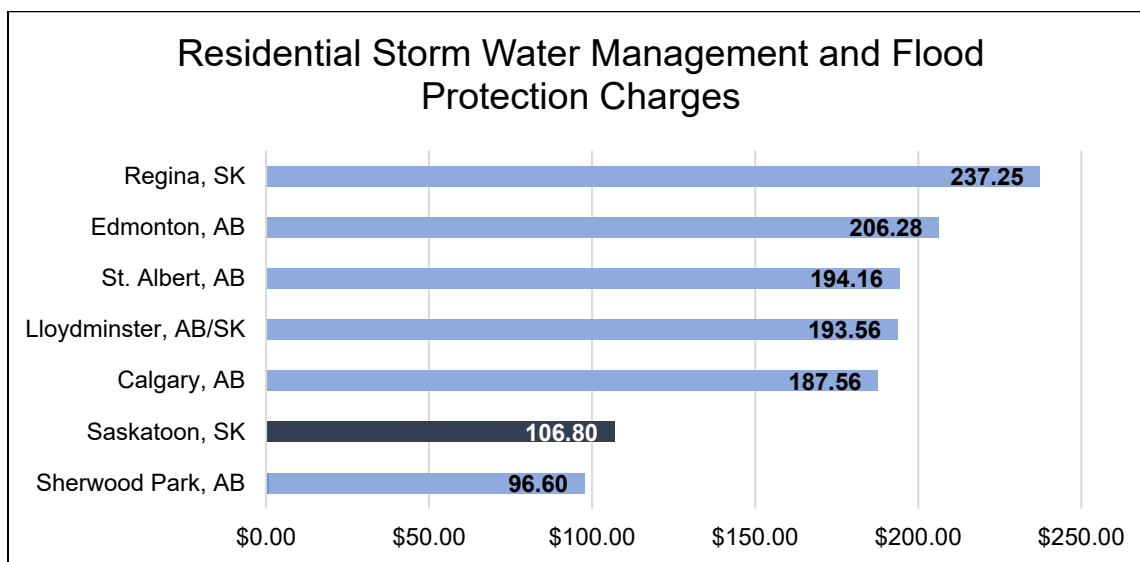


Figure 17: 2023 Residential Storm Water Management and Flood Protection Charges¹

Non-residential properties are more difficult to compare, as storm water utility programs ranged from flat rates for all customers to charges based on area size and imperviousness.

- For a typical restaurant (4,515 m²) that is all hard surface, municipality storm water charges range nationally from \$97 (Sherwood Park) to \$3,217.56 (Edmonton). Saskatoon has the fourth highest annual rate, charging \$1,602.
- For a large shopping centre (37,200 m²) that is all hard surface, municipality storm water charges range nationally from \$97 (Sherwood Park) to \$26,020.80 (Edmonton). Saskatoon has the third highest annual rate, charging \$10,860.

Saskatoon's maximum annual storm water charge was \$10,860 in 2023 for non-residential properties, which was the second highest maximum charge out of the seven

¹ Sources: Rates from websites of cities of Calgary, Lloydminster, Regina, Sherwood Park, St. Albert, and EPCOR.

prairie cities surveyed. A comparison between the maximum and minimum commercial fees of the seven prairie cities is shown in Figure 18.

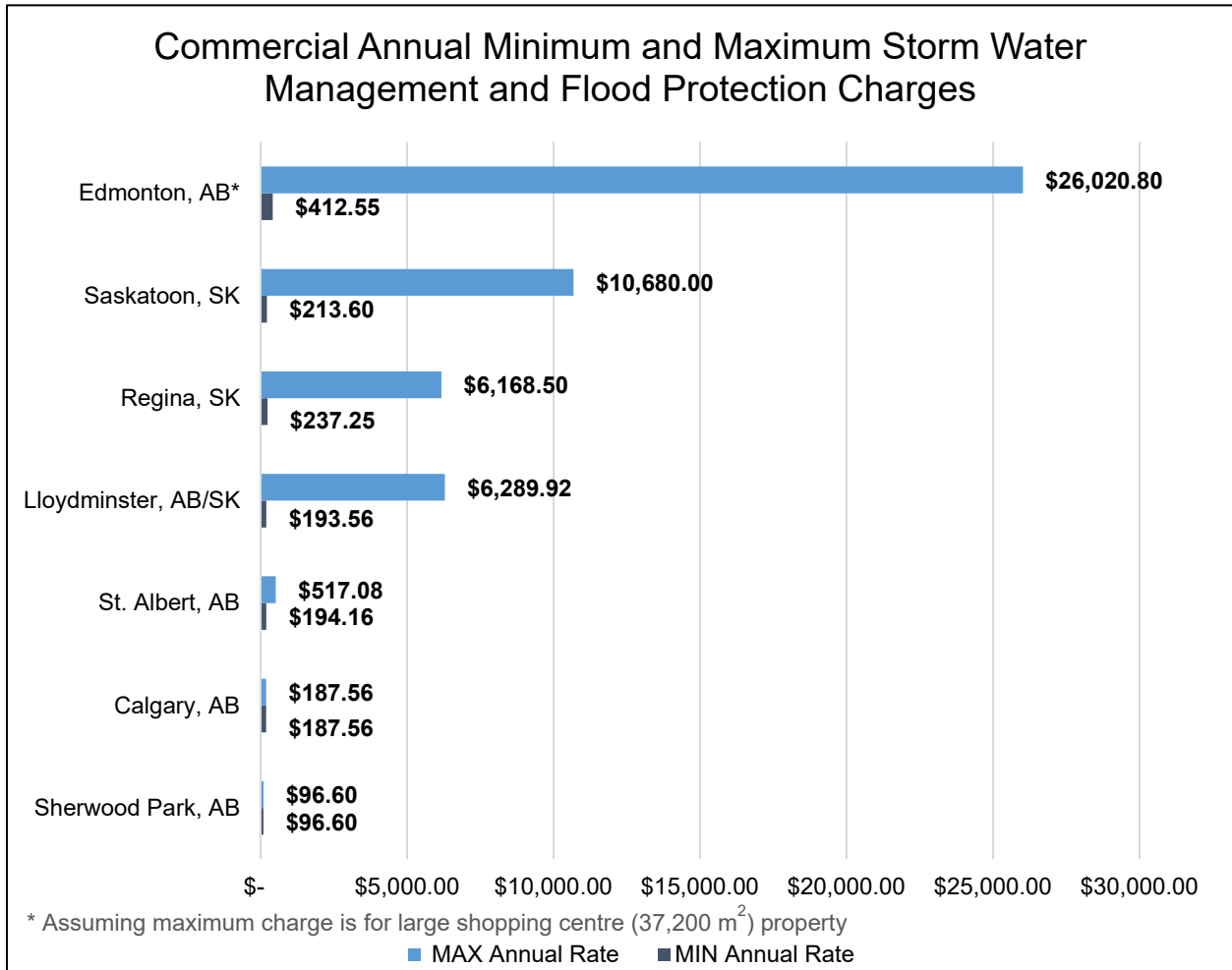


Figure 18: 2023 Commercial Annual Minimum and Maximum Storm Water Charges

6.0 OUR CHALLENGES

Storm water management has continuing and expected future challenges that are summarized below:

Citizen Expectations: Citizens have high expectations for storm water drainage that minimizes ponding on their streets and on properties. Flooding happens relatively rarely, but when it does happen, it can impact many properties at once. Citizens expect quick reactions by the City to their areas.

Climate Change: Climate change adds to the potential of more frequent, higher intensity rain events, and increased demands on the storm water infrastructure.

Condition of Existing Infrastructure: Water infrastructure has a limited life expectancy. Over time, the pipes, culverts, and other infrastructure must be repaired or replaced. Some of Saskatoon's storm water infrastructure dates back to the early 1900s.

Costs for Businesses: Storm water charges for some businesses have increased over the past five years, which may generate negative feedback. Actions that businesses can take to reduce their storm water run-off (storm water credits) generally have high capital costs relative to the annual reduction in storm water management charges.

Drainage Bylaw Enforcement: Neighbourhood storm water drainage is negatively impacted by properties developed contrary to approved design standards or drainage paths that are not maintained. When development occurs, inspections are necessary to minimize future problems.

Fluctuating Groundwater Levels: Higher groundwater levels have changed drainage patterns as water is unable to seep into the ground. The groundwater levels impact neighbourhood drainage and contribute to East Riverbank slumping and slope failure. As groundwater levels decrease during times of drought, the impact of high groundwater can be forgotten by non-technical staff and residents alike, resulting in lower implementation of groundwater management practices.

Historical Design Standards: Limited standards for storm water infrastructure were in place when Saskatoon neighbourhoods began to develop. In 1989, new storm water standards for new neighbourhoods were established to handle "1-in-100 year" storms. Surface flooding during high intensity storms continues to be an issue for many low-lying areas in older parts of the city.

Infill Development: Cumulative impacts of infill development are placing higher demands on our storm water-related infrastructure. Infill reduces greenspace and increases surface runoff.

Inflow and Infiltration to the Sanitary Sewer: Extraneous inflow and infiltration of snowmelt and rainfall to the sanitary system increases risk of sanitary sewer back-up

during rain events and creates unnecessary costs for treatment and capacity upgrades for the Wastewater Treatment Plant.

7.0 CONCLUSION

Several initiatives the Storm Water Utility progressed in 2023 will be further developed in 2024 and beyond, including the following:

- Flood Control Strategy
- Montgomery Place Drainage Improvement Project
- CN Industrial Drainage Improvement
- Asset Management
- Storm Pond Inspections
- Outfall Inspections
- Storm Water Management Charge Billing
- Canadian Infrastructure Benchmarking Initiative

The Storm Water Utility is committed to working collaboratively with other departments making Saskatoon a more flood resilient City.

8.0 APPENDICES

Appendix 1: Definitions and Abbreviations

Definitions

Catch Basins: Used to convey storm water from the ground surface, usually on a street or parking lot, to the storm water collection system. Collector catch basins are located on collector mains and trunk catch basins are located on trunk mains.

Culverts: Used to channel water under roads, railways, or embankments. Culverts have open inlets and outlets, usually transporting water from one ditch to another.

Equivalent Runoff Unit (ERU): A measurement unit for runoff that is used for storm water management fees. One ERU is based on an average single-family residential property's areas and types of surfaces (i.e. amount of grass, hard surface, etc.).

Force Mains: Pressurized mains from 100 mm to 900 mm in diameter which connect storm water pumping stations and lift stations to the gravity collection system.

Leads: Pipes connecting catch basins to the storm collection system which range in diameter from 100 mm to 900 mm. Collector leads are located on collector storm mains. Trunk leads are located on trunk storm mains.

Lift Stations: Move storm water from lower to higher elevations, particularly where the elevation of the source is not sufficient for gravity flow and/or when the use of gravity conveyance will result in excessive excavation depths and high sewer construction costs.

Lining: A layer of material installed in a sewer main to improve performance and extend the lifespan.

Manholes: Chambers used to access sewer mains for maintenance and inspection purposes.

Oil and Grit Separators (OGS): A variation of the traditional settling tanks designed to capture sediments and trapped hydrocarbons (oils) in storm water runoff. OGS replace conventional manholes.

Outfalls: Are the discharge point of the storm sewer system to the river, and include the following three categories:

- Local – Expel water from relatively smaller local areas than the collector or trunk outfalls
- Collector – Connect to the storm sewer system through collector mains
- Trunk – Connect to the storm sewer system through trunk mains

Piezometers: Devices used to measure pressure or depth of groundwater at a specific location.

Return Period: The estimated average time between equivalent rain events based on rainfall intensity and duration. A rain event with a 2-year return period has a 50% probability of occurring in any year. A rain event with a 100-year return period has a 1% probability of occurring in any year.

Runoff: Rain and snowmelt draining from land, buildings, or other surfaces.

Service Connections: Connect drainage systems from customer properties to storm mains in the street.

Sewer Mains: Principal pipes in a system that distribute water or collect storm water and waste water, and include the following two categories:

- Collector – Sewer mains that are less than 1,350 mm in diameter
- Trunk – Sewer mains that are more than 1,350 mm in diameter

Slope Inclinator: Geotechnical instruments used to measure horizontal displacements along various points on a borehole to detect slope movement.

Storm Water Ponds: Manmade basins that control excess storm water during and after heavy rainfall events and provide water quality improvements for runoff.

- Dry Ponds – normally do not store water. They detain runoff during intense rain events and then gradually release the water back into the storm sewer system.
- Wet ponds – permanently retain water throughout the year.

Sub-Drainage: Perforated pipes located in the slope along the riverbank used to collect ground water and remove it from the slope. This decreases the groundwater level in the slope and helps to stabilize the area.

Sump Pumps: Remove water that has accumulated in a water-collecting sump basin, commonly found in the basements of homes.

Vibrating Wire Piezometers: Used to provide accurate pore-water pressure readings in soils to measure groundwater levels.

Abbreviations

CN Industrial	Canadian National Industrial
City	City of Saskatoon
ERU	Equivalent Runoff Unit
FCS	Flood Control Strategy
GoC	Government of Canada
GoS	Government of Saskatchewan
ICI	Industrial, Commercial, Institutional
MPDIP	Montgomery Place Drainage Improvement Project
NIF	Natural Infrastructure Fund
RFS	Roadways, Fleet and Support
WWO	Water and Waste Operations

Appendix 2: Communications

New project in Churchill Park will significantly reduce neighbourhood flooding

UE23-4376

September 7, 2023 - 2:00 pm

Devastating floods are less of a concern for dozens of property owners in the Adelaide/Churchill Park neighbourhood, thanks to a new project in the north end of Churchill Park. A dry storm pond, which serves as park and recreational space when dry, officially opened today.

The new dry storm pond is the second of nine flood mitigation projects to be completed under the Flood Control Strategy (FCS) by 2027. The FCS was approved by Saskatoon City Council in 2018. The first project, also a dry storm pond, opened in W.W. Ashley District Park in 2022 and construction is now underway on a dry storm pond in Weaver Park. The Government of Canada has contributed \$21.6 million towards Saskatoon's FCS through the Disaster Mitigation and Adaptation Fund.

"Due to climate change, extreme weather events are occurring more frequently all over the world," said the Honourable Sean Fraser, Minister of Housing, Infrastructure and Communities. "This is why we are proud to celebrate the opening of the Churchill Dry Storm Pond in Saskatoon. This important infrastructure will protect neighbourhoods and businesses from future flooding events. We will continue investing in projects that enable communities to withstand natural disasters and thrive for generations to come."

"Dry storm ponds provide tremendous value in preventing flooding in neighbourhoods that historically have been prone to floods," said Saskatoon Mayor, Charlie Clark. "These ponds help to mitigate the damage from weather events and can provide peace of mind to residents. The Churchill Dry Storm Pond will provide this same reassurance to residents in the surrounding area. Thanks to continued funding partnerships, we're able to build infrastructure that protects against more frequent extreme weather events."

"We have a plan in place to ensure all of our flood mitigation projects are built and functioning before the end of 2027," said Mitch McMann, Storm Water Utility Manager. "With more severe and less predictable rain events, these projects are important to our residents. During a heavy rain event on June 3 of this year, storm water that would have previously flooded nearby intersections and properties, drained into this dry storm pond instead. The new project functioned very well and as it was intended to."

Dry storm ponds hold water that would otherwise cause nearby flooding during intense rainfalls. The water flows into storm drains, then through underground pipes into the dry storm pond, where it then flows toward and empties into the South Saskatchewan River.

The Churchill Park dry storm pond will help prevent flooding at more than 50 properties around Ruth Street and Cairns Avenue, Bute Street and Munroe Avenue, Ruth Street and York Avenue, and Bute Street and Albert Avenue. The project also included the establishment of new trees, a new pathway, multi-purpose sports fields, and spectator seating built into the slopes.

Once all FCS projects are completed, the City anticipates seeing a substantial decrease in the amount of neighbourhood flooding in the top 10 highest risk areas of Saskatoon.

For more information about the FCS, visit saskatoon.ca/floodplan.



Construction finishes up on the City's third Flood Control Strategy project

UE23-4603

December 7, 2023 - 9:00 am

Construction has wrapped up in Weaver Park where crews had been working since February on the City of Saskatoon's (City) third Flood Control Strategy (FCS) project. The playground has reopened, but the new dry storm pond will remain fenced off until fall 2024 to allow the new sod and trees time to establish.

"During intense summer storms, rainwater would pool and cause significant flooding around Cascade Street, Dufferin Avenue and Bute Street intersections," says Russ Munro, Director of Saskatoon Water. "Now, the water will flow through an upgraded storm sewer system and into the new pond. The pond temporarily stores the water which eventually drains back through the underground pipe system and into the South Saskatchewan River. Outside of major rain events, the pond is dry and enjoyed as recreation and green space."

The FCS was approved by City Council in 2018 and is aimed at reducing flooding in nine of Saskatoon's most flood prone areas. Dry storm ponds have since been built in W.W. Ashley Park and Churchill Park, and construction on the City's fourth FCS project will begin in Brevoort Park South in early 2024.

Prior to the establishment of the FCS, Saskatoon already had nine dry storm ponds, mostly in neighbourhoods built after 1989 when enhanced storm water infrastructure standards were established.

The Government of Canada is contributing 40% of the eligible construction costs up to a maximum of \$21.6 million toward nine FCS projects. The City is funding the remaining construction costs through the Storm Water Utility Capital Program and revenue generated from storm water utility charges.

For more information about the FCS, visit saskatoon.ca/floodplan.



Montgomery Place 2023 Drainage Update

Drainage

When it rains or when the snow melts, you can help with ditch drainage to reduce flooding in Montgomery Place.

How you can help:

- › Do not fill in ditches within City of Saskatoon right-of-way (ROW). A permit to alter the ROW is required.
- › Keep culverts clear.
- › Work with neighbours to resolve ditch drainage issues.

What you can expect from us:

- › The City will clear major drainage paths and culverts each spring.
- › The City will assist homeowners through the Ditch Crossing Driveway Permit application process.
- › The City will follow up on ditch drainage complaints regarding new driveway crossings.

Contact Us

For urgent matters regarding drainage or current construction, please contact the Customer Care Centre:

Phone: 306-975-2476
Email: customercare@saskatoon.ca

For questions about the overall project and future phases, please contact the storm water team:

Phone: 306-975-7611
Email: stormwater@saskatoon.ca

Sign Up for Project Updates

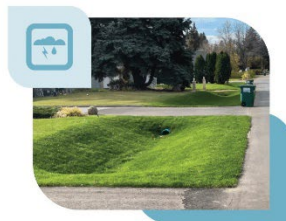
To receive biweekly Drainage Improvement Project updates, please e-mail your name and e-mail address to constructionupdates@saskatoon.ca



Fall 2023 Drainage Improvement Project Update Montgomery Place



Montgomery Place Drainage Improvement Project



Drainage improvements in Montgomery Place are possible thanks to funding from the Government of Canada and Government of Saskatchewan. The City's Storm Water Utility is also funding a portion of the project.

The City is improving drainage by reconstructing ditches and driveway crossings, and by adding standardized culverts.

Phase 2:

The City and Lafarge Canada began Phase 2 in 2023 which included work on Lancaster Boulevard, Ortona Street, Dundonald Avenue and Mountbatten Street. Phase 2 will continue in 2024 on Bader Crescent and Lancaster Crescent. Improvements will also continue in areas left remaining at the end of the 2023 construction season.

Phase 3:

Phase 3 will be the final phase of construction and will take place in 2025 and 2026. Tentative work areas include Cassino Avenue, Mountbatten Street, Crerar Drive and Elevator Road. An information session will be held in the fall of 2024 where residents can learn more about Phase 3.

For more information and background on the Drainage Improvement Project, visit saskatoon.ca/montgomeryplace

Ditch Crossing Driveway Permits

Saskatoon Water manages private ditch crossing permits for Montgomery Place. Permits are necessary for the construction of any driveway or landscaping project that crosses over the public right of way (ROW).

Ditch crossing specifications for driveway width within the ROW have been updated and are based on lot frontage in Montgomery Place.

To apply for a permit and to view the Driveway Crossing Information Package, visit: saskatoon.ca/ditchcrossingpermit

Questions?

Call 306-975-7611 or email stormwater@saskatoon.ca

Private Crossings Over Ditches Bylaw

Bylaw No. 9730 is specific to drainage improvement projects in Montgomery Place and improving driveway ditch crossing permitting and compliance.

To review the bylaw, please visit saskatoon.ca/bylaws and enter "9730" into the search field.