Storm Water Utility
2017 Annual Report

Saskatoon Water
Transportation & Utilities Department

City of Saskatoon

SASKATOON STORM WATER UTILITY

2017 ANNUAL REPORT

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EXECUTIVE SUMMARY

The Saskatoon 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 Utility also monitors and stabilizes the East Riverbank to protect strategic public property. In 2017, the Storm Water Utility had a budget of $6.2 million, including $3.5 million for operating expenses and a $2.7 million transfer to the capital reserve.

In 2017, City Council approved a comprehensive Storm Water Business Plan with a focus on asset maintenance and preservation. The five-year funding strategy will increase the Storm Water Utility's annual budget to $13.7 million by 2022.

Some other Storm Water Utility highlights for 2017 include the following:

- Completed the *"2016 State of the Storm Water Retention Ponds"* report which documents details of the City's 26 wet ponds and eight dry ponds. A review of best practices for storm pond safety was completed.
- Initiated a Montgomery Place drainage asset management program.
- Completed flushing, videoing, and assessing approximately 20 km of storm water sewers.
- Completed the16th Street Slope Remediation project including extending and enhancing the outfall, and monitored other slope risks.
- Implemented a new fall street sweep approach which focused on tree density and flood risk to increase effectiveness.
- Completed the 2017 *Storm Water Utility Program Comparison* to benchmark Saskatoon and other municipalities' storm water charges. Saskatoon had the second lowest storm water charge for residential properties and was mid-range for commercial properties.

In 2017, Saskatoon experienced two localized rainfall events with estimated return periods of "25 years" resulting in basement flooding in the south and southwest areas of Saskatoon. Households in high flood risk areas were surveyed to determine the extent of flooding. A partnership with the Intact Centre for Climate Adaptation was established to pilot a Home Flood Protection Program in Saskatoon in 2018, with a focus on the highest flood risk areas.

SASKATOON STORM WATER UTILITY

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 and capacity enhancements, and drainage inspections. The Utility also monitors and mitigates damage to public infrastructure caused by riverbank slumping.

Storm water services are provided to residential and to commercial, industrial, and institutional (Commercial) properties. In 2017, storm water charges were applied to 64,400 single-residential properties and to 4,100 multi-residential and commercial properties including City properties.

Saskatoon's storm water infrastructure includes over 22,000 manholes and catch basins, 742 km of pipes, 34 ponds, and other drainage infrastructure with a replacement value of over $3 billion.

1.2 Strategic Linkages

Our Vision

The City of Saskatoon is a world 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 Values

- Trust
- Integrity
- Respect
- Honesty
- Courage

Leadership Commitments

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

2.0 OUR STORM WATER UTILITY TEAM

The Storm Water Utility is part of the Saskatoon Water Division in the Transportation and Utilities Department. The Utility pays for services provided by staff in the following City divisions:

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

- Rainfall monitoring
- Assessing runoff factors of multi-residential, commercial, industrial, and institutional facilities for billing purposes
- Engineering support for drainage projects
- Community liaison for storm water issues
- Modelling storm system capacity relative to varying levels of rainfall volume and intensity
- Planning and design of storm water infrastructure for new land development

Water & Waste Stream (WWS) provides the ongoing day-to-day operations and maintenance of storm water ponds, outfalls, and below ground storm water drainage and infrastructure.

Roadways and Operations (R&O) maintains above ground drainage including culverts, and completes a fall street sweep.

Major Projects (MP) tracks the infrastructure inventory, completes condition assessment, and oversees the asset preservation program.

Construction & Design (C&D) operates the "Connection Desk" and provides project management services, including survey work and inspection, for storm water infrastructure construction projects.

Community Standards (CS) provides drainage inspections, drainage advice to residents and developers, bylaw updates, and bylaw enforcement.

Environmental & Corporate Initiatives (ECI) provides leadership in activities that contribute to storm water practices that protect our watershed and natural resources.

Communications (Comm) assists in initiatives to enhance citizen awareness and engagement to improve flood resiliency.

Corporate Revenue (CR) provides storm water billing and collection services.

Transportation & Utilities Business Administration (BA) provides accounting and administrative support.

3.0 OUR INFRASTRUCTURE

The table to the right summarizes the City's storm water infrastructure with a replacement value of $3.1 billion.

The Storm Water Utility's **minor system** consists of piping, manholes, catch basins, and outfall structures that are able to convey runoff from more frequent, lower intensity storm events (up to a "1-in-2-year" storm). The system includes 742 km of storm sewer pipes, 9,371 manholes, 13,501 catch basins, 3,057 service connections, and 112 outfalls.

The **major system** consists of overland street drainage, eight dry ponds, 26 wet ponds (including three natural ponds and two constructed wetlands), 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.

Asset	Type	2017 Inventory	
Sewer Mains	Collectors	672	km
	Trunks	70	km
Manholes	Collectors	8,879	ea
	Trunks	492	ea
Force mains		4	km
Service Connections		3,057	ea
Catch Basins	Collectors	13,015	ea
	Trunks	486	ea
Leads	Collectors	150	km
	Trunks	7	km
Dry Ponds		8	ea
Wet Ponds		26	ea
Culverts		12	km
Outfalls		112	ea
Sub-drainage		44	km
Oil & Grit Separators		1	Ea
Lift Stations		2	Ea
Replacement value		$3.1	B

Wildwood Storm Water Pond

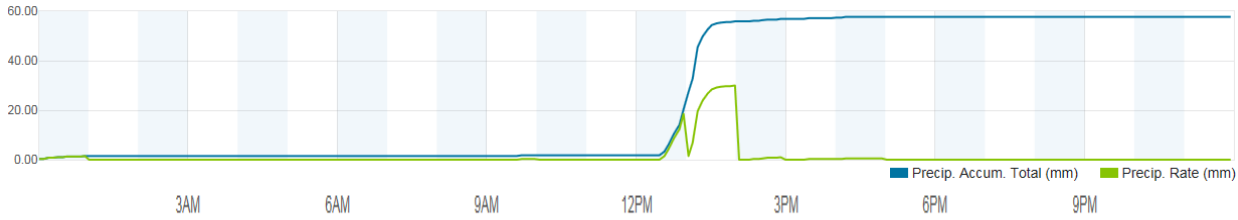
4.0 OUR RESULTS

4.1 Surface Flooding

Seven rainfall gauges were regularly monitored between April 1 and September 30, 2017 with a summary of Saskatoon's 2017 rainfall season provided in *The 2017 Annual Rainfall Report*. Overall, Saskatoon had a slightly drier than average rainfall year with 230 mm of rainfall accumulating (265 historical average).

Two rainfall events with estimated return periods of 25 years resulted in localized basement flooding in the south and southwest areas of Saskatoon:

- On July 10, 45 mm of rainfall in one hour was recorded at the Saskatoon Light & Power rain gauge in Stonebridge.
- On August 8, 55 mm of rainfall in one hour was recorded at an unofficial rain gauge in Holliston (see graph below[1]).



In response to the 2017 flooding, a partnership was initiated with the University of Waterloo's Intact Centre for Climate Adaptation to offer the Home Flood Protection Program. City Council approved $200,000 to offer subsidized home inspections in 2018, and SGI committed $20,000 in sponsorship. Saskatoon will be the second city in Canada to pilot this leading edge program.

The Storm Water Utility started more technical detailed concept designs and costing for the top two flood risk zones and conducted modelling on the impact of these designs in protecting properties from rain events similar to those experienced in 2017.

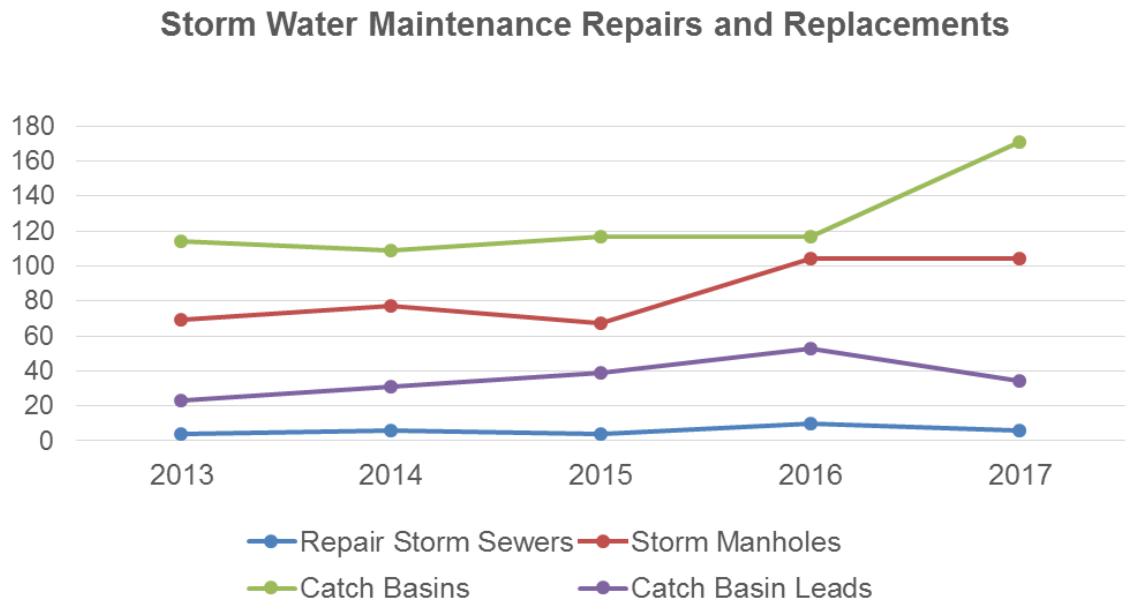
[1] Source: https://www.wunderground.com/personal-weather-station/dashboard?ID=ISASKATC121#history/s20170808/e20170808/mdaily. Retrieved November 3, 2017

4.2 Maintenance and Operations

Water and Waste Stream (WWS) Maintenance

WWS operated and maintained below-ground storm water infrastructure including sewer mains, manholes, and connections. A total of 315 storm sewers, manholes, and catch basins were repaired or replaced in 2017, an 11% increase relative to 2016, and the highest number completed in a year. A significant increase in the number of repaired catch basins contributed to the increase.

The graph below shows the 2017 WWS repairs and replacements of storm water infrastructure compared to the previous five years.



The table to the right summarizes WWS's storm water related activities including flushing and televising storm water sewers, and cleaning and inspecting infrastructure.

"Storm Sewer Meters" refers to the storm segment meters flushed, while "Flushing Storm Sewers" includes multiple passes by the flusher hose in the same segment. "Catch Basin Leads" is the number of leads flushed or cleaned. "Outfalls" is the number of outfalls inspected and/or cleaned. "Storm Ponds" is the number of trips made to maintain storm ponds.

Actvity	Yearly Total	Units
Flushing Storm Sewers	20,447	Meters
Storm Sewer Meters	9,512	Meters
# of Passes	286	#
Flushing Catch Basins (CBs)	150	#
Televise Storm Sewers	1,280	Meters
Catch Basin Leads	85	#
Inspect Storm Manholes (MHs)	597	#
Inspect CBs	465	#
Outfalls	112	#
Storm Ponds	69	#
Clean CBs	14,865	#
Repair Storm Manholes (MH)	87	#
Repair CBs	144	#
Grout MHs/CB's	16	#
Culverts	7	Hours

Transportation and Operations' Fall Sweep
In 2017, the fall Street Sweep program utilized a tree density and flood risk approach rather than the neighbourhood boundaries approach previously used. A total of 132.5 km of streets were swept, with 1,888 tonnes of debris collected. By designing the program based on higher tree density, debris pickup during the sweep improved from 12 tonnes to 14 tonnes per linear kilometer, and therefore provided better flood risk reduction per kilometer swept.

Through an analysis of at-risk properties, the 2017 Fall Street Sweeping program decreased the spring flood risk of 231 properties in a "5 year" storm.

4.3 Storm Water Asset Management

Storm Water Sewer Inspections and Assessments
In 2017, the Storm Water Utility funded the cleaning and inspection of approximately 20 km of storm sewers. The 2016/2017 contract for cleaning and inspecting storm pipes was completed and a 2017/18 contract was 40% completed. Over 73 km of storm pipes in total have been inspected and rated (10% of total system). Saskatoon Water and Major Projects collaborated to identify eight priority storm water pipes for lining in 2018.

Montgomery Place Culverts and Ditch Drainage
In 2017, the Storm Water Utility initiated an asset management plan for the culverts and ditches in Montgomery Place. An inventory, assessment, and ArcGIS mapping of culverts and ditches in Montgomery Place was started. The Utility also initiated a review of Montgomery Place Right-of-Way crossings, in collaboration with other divisions, to determine compliance of culverts and driveways with current standards, and to assess the process for permits and inspections and the process for complaints for non-compliant crossings.

In spring 2017, frozen culverts, exacerbated by several freeze/thaw cycles resulted in extensive ponding during the spring snow melt and generated 48 Work Requests to Service Saskatoon to unthaw frozen culverts.

Storm Water Retention Ponds
In 2017, the Storm Water Utility completed the *"2016 State of the Storm Water Retention Ponds"* report which documents the background, specifications, maintenance, signage, and recreation for the City's 26 wet ponds and eight dry ponds. Results of inspections and recommendations for follow-up maintenance of each pond and surrounding park area were also prioritized.

Outfalls

Saskatoon Water identified 32 outfall maintenance items in the *2016 Outfall Assessment report*. WWS completed the priority outfall maintenance in 2017.

Avenue D/30th Street Storm Sewer Replacement

During roadways preservation work, the City CCTV crew discovered that the storm sewer had deteriorated beyond the options to line or repair. Therefore, 78 meters of the 600mm storm sewer was abandoned and 95 meters of 600mm new storm sewer pipe (including manhole replacements and additional catch basin leads) was installed during the road reconstruction.

Cross Connections

Disconnections of six known storm water and sanitary sewer cross connections were completed in 2017 by WWS. The disconnections will help to protect the river from hazardous sanitary waste and reduce unnecessary costs of treating storm water runoff.

4.4 Bylaws and Enforcement

The Storm Water Utility helps developers and citizens ensure that drainage is meeting Saskatoon's *Drainage Bylaw* by funding a drainage inspector position in the Community Standards division. In 2017, Community Standards received 160 drainage calls, with 42 of those being related to sump pump discharge concerns. In 2017, Community Standards adopted new Bylaw Enforcement Network software to help track calls and follow-up.

Community Standards also received two complaints about non-compliant driveway crossings and culverts in Montgomery Place, with one resulting in a charge by City Solicitors.

In 2017, the Storm Water Utility contributed funding towards a cost-shared two-year capital project led by Community Standards to determine the best practice model for more effective drainage enforcement. Research has been conducted on approaches used by other jurisdictions.

4.5 East Riverbank

Monitoring:

Saskatoon Water staff regularly visually monitored high risk East Riverbank sites near 16th Street and 11th Street, with monitoring being more frequent when risk of slope movement was higher. Staff also completed piezometer readings of groundwater levels.

In 2017, the Storm Water Utility issued three Requests for Proposals and signed agreements with geotechnical companies for the following:

- East Riverbank Spring Reconnaissance: Three year contract for slope inclinometer (SI) readings, a visual review, risk rating (based on probability and consequence of slope failures), and recommended actions for 22 East Riverbank sites. Staff summarized and met with WWS and R&O to plan next steps for the recommended actions.

- Nutana Slope Instrumentation Monitoring: Two year contract with an option for a third year to survey and report on various instrumentation readings between 11th Street and Saskatchewan Crescent. Three reports were completed, and results provided to area residents. No significant slope movement was observed.

- 16th Street Outfall Review and Design: Contract to review the existing 16th outfall in light of spring erosion, and determine if upgrading was needed to protect City infrastructure. Boreholes were assessed, and slope inclinometers were monitored to determine slope movement subsequent to the outfall rehabilitation.

East Riverbank Stabilization - 16th Street and Saskatchewan Crescent:

The 16th Street Slope Remediation project was finished in 2017 including installing a guardrail, widening the upper Meewasin Trail, and final paving on Saskatchewan Crescent. Meewasin Valley was contracted to revegetate the slope.

To minimize erosion and risk of future slope failure, the toe and lower slope was stabilized and the **16th Street Storm Water Outfall** was upgraded to handle expected drainage.

4.6 Community Awareness and Engagement

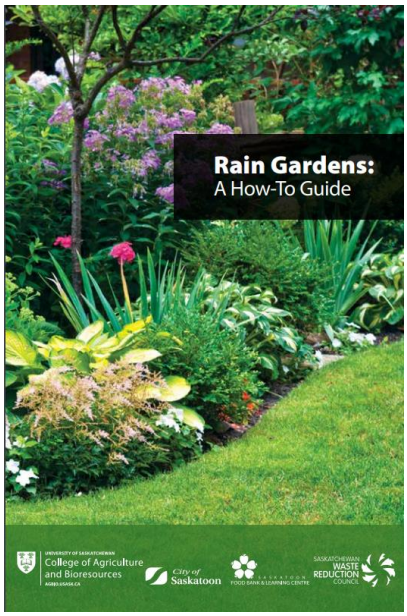
Saskatchewan Crescent and 16th Street: Two construction notices were distributed to neighbourhood residents to inform them about road closures and construction occurring from June through November.

Montgomery Place Drainage: Flyers were delivered to Montgomery Place residents in the spring to increase awareness on what to expect from the City for drainage maintenance, actions for citizens to maintain drainage, and drainage requirements for driveway crossings.

Nutana Slope: Three flyers were distributed to residents near the Nutana Slope to inform them of instrumentation monitoring results. A "Notice to Residents" which superseded the previous "Evacuation Pre-Alert" was also delivered to provide information on what to expect from the City and what citizens can do to reduce risk from slumping. One neighbourhood meeting was held with residents in the Nutana Slope area to provide an update on the slope situation and address questions.

Yellow Fish Road Program: The Storm Water Utility, in collaboration with Environment & Corporate Initiatives and Water & Waste Stream, supported Meewasin Valley Authority in delivering the "Yellow Fish Road Program" to remind citizens that water goes through the storm water system untreated to the Saskatchewan River.

Rain Garden Program: The Storm Water Utility funded the development of "Rain Gardens: A How-To Guide" (printed copies and available on Saskatoon.ca) and a demonstration project at the 33rd Street Community Garden.



Surface Flooding: The Storm Water Utility provided flyers to flood risk areas about the Provincial Disaster Assistance Program (PDAP) and conducted an online survey of citizens in the top flood risk area to determine the extent of flooding in July and August.

Storm Water Charges: Bill inserts were prepared to provide information to owners of commercial about the storm water management charges.

Saskatoon.ca Website Updates: Changes were made to Saskatoon.ca to update citizens on the 16th Street slope remediation project, and to make the storm water pages more user-friendly.

4.7 Longer Term Planning

In 2017, City Council approved a comprehensive Storm Water Business Plan with a focus on asset maintenance and preservation. The five-year funding strategy will increase the Storm Water Utility's annual budget to $13.7 million by 2022.

Concept design and costs for storm water infrastructure was modelled for a Saskatoon population of 500,000, and in less detail for a population of 1,000,000. Modelling was also completed to determine the impact of new infill development on the storm water system.

The Storm Water Utility participated in updating the Design and Development Standards Manual to ensure future storm water infrastructure meets best practice standards.

4.8 Safety

Storm Water Pond Safety Review
The Utility participated in the Storm Water Pond Safety Review which was initiated in response to the unfortunate drowning incident in the Dundonald Storm Water Pond in September 2017. Research was conducted on storm water pond safety risks, results of safety reviews conducted by other municipalities, and identification of best practice options for Saskatoon.

4.9 Storm Water and the Environment

Storm Water Quality Monitoring
Saskatoon Water monitors nine major outfalls for storm water quality. Five major outfalls surrounding the water and wastewater treatment plants are monitored weekly to test for coliforms and E.coli. These five and an additional four outfalls are tested monthly for a more complete list of pathogens. In 2017, Saskatoon Water began an initiative to efficiently share outfall water quality results internally through SharePoint, and to more present the results and changes over time in a user-friendly way. In 2017, a partnership was initiated with the University of Saskatchewan to complete more comprehensive storm water quality testing and analysis in 2018.

A monitoring program also tracks immediate and long-term changes in water quality and quantity for the Northeast Swale. A monitor 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.

Green Infrastructure Strategy
The Storm Water Utility participated in the new Green Infrastructure Strategy with Environment and Corporate Initiatives, Planning and Development, other divisions and Meewasin Valley Authority. Green storm water infrastructure, such as swales and storm water ponds, are an important part of the green network inventory that was

identified in 2017. Green storm water infrastructure will be incorporated in future neighbourhood planning to contribute to the green network and to improve storm water quality entering the South Saskatchewan River. The strategy will also help to reposition storm water as an important resource.

4.10 Utility Billing

A new 2017 city aerial photo was used to re-assess commercial and multi-residential sites for changes in ERU billing. Multi-residential sites with a generic runoff factor prior to 2017 and sites with new building permits were re-assessed, resulting in annual revenue increases of over $80,000.

4.11 Continuous Improvement Highlights

The following are highlights of how the Storm Water Utility has undertaken Continuous Improvement to increase service levels, improve efficiencies, and reduce costs in 2017.

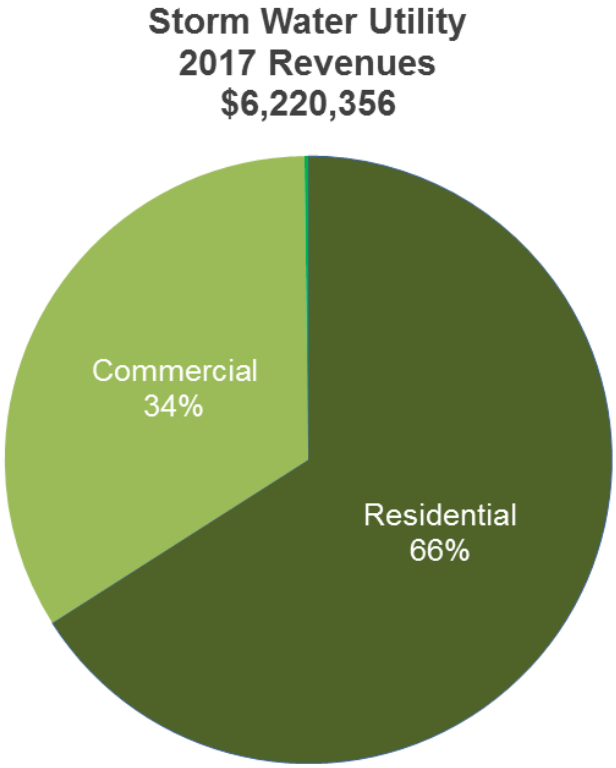
1. Savings of over $50,000 over three years (2017 to 2019) through more cost-effective instrumentation monitoring completed by staff rather than by consultants, and by consolidating and tendering a three-year contract for the annual Riverbank Spring Reconnaissance Report and annual instrumentation readings.
2. Savings of approximately $68,000 in 2017 through right-sizing and tendering a contract for 11th Street slope monitoring that was previously sole-sourced.
3. Restored the Meewasin Trail at 16th Street to a higher level of service by widening it to the new Meewasin standard.
4. Upgraded the 16th Street outfall to increase long-term sustainability, slope stability and protection of City infrastructure.
5. Increased focus on asset preservation for long-term sustainability through completing a report on State of the Storm Pond Retention System and starting a new culvert assessment and management plan.
6. Established partnerships with the University of Saskatchewan and University of Waterloo which will help to leverage future storm water resources and expertise.

5.0 OUR FINANCES

The Storm Water Utility is funded on a user-pay principal with charges reasonably proportional to the storm water generated according to property size and surface imperviousness (green space is charged less than buildings and pavement). A one-unit 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 Chargethat single residences pay is $4.40 per month ($52.80 annually).

Commercial, industrial and institutional (Commercial) properties can generate significantly more storm water than Residential properties; therefore they are charged multiple ERUs from a minimum of two annual ERUs ($105.60) to a maximum of 85 ERUS ($4,488) in 2017.

5.1 Revenues

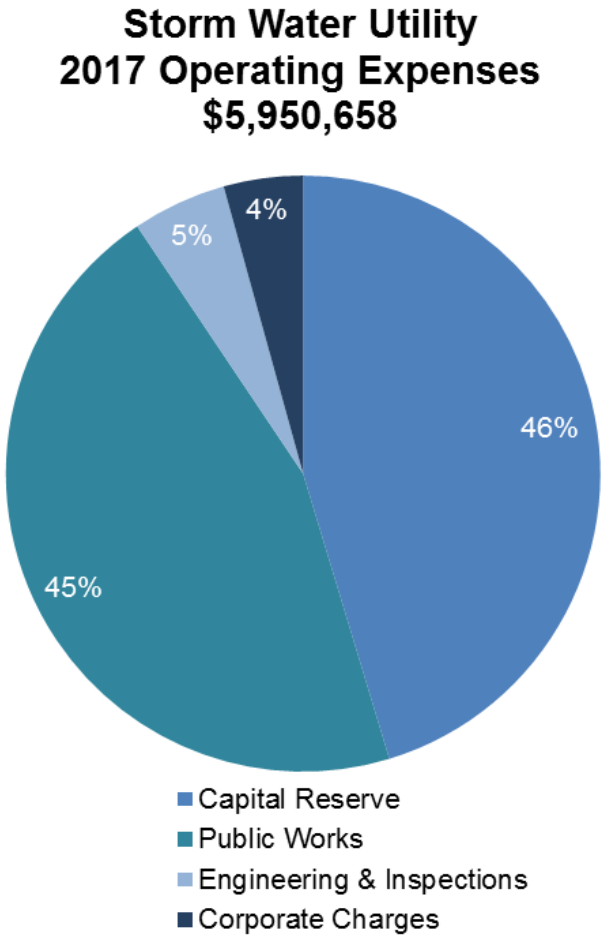


2017 Storm Water Utility revenues were $6.2M, an increase of 1.6% from 2016. Commercial customers accounted for $2.1M or just over one third of revenues (about 5% of customers), while Residential customers contributed $4.1M or approximately two thirds of revenues (95% of customers). The Residential revenues included about $680K from multi-residential properties which are assessed similar to commercial properties. Revenue from City-owned properties was $85K, slightly lower than in 2016 because more areas were exempted as parks.

Late charges were an additional $12.6K.

Variances: Actual total Storm Water Revenues were as budgeted.

5.2 Operating Expenditures



The Storm Water Utility's 2017 operating expenditures (not including interest) were $5.95M, approximately 1.2% more than 2016 expenses.

Approximately $2.7M was allocated to the Capital Reserve.

Water & Waste Stream and Transportation & Operations (Public Works) received $2.7M to operate and maintain the storm water system including handling citizen drainage calls, keeping storm drains clear, and replacing and repairing the infrastructure.

Administration costs (corporate charges) of $0.3M included billing services by the Revenue Branch, financial and administration services from the T&U Business Administration Branch, and insurance.

Engineering and inspections, including overall utility management, accounted for $0.3M.

Variances: Operating expenditures in 2017 were $293K (4.7%) lower than budgeted because of staff vacancies, rain events were less widespread than average years, and less was allocated to the Capital Reserve.

The following table shows the actual 2017 Operating Revenues and Expenditures compared to the 2017 budgeted and 2016 actual amounts.

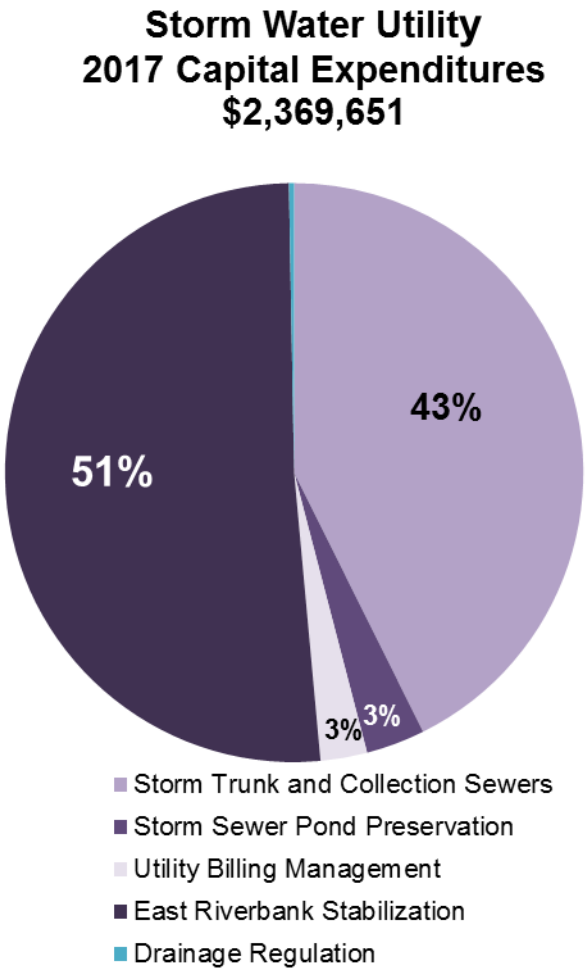
Storm Water Utility Operating Revenues and Expenditures			
	2017 Actual	**2017 Budget**	**2016 Actual**
Revenues			
Storm Water Charges	$ 6,207,759	$ 6,209,000	$ 6,107,662
Late Charges	12,597	11,000	12,272
Total Revenues	**$ 6,220,356**	**$ 6,220,000**	**$ 6,119,934**
Expenses			
Engineering & Inspections Operations	$ 304,572	$ 432,000	$ 376,410
Maintenance (Public Works)	1,933,439	1,931,400	1,804,527
Drainage (Public Works)	759,959	909,100	814,177
Customer Billing (Revenue Branch)	124,888	126,000	127,220
Corporate Services (Business Administration)	51,800	51,800	51,800
Licenses & Insurance	79,700	79,800	15,800
Interest Expense/(Revenue)	(23,200)	(23,200)	(24,800)
Provision to Capital Reserve	2,696,300	2,713,100	2,691,300
Total Operating Expenses	**$ 5,927,458**	**$ 6,220,000**	**$ 5,856,434**
Revenue Less Expenses	**$ 292,898**	**$ -**	**$ 263,500**

5.3 Storm Water Stabilization Reserve

The Storm Water Stabilization Reserve has been established to provide for normal fluctuations in expenses for storm water expenses as a result of differences in weather conditions that impact requirements for storm water maintenance services. The balance ensures that funding is available in the event of a widespread severe rain event. The balance at the end of 2017 was $1.7M.

Change in Storm Water Stabilization Reserve			
	2017	**2016**	**2015**
Stabilization Reserve Beginning of Year	$ 1,406,317	$ 1,196,817	$ 1,100,010
Balance From Year	$ 292,898	$ 263,500	$ 96,807
Storm Stabilization Reserve End of Year	**$ 1,699,215**	**$ 1,460,317**	**$ 1,196,817**

5.4 Capital Expenditures



In 2017, Storm Water Utility capital expenditures were almost $2.4M.

Slightly over half of 2017 capital expenditures were for riverbank monitoring and stabilization costs ($1.2M). The slope rehabilitation to protect public property at 16th Street and Saskatchewan Crescent was started in 2016 and completed in 2017.

In 2017, $1.0M was expended on storm sewer drainage improvement projects, and asset management and preservation including emergency repairs, including $460.5K for the Avenue D/ 30th Street storm sewer replacement.

Storm pond preservation expenditures were $78.4K, and primarily included the storm pond evaluation and safety review.

Utility billing expenditures of $61.9K included the review and update of commercial properties' storm water management charges based on hard surfaces from the 2017 aerial photos.

The Storm Water Utility's 50% share of the drainage regulation project expenditures was $6.9K.

Variances: Actual 2017 capital expenditures were $54.3K less than budgeted with the following significant contributing factors:

- Fewer drainage improvement projects were completed.
- No pond preservation project was undertaken.
- Actual expenditures for the East Riverbank were more than budget because the 16th Street slope remediation was budgeted in 2016 and was finished in 2017. Additional work was also done to improve the 16th Street outfall to reduce the risk that runoff will impact future slope stability.
- The drainage regulation project was delayed.

The following table shows the actual 2017 Storm Water Capital Expenditures compared to the 2017 budgeted and 2016 actual amounts.

Storm Water Capital Expenditures			
	2017 Actual	**2017 Budget**	**2016 Actual**
Storm Trunk and Collection Sewers	$ 1,013,366	$ 1,124,000	$ 440,957
Storm Sewer Pond Preservation	78,376	125,000	203,447
Utility Billing Management	61,908	78,000	56,795
East Riverbank Stabilization	1,216,001	1,035,000	2,432,011
Drainage Regulation	6,884	62,000	-
Total Capital Expenditures	**$ 2,369,651**	**$ 2,424,000**	**$ 3,133,210**

5.5 Storm Water Capital Reserve

The Storm Water Capital Reserve provides funding for significant capital projects that may extend over one budget year. The capital reserve at the end of 2017 was $2.0M.

In 2017, several capital projects from previous years were closed, with unspent balances returned and overages deducted from the capital reserve, with a net addition of $15.2K. The only significant closure that was over budget was the Cosmo Park riverbank restoration project completed in 2010 and 2011 ($303K over budget.)

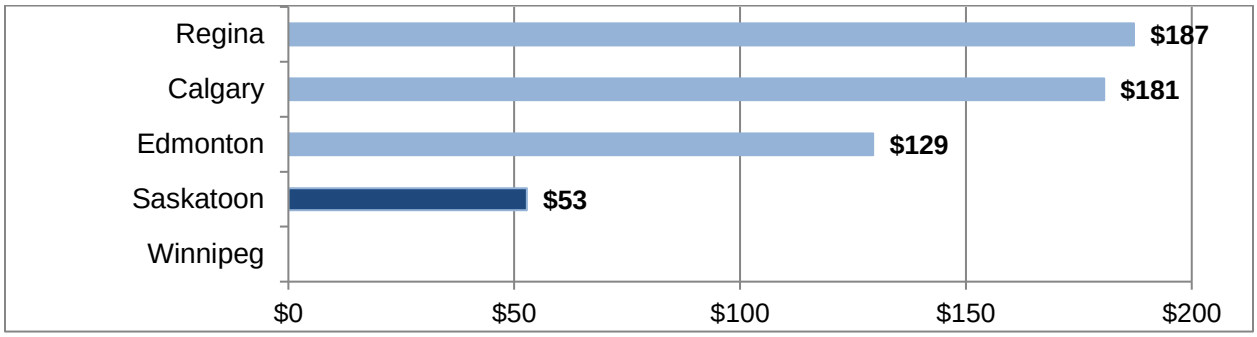
Change in Storm Water Capital Reserve			
	2017	**2016**	**2015**
Capital Reserve Beginning of Year	$ 1,720,852	$ 3,537,785	$ 1,433,032
Provision to Capital Reserve	2,696,300	2,691,300	2,956,500
Capital Budget	(2,424,000)	(5,414,000)	(2,935,000)
Closures Returned to Capital Reserve	15,294	905,767	2,083,253
Capital Reserve End of Year	**$ 2,008,446**	**$ 1,720,852**	**$ 3,537,785**

5.6 Storm Water Utility Benchmarking

The 2017 *Storm Water Utility Program Comparison* report compared the City of Saskatoon's program with 13 other cities for different property types on the basis of costs and user-pay. Saskatoon was among the leading ***user-pay*** cities, ranking sixth among the 13 cities, which ranged from flat rates for all customers to charges for all customers based on area size and imperviousness. Among the 13 cities, Saskatoon had the second lowest storm water charge in 2017 for residential properties at $52.80 annually.[2] Winnipeg has no storm water utility fees.

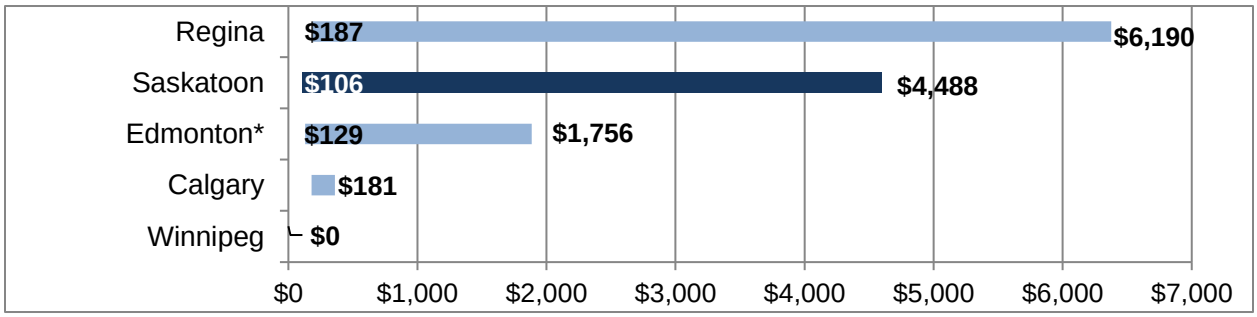
Saskatoon's maximum annual storm water charge was $4,488 in 2017 for commercial properties. Saskatoon had between the fifth and eighth lowest charge for commercial properties, depending on the size and property characteristics. Annual storm water charges for a typical large shopping centre ranges from $102 fixed rate charge in Sherwood Park to $192,915 in Mississauga which has no cap.

Single Family Residential 2017 Annual Storm Water Utility Charges[3]



Source: City of Saskatoon, 2017

Commercial 2017 Annual Minimum and Maximum Storm Water Utility Charges[4]



Source: City of Saskatoon, 2017

[2] The rate does not include Saskatoon's Temporary Flood Protection Charge of $54.00 annually per meter which has funded superpipes which protect properties from sanitary sewer backups during extreme rain events. This funding has been part of the Water and Waste Water Utility budget.
[3] 500 m^2 area
[4] *Edmonton maximum assumes 4,000 sq m property with 0.9 runoff co-efficient.

6.0 OUR CHALLENGES

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

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

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 areas of the City.

Higher 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.

Infill Development: Cumulative impacts of infill development are placing higher demands on our water-related infrastructure. Infill reduces greenspace and increases surface runoff so appropriate policies are needed to minimize surface flooding.

***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.

Insufficient 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. Inspections when development occurs are necessary to minimize future problems.

Regulatory Requirements: Evolving federal and provincial regulations have the potential to impact discharges to the river, and may require future investments to improve the quality of storm water runoff.

Inflow & 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.

***Costs for Businesses*:** Storm water charges for some businesses will more than double over the next four years, which may generate negative feedback. Actions that businesses can take to reduce their storm water run-off generally have high capital costs relative to the annual reduction in storm water management charges.

7.0 CONCLUSION

In 2017, the Storm Water Utility made progress towards making Saskatoon a more flood resilient City. The completion and approval of the new business plan will provide direction for the Storm Water Utility in 2018 and beyond to utilize the funding entrusted by Saskatoon citizens in cost effective ways to manage the impacts of rain and snow melt.