Appendix 3

2021

CORPORATE ASSET MANAGEMENT PLAN

Storm Water Infrastructure

We invest in what matters...financial and physical resources under our care are used to address the needs of citizens today — and tomorrow.

City of Saskatoon

INTRODUCTION

The Storm Water Asset Management Plan (AMP) contributes to achieving the City's Storm Water goals for citizen quality of life, asset and financial sustainability, and environmental leadership. The plan contributes to a long-term lowest life cycle asset management costing approach to provide effective and efficient resource use that meets citizen expectations. Approximately 31% of the overall storm water infrastructure system has been inspected.

The City's storm water infrastructure… has a replacement value of over **$2.6 billion.**

CURRENT INVENTORY

The Storm Water Utility's **minor system** consists of piping, manholes, catch basins, and outfall structures that convey runoff from more frequent, lower intensity storm events (up to a "one-in-two-year" storm).

The **major system** consists of overland street drainage, nine dry ponds, 31 wet ponds (including six naturalized 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.

What do we own, what is it worth?

The City's storm water infrastructure, detailed in the table below, has a replacement value of over $2.6 billion. The inventory for each asset was sourced from the City's GIS database up to December 31, 2019.

Replacement values were updated to take into account contract costs up to and including 2019 contracts. Values may have changed from previous reports due to normal variations in costs and updated data. The data is consistent with reporting in the Asset Management Plan.

Table 1 – Storm Inventory and Valuation

Asset	Inventory	Replacement Value
Storm Mains	751 km	$2,234 M
Manholes	9,370 ea	$101 M
Force Mains	4 km	$8 M
Service Connections	2,930 ea	$26 M
Catch Basins	13,696 ea	$58 M
Leads	158 km	$80 M
Dry Ponds	9 ea	$7 M
Wet Ponds	31 ea	$44 M
Culverts	9 km	$9 M
Outfalls	114 ea	$5 M
Sub-Drainage	44 km	$34 M
Oil & Grit Separators	1 ea	$0.05 M
Lift Stations	2 ea	$2 M
Total		**$2.6 Billion**

CONDITION OF ASSET

The physical condition of storm water assets has been assessed and rated based on a sample of CCTV inspections for the storm water mains (2019), and visual inspections of outfalls (2019) and storm ponds (2019). Culvert inspection timelines will be determined in the future. The City also inspected Montgomery Place culverts (2018) as part of planned drainage improvements for this neighbourhood. Montgomery Place right-of-way ditch crossings to private property culvert costs and maintenance are the responsibility of the property owner but will be monitored periodically by the City as they are crucial infrastructure for flood protection for this area.

Table 2 – Storm Infrastructure Physical Condition Information

Asset	Description	Rating	Number	Percent
Storm Water Mains – Collectors	Known condition of Collector Mains. Rated A, C, & F as very good, fair, and very poor respectively as of December 31, 2019.	A: Very Good	89 km	13%
		C: Fair	19 km	3%
		F: Very Poor	5 km	1%
		Total	**113 km**	**17%**
Storm Water Mains – Trunks	Known condition of Trunk Mains. Rated A, C, & F as very good, fair, and very poor respectively as of December 31, 2019.	A: Very Good	8.2 km	12%
		C: Fair	0.5 km	11%
		F: Very Poor	0.3 km	0%
		Total	**9.1 km**	**13%**
Outfalls	Condition based on 2019 visual inspections of outfall and ranked based on maintenance required as routine, low/moderate, high, and urgent. Inspection ratings incorporate outfall pipe and structure condition, handrail and grate condition, and any factors impeding outflow or causing erosion such as overgrowth, sedimentation, or lack of erosion protection.	A: Routine	37	32%
		B: Low/Moderate	54	47%
		C: High	6	5%
		D: Urgent	0	0%
		Unknown	17	15%
		Total	**114**	**100%**
Ponds	Comprehensive storm water pond inspections were completed in 2019. Visual assessment was based on the condition of inlet and outlet pipes, structures, and grates, shoreline and rip rap, sediment buildup, invasive species, algae, and any other visual concerns. Ponds were given a condition of good, fair, and poor. *Note: four ponds have been added to the inventory after 2019.*	Good	23	64%
		Fair	13	36%
		Poor	0	0%
		Total	**36**	**100%**
City-owned Culverts	The City has 9 km of culverts in the inventory. Condition assessment to be included in AMP.	TBD	0	0%
Montgomery Place Culverts	Montgomery Place culverts were assessed and rated in 2018 from A to D based on physical condition and amount of sedimentation (680 properties with culverts, 6 km of culverts).	A: Good	207	23%
		B: Moderately Good	177	20%
		C: Moderately Poor	169	19%
		D: Poor	127	14%
		No Culverts	222	24%
		Total Crossings	**902**	**100%**

LIFE CYCLE PROGRAMS

Creation/Construction Plan

New storm water infrastructure will be constructed between 2019 and 2028 through the $57 million Flood Control Strategy (FCS) to reduce flooding impacts, with nine projects for at least ten areas at high risk of flooding. The first project, a dry pond at W.W. Ashley District Park, will be completed in 2021.

New storm water infrastructure funded by developers is continually being constructed in new neighbourhoods. The Drainage Regulation Strategy will identify ways to ensure new storm water and drainage infrastructure meet the City's Design and Development Standards. New storm water systems will also incorporate storm water ponds and natural drainage patterns to address the City's Green Infrastructure Strategy objectives.

Asset Renewal/Replacement Plan

The $8 million Montgomery Place Drainage Strategy will reconstruct ditches and swales, and replace or add culverts under driveways on the public right-of-way from 2021 to 2027 to restore drainage paths for snow melt and intense rain events.

Storm water sewer mains will continue to be inspected and rated under the Storm Water Asset Preservation program. Storm water pipes will be prioritized for the addition of cured-in-place pipe (CIPP) lining to lengthen lifespans and minimize lowest life cycle costs.

Storm pond bathymetric surveys, started in 2020, will continue to determine pond sedimentation levels and impacts on performance to develop the most cost-effective dredging program.

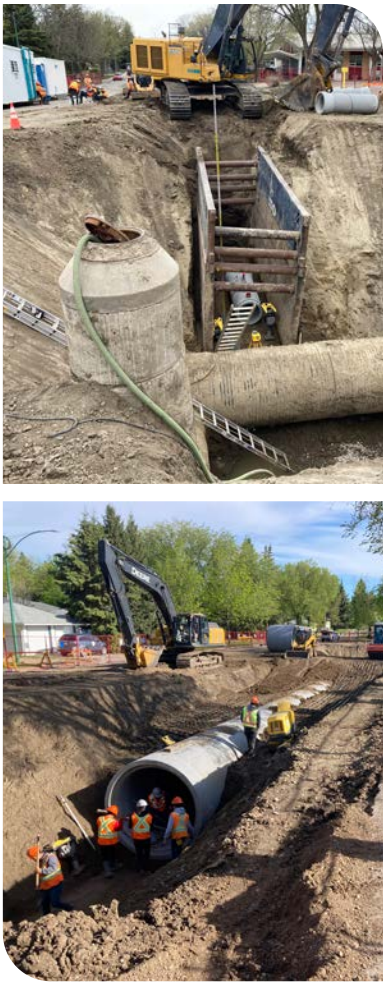
The City has started to address capacity issues in the most flood prone areas through the FCS. Additional work is planned for the AMP to document the capacity condition of the storm mains within the City.

Operations and Maintenance (O&M) Plan

The level of storm water related maintenance activities, including flushing and televising storm water sewers, cleaning and inspecting infrastructure, and repairing or replacing storm sewers, manholes, and catch basins decreased in 2020, partly due to the COVID-19 response and the availability of human resources. The O&M activities completed in 2019 and 2020 are shown in Table 3. An assessment of storm water asset maintenance priorities and a plan to address these will be developed in 2021 and 2022.

Storm outfalls and storm water ponds will be inspected annually for maintenance priorities, with a detailed visual assessment and reporting every three years. All catch basins will be inspected annually, and repairs or replacements made as required. Storm sewers will be inspected and cleaned in conjunction with the Roadways rehabilitation program, or as required on an emergency basis.

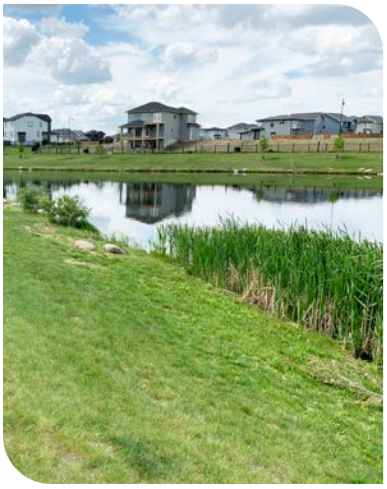
The fall street sweep will continue to utilize a tree density and flood risk approach to maximize the debris captured during the sweep and provide optimal flood risk reduction per kilometre swept. Expansion and calibration of the fall sweep is being assessed for 2021 and beyond.



Installing Storm Sewer in W.W. Ashley District Park

Table 3 – Storm Infrastructure Maintenance

Activity (unit)	2019	2020
Storm Sewer Flushing (metres)	10,766	4,703
CCTV of Storm Sewers (metres)	20,157	2,104
CB Leads Cleaned and Flushed (each)	138	42
Catch Basin Inspections (each)	301	N/A
Catch Basin Cleanings (each)	25,380	5,726
Catch Basin Repairs (each)	117	19
Manhole Inspections (each)	582	80
Manhole Repairs (each)	116	41
Outfalls Inspected (each)	400	46
Storm Pond Maintenance (each)	69	23



Wet Pond, Kensington

SERVICE EXPECTATIONS

Citizens expect the following for our storm water infrastructure:

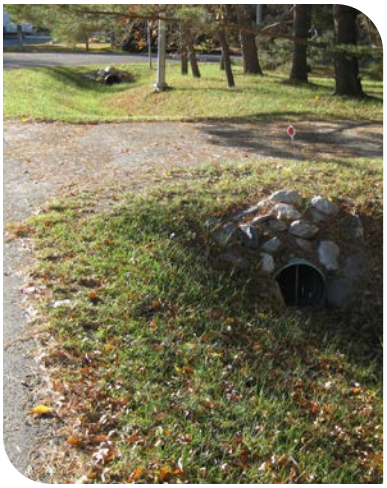
- **Available:** Sufficient capacity prevents flooding during snow melt and intense rain events.
- **Reliable:** Service requests for maintenance are promptly completed.
- **Responsive:** Citizens feel they are heard and are treated with empathy and respect.
- **Cost Effective:** Storm water costs are affordable, and assets are managed for lowest life cycle costs.
- **Safe:** Citizens and staff are safe when using and working with storm water assets.
- **Suitable:** Storm ponds are multi-functional, providing passive and/or active recreation opportunities and habitat for native species.
- **Sustainable:** Storm water assets minimize damage to the environment.

Service level targets will be set as part of the Asset Management Planning process.

POTENTIAL PLAN TO ADDRESS FUNDING GAP

In 2017, the temporary Flood Protection Program was extended to the end of 2021, and a phased increase was approved for Storm Water Management Charge rates from $52.80 in 2018 to $106.80 in 2022 to address gaps in funding enhanced storm water capacity, asset preservation, and additional operations and maintenance. The new rates will increase annual revenues from $6.2 million in 2017 to $13.8 million in 2022.

In addition, the Storm Water Utility successfully applied for federal and provincial funding which will contribute up to $27.5 million between 2021 and 2028 to address storm water capacity issues. The Disaster Mitigation and Adaptation Fund ($21.6 million) for the Flood Control Strategy will contribute to new storm water assets in high flood risk areas. The Investing in Canada Infrastructure Fund ($5.9 million) will help fund drainage restoration for the Montgomery Place neighbourhood's ditch/swale and culvert network.



Culvert in Montgomery

INFRASTRUCTURE RESILIENCE AND CLIMATE CHANGE ADAPTATION STRATEGY

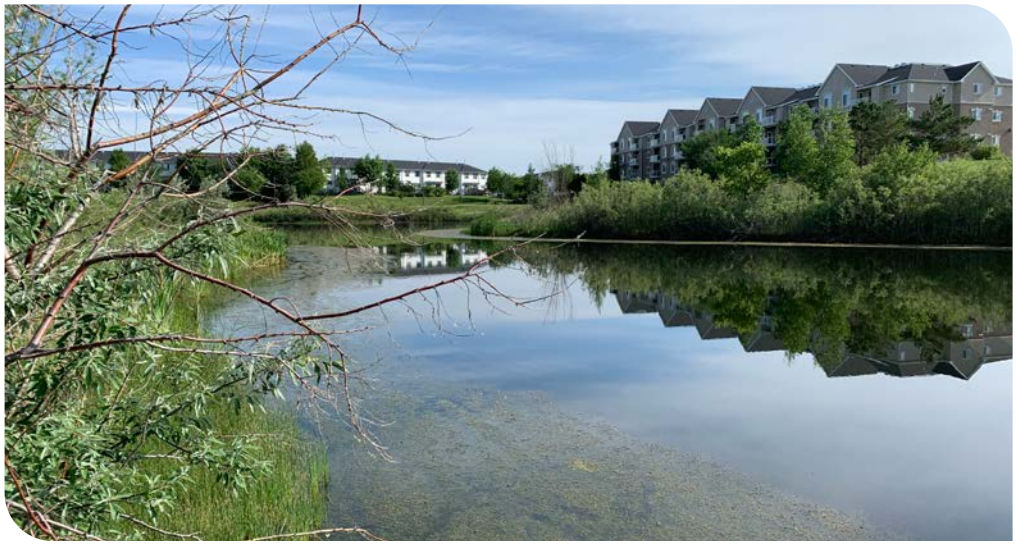
A research study, completed in 2020, to quantify climate change risks for intense rain events and the potential impact on storm water infrastructure, concluded that the future holds greater uncertainty and risk for more intense 1-in-100-year rain events. The following storm water asset management practices will help adapt to future uncertainties and provide greater resiliency for our climate change strategy:

- On-site storm water management requirements for new developments
- Incorporation of green storm water infrastructure in new neighbourhoods
- Low Impact Development Guidelines
- Flood Control Strategy
- Montgomery Place Drainage Strategy
- Drainage Regulation Project
- Evaluation of storm water design standards for possible changes

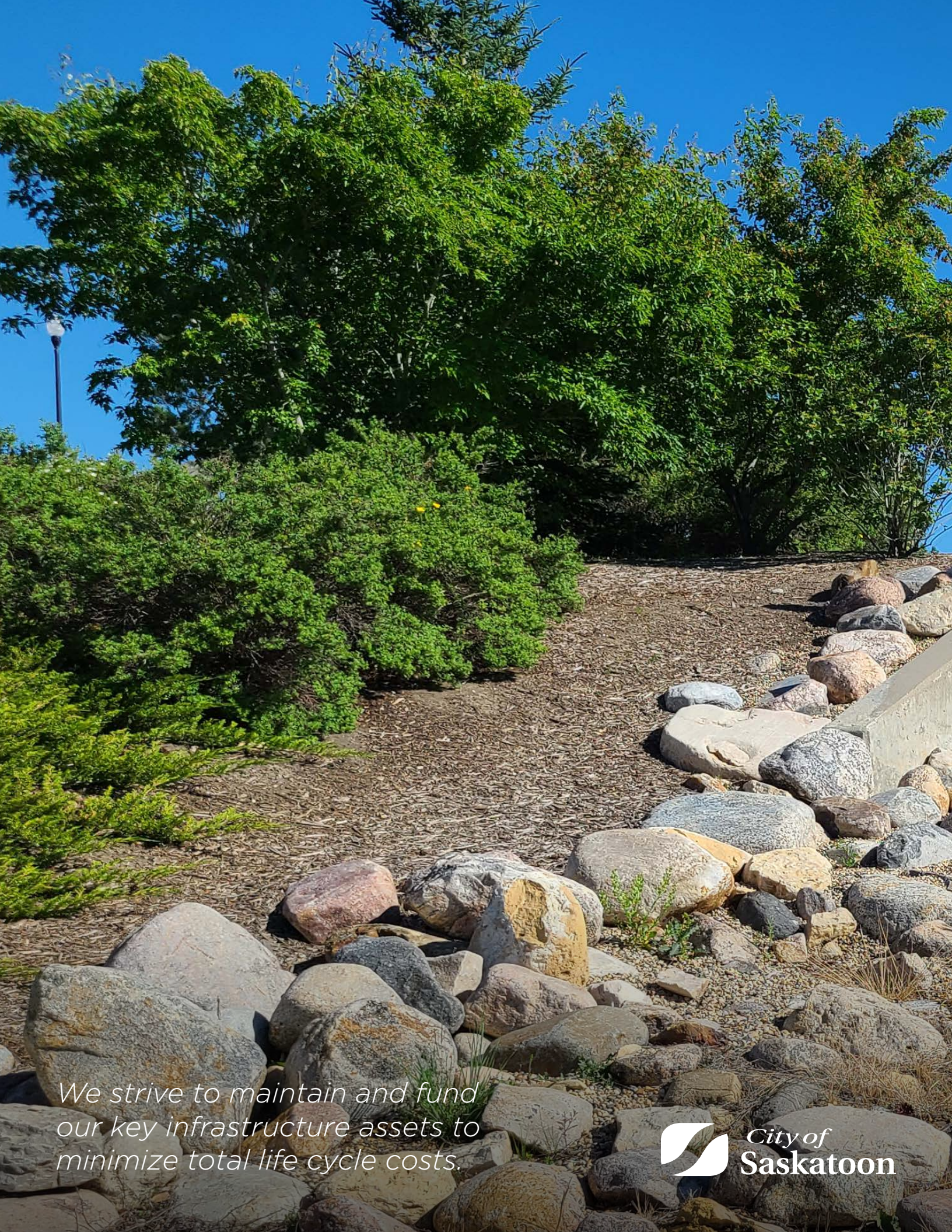
Outfall to the South Saskatchewan River

THE WAY FORWARD

- The current physical condition of storm water assets will continue to be assessed, with an emphasis on maintaining and preserving the infrastructure to prevent higher future costs. Annual asset and preservation funding for storm water sewers will more than double from $800,000 in 2018 to more than $1.7 million in 2022 and 2023 to provide more emphasis on lining to achieve lowest life cycle costs. Required storm water asset maintenance activities will be assessed and prioritized, and an ongoing plan to address these will be developed in 2021 and 2022.
- The first phase of the Montgomery Place Drainage Strategy is being constructed in 2021–2022. An implementation plan for future phases will be developed to construct over $8.0 million in neighbourhood drainage improvements between 2021 and 2027.
- The $57 million Flood Control Strategy will be implemented to protect as many properties as possible from flooding within the available budget by 2028. The second and third projects will be construction of underground infrastructure and dry ponds in Churchill Park and Weaver Park (subject to a feasibility assessment and approval) in 2022 and 2023 respectively. Other cost-effective options will be sought for other areas that are at risk of flooding.
- Although most of the City's storm water ponds are relatively new, sedimentation building up in older ponds will require removal to maintain performance. The amount allocated to storm pond preservation is increasing from $350,000 in 2018 to about $700,000 in each of 2022 and 2023 to allow for more proactive sedimentation removal.
- A capacity condition assessment needs to be created to document storm sewer capacity issues for the City, particularly in older neighbourhoods that were constructed to different design specifications (prior to 1989).



Wet Pond in Rosewood


We strive to maintain and fund
our key infrastructure assets to
minimize total life cycle costs.
City of
Saskatoon