



## AGENDA

### SPC ON UTILITIES AND CORPORATE SERVICES

April 15, 2020, 9:30 AM  
IN THE COUNCIL CHAMBER  
Members

Councillor W. Sutherland, Chair  
Councillor P. Demong, Vice-Chair  
Councillor G. Chahal  
Councillor D. Colley-Urquhart  
Councillor D. Farrell  
Councillor R. Jones  
Councillor S. Keating

**SPECIAL NOTES:** Public are encouraged to follow Council and Committee meetings using the live stream <http://video.isilive.ca/calgary/live.html>  
Members will be participating remotely.

1. CALL TO ORDER
2. OPENING REMARKS
3. CONFIRMATION OF AGENDA
4. CONFIRMATION OF MINUTES
  - 4.1 Minutes of the Standing Policy Committee on Utilities and Corporate Services, 2020 February 19
5. CONSENT AGENDA
  - 5.1 DEFERRALS AND PROCEDURAL REQUESTS  
None
  - 5.2 BRIEFINGS
    - 5.2.1 Status of Outstanding Motions and Directions – Q1 2020, UCS2020-0376

5.2.2 Residential Collection Services Review: Industry Engagement and Service Efficiency Opportunities, UCS2020-0248

5.2.3 2019 Integrated Watershed Management Update, UCS2020-0424

6. POSTPONED REPORTS  
(including related/supplemental reports)

None

7. ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

7.1 Residential Black Cart Collection Mixed Service Delivery Pilot Project Update, UCS2020-0440  
Attachment 3 held confidential pursuant to Section 24 (Advice from officials) of the *Freedom of Information and Protection of Privacy Act*.

**Review By: 2020 April 09**

7.2 Climate Resilience Strategy Update 2019, UCS2020-0308

7.3 2019 Flood Resiliency and Mitigation Annual Update, UCS2020-0372

8. ITEMS DIRECTLY TO COMMITTEE

8.1 REFERRED REPORTS  
None

8.2 NOTICE(S) OF MOTION  
None

9. URGENT BUSINESS

10. CONFIDENTIAL ITEMS

10.1 ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

10.1.1 (Postponed) Summary of Real Estate Transactions for the Fourth Quarter 2019, UCS2020-0357  
Held confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act*.

**Review By: 2020 April 30**

10.2 URGENT BUSINESS

11. ADJOURNMENT

Members will be participating remotely.



**MINUTES**

**SPC ON UTILITIES AND CORPORATE SERVICES**

**February 19, 2020, 9:30 AM  
IN THE COUNCIL CHAMBER**

**PRESENT:** Councillor W. Sutherland, Chair  
Councillor P. Demong, Vice-Chair  
Councillor G. Chahal  
Councillor D. Colley-Urquhart  
Councillor D. Farrell  
Councillor R. Jones  
Councillor S. Keating (Remote Participation)  
Councillor S. Chu

**ALSO PRESENT:** A/General Manager C. Arthurs  
Legislative Advisor J. Palaschuk  
Legislative Advisor A. de Groot

1. CALL TO ORDER

Councillor Sutherland called the Meeting to order at 9:32 a.m.

2. OPENING REMARKS

No opening remarks were given.

3. CONFIRMATION OF AGENDA

**Moved by** Councillor Demong

That the Agenda for the 2020 February 19 Regular Meeting of the Standing Policy Committee on Utilities and Corporate Services be confirmed.

**MOTION CARRIED**

4. CONFIRMATION OF MINUTES

4.1 Minutes of the Standing Policy Committee on Utilities and Corporate Services, 2020 January 29

**Moved by** Councillor Keating

That the Minutes of the 2020 January 29 Regular Meeting of the Standing Policy Committee on Utilities and Corporate Services be confirmed.

**MOTION CARRIED**

5. CONSENT AGENDA

5.1 DEFERRALS AND PROCEDURAL REQUESTS

None

5.2 BRIEFINGS

None

6. POSTPONED REPORTS

None

7. ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

7.1 Proposed Encroachment Bylaw to Replace Encroachment Policy CS008, UCS2020-0228

A presentation entitled "Proposed Encroachment Bylaw to Replace Encroachment Policy CS008" was distributed with respect to Report UCS2020-0228.

Councillor Sutherland introduced a group of Grade 6 students from St. Matthew School in Ward 11, along with their teachers Debbie Nicholson and Amanda Horsley.

**Moved by** Councillor Chu

That with respect to Report UCS2020-0228, the following be approved:

That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:

1. Give three readings to the proposed Encroachment Bylaw (Attachment 1); and
2. Rescind Encroachment Policy CS008 (Attachment 2).

**MOTION CARRIED**

8. ITEMS DIRECTLY TO COMMITTEE

8.1 REFERRED REPORTS

None

8.2 NOTICE(S) OF MOTION

None

9. URGENT BUSINESS

None

10. CONFIDENTIAL ITEMS



**Moved by** Councillor Demong

That pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act*, Committee move into Closed Meeting at 9:52 a.m. in the Council Lounge to consider confidential matters with respect to the following items:

- 10.1.1, Summary of Green Line Real Property Transactions for the Fourth Quarter 2019, UCS2020-0229; and
- 10.1.2, Summary of Real Estate Transactions for the Third Quarter 2019, UCS2020-0230.

**MOTION CARRIED**

Committee reconvened in Public at 9:57 a.m. with Councillor Sutherland in the Chair.

**Moved by** Councillor Demong

That Committee rise and report

**MOTION CARRIED**

## 10.1 ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

## 10.1.1 Summary of Green Line Real Property Transactions for the Fourth Quarter 2019, UCS2020-0229

People in attendance during the Closed Meeting discussions with respect to Report UCS2020-0229:

Clerks: J. Palaschuk and A. Degrood. Law: L. Lau. Advice: C. Arthurs. Observers: F. Snyders, S. McClurg, J. Moisan, J. Cullen, J. Halfyard.

A confidential revised attachment 2 was distributed with respect to Report UCS2020-0229.

**Moved by** Councillor Demong

That with respect to Report UCS2020-0229, the following be approved:

The Standing Policy Committee on Utilities and Corporate Services recommends that Council:

1. Direct that the Report be held confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials) and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act* until the report is published in the Council agenda; and
2. Direct that the Attachments be held confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials) and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act* unless

The City is required to disclose pursuant to the *Expropriation Act (Alberta)*, to be reviewed 2029 February 12.

Against: Councillor Farrell

**MOTION CARRIED**

10.1.2 Summary of Real Estate Transactions for the Third Quarter 2019, UCS2020-0230

People in attendance during the Closed Meeting discussions with respect to Report UCS2020-0230:

Clerks: J. Palaschuk and A. Degrood. Law: L. Lau. Advice: J. Halfyard. Observers: F. Snyders, S. McClurg, J. Moisan, J. Cullen, C. Arthurs.

**Moved by** Councillor Colley-Urquhart

That with respect to Report UCS2020-0230, the following be approved:

The Standing Policy Committee on Utilities and Corporate Services recommends that Council:

1. Direct that the Recommendations, Report and Attachments be held confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials) and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act* until the report is published in the Council agenda, to be reviewed 2020 April 06.

**MOTION CARRIED**

10.2 URGENT BUSINESS

None

11. ADJOURNMENT

**Moved by** Councillor Demong

That this meeting adjourn at 10:00 a.m.

**MOTION CARRIED**

The following items have been forwarded to the 2020 March 16 Combined Meeting of Council:

CONSENT

- Summary of Green Line Real Property Transactions for the Fourth Quarter 2019, UCS2020-0229
- Summary of Real Estate Transactions for the Third Quarter 2019, UCS2020-0230

COMMITTEE REPORTS

- Proposed Encroachment Bylaw to Replace Encroachment Policy CS008, UCS2020-0228

The next Regular Meeting of the Standing Policy Committee on Utilities and Corporate Services is scheduled to be held 2020 March 18, at 9:30 a.m.

CONFIRMED BY COMMITTEE ON

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CHAIR

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ACTING CITY CLERK

UNCONFIRMED



POSTPONED BRIEFING

Status of Outstanding Motions and Directions – Q1 2020, UCS2020-0376

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Briefing UCS2020-0376 was postponed from the Regular Meeting of the 2020 March 18 Standing Policy Committee on Utilities and Corporate Services meeting, which was cancelled on 2020 March 16.



# BRIEFING

Page 1 of 1

Item # 5.2.1

Utilities & Environmental Protection Briefing to

SPC on Utilities and Corporate Services  
2020 March 18

ISC: UNRESTRICTED  
UCS2020-0376

## Status of Outstanding Motions and Directions – Q1 2020

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### **PURPOSE OF BRIEFING**

This briefing note summarises the status of the Department of Utilities and Environmental Protection's outstanding motions and directions for Standing Policy Committee (SPC) on Utilities and Corporate Services (UCS) as of 2020 March 18.

### **SUPPORTING INFORMATION**

On 2007 February 06, the Personnel and Accountability Committee approved PAC2007-05 Status of Outstanding Motions and Directions, directing Administration to bring forward as an item of business to each Standing Policy Committee, a list of tabled and referred motions and reports for each committee; such lists to be reviewed by each Standing Policy Committee on a quarterly basis.

There are no current or future capital or operating budget implications associated with this status report.

### **ATTACHMENT**

1. Attachment 1 – Status of Outstanding Motions and Directions – Q1 2020





Status of Outstanding Motions and Directions – Q1 2020

ISC: Unrestricted

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ITEM	DATE OF REQUEST	APPROVAL	SUBJECT	MEETING DATE
Extended Producer Responsibility	2019 February 4	C2019-0129	Administration to cooperate with other Alberta municipalities, AUMA, producers and recyclers of packaging and paper products, and the Province of Alberta to develop a baseline that can inform the design of a provincial EPR program by researching: <ul style="list-style-type: none"> <li>• The benefits, challenges, and risks of an EPR program in Alberta for these groups and their constituents;</li> <li>• The current recycling systems and supply chains across the province, and potential impacts of an EPR program in Alberta;</li> </ul> and report back through the SPC on Utilities and Corporate Services no later than 2019 October. Deferred to March 2020.	2020 March 18
Lead Water Pipe Removal Options	2019 December 3		Direct Administration to prepare a report on accelerated removal of lead water pipes, from both public and private sector properties, returning to council through SPC on UCS no later than Q1 2020, considering: <ul style="list-style-type: none"> <li>• Estimated costs and funding options</li> <li>• Opportunities for collaboration and cost sharing with private property owners and the Government of Alberta</li> <li>• Timelines</li> </ul>	2020 March 18
Water Customer Assistance Program Pilot	2018 November 19	UCS2018-1193	Administration to proceed with a project to conduct customer billing data collection and analysis to determine the need for a Water Customer Assistance Program Study and report back to Council no later than Q1 2020 on results and recommendations for next steps.	2020 March 18



Status of Outstanding Motions and Directions – Q1 2020 Continued

ISC: Unrestricted

Page 2 of 4

ITEM	DATE OF REQUEST	APPROVAL	SUBJECT	MEETING DATE
Scoping Report for Privatization of up to 25% of Residential Black Cart Collection Services	2019 November 18	C2019-1467	Direct Administration to: <ul style="list-style-type: none"> <li>Report back to the SPC on UCS no later than April 2020 on the scoping and development of a RFP to contract out up to 25% of residential black cart collection services/ and</li> <li>Report back to the SPC on UCS no later than Q4 2020 on the results of the RFP and a timeline for an implementation goal of Q1 2022</li> </ul>	2020 Q2
Industry Feedback – 2018 Collection Services Review	2019 January 23	UCS2019-0113	Direct Administration to solicit feedback from the waste and recycling collection services industry regarding the 2018 Collection Services Review report and to assess and pursue service efficiency opportunities identified in that same report and return to Utilities and Corporate Services Committee by Q2 2020 with findings.	2020 Q2
Cost Analysis for the Potential Reintroduction of Fluoride into the Water System	2019 October 29	CPS2019-0965	Direct Administration to undertake a full cost analysis for the potential reintroduction of fluoride into the water system including ongoing projected operational costs, City's authority and jurisdiction with regard to fluoridation, capital cost and possible utility rate impacts; and report back directly through the Priorities and Finance Committee no later Q2 2020	2020 Q2
Annual Water Efficiency Plan update	2005 December 12	UE2005-55	Administration to report back to the SPC on Utilities and Corporate Services annually with updates on progress towards "30 in 30" goal.	2020 Q2
	2019 Dec 18	UCS2019-1539	Report on water security annually as part of the Water Utility update to the Standing Policy Committee on UCS	



Status of Outstanding Motions and Directions – Q1 2020 Continued

ISC: Unrestricted

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ITEM	DATE OF REQUEST	APPROVAL	SUBJECT	MEETING DATE
Flood Resiliency and Mitigation annual report	2014 December 02	PFC2015-0777	Administration to report back to the SPC on Utilities and Corporate Services annually on progress related to the recommendations from the Expert Management Panel on River Flood Mitigation. (Expert panel recommendation 6f).	2020 Q2
Annual Organizational Health, Safety and Wellness Performance	2019 May 15	UCS2019-0460	Direct Administration to change environmental and safety performance reporting frequency from biannual to annual and provide separate corporate performance reports on the following service lines going forward as part of One Calgary: <ul style="list-style-type: none"> <li>• Environmental management.</li> <li>• Organizational health, safety and wellness.</li> </ul>	2020 Q2
Source Water Protection Plan and Policy	2019 Dec 18	UCS-20191539	Administration to report on the Source Water Protection Plan and Policy by end of Q2 2020.	2020 Q2
Progress Update: Nose Creek Watershed Water Management Plan	2019 June 19	UCS-20190808	Administration to report back to SPC on Utilities and Corporate Services with a progress update on Plan implementation no later than 2020 Q3.	2020 Q3
Single Use Items Reduction Strategy and Implementation Plan	2019 May 15	UCS2019-0370	Administration to develop a single-use items reduction strategy and implementation plan to return to Committee with a strategy no later than Q3 2020.	2020 Q3



Status of Outstanding Motions and Directions – Q1 2020 Continued

ISC: Unrestricted

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ITEM	DATE OF REQUEST	APPROVAL	SUBJECT	MEETING DATE
Annual Corporate Environmental Management Performance	2019 May 15	UCS2019-0460	Direct Administration to change environmental and safety performance reporting frequency from biannual to annual and provide separate corporate performance reports on the following service lines going forward as part of One Calgary: <ul style="list-style-type: none"> <li>• Environmental management.</li> <li>• Organizational health, safety and wellness.</li> </ul>	2020 Q4
Variable Stormwater Rate Structure	2018 July 30	UCS2018-0884	Administration to develop an implementation plan for a variable stormwater rate structure and report back to Council by Q4 2020 for potential implementation for the 2023 to 2026 business cycle.	2020 Q4
Extra Strength Surcharge Parameters for Wastewater	2018 July 30	UCS2018-0884	Administration to report back on rates and limits for wastewater extra strength surcharge parameters no later than 2020 November.	2020 Q4
Detailed Pilot Plan for Variable Set-Out for the Black Cart Program	2018 Dec 18	UCS2019-1142	Administration to report back to the SPC on UCS no later than Q2 2021 with results from the review of customer behaviour and a detailed pilot plan including proposed pilot communities, rates that will be piloted, a detailed cost estimate, and a plan for funding the pilot.	2021 Q2
Water, Wastewater and stormwater rates for 2023-2026	2018 July 30	UCS2018-0884	Administration to develop water, wastewater and stormwater rates for 2023-2026 that recover 100% of the cost of service for each customer class.	2022



# BRIEFING

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Item #5.2.2

Utilities and Environmental Protection Briefing to

SPC on Utilities and Corporate Services  
2020 April 15

ISC: UNRESTRICTED  
UCS2020-0248

## Residential Collection Services Review: Industry Engagement and Service Efficiency Opportunities

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### PURPOSE OF BRIEFING

The purpose of this briefing note is to summarize work undertaken by Administration to meet Council's direction to solicit feedback from the waste and recycling collection services industry regarding the 2018 Collection Services Review Report (UCS2019-0113), pursue identified efficiency opportunities and report back to the Standing Policy Committee (SPC) on Utilities and Corporate Services (UCS) by 2020 Q2.

### SUPPORTING INFORMATION

#### Waste and recycling collection services industry engagement

Working with The City of Calgary's (The City's) Engage Resource Unit, Administration sought feedback from the waste and recycling collection services industry through two engagement activities:

- **Industry workshop:** Engage hosted a workshop for representatives from the private waste collection industry on 2019 June 26. Representatives from 42 businesses and organizations involved in waste and recycling collection were invited. Nine industry representatives from seven organizations attended.
- **Online survey:** At the request of workshop participants, an online survey including the same questions covered in the June workshop was circulated to invitees so that those who could not attend the workshop could provide feedback. The survey was open from 2019 June 26 to September 20 and received two responses.

Industry participants indicated that they felt the report (UCS2019-0113) did not accurately represent the advantages of the private waste collection industry; however no information or data to validate that position was shared with The City during the engagement process. Participants did suggest that a Request for Proposal (RFP) process would be the best approach to validate private waste collection performance and that the RFP should include clear standards for environmental performance, customer service, safety, and costs. Feedback from the industry engagement is included as Attachment 1.

Waste & Recycling Services (WRS) will be using an RFP process for a mixed service delivery pilot for residential garbage collection. Feedback from the industry engagement is being considered in the development of the RFP. An update report on the development of the mixed service delivery pilot is provided in report UCS2020-0440: *Residential Waste Collection Mixed Service Delivery Pilot Project Update*.

# BRIEFING

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Item #5.2.2

## Service efficiency opportunities

WRS continues to focus on the four service value objectives shared in the *2018 Residential Collection Services Review* report (UCS2019-0113): customer experience, safety, environment and costs. Significant efficiencies have been realized in WRS residential collections over time through automation of collection, reductions in fleet maintenance costs, and introducing improved route design software.

To realize further efficiencies, WRS is pursuing the following opportunities:

- **Fleet initiatives:** a comprehensive feasibility analysis to inform the alternative fuel strategy, in-truck technology, and a truck rental pilot
- **Reduced set-out:** a tag-a-bag program and a variable set-out pilot
- **Workforce management:** seasonal employee sharing

Additionally, WRS assessed the cost benefit of extending collection shifts to a ten-hour work day, as recommended in the *2018 Residential Collection Services Review*.

Progress on these opportunities is summarized in Attachment 2.

## ATTACHMENTS

1. Attachment 1 – Industry Engagement: What We Heard Report
2. Attachment 2 – Service Efficiency Opportunities



# WRS Collection Services Review

Stakeholder Report Back: What we Heard

October 2019

## 1 Project overview

At the Combined Meeting of Council on 2019 February 4, Council received report UCS2019-0113: Waste & Recycling Services (WRS) 2018 Residential Collection Services Review (the report). The following Council direction was adopted with reference to that report:

That Council direct Administration to solicit feedback from the waste and recycling collection services industry regarding the *2018 Collection Services Review* report and to assess and pursue service efficiency opportunities identified in that same report and return to Utilities and Corporate Services Committee by Q2 2020 with findings.

## 2 Engagement overview

In support of the above Council direction, we conducted the following engagement activities:

- **Private Waste Collection Industry Workshop:** We hosted a workshop for representatives from the private waste collection industry on June 26, 2019, at Fort Calgary. Representatives from 42 businesses and organizations involved in waste and recycling collection were invited. Nine industry representatives from seven organizations attended.
- **Private Waste Collection Industry Online Survey:** At the request of workshop participants, an online survey including the same questions as the June 26 workshop was open from June 26 to September 20, 2019, for those members of the private waste collection industry who did not attend the workshop. There were two responses to the online survey.

## 3 What we asked

While both the workshop and online survey allowed for discussion of the full report, we prioritized the following aspects of the report to ensure the greatest value from engagement.

1. Cost Impact (report attachment 4)
2. Industry Scan (report attachment 3)
3. WRS Efficiency and Effectiveness (report attachment 2)
4. Benchmarking (report attachment 5)
5. Summary, mainly focusing on the Collection Services Value Framework as new information (report attachment 1)

For each of these sections, we asked the following questions:

1. What do you support and/or agree with regarding this report?
2. What concerns do you have regarding this report?
3. What new information would you like The City to know in addition to what is in this report?



# WRS Collection Services Review

Stakeholder Report Back: What we Heard

October 2019

## 4 What we heard

In general, participants felt that the report did not accurately represent the advantages of the private waste collection industry. Specifically, participants indicated that the cost savings of moving to a private waste collection model could result in much higher cost savings than indicated in the report, and that many of the issues of a private model identified in the report were not a fair representation of the private waste collection industry and could be managed through the RFP and contract process.

- For a detailed summary of the input that was provided, please see the [Summary of Input](#) section.
- A verbatim listing of all the input that was provided can be found here:  
<https://www.calgary.ca/UEP/WRS/Pages/Commercial-Services/Services/Collection-Services-Review.aspx>

## 5 Next steps

WRS will report back to the Standing Policy Committee on Utilities and Corporate Services regarding the results of this engagement program before the end of June 2020.





# WRS Collection Services Review

Stakeholder Report Back: What we Heard

October 2019

## 6 Summary of Input

### 6.1 Attachment 4 – Cost Impact for Alternative Service Delivery

Theme	Description
Contradictory recommendations	Participants were frustrated that the report often spoke to the benefits of private waste collection, but that the conclusion of the report contradicted this in its recommendation to continue using public services.
Cost savings	Participants indicated that the report underestimated the potential savings of moving to private collection service, and that savings would likely be closer to 15-25%. In addition, participants shared that The City would see additional economic benefits through tax revenue paid by private waste haulers.
Efficiency	Participants shared several ways in which private waste haulers could improve efficiency of waste collection, including cutting the number of vehicles required, working five-day weeks, reducing the need for overtime and private waste haulers working to stay within the costs quoted as part of their contract.
Cost accounting	Participants wanted more information regarding how costs were determined within the report to allow for a more balanced comparison of private versus public waste collection. Examples included details on worker compensation costs, fleet replacement costs and maintenance costs.

### 6.2 Attachment 3 – Industry Scan and Strategic Analysis

Theme	Description
Service levels	Participants did not support the report's conclusions that private waste haulers have lower service levels in areas such as environmental performance and customer service, stating that other studies have shown the private industry to outperform public waste collection. Examples include results of private waste collection in Edmonton being similar to public services, but at a cost savings. In addition, participants noted that service levels are typically worked into their contracts, and that if they fail to perform, they will lose the work.
New technologies	Participants indicated that some private waste haulers already use better technologies than The City, such as compressed natural gas (CNG) vehicles, and are better able to update to new technologies as they come available.
Accountability	Participants indicated that the report did not consider the impact of shareholder accountability and brand reputation. Private waste haulers are accountable to their shareholders and are motivated to maintain high customer satisfaction to win new contracts.



## WRS Collection Services Review

Stakeholder Report Back: What we Heard

October 2019

### 6.3 Attachment 2 – Efficiency and Effectiveness

Theme	Description
Request for proposals (RFP)	Participants indicated that the best way to compare City services against those of private waste haulers would be to release an RFP and assess the bids. Participants suggested that this RFP include clear standards for environmental performance, customer service, safety and costs. As written, participants felt the report did not allow for an “apples to apples” comparison between private and public services.
Missed pickups	Participants wanted greater clarity around how the comparison of missed pickups between municipalities was conducted.
Administrative process	Participants indicated that private collection services would reduce the administrative burden on The City in areas such as vendor management and human resources.

### 6.4 Attachment 5 – Benchmarking and Performance Measurement

Theme	Description
Need for data	Participants suggested contacting private waste haulers as well as municipalities who have moved to private waste collection to get more robust benchmarking data for consideration in the report.

### 6.5 Attachment 1 – 2018 Residential Collection Services Review Summary

Theme	Description
Report bias	Participants indicated that, because of the way the report was written, and the missing or inaccurate data used, the report tends to favor public waste collection, even though private haulers could meet or exceed City performance.

# WASTE & RECYCLING SERVICES





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  - 2.2 Reduced Set-Out ..... 4
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## 1. Introduction

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As part of the *2018 Collection Services Review* report the consultant made 10 recommendations based on the research and analysis completed (UCS2019-0113 Attachment 4). Some of these recommendations are related to service efficiency opportunities.

On 2019 February 4, Council directed Administration to assess and pursue service efficiency opportunities identified in the report and return to Utilities and Corporate Services Committee by Q2 2020 with findings.

This document provides a summary of Waste & Recycling Services' (WRS') ongoing efforts to pursue the service efficiency opportunities identified in the 2018 Collection Services Review, and other opportunities identified by Administration.

## 2. Service Efficiencies

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WRS continues to focus on the four service value objectives developed in the consultants' report (UCS2019-0113 Attachment 1): customer experience, safety, environment and costs. WRS continually strives to balance operational efficiencies in line with the value objectives to be part of the fabric of the community by providing courteous, reliable, safe and environmentally responsible collection services.

Significant efficiencies have been realized in WRS' residential collections over time through automation of collection, reductions in fleet maintenance costs, and implementation of improved route design software.

To realize further efficiencies, WRS is pursuing the following opportunities:

- Fleet initiatives: an alternative fuel strategy, in-truck technology and a truck rental pilot
- Reduced set-out: a tag-a-bag program and a variable set-out pilot
- Workforce management: seasonal employee sharing

Additionally, WRS assessed the cost-benefit of extending collection shifts to a ten-hour work day. Progress on these opportunities is summarized below.

### 2.1 Fleet Initiatives

#### Alternative fuel strategy

In the *2018 Collection Services Review* report, the consultants recommended developing an alternative fuel strategy: *"A feasibility analysis should be conducted to assess the financial and environmental benefits and concerns to WRS if alternative fuels such as CNG were used in one of the districts or the entire fleet. Electric vehicles are also worth considering as they are being tested across several jurisdictions across North America."*

The City undertook a comprehensive feasibility analysis to inform the alternative fuel strategy.

The City is committed to improving air quality, reducing greenhouse gas (GHG) emissions, and carbon footprint by transitioning to cleaner fuel and low emissions vehicles. The City engaged a consultant to assess the feasibility of different alternative fueled vehicles for Calgary's fleet of refuse trucks (side, front and rear loading vehicles). Based on the consultants' report, an alternative fuel strategy has been developed by Corporate Analytics & Innovation (CAI), WRS and Fleet.

Key initiatives of the strategy include purchasing electric-hybrid and battery-electric vehicles this year to be field tested in 2021. Additionally, bio-diesel is being considered as a short-term solution to reducing GHG emissions, as it would have a lower environmental impact, and no or little cost and performance impact, compared to the diesel baseline.

### **In-truck technology**

WRS is currently undertaking a project to equip collection vehicles with technology which will primarily improve customer support while also improving collection efficiency. The In-truck technology project will assess opportunities to:

- Simplify and automate recording of field data
- Improve record management for collection concerns (tagged carts)
- Improve asset tracking
- Modernise route mapping and add turn-by-turn routing
- Add flexibility for future program options (such as variable set-out)
- Improve service validation to support customer service
- Modernize in-field workforce management

### **Truck rental pilot**

WRS is planning to undertake a pilot in 2020 to test the feasibility and perform cost analysis to determine if it is more economical to rent additional collection vehicles seasonally during weekly green cart collection as compared to leasing the vehicles for the entire year.

## **2.2 Reduced Set-Out**

### **Tag-a-bag program**

In efforts to promote diversion and waste reduction, a major initiative is the implementation of a tag-a-bag program for residential garbage. The planned start date was June 1, 2020, however, given the COVID-19 situation, it is now tentatively scheduled to begin in the Fall of 2020. With tag-a-bag, if a household's black cart is full and the household has extra bags of garbage, they will need to buy tags to put on the extra garbage bags for them to be picked up. Tags will be \$3 each and will be available at convenience stores and grocery stores around Calgary. The tag-a-bag program is a first step towards greater fairness in our garbage collection fees, as homes that reduce waste and divert more materials into the Blue and Green cart will be less likely to need to buy tags for extra garbage. This program introduces a financial incentive to fully use waste diversion programs and reduce the amount of garbage put out for collection. The program may also improve collection efficiency and reduce driver exposure to safety issues through reducing the amount of excess garbage that drivers must get out of their vehicle to collect.

### **Variable set-out pilot**

WRS is currently exploring customer behaviour to develop a detailed plan for piloting a variable set-out pay-as-you-throw (PAYT) program. This program will potentially charge customers based on how often their cart is set out for collection. A decrease in set-out rates could further increase collection efficiency. Potential cost savings will be estimated and included in a report to Council in Q2 2021.

## **2.3 Workforce Management**

### **Seasonal employee sharing**

WRS continues to collaborate with other business units to benefit operations and support employee satisfaction. The 2019 seasonal employee sharing pilot with Roads allowed 20 seasonal staff to be employed year-round by moving from WRS to Roads in the winter for snow and ice control (SNIC) operations before moving back to WRS in the spring when weekly green cart collection resumes. The pilot should reduce hiring and onboarding costs, and may increase employee retention.

### **Ten-hour work day**

The *2018 Collection Services Review* report recommended that WRS consider extending collection shifts: *“Drivers work 9.5 hours per day for a total of 38 hours per week. If there is a desire to improve collection rates by extending the shifts to a 10-hour day, the extra 30 minutes could result in 60 to 100 more pick-ups per shift thereby improving the daily efficiency of each collection vehicle.”*

Route design software that factored in field verified static and dependent variables validated the consultant estimation of 60 to 100 additional pick-ups per shift. Based on truck capacity, this equates to a reduction of vehicles.

While there are significant cost savings of removing vehicles, these savings would be offset by additional costs (salary & wage, maintenance, fuel and compensation) due to the additional 0.5 hour per day.

Potential cost savings were estimated and a clear savings opportunity did not emerge. WRS' best estimate indicates the net benefit to customers would be a \$0.05 reduction on monthly user fees, though it could be higher or nothing at all.

The impact to customers of implementing a ten-hour work day was considered, with the biggest impact being that residents would be required to place their carts out by 6:30am instead of 7am, and noise impacts associated with earlier collection. To maximise the efficient use of the additional thirty minutes, the time would be added to the start of the day to mitigate the impact of afternoon rush hour traffic on transportation times.

Given that there is not a clear savings opportunity with changing to a 10-hour work day, WRS will continue to focus on refining operational efficiencies to reduce travel time and increase productive time collecting carts. For example, beginning in 2019 and continuing in 2020, WRS is undertaking major route design and collection day changes to accommodate city growth.





# BRIEFING

Page 1 of 2

Item #5.2.3

**Utilities & Environmental Protection Briefing to**

**SPC on Utilities and Corporate Services**  
**2020 April 15**

**ISC: UNRESTRICTED**  
**UCS2020-0424**

## **2019 Integrated Watershed Management Update**

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### **PURPOSE OF BRIEFING**

The City is committed to ensuring a resilient watershed to continue to make life better for Calgarians. The purpose of this briefing and attachments is to provide a summary of The City of Calgary's (The City's) integrated watershed management (IWM) initiatives and performance in 2019 and highlight planned actions for 2020. Through One Calgary, Calgarians reinforced how much they value healthy river areas, reliable, safe drinking water, and the management of their wastewater.

IWM is being achieved across four key goal areas: #1 protect our water supply; #2 use water wisely; #3 keep our rivers healthy; and #4 build resiliency to flooding. Council's decisions and significant investments over the past 30 years have helped ensure Calgary's water security despite population growth and a changing climate. The Water Utility continues to balance the impacts of city-building on water management through three lines of service: water treatment and supply, wastewater collection and treatment, and stormwater management.

### **SUPPORTING INFORMATION**

The Water Utility takes a customer-focused approach to watershed resilience by working collaboratively across the Corporation, with Calgarians, other orders of government, regional municipalities, landowners, the development industry, and businesses through engagement, research, partnerships and education. More detailed information is provided in the attachments to this briefing note.

To protect Calgary's water supply, the Water Utility completed the One Calgary One Water Security Framework in 2019 with six key actions to ensure future water security. In 2020, the Water Utility will make progress on these key actions, including refining river modelling, participating in the Bow River Working Group's feasibility study of upstream reservoir options, and delivering the Source Water Protection Policy to Council. This policy will be presented in Q3 instead of Q2 due to shifting priorities caused by the Covid-19 pandemic. To better prepare Calgary for future droughts, a Drought Risk and Vulnerability Assessment was completed. This will inform Phase 2 of the Drought Management Plan to be completed in 2020. The City also actively contributed to Calgary Metropolitan Region Board (CMRB) conversations to ensure IWM priorities inform the development of the regional growth and servicing plans in 2020.

To encourage wise water use, the Water Utility is exploring new water conservation solutions for residential outdoor water use and for the business sector to keep Calgary on track to achieve water conservation targets. A business friendly program including water audits and a rebate initiative will be developed in 2020 to support large and small businesses to reduce operational costs and achieve water savings. To meet new Federal guidelines and ensure high drinking water quality for all customers, The City is accelerating the removal of a small remaining number of lead service lines by 2023.

# BRIEFING

To keep our rivers healthy, The City renewed its Approval to Operate for its wastewater treatment plants, optimizing operational efficiency while ensuring our commitment to a healthy river. Major upgrades to the Bonnybrook Wastewater Treatment Plant are on time and on budget. Upgrades will continue in 2020 and will accommodate future growth and protect the environment. Sediment loadings into the Bow River from stormwater remain below The City's benchmark, demonstrating the effectiveness of stormwater quality investments and pollution prevention programs. Stakeholder engagement was undertaken in 2019 to inform a new Stormwater Management Strategy being drafted in 2020 which will address stormwater and city-building challenges. Riparian health is also being improved, with 30 new natural infrastructure projects complete or underway to restore riparian health in areas used by fish and wildlife and make river banks more resilient to flooding. Progress on The City's riparian health target will be measured in 2020.

Working closely with communities to progress on key flood mitigation projects, advocating for upstream mitigation, and planning policy direction continue to be key focus areas in 2019 and 2020 to improve Calgary's resilience to river flooding (see UCS2020-0372).

The Water Utility's IWM work aligns with The City's Climate Resilience Strategy (Water Management and Natural Infrastructure themes) and is represented in the Climate Resilience Strategy Update 2019 (UCS2020-0308). IWM activities also tie into Resilient Calgary (Pillar #3 Natural Infrastructure and Pillar #4 Future-Ready Infrastructure). Advancing work across the four watershed management goals aligns with the One Calgary Council Directive stating that IWM is essential to protect public health and the environment, while strengthening resiliency to a changing climate, recognizing the importance of integrating watershed management into land use policies, plans and decisions while working collaboratively with stakeholders.

During the COVID-19 situation, the health and safety of citizens and employees remains a top priority. The Water Utility is prioritizing the delivery of essential services, and continues to move IWM initiatives forward, recognizing that there may be delays if resources need to pivot to ensure continuity of essential services. Some project stakeholder engagement and communication is being conducted through new avenues, including online meetings, town halls and other web-based feedback opportunities.

The City continues to treat, test and deliver high-quality water to customers during the COVID-19 pandemic, while working closely with partners and will continue to monitor the current situation to adjust work as needed. At this time, there is an increase in residential water use due to hand washing and more people being at home due to COVID-19. Conversely, there is a decrease in water use by businesses and industrial customers. Overall, water use in the city remains about the same.

## **ATTACHMENT(S)**

1. Attachment 1 – 2019 Integrated Watershed Management Snapshot – Demonstrating Value to Calgarians
2. Attachment 2 – 2019 Integrated Watershed Management Update



Growth in Calgary and the region relies on a safe, reliable, and secure water supply. The City’s water security framework, approved in 2019, addresses risks to Calgary’s water security, and provides guidance on Supply, Demand and Systems Operations initiatives to maintain water security now and in the future.

**2020 Planned Actions:** Make progress on the 6 water security actions, complete Phase 2 of the Drought Management Plan, deliver the Source Water Protection Policy to Council by Q2 2020, advance actions from the Wildfire Source Water and Bearspaw Reservoir Task Forces, broaden technical understanding of stormwater impacts on Calgary’s source water, and provide input to the Calgary Municipal Region Board growth and servicing plans being developed in 2020.

**2019 highlights**



Completed The City’s **Drought Risk and Vulnerability Assessment** so Calgary is better prepared to respond to future drought.



**Accelerating removal of lead pipe services** to address the public health risk posed by lead water pipes, with work to be complete by 2023.

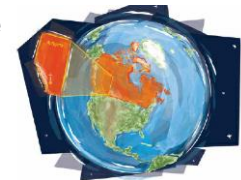


Calgary continues to have **high quality source water** in the Bow and Elbow Rivers. High quality water coming into our treatment plants allows us to provide **reliable, safe water for customers.**

**One Calgary One Water: A framework for Calgary’s water secure future**

was approved by Council in 2019. The framework aims to ensure water security for the future.

All **6 key actions** to address water security are underway:



1. Develop future water supply scenarios
2. Address water licence limits on high demand days
3. Ensure collaboration on a regional solution for water security
4. Advocate for a new upstream reservoir on the Bow River
5. Finalize the Drought Management Plan
6. Finalize the Source Water Protection Policy.



**GOAL #2: Use Water Wisely**

ISC: Unrestricted

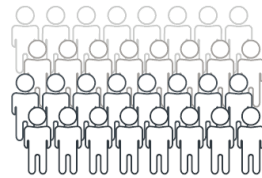
Since the 1980s, The City has invested over \$700M to reduce water demand through leak detection, water main replacement, metering, educational programs and water treatment plant improvements. This foresight has prepared Calgary for population growth and the impacts of climate change as we continue to take action to accommodate future generations. Guided by The City's 30-in-30 Water Efficiency Plan, in 2019, numerous citizen and business-focused programs and initiatives continued to keep water demand on track to meet goals.

**2020 Planned Actions:** Develop new water conservation tools for outdoor residential and business customers, expand program delivery for business customers, continue to partner with the irrigation industry to reduce water use, and examine short, medium and long term actions as part of the Water Loss Strategy.

**2019 highlights**

Peak day water use was 626 million litres on August 5, well below water treatment plant capacity. This means we **can sustain a population of 1.46 million** on a peak day.

total population calgary can provide water on a peak day

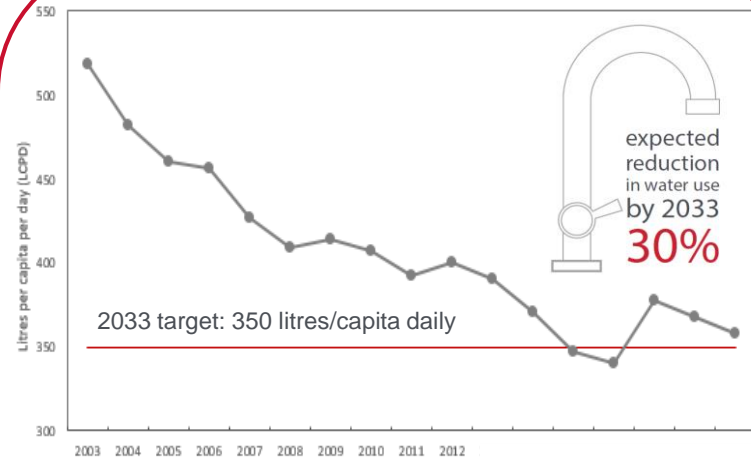


**1,460,000**

Developed a **Water Loss Strategy** to provide a holistic view of water loss and coordinate efforts across The Water Utility.

**Saved more than 240,600 L/day by fixing leaks** in Calgary's water distribution system, equivalent to almost 800 bathtubs/day. This also results in financial savings for The Water Utility.

Planned to explore additional **water conservation** solutions for **residential outdoor** water use and in the **business** sector.



Calgary is **on track to meet 30% water reduction** by 2033.

Single-family residential daily demand was the **lowest on record** for this customer group.

**197 L** of water used by average citizen daily

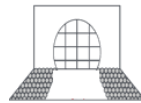




Pollutants in the rivers can negatively impact fish and wildlife, the ecosystem and drinking water. The City works diligently to manage risks through efficiencies in wastewater treatment, mitigating the impacts of city-building on stormwater quantity and quality, and protecting riparian areas adjacent to rivers and creeks.

**2020 Planned Actions:** Continue implementing major upgrades of Bonnybrook Wastewater Treatment Plant (WWTP), initiate ammonia toxicity study, draft the updated Stormwater Management Strategy, evaluate progress on riparian restoration and fish habitat compensation projects, initiate Phase 2 of the Watershed Health Indicators project and report to Council on the progress on the Nose Creek Watershed Management Plan.

**2019 highlights**



Renewed 10-year **Approval to Operate** Wastewater Treatment Plants, which will ensure a **clean and healthy river** and optimize operational efficiency.

**Major upgrades** to the Bonnybrook Wastewater Treatment Plant are **on time and on budget**. Upgrades will accommodate growth, help protect the environment, and improve energy efficiency.

Continued stakeholder engagement to develop a new **Stormwater Management Strategy**, which will be drafted in 2020. The purpose is to provide new opportunities to address stormwater and city-building challenges.



**Stormwater Pollution Prevention Program** efforts contributed to healthier rivers by reducing soil loss from construction sites by 28,346 tonnes. **Training and education** helped achieve 95% compliance with Erosion & Sediment Control guidelines.

Calgary remained under The City's benchmark for Total Suspended Solids (TSS) loadings into the Bow River from stormwater, demonstrating **the effectiveness of The City's stormwater quality investments** to keep our rivers healthy.

**30 new** bioengineering and riparian planting projects were complete or underway, providing **natural infrastructure** used by fish and wildlife, improving riparian health and providing flood resiliency.



**GOAL #4: Build Resiliency to Flooding**

ISC: Unrestricted

The City’s Flood Resilience Plan is adaptable and flexible. It includes a combination of upstream, community, and property-level flood mitigation to make Calgary more resilient to river flooding considering climate uncertainty and continued urban development. The Community Drainage Improvement (CDI) program increases stormwater capacity to minimize localized flooding risks, address to address climate impacts and future densification in mature communities.

**2020 Planned Actions:** Continue to work with communities to build resiliency, explore policy tools in advance of future flood hazard mapping updates, continue advocating for upstream flood mitigation efforts, support research and development, continue advocacy efforts and support the delivery of the Community Drainage Improvement program.

**2019 highlights**



payback  
on flood  
investments  
**10:1**



Integrated prioritization of **river flood** and **Community Drainage Improvement** projects to address all flooding as a single priority.

Advanced detailed design for the **Downtown Flood Barrier** and **Upper Plateau Separation** resilience projects to improve flood resiliency in these communities.

Made significant progress on gate **upgrades at the Glenmore Dam**. The gates will be operational before the 2020 flood season, **minimizing flood damage** from smaller more frequent flood events on the Elbow River.



Worked **closely with at risk communities** to progress key community-mitigation barrier projects **to ensure stakeholder concerns were well understood** by The City and considered as projects progress.

Focused advocacy efforts on **upstream mitigation** on the **Elbow** and **Bow Rivers** projects required for flood resiliency.

Identified a **need for new policy direction** in anticipation of Government of Alberta flood hazard mapping **to ensure appropriate land use and policy** measures to reduce Calgary’s flood risk.



# 2019 INTEGRATED WATERSHED MANAGEMENT UPDATE



Prepared by the Water Resources Business Unit

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## 1. INTRODUCTION

### 1.1 PLANNING FOR A HEALTHY WATERSHED

Water is our most valuable natural resource. A healthy, resilient watershed provides clean, reliable water and is vital for current and future generations in Calgary and the region. The heart of Calgary is situated where the Bow River meets the Elbow River, highlighting the interaction of the natural system with our built environment.

Through One Calgary, **Calgarians reinforced how much they value healthy river areas, reliable safe drinking water, and the management of their wastewater.** The City is committed to ensuring a resilient watershed to make life better for Calgarians. Aligning with Council’s Healthy and Green City Directive, The City of Calgary (The City) is dedicated to an integrated watershed-scale management approach.

This is important because increased pressure on watersheds from growth in the region, as well as the impacts of a changing climate, makes watershed management one of Calgary’s most critical resiliency challenges and requires a collaborative, flexible approach.

Council’s decisions and significant investments over the past 30 years have prepared Calgary for population growth and climate change. We continue to take a forward-looking, adaptive approach to integrated watershed management in a climate-constrained future.

Land and water resources in the Bow and Elbow watersheds are used for traditional purposes by indigenous peoples and The City of Calgary acknowledges that our watersheds are a part of the traditional territories of the Treaty 7 First Nations.

With guidance from Council, The City’s commitment to watershed protection considers the **needs of a growing customer base and maximizing the economic, social and environmental benefits of decisions, programs, and investments.** Building resiliency of shared water resources is the driving force behind an integrated watershed management approach.

Working inclusively with the Province, regional partners, stakeholders and citizens, The City aims to protect the water supply, use water wisely, keep rivers healthy and build resiliency to flooding. The City’s Water Utility (Water Utility) delivers on this commitment through three lines of service: water treatment and supply, wastewater collection and treatment, and stormwater management.

## 1.2 OUR GOALS

The Water Utility’s integrated watershed management (IWM) framework (Figure 1.1) is designed to be flexible, inclusive, and considers social, environmental, and economic benefits of delivering the Water Utility’s four IWM goals across the Water Utility’s Lines of Service (Figure 1.2). This report describes the 2019 actions taken to achieve the goals, how these actions support the services delivered to customers and addresses watershed challenges and priorities.

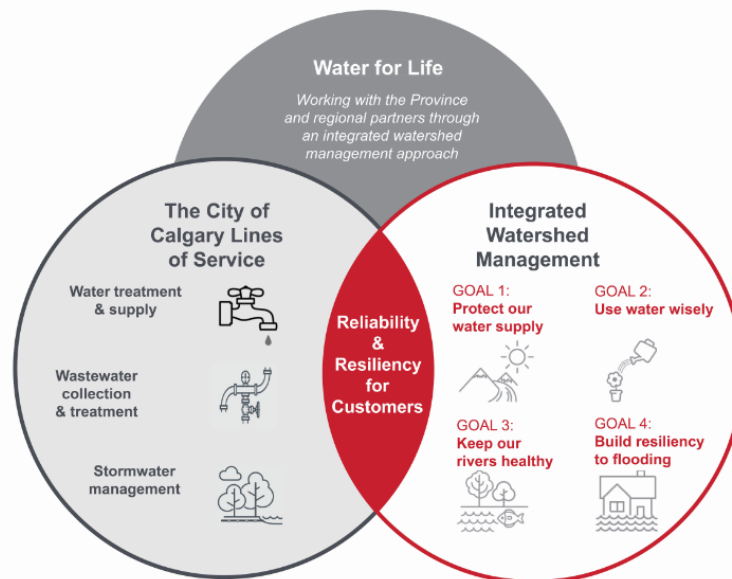



FIGURE 1.1 THE WATER UTILITY’S INTEGRATED WATERSHED MANAGEMENT STRATEGIC FRAMEWORK





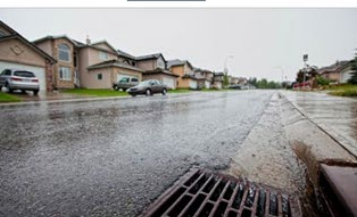
 <p><b>Water Treatment and Supply</b></p> <p>Treatment and delivery of your drinking water, ensuring public health and long-term sustainability of a precious resource</p>	 <p><b>Wastewater Collection and Treatment</b></p> <p>Capture and treatment of Calgary’s wastewater; protects public health, property, and the environment</p>	 <p><b>Stormwater Management</b></p> <p>Collection and management of rain and snow/ice melt, protecting you, your property and our environment</p>
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FIGURE 1.2 THE CITY ADVANCES ITS INTEGRATED WATERSHED MANAGEMENT APPROACH THROUGH THREE LINES OF SERVICE

### 1.3 ALIGNMENT WITH CORPORATE PRIORITIES



## One Calgary

The Water Utility’s watershed management goals are aligned with One Calgary’s Council Directive of **A Healthy and Green City**, and **A City of Safe and Inspiring Neighbourhoods**. A Healthy and Green City: Calgary is a leader in caring about the health of the environment and promotes resilient neighbourhoods where residents connect with one another and can live active, healthy lifestyles. Advancing integrated watershed management goals aligns to the following One Calgary Council Directives:

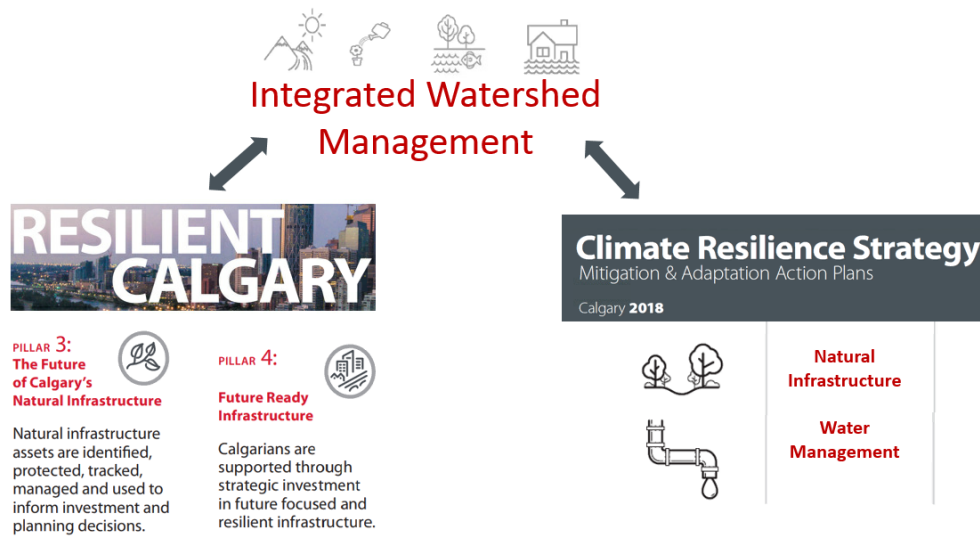
- Integrated watershed management is essential to protect public health and the environment, while strengthening our resiliency to a changing climate.
- Calgary must develop our communities with a focus on achieving future water security and a sustainable water supply.
- Watershed management must be integrated into our land use policies, plans and decisions.
- Accomplishing sustainable, effective watershed management within Calgary and the region will also require working collaboratively with other orders of government, adjacent municipalities, residents, Watershed Planning and Advisory Councils (WPACs), stakeholders, landowners, the development industry, businesses and the First Nations.

### 1.4 RESILIENT WATER MANAGEMENT AND CLIMATE CHANGE

We are taking action to **ensure that Calgary’s watersheds are resilient to climate impacts through proactive planning of water management practices** and storage capacity for both extreme flood and drought as priorities. In support of the Climate Resilience Strategy, the Water Utility is considering climate impacts in its programs, projects, strategies and plans, ensuring flexibility to adjust these along the way. Several mitigation and adaptation actions are integrated into programs and projects in the 2019-2022 business cycle.

Climate change is altering how and when Calgary’s watershed receives precipitation, affecting both water quantity and water quality. Precipitation will fall with greater intensity, summers will become hotter, drier and longer, and mountain snowpack melting may occur earlier in the year. With increasing temperatures and drought conditions, water demands will likely increase. Increasing threat of wildfire in our source watersheds is a risk to our source water quality.

**Our integrated watershed management work supports The City’s Climate Resilience Strategy and Resilient Calgary Strategy** (Figure 1.3). Examples of how the Water Utility’s work helps achieve these corporate priorities are highlighted throughout this report.



**FIGURE 1.3 THE CITY'S INTEGRATED WATERSHED MANAGEMENT PROGRAMS HELP ACHIEVE OUTCOMES OF THE RESILIENT CALGARY STRATEGY AND THE CLIMATE RESILIENCE STRATEGY**

## 2. GOAL #1: PROTECT OUR WATER SUPPLY

### ***The value of ensuring a water secure future***

Economic and urban growth in Calgary and the region relies on a safe, reliable, and secure water supply. The region is prone to drought and future water security may be impacted by climate change and regulatory and surface water licence restraints. Urban growth and climate uncertainties are expected to increase pressures on Calgary's source water. Our new water security framework will help protect our water supply and address water security risks including impacts to both water quality and quantity, and allows us to continue to take actions to address these challenges.

### **2.1 WATER SECURITY**

*One Calgary One Water: A framework for Calgary's water secure* was developed to support the **OneCalgary Directive to develop our communities with a focus on achieving future water security** and provide action on the Water Utility's Water Treatment and Supply service commitment to provide long-term sustainability of water resources.

*One Calgary One Water* was finalized in 2019 and accepted for information at Calgary City Council on 2020 January 13. This **framework provides guidance around the critical question of water security: Will there be enough safe clean water to meet the needs of customers, the environment and ensure a sustainable economy in the future?**

The Framework identifies three major risks that impact water security (Figure 2.1):

- A changing climate introduces uncertainty regarding water quality and quantity in the future, particularly around disruptive and costly events such as drought and wildfire;

- Regulatory and water licence limits impact river water availability to Calgary’s Water Treatment Plants within a 20-year timeframe; and
- Population and economic growth pressures continue to change the balance of water supply and demand.

The Framework highlights current Supply, Demand and Systems Operations initiatives that maintain water security today. Six priority actions recommended in the Framework are underway to guide critical long-term work:

1. Develop future water supply scenarios
2. Address water licence limits on high demand days
3. Ensure collaboration on a regional solution for water security
4. Advocate for a new upstream reservoir on the Bow River
5. Finalize the Drought Management Plan
6. Finalize the Source Water Protection Plan and Policy

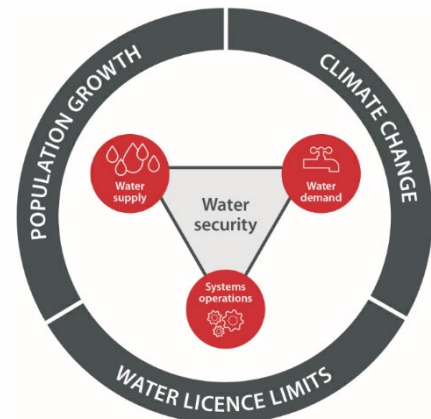


FIGURE 2.1 WATER SECURITY RISKS (OUTSIDE) AND LEVERS (INSIDE)

Next steps on each of these actions for 2020 are outlined in Table 2.1 at the end of this section.

## 2.2 DROUGHT RESPONSE AND MANAGEMENT

The summer of 2019 provided a reprieve from the hot temperatures and below average precipitation experienced in the Calgary region between 2015 and 2018. Climate variability is expected and provides The City an opportunity to **advance collaborative efforts to prepare for future drought conditions and provide input to the Drought Management Plan - Priority Action 5 from the water security framework.**



FIGURE 2.2 ALBERTA WATER COUNCIL GUIDE, 2019

**To assist communities in preparing for and responding to multi-year drought,** The City supported the Alberta Water Council (AWC) with the development of the guide *Building Resiliency to Multi-Year Drought* (Figure 2.2). The guide brings together Alberta’s drought resources including lessons learned from major drought events (Figure 2.3) and the most current tools and information to prepare for drought.

The City’s internal **Drought Risk and Vulnerability Assessment was completed in 2019 to better understand and respond to drought.** The Water Utility examined four future climate scenarios for the mid-to late century and evaluated the risks and vulnerabilities to seven drought impacted systems: Water Supply, Stormwater, Wastewater, Operational, Environmental, Organizational and Regional/Communities. This work will **help prioritize systems which may have significant consequences** should droughts occur at longer durations or greater frequency under a changing climate.



Starting in 2020, these two projects will form the basis for developing The City of Calgary’s Drought Mitigation and Response Strategies project. Building on the collaborative work in 2019, new drought mitigation and response strategies will be developed in 2020.

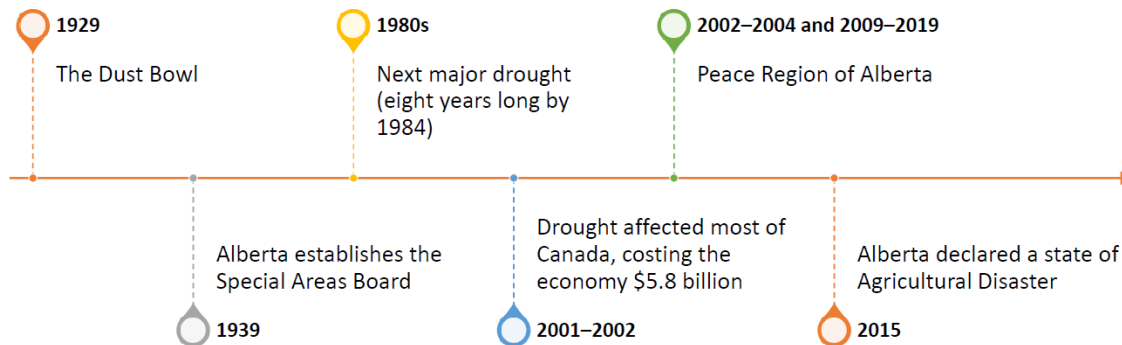


FIGURE 2.3 MAJOR DROUGHT EVENTS IN RECENT ALBERTA HISTORY (AWC, 2019)

## 2.3 SOURCE WATER PROTECTION

### *The value of protecting Calgary’s source water*

The purpose of Calgary’s Source Water Protection Plan vision is that “*Our source watershed continues to provide clean, high quality water to the region, through proactive stewardship and management*”. As Calgary’s population continues to grow, so does the demand on the rivers. The Plan’s four key goals and targeted priority actions aim to proactively protect the quality of our source water supplies.

As part of the *One Calgary One Water: A Framework for Calgary’s Water Secure Future*, a commitment was made to bring a Source Water Protection Policy to Council by Q2 in 2020. This has since been delayed to likely Q3 as a result of the Covid-19 pandemic. A Council-approved Source Water Protection Policy will **ensure that actions in the Source Water Protection Plan and the Riparian Action Program are corporate priorities and will meet Council’s One Calgary directive to integrate watershed management into our land use policies, plans and decisions.**

Other high priority source water protection activities in 2019 included:

- The Bearspaw Reservoir Tri-lateral Task Force (Bearspaw Task Force), a collaborative effort by The City, Rocky View County and TransAlta, completed a Consensus Report in 2019. The report establishes recommendations and next steps for local and regional risk management of the Reservoir. Some of the high risks include: growth and land use change and associated stormwater runoff, recreation activities, and runoff after major wildfires upstream. The City is actively engaged with Rocky View County to scope the next stages of work for a risk management strategy for the Bearspaw Reservoir.
- Run-off from landscapes burned by wildfires in our source watersheds contaminating water supplies was identified as one of two biggest risks to Calgary’s source water. A collaborative Source Water Wildfire Task Force initiated by The City completed its analysis and evaluation of

wildfire risks to source water and proposed a series of management options. Strategies include actions related to: communications and coordination, research partnerships, water treatment and asset planning, and reduce large wildfire risks through actions such as prescriptive burns and other forest management techniques.

## 2.4 WATER QUALITY

### *The value of safe and reliable drinking water*

The City works hard to ensure all Calgarians have a safe and reliable supply of drinking water, a key performance metric for the Water Utility. Calgary's water treatment plants operate 24 hours a day, 365 days a year. As water travels from the mountains and foothills, through our water treatment plants, across the city through the distribution system and to customer taps, Calgary's water is tested at every step to ensure its quality is maintained. Calgary's drinking water is safe and reliable, and meets or is better than the Guidelines for Canadian Drinking Water Quality. The City's monitoring results on key drinking water quality parameters can be found at [www.calgary.ca/water](http://www.calgary.ca/water).



100%  
regulations met for treated  
drinking water quality

### 2.4.1 CALGARY'S SOURCE WATER QUALITY

The City regularly tests water near its treatment plants and Calgary's source water quality continues to meet a high standard. **Safeguarding our high-quality source water provides the first line of defense in a multi-barrier approach to delivering safe, clean drinking water, something that is valued highly by customers.** Both the Bow River near the Bearspaw Dam and the Elbow River near the Glenmore Reservoir provide very high-quality water supply to The City's water treatment plants. The federal Water Quality Index (WQI) is used to track conditions, which translates data from multiple water quality parameters into a score. The Bow River typically has 'Excellent' water quality, while the Elbow River typically has 'Good' water quality. The lower flow rates of the smaller Elbow River result in higher sensitivity to water quality conditions, so guidelines are more often exceeded. Over the last decade, consistently high WQI ratings have been observed near The City's water treatment plants (Figure 2.4). **This means the water is easier to treat before it goes to customer taps.**

With growth in Calgary's source watersheds, understanding the risk of stormwater contamination to The City's drinking water supplies remains a key priority for water quality monitoring in 2020. Continued monitoring is being completed to characterize the risk of pollutants introduced to Calgary's source waters and the potential impacts to the drinking water treatment process. Broader Water Utility-wide discussions are occurring to examine possible mitigation strategies through stormwater infrastructure and best management practices.



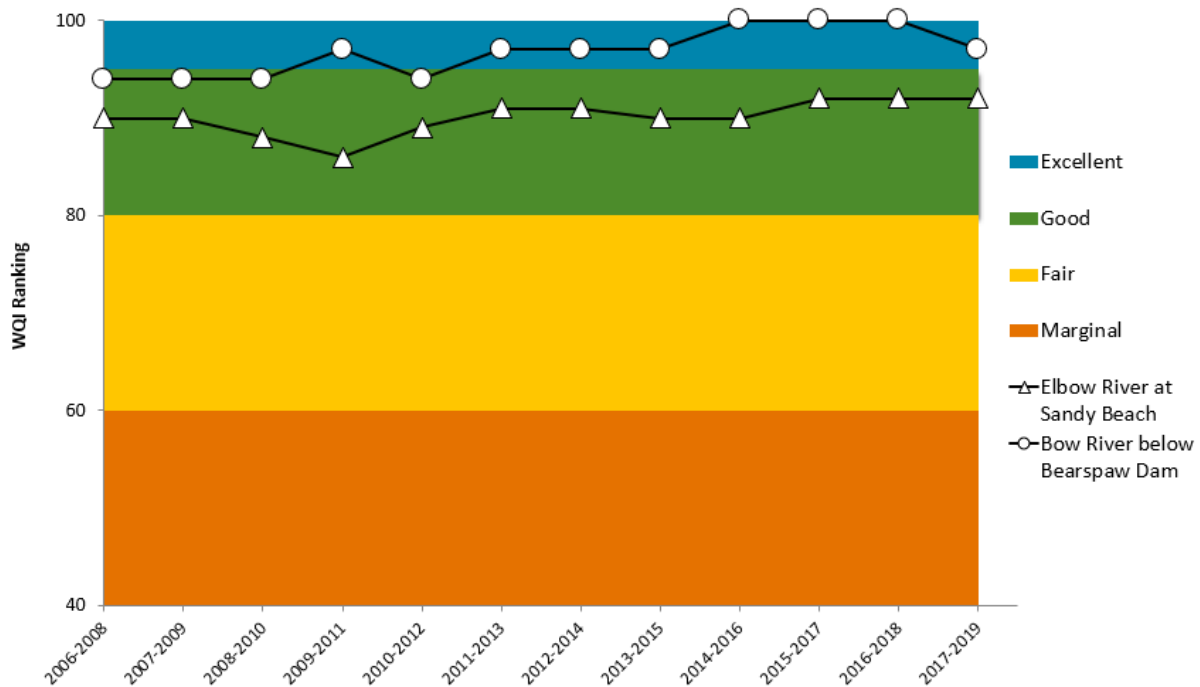


FIGURE 2.4: WATER QUALITY INDEX - CALGARY'S SOURCE WATER

### 2.4.2 LEAD SERVICE LINES

Lead is not naturally occurring in the Bow and Elbow Rivers. There are also no lead pipes at Calgary's water treatment plants or in the network of water mains that deliver water to households. In Calgary, any issues of elevated levels of lead are related to older homes that have lead water service lines connecting the water main under the street to the home, and/or from pipes and plumbing inside the home. Water service lines are a shared responsibility between The City and customer at the property line.

About 550 homes have public lead service connections, representing about 0.2% of water service.

Replacement of lead water service lines is a best practice in lead mitigation across Canada. **To address the public health risk posed by lead water services and from pipes and plumbing inside the home, The City will implement a revised lead mitigation strategy in 2020.** A foundational component of this strategy is the accelerated removal of the remaining lead services lines. The City will replace 550 known public lead services and 150 known lead services on private property. Replacement of these known public and private lead water services is estimated to be complete by the end of 2023.

In 2019 several significant changes were made in how lead is expected to be managed in drinking water in Alberta. In 2019 March, Health Canada lowered the Maximum Acceptable Concentration (MAC) for lead from 10 per billion (ppb) to 5 ppb. In the past, a utility's compliance was based on samples taken from its treatment and distribution system. The new guidelines will require that compliance to be based on concentration levels at customer's taps.

In addition to accelerated lead service replacement, The City will implement a revised lead mitigation strategy, in 2020, focused on increased sampling and customer education in alignment with Alberta Environment and Parks Guidance Document for Managing Lead in Municipal Drinking Water Systems in Alberta. The increased sampling will occur throughout the distribution system, including in homes built in a variety of different years.

## 2.5 REGIONAL COLLABORATION

The Water Utility’s integrated Watershed Management Strategic Framework recognizes the importance of working with the Province and regional partners. Many of the programs and projects in this report speak to those relationships. In addition, the Water Utility takes a broad, programmatic approach to ensure clear, consistent and intentional decisions and actions across all of its regional activities.

### Regional servicing

The City is dedicated to **ensuring reliable and resilient water and wastewater servicing for Calgary and its regional customers**. The Water Utility has been providing water and wastewater services outside of its corporate boundaries since 1961 and continues to receive and address formal requests for services outside of the Calgary’s boundaries. The City retains full ownership of its water licences and has reserved roughly two percent of Calgary’s annual water allocation for existing regional customers through 2022.



The Water Utility worked with regional customers in 2019 to amend regional Master Servicing Agreements (MSAs) following the completion of the 2019-2022 Cost of Service Study. The purpose of these MSAs is to reinforce the commitment of both parties to **integrated long term planning and full cost recovery for services** provided.

### Regional planning

As part of the Corporate team, the Water Utility continued to be involved in the work of the Calgary Metropolitan Region Board (CMRB) throughout 2019. The CMRB was established in 2018 with a membership of 10 municipalities to promote regional long-term sustainability, ensure environmentally responsible growth management, coordinate regional infrastructure investment and service delivery, and promote the economic well-being of the region.

2019 provided an opportunity to **express some of The City’s top priorities related to integrated watershed management to ensure they are considered in the CMRB’s long-term growth plan and servicing plan** being developed by January 2021. Work in 2019 work focused on the development of background reports and technical studies intended to inform the growth plan development in 2020. In parallel, the Water Utility continues to support development of a corporate regional strategy and to provide technical review and comment on regional planning circulations to ensure The City’s interests and intermunicipal planning commitments are upheld in the development plans of our neighboring municipalities.

### Partnerships with the Province

The Water Utility’s commitment to IWM recognizes the authorities and responsibilities of the Government of Alberta in delivering on the goals and actions articulated in Alberta’s Water for Life strategy. The three main goals are:

- Safe, secure drinking water supply
- Healthy aquatic ecosystems
- Reliable, quality water supplies for a sustainable economy.

As such, the Water Utility’s relationship with the Province involves many staff from across both orders of government. The Water Utility continues to carefully manage and foster long-term, successful relationships with counterparts in Alberta Environment and Parks and Alberta Transportation, in particular.

## 2.6 PRIORITIES IN 2020

Table 2.1 summarizes activities The City plans to take to continue protecting our water supply in 2020.

**Table 2.1 Goal #1: Protect Our Water Supply – 2020 focus**

2020 Planned Actions
Water Security #1: Refine Bow River flow modelling work with research partner Global Water Futures.
Water Security #2: Explore water licence discussions with major stakeholders TransAlta and the Government of Alberta.
Water Security #3: Continue work with the CMRB to develop Regional Growth and Servicing Plans.
Water Security # 4: Remain an active member of the Bow River Working Group. Advocate for Phase 2 of the Bow River Reservoir Options project to explore feasibility of the three options for an upstream water management reservoir on the Bow River.
Water Security #5: Complete Phase 2: Drought Mitigation and Response Strategies.
Water Security #6: Report to Council on the Source Water Protection Plan and Policy in 2020.
Continue working with Rocky View County on managing risks at the Bearspaw Reservoir.
Continue to advance implementation actions of the Wildfire-Source Water Task Force Strategy.
Broaden understanding of stormwater contamination risk to The City’s drinking water supplies.

## 3. GOAL #2: USE WATER WISELY

Significant investments over the past 30 years have helped ensure Calgary’s water security despite population growth and a changing climate. The City has invested heavily (over \$700M) to reduce per capita demand through leak detection, main replacement, water metering, educational programs and water treatment plant upgrades. Today, our per capita target is 350 litres per day. This foresight on water conservation and plant efficiency has kept the Water Utility on track to achieve our water conservation targets. **Effective water**

**efficiency and conservation programming enables The City to continue to supply all Calgarians with the water they need, even as our population increases over time.**

### 3.1 WATER EFFICIENCY PLAN

#### *The value of water conservation initiatives*

The City’s 30-in-30 Water Efficiency Plan continues to guide sustainable water management with a goal to maintain Calgary’s total water use at 2003 levels through 2033, even as the population grows. Through strategic investments in infrastructure, bylaw adjustments and water efficiency programs, overall water demand has declined since 2003, keeping more water in the river and ensuring water supply and licence security. To encourage wise water use, citizen-focused initiatives continue to keep water demand on track to meet our Water Efficiency Plan goals, while also providing customers’ savings on their monthly bills.

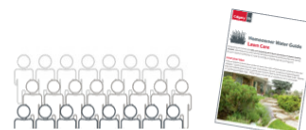
In 2019, The City reviewed progress on the 2016 Water Efficiency Plan and developed a plan to research additional water conservation solutions for residential outdoor water use and in the business (industrial, commercial and institutional or ICI) sector. The development of a Business Water Efficiency Program continued in 2019. This business-friendly Program was refined to develop quality services for a broader ICI audience, supporting the Calgary’s Comeback initiative for economic recovery. The Program will include water audits and a rebate initiative to support large and small businesses to reduce their operational costs and achieve water savings. By the end of 2020, we will build upon existing programs with new recommendations for water conservation solutions in residential outdoor settings and the business sector. These recommendations will be designed with the Calgary market in mind and will align with existing work in climate change, drought, stormwater and land use planning. This work ensures a secure and sustainable water supply while protecting public health and the environment for generations to come.



In 2019, The Utility developed a plan to research additional **water conservation** solutions for **residential outdoor** water use and in the **business** (industrial, commercial and institutional or ICI) sector.

#### 2019 highlights:

- Increased reach of the residential water leak detection program to support high water use messaging
- Continued focus on peak day specific messaging to reduce outdoor water use
- Launched the Homeowner Water Guide Series to reduce both indoor and outdoor water use
- Participated in industry wide cooling tower research to further knowledge of our business customers and their technology
- Continued delivery of the multifamily toilet replacement program
- Supported the local irrigation industry in educating members about efficient outdoor water use
- Provided public tours of the Glenmore Water Treatment Plant to 240 Calgarians.



We shared water conservation messaging with **over 10,000 citizens** and launched a **Homeowner Water Guide** in 2019.

### 3.2 CALGARY'S WATER USAGE

Water efficiency measures implemented by The City, improvements in water efficient technology, and effective citizen outreach and education have been successful in helping Calgary remain below the Water Efficiency Plan benchmark. The City's water efficiency measures have been successful in helping Calgarians reduce water usage over the years, despite population growth during that time in Calgary and the region (Figure 3.1).

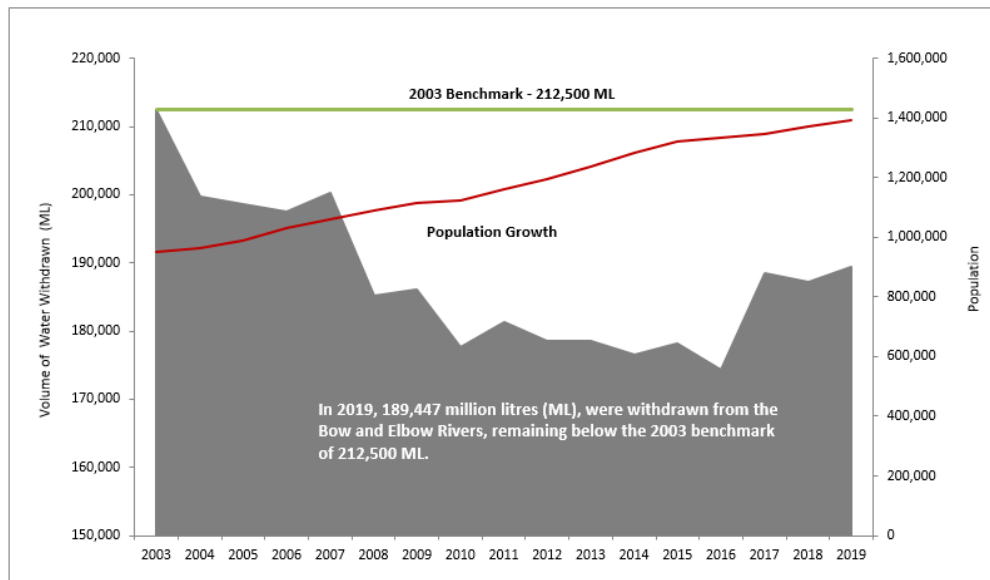


FIGURE 3.1 RIVER WITHDRAWALS OVER TIME

### 3.3 CALGARY'S PER CAPITA WATER DEMAND

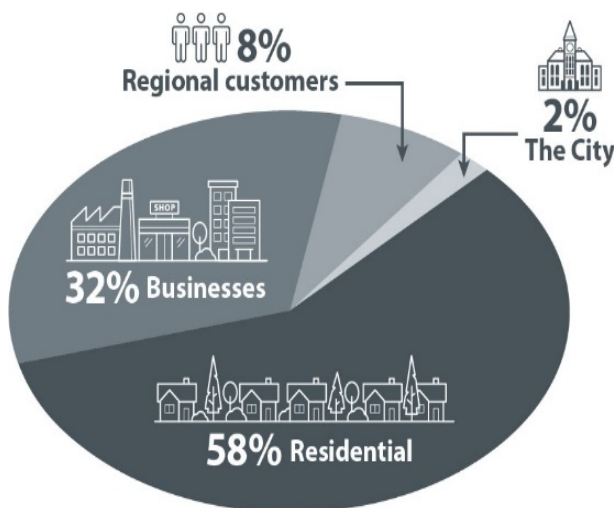


FIGURE 3.2 CALGARY'S 2018 WATER DEMAND BY CUSTOMER

Most of Calgary's water demand is made up of single-family and multi-family customers, followed by business customers (Figure 3.2).

Per capita water demand is the average volume of water used per person per day. In 2019, Calgary's overall water use, including all residential, business and municipal, was 356 litres per capita per day (lpcd), well on track to meet the 2033 target of 350 lpcd (Figure 3.3).

Of the overall water use in 2019, **single-family residential demand was estimated to be 197 lpcd, the lowest on record for this customer group. This**

shows that customers are doing their part, and The City’s water conservation programs are working.

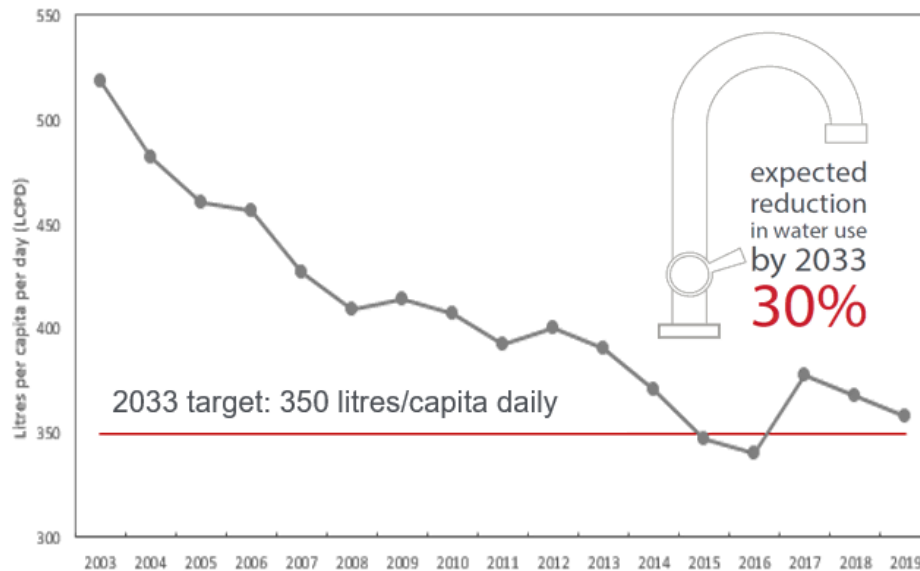


FIGURE 3.3 CALGARY'S TOTAL PER CAPITA WATER DEMAND OVER TIME

Citizen and business focused initiatives around water conservation help to ensure that Calgary is on track to meet the goals of the Water Efficiency Plan. In 2019 The City launched the Homeowner Water Guide series on [Calgary.ca/waterguide](http://Calgary.ca/waterguide). These guides are meant to educate Calgarians on all aspects of indoor and outdoor water use on their property. Topics range from seasonal “how-to” checklists to checking toilets and faucets for leaks.



The guides were made available to citizens at a variety of events and were promoted to Calgarians on social media and on the ReThink Water Facebook page.

Water savings of over 32 million litres were achieved at multifamily properties in 2019, by replacing more than 580 toilets at 16 different locations, contributing to the continued reduction in per capita water demand. This program will continue in 2020 and is available to any multi-unit building in Calgary where high-efficiency toilets have been purchased and installed to replace old 13L toilets.

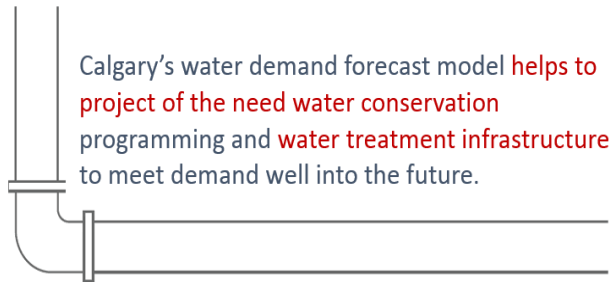
### 3.4 PEAK DAY DEMAND

The one day in a year that customers use the most water is referred to as the peak day demand. This typically occurs in the spring or summer months, as water demand can spike from outdoor watering activities and cooling. In 2019, Calgary’s peak day water demand occurred on August 5<sup>th</sup>, and was 626 megalitres (ML), below the 950 ML threshold which is the current capacity of Calgary’s water treatment plants (Figure 3.4). **This means we can continue to provide water for 1.46 million people on a peak day.** This year’s peak day was lower than observed in recent years and can likely be attributed to cooler and wetter than average summer conditions.

total population calgary can provide water on a peak day



The Water Utility **partners with customers to conserve water and reduce peak day demand**. An emphasis on outdoor water conservation and making low water use landscaping choices played an



Calgary's water demand forecast model **helps to project the need water conservation programming and water treatment infrastructure** to meet demand well into the future.

important role in saving water through the summer months. The YardSmart Program continued delivering its peak day messaging to target outdoor watering. In 2019, through continued work with partners, the YardSmart program delivered 10 Water Wise landscape design workshops, sold 1300 rain barrels and reached over 3000 Calgarians at public events.

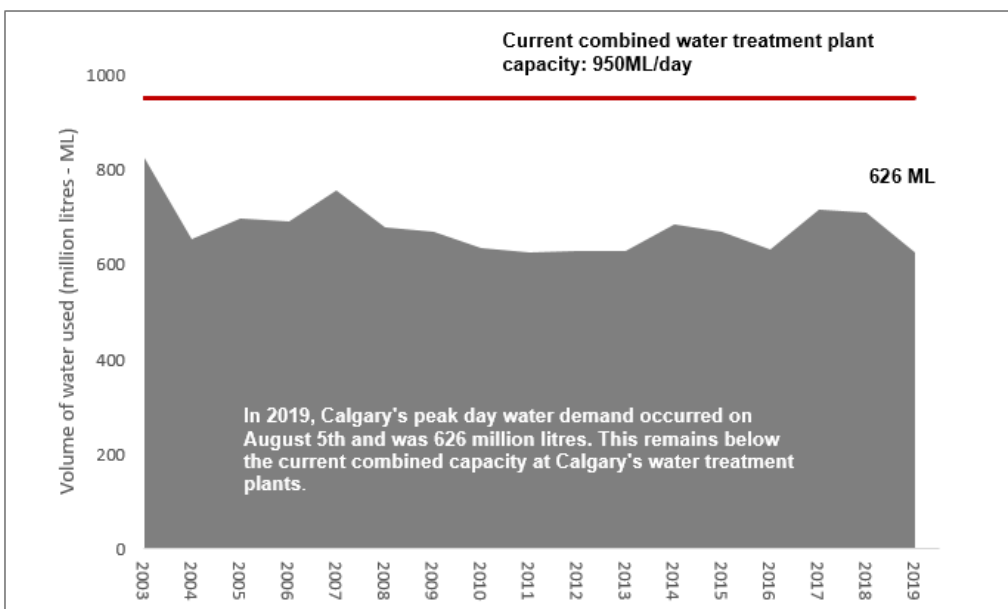


FIGURE 3.4 - PEAK DAY DEMAND – MAXIMUM VOLUME OF WATER USED IN CALGARY IN ONE DAY

### 3.5 WATER LOSS MANAGEMENT

Non-revenue water is a term used to describe water that's treated and distributed, but not billed to a customer. **The Water Utility undertakes several proactive initiatives to reduce non-revenue water loss.** Water loss includes real losses, which is water lost through system leakage and main breaks, as well as apparent losses – water lost through inaccurate metering and systematic data handling issues associated with billing. Non-revenue water also includes water used for delivery of City services such as main flushing and firefighting, but this water is not considered loss. Apparent water losses are those incurred when customers are not appropriately metered and billed for the water they use. The Water Utility completes proactive meter testing and replacement for customers across the city to ensure meter accuracy.

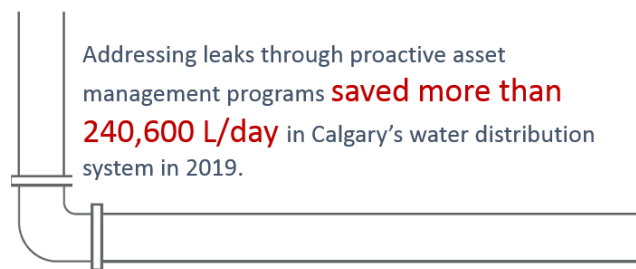


### Water loss strategy

In 2019, the Water Utility developed a **Water Loss Strategy to provide a holistic view of water loss across the Water Utility and coordinate water loss reduction efforts.** In 2019, the focus of the strategy was the completion of a thorough water audit to understand the current state of water loss across the Water Utility, as well as recent and ongoing water loss reduction activities. Plans for 2020 include working on the short, medium and long-term activities required to reduce Water Utility water loss and build the structure of the strategy and water loss targets.

### Leak detection

**To reduce real losses, as well as protect property, the environment, and drinking water quality, we conduct proactive asset management on City water infrastructure.** In addition to addressing main breaks and other leaks that present themselves, leak detection and feeder main inspections are critical pieces of our infrastructure maintenance program as it relates to water loss. The identification of leaks prior to the surfacing of the leak can reduce the overall leak run time and the volume of water lost, and reduces the likelihood for catastrophic failure. Additionally, there are areas in the city where due to the geotechnical conditions, water leaving a distribution main may never come to surface and would instead drain into other infrastructure or to the river.



In 2019, crews tested new equipment that is more effective at locating leaks on plastic (PVC and polyethylene) pipes. This is critical as plastic pipe materials comprise an increasing percentage of the water distribution system. Leaks identified through the leak detection and feeder main inspection programs are scheduled for repair.

In 2019, City crews identified and fixed leaks in water mains, copper service connections, and feeder mains, leading to a savings of more than 204,600 L per day.

## 3.6 PRIORITIES IN 2020

The City will continue working with customers to encourage responsible and efficient use of water. Activities planned for 2020 are summarized in Table 3.1.

**Table 3.1 Goal #2: Use Water Wisely – 2020 Focus**

2020 Planned Actions
Implement Business Water Efficiency Program including water audits and a rebate initiative. Create new recommendations for water conservation in residential outdoor settings and the business sector.
Promote the Homeowner Water Guide Series
Continue delivery of the multifamily toilet replacement rebate program
Expand program delivery for business customers
Continue to partner with the irrigation industry to support efficient outdoor water use
Continue to work on short, medium, and long-term activities required to reduce utility water loss
Utilize water demand forecast modeling to support peak day management programming initiatives.



## 4. GOAL #3: KEEP OUR RIVERS HEALTHY

### ***The value of wastewater, stormwater and riparian improvements to keep rivers healthy***

Calgary is a big, growing city on relatively small rivers and requires ongoing efforts to keep our waterways healthy. Excess nutrients, sediment, bacteria and other pollutants that enter our rivers can negatively impact fish and wildlife, the ecosystem and drinking water. Managing water quality is a major component of our alignment to the Provincial South Saskatchewan River Basin Regional Plan and protecting Calgary’s waterways is guided by Provincial objectives for the Bow River. We work diligently to manage these risks through efficiencies in wastewater treatment, mitigating the impacts of city-building on stormwater, and protecting the areas adjacent to rivers and creeks.

### 4.1 WASTEWATER MANAGEMENT

#### 4.1.1 APPROVAL TO OPERATE

The City operates its three wastewater treatment plants (Bonnybrook, Pine Creek and Fish Creek) and a wastewater collection system. In 2019, The Government of Alberta renewed Calgary’s wastewater operating approval for the next ten years.

**The renewal helps optimize operational efficiency while ensuring our commitment to a clean and healthy river.**

Following substantial collaboration and negotiation with provincial regulators, this is a major milestone for The City of Calgary.



Received **Approval to Operate** WWTPs to ensure **healthy**

**watersheds** and **manage costs** for stormwater and wastewater treatment upgrades

#### **Bow River Water Quality Model upgrade**

The Water Utility upgraded its Bow River Water Quality Model (BRWQM) to simulate water quality conditions in the Bow River to incorporate changes in the wastewater treatment plants and stormwater infrastructure. Modelling results were used to support The City’s Wastewater Approval to Operate.

#### **Total Loading Objective Assessment**

The goal of the total loading objective assessment (TLOA) study was to **identify watershed loading objectives for select water quality parameters to protect fish health and habitat.** The TLOA screened more than 123 parameters to assess potential impacts to the Bow River and confirmed stormwater and wastewater loading objectives for the Approval renewal.

#### **City-wide stormwater loading targets**

The Water Utility developed a new, fine-resolution stormwater management model to simulate Calgary’s non-point source loadings going into the Bow River. The new model also includes updated information on Calgary’s impervious cover to simulate the city-wide runoff. This model will be used to provide guidance on stormwater management to optimize best management practices.

Through these studies, The City **negotiated Provincial water quality guidelines to keep Calgary’s watershed healthy and potentially save millions of dollars in future wastewater and stormwater upgrades.** In 2020, the Water Utility will initiate a study on ammonia toxicity to inform the development

of site-specific ammonia guidelines appropriate for Calgary’s watershed. The Water Utility’s continued rigorous analysis ensures that the Bow River and its aquatic species are kept healthy, while allowing operational flexibility and balancing investments in wastewater treatment upgrades.

#### 4.1.2 WASTEWATER TREATMENT PLANTS

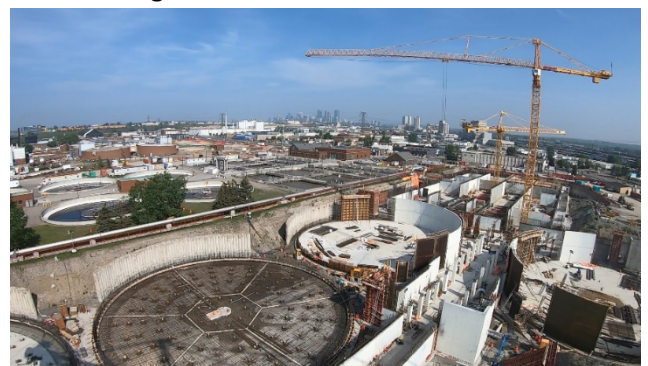
In 2019, The City’s wastewater treatment plants continued to produce treated effluent compliant with Provincial regulations. **Major upgrades to the Bonnybrook Wastewater Treatment Plant are ongoing to protect our rivers by ensuring continued compliance with regulatory requirements and support population growth** (Figure 4.1). Progress on these upgrades continue to be on time and on budget. In 2019, two new treatment channels in the Ultraviolet Light Disinfection Building were commissioned to increase both the treatment quality and liquid stream treatment capacity to accommodate future growth.



100%  
regulations met for treated  
wastewater returned to the river

0 sewage releases from the collection system that reached a waterbody which has resulted in regulatory enforcement actions

Construction of the Plant D Secondary Treatment project was in full flight in 2019 and is progressing well. This project **will increase treatment capacity of the plant by 20 per cent when it becomes operational**. Construction of the Plant D Primary Treatment project was started in 2019 and will increase the treatment capacity at the plant in conjunction with the Secondary Treatment Project. Construction of the Bonnybrook cogeneration facility also started in 2019. This project will use biogas generated by the wastewater treatment process to generate additional electricity for use at Bonnybrook.



**FIGURE 4.1: MAJOR UPGRADES AT BONNYBROOK WILL HELP ACCOMMODATE GROWTH AND IMPROVE WATER QUALITY FOR DOWNSTREAM USERS.**

All three projects are expected to be operational in 2021.



**20%**  
**Increased capacity** at Bonnybrook WWTP from Plant D Secondary treatment **upgrades by 2021**.  
Work is proceeding on time, on budget.

Significant progress was also made on the construction of the new Bonnybrook Plant outfall in 2019. The new, upsized twin outfall will provide for additional treatment capacity for Bonnybrook and additional flood protection for the critical wastewater treatment infrastructure at the plant. The design study for upgrades at the Fish Creek Wastewater Treatment Plant was also started. The primary objective of this study is to evaluate and select a technology for treating ammonia to meet the Federal Wastewater Systems Effluent Regulations and treat peak wet weather flows.

### 4.1.3 WASTEWATER BUSINESS CUSTOMERS

Some ICI customers produce wastewater that may have a higher concentration and contain different contaminants that exceed Wastewater Bylaw requirements. This is called high-strength wastewater. **The Water Utility's Wastewater Loading Management Program aims to improve management of high-strength wastewater from ICI customers, as this wastewater is technically challenging and expensive to manage and treat.** The program identifies and implements cost-effective, resource-efficient, reliable and equitable strategies that meet customer needs for wastewater load management and optimize use of wastewater treatment plant capacity.

The Water Utility advanced this program in 2019 by initiating an options analysis for the management of ICI wastewater loadings to Calgary's wastewater treatment plants. A comprehensive flow monitoring program was introduced and continued with high-strength wastewater monitoring. The program is scheduled for completion in 2020, and the work done will form the basis of how the Water Utility moves forward with wastewater management solutions for customers based on their individual needs.

## 4.2 TOTAL LOADING MANAGEMENT

The City's **Total Loading Management Plan (TLMP)** is a planning tool used to derive loading objectives for both stormwater infrastructure and wastewater treatment plants, to manage impacts from our wastewater and stormwater loadings on the Bow River. The City's TLMP identifies total suspended solids (TSS) and total phosphorus (TP) as the key parameters that require management to mitigate environmental impact to Calgary's watershed.

The City reassesses watershed water quality related threats every five years to determine if there are other water quality parameters that require management to protect Bow River aquatic habitat. The next update is planned for 2024 and work on this will start in 2021.

### 4.2.1 TOTAL SUSPENDED SOLIDS IN THE BOW RIVER

Stormwater and treated wastewater contain total suspended solids, which include organic and inorganic materials. These materials enter waterways and can impact water quality and aquatic habitat. Figure 4.2 shows that The City has remained under the Provincial objective for TSS loadings into the river from stormwater and wastewater sources.

Urban runoff from stormwater contributes a significantly higher proportion of total suspended solids to the Bow River compared to wastewater effluent. In 2019, estimated TSS loadings from stormwater to the Bow River were 39,978 kg/day, which is below The City's 2005 benchmark. This **demonstrates the effectiveness of The City's stormwater quality investments and pollution prevention programming considering population growth and urban expansion.**

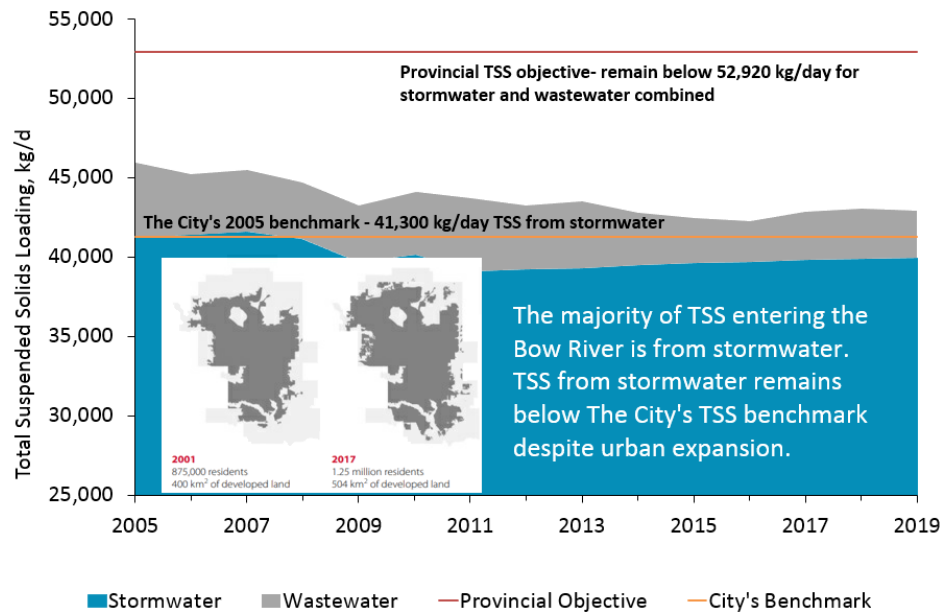


FIGURE 4.2 TOTAL SUSPENDED SOLIDS (TSS) LOADING TO THE BOW RIVER FROM STORMWATER AND WASTEWATER

#### 4.2.2 PHOSPHORUS IN THE BOW RIVER

Too much phosphorus in waterways can cause accelerated plant growth, algae blooms and low dissolved oxygen, which is detrimental to aquatic life. The City's TLMP has a total loading objective for Total Phosphorus (TP) to ensure Calgary's aquatic habitats remain healthy and safe. The primary source of TP entering the Bow River in Calgary is from treated wastewater effluent, with the remaining amount contributed by stormwater. Figure 4.3 shows the reported amount of TP entering the river from both stormwater and wastewater to be below the Provincial objectives in 2019, demonstrating that our wastewater treatment continues to be effective. Treated wastewater contributes more than double the amount of TP to the Bow River compared with stormwater sources.

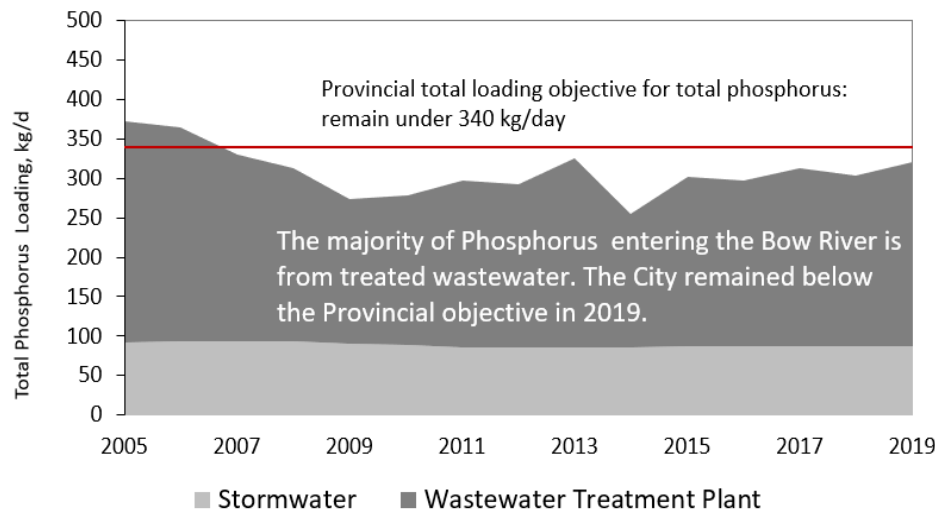


FIGURE 4.3 TOTAL PHOSOPHORUS LOADINGS TO THE BOW RIVER FROM STORMWATER AND TREATED WASTEWATER

## 4.3 STORMWATER MANAGEMENT

### *The value of stormwater management initiatives*

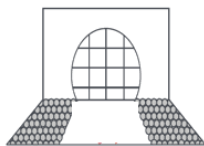
The Water Utility manages water from rain or snow/ice melt by either collecting, storing, or moving it into the nearest river or creek through storm drains, pipes and ponds. Parts of Calgary’s stormwater system are designed to limit the sediment going into the river, ensuring healthy rivers and river banks and allowing the quality of the rivers to be maintained for Calgarians and downstream users.

Stormwater management is a key component in the design of vibrant, safe and resilient communities. The City’s investments in stormwater retrofits, the Community Drainage Improvement Program (CDI), and green stormwater infrastructure help manage the impacts of climate change and a growing city as well as reducing the impacts of localized and river flooding on citizens and businesses.

### 4.3.1 STORMWATER MANAGEMENT STRATEGY UPDATE

Since the 2005 Stormwater Management Strategy was implemented, municipal stormwater management practices have advanced and the potential impacts of climate change on stormwater runoff are better understood. Using a customer-centric approach, The City is updating the Strategy to consider these changes and set a strategic course on how stormwater is managed over the next 20 years. **The Strategy will help us better understanding of the complexities of the stormwater issues and contributing factors needed to enable more practical, and innovative solutions.**

To inform this update, The City began engagement with internal and external stakeholders including businesses, the building and development industry, non-government agencies, academia, regional municipalities, regulators and communities and customers. The first phase of the engagement concluded at the end of 2019 and focused on understanding stakeholder values and perspectives and building a stronger understanding of opportunities to address stormwater management challenges. The input gathered from this phase informed an aspirational draft vision, principles and goals.



**Stakeholder engagement** underway to inform a renewed **Stormwater Strategy** draft by the end of 2020

The second phase of stakeholder engagement will continue until mid-2020 to help identify short, medium and long-term actions. The input from stakeholders will inform The City, as it considers technical expertise, best management practices, and a Triple Bottom Line analysis to update the Stormwater Management Strategy. In alignment with the second phase of engagement, a draft green stormwater infrastructure (GSI) strategy will be completed by 2021.

The Stormwater Management Strategy will align with other corporate strategies and policies such as the updated Municipal Development Plan, The City’s Climate Resilience Strategy, the Corporate Resilience Strategy, the BiodiverCity and Wetland Policy. A draft of the updated Strategy will be completed for the end of 2020.

### 4.3.2 STORMWATER QUALITY RETROFIT INVESTMENTS

The City constructs **stormwater quality retrofit projects** such as wet ponds or constructed wetlands to **improve water quality by removing solids and other pollutants before it enters our rivers.** Design of South Highfield stormwater quality retrofit pond was initiated in 2019. This pond will help reduce

pollutants from this industrial area. The City also started construction of the Bebo Grove Storm Pond and diversion trunk in the Woodland-Woodbine neighborhood.

#### 4.3.3 STORMWATER PONDS

Calgary's stormwater drainage system contains over 300 wet and dry storage ponds. These **ponds reduce the amount of sediment and other pollutants entering our rivers. They also provide some localized flooding mitigation** by holding stormwater during high rainfalls, releasing it slowly back into The City's stormwater system. The City's Pond Condition Assessment identified the need for regular maintenance of Calgary's ponds to ensure they are operating effectively, meeting water quality and stormwater volume requirements. In 2019, The Water Utility continued work on upgrades to the Hanson Ranch stormwater pond.

#### 4.3.4 GRAVEL LANE SEDIMENT ABATEMENT STUDY

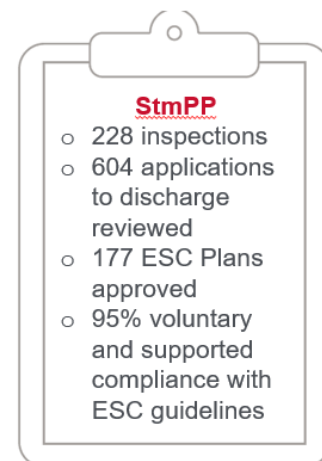
Gravel back lanes produce disproportionate amount of TSS loadings into Calgary's rivers. These sediments can become trapped in stormwater infrastructure and maintenance costs. It's estimated that gravel lanes generate up to 11 per cent of total sediment (TSS) loadings in our waterways but compromise only 1.4 per cent of Calgary's land area.

Many of Calgary's residential areas still have gravel as the surface in their back lanes. Gravel back lane related complaints are in The City's top ten 311 customer complaints. The City is undertaking a **collaborative study between the Water Utility and the Transportation Department, along with other City stakeholders on various approaches to reduce gravel lane sediment from reaching Calgary's waterways**. Phase I has evaluated gravel lanes alternatives, identified pilot sites, and collected baseline data. This data confirmed modelling predictions on gravel back lane TSS loads. A preliminary action plan, designs and cost estimates are being developed. Phase 2 includes the implementation of pilot designs at three locations and monitoring the effectiveness with respect to TSS reduction.

#### 4.3.5 STORMWATER POLLUTION PREVENTION PROGRAM (STMPP)

The Stormwater Pollution Prevention (StmPP) program ensures customers and City staff plan, implement and monitor effective practices to **reduce stormwater pollutant loadings from construction activity** and ensure regulatory compliance.

Construction activity in Calgary exposes highly erosive subsoil, which is easily transported by wind and water. In 2019, to protect our watershed and storm infrastructure from the impacts of construction site sediment, City staff reviewed 367 Erosion and Sediment Control (ESC) Plan applications resulting in the approval of 177 ESC Plans. Approved ESC Plans are estimated to reduce soil loss from active construction sites by 28,346 tonnes per year. Soil losses then generally decrease once sites are stabilized with natural vegetation, buildings, roads, etc. During 2019,





there were a total of 883 construction sites in Calgary with an active approved ESC Plan. StmPP performed 338 inspections at 212 of those sites.



In 2019, StmPP reviewed 604 applications to discharge drainage from construction, commercial, and industrial sites and operational activities to storm infrastructure.

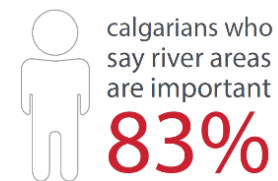
To continue customer service improvements, StmPP delivered training sessions in 2019 to inform and support customers with the 2018 updated requirements for successful implementation of The of City’s ESC Guidelines and Standard Specifications.

New efficiencies in monitoring and compliance included collaboration with Community Standards (Bylaw) and Law to enhance customer compliance. This is being achieved by referring non-compliant files to Bylaw for enforcement under the Drainage Bylaw.

#### 4.4 RIPARIAN ACTION PROGRAM

Riparian areas are natural assets that provide many ecological, social and economic benefits including water quality protection, resilience to flood and drought, biodiversity enhancements and recreational opportunities. The City’s **Riparian Action Program (RAP) delivers on the Municipal Development Plan’s goal of greening the city and objectives related to green infrastructure, watershed protection and ecological networks.**

Protection and management of riparian areas aligns to the Natural Infrastructure pillar of Corporate Resilience and to the Corporate Climate Strategy and complements the Flood Mitigation and Resiliency Program. The City’s RAP is a comprehensive and coordinated approach to protect riparian areas in Calgary and contains three specific program areas: (i) Riparian Health Restoration and Monitoring, (ii) Riparian Land Use Planning and (iii) Outreach and Education. The sections below summarize the activities conducted in 2019 to support the goals and objectives of the RAP.



Riparian zones are the areas of land along the edges of rivers, creeks, and other waterbodies. These areas extend into the floodplain and are transitional areas between land and aquatic ecosystems.

##### 4.4.1 RESTORING RIPARIAN AREAS

###### ***The value of restoring riparian areas***

Riparian restoration projects lead to a more resilient natural infrastructure that provides protection against floods and erosion and improves water quality. In 2019, The City continued efforts to improve riparian health and restore riparian areas through bioengineering and riparian planting projects. Bioengineering is an approach to river bank engineering that incorporates living plants with natural and synthetic support materials to stabilize slopes and reduce erosion. Riparian planting projects use native vegetation with deep-rooted plants that stabilize riparian areas.

Approximately 30 bioengineering and riparian planting projects were ongoing or completed in 2019. Several of these projects were delivered through a partnership between Water Utility and Parks. Sharing of internal resources and expertise provides financial benefits and ensures business units meet their respective goals and objectives more effectively. These projects include those part of the Fish Habitat Compensation Program, which offset the loss of fish habitat caused by the 2013 flood.



FIGURE 4.4 THE NEW BOWMONT PROJECT IS BEING USED AS A SPAWNING CHANNEL FOR BROWN TROUT

- The Bowmont West Fish Habitat Project was completed in early 2019 (Figure 4.4) and by the fall was being used by over 160 brown trout as a spawning channel.
- Construction of the Elbow Island Fish Habitat Project began in 2019 with an expected completion date by the end of 2020. The project incorporates public art into the engineering design.
- The Inglewood Bird Sanctuary Reconnection Project is nearing completion of the design phase. This project will reinstate natural processes and improve the local ecology of the park while at the same time creating a significant amount of fish habitat offsets.
- In 2019 construction was completed at the multi-award-winning Bioengineering Demonstration and Education Project (BDEP) site. The project has now entered its monitoring phase to assess the effectiveness of the various bioengineering techniques and to ensure fish habitat and wildlife goals are being met.

#### 4.4.2 MONITORING RIPARIAN HEALTH

Monitoring of riparian areas is one of the **key actions of the RAP to measure the improvement of riparian health over time**. The City’s 2026 riparian restoration target is an average riparian health score of 72 per cent. 2019 marked the second year of The City’s 5-year Riparian Monitoring Program.



##### Trend monitoring

Over 100 Riparian Health Inventory (RHI) sites will be monitored during the program to identify healthy areas and areas where further action is needed to improve riparian health. A comprehensive trend analysis will be completed in 2020 to determine progress towards the 2026 restoration target. In 2019, 26 RHI sites were visited, encompassing approximately 190 hectares of riparian habitat along 26 km of riverbank.

##### Effectiveness monitoring

In addition to trend monitoring, 55 bank restoration sites and 30 riparian planting projects are being monitored to assess the effectiveness of restoration practices. In 2019, the Water Utility examined the



effectiveness of 19 bank restoration and nine riparian planting projects. The majority of the sites were found to be successful.



#### **Bioengineering Demonstration and Education Project**

2019 marked the first year of monitoring work at the BDEP site (Figure 4.5). The work included examining post-construction monitoring of fish and fish habitat, wildlife, riparian health and bioengineering structural integrity over a 10-year period. Preliminary results for 2019 show that planted vegetation survival is 80 per cent, both fish and wildlife are using the constructed habitat enhancements, and riparian health has improved.

**FIGURE 4.5 RIPARIAN HEALTH AT THE BDEP HAS IMPROVED, WITH FISH AND WILDLIFE USING THE CONSTRUCTED HABITAT ENHANCEMENTS.**

#### **4.4.3 RIPARIAN EDUCATION AND OUTREACH**

In 2019, we continued our partnership with The RiverWatch River Ambassador Program **to engage with Calgaryans about riparian stewardship and advance the Riparian Outreach and Education program.**

The program engaged 1,703 pathway users in river awareness conversations and took 459 citizens on interpretive floats down the Bow River.

We continue to promote the Healthy Rivers Story Map among our watershed partners and to citizens through targeted education opportunities. The map is updated annually to capture new restoration projects within the City of Calgary and to promote education and volunteer opportunities for citizens.

In 2019 several education initiatives related to the Bioengineering Demonstration and Education Project were piloted including a one-day parks school, in partnership with Calgary Parks, and a Stream Rehabilitation Program in partnership with Trout Unlimited Canada. Interpretive signage and a website are in development and will be completed in 2020.

### **4.5 WATERSHED MANAGEMENT PLANNING PARTNERSHIPS**

Watershed management plans and partnerships **provide important frameworks and support actions to improve watershed health in the region.** The City participates with regional partners, stakeholders and watershed groups on many watershed planning initiatives. City Council has endorsed three watershed management plans: the Bow Basin Watershed Management Plan (2008), the Elbow River Watershed Management Plan (2008) and the Nose Creek Watershed Water Management Plan (2007 – updated in 2019).

#### **Nose Creek Watershed Management Partnership**

The Nose Creek watershed is one of Calgary’s most sensitive watersheds and it continues to experience significant land development pressures. In 2019, Council endorsed the update of the Nose Creek

Watershed Water Management Plan, which provides a framework for **balancing urban development with watershed protection**.

Recommendations in the updated Plan include actions to:

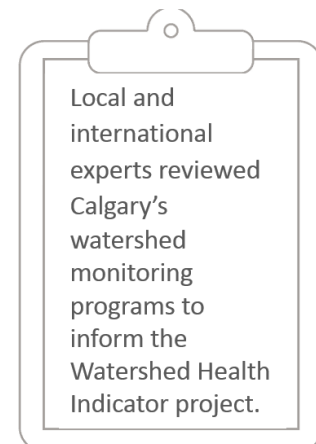
- Improve stormwater management and water quality
- Retain riparian areas and wetlands in urbanizing areas
- Preserve biodiversity in the watershed.

The work of the Partnership is directly linked to two of the four goals of Integrated Watershed Management including: 1) Protecting Water Supply, and 2) Keeping Rivers Healthy. The Partnership remains a model for inter-municipal collaborative watershed management across the Province and is viewed by the Government of Alberta and partner municipalities as a successful example of working together to protect a stressed watershed.

A key outcome of the Plan will see the development of a hydrologic model for the watershed, a tool to help the Partnership and The City understand how development decisions are impacting the Nose Creek Watershed. Calgary’s endorsement of the Plan included direction to City Administration to report back to Council with a progress update on Plan implementation by Q3 2020.

#### 4.6 WATERSHED HEALTH INDICATORS

To enhance our ability to **incorporate watershed resiliency in decision making**, the Water Utility is developing a watershed health index for Calgary. In 2019, The City partnered with the Southern Alberta Institute of Technology (SAIT) to deliver a stakeholder Watershed Health workshop to assess best practices and explore potential watershed health indicators for The City of Calgary. Local and international experts reviewed Calgary’s existing monitoring programs and data and identified gaps that required further analysis. With the completion of Phase 1 in 2019, Phase 2 work will begin in 2020.



#### 4.7 PRIORITIES FOR 2020

To continue reducing the impacts on the watershed and keeping our rivers healthy, The City’s focus areas for 2020 are summarized in Table 4.2.

**Table 4.2 Goal #3: Keep Our Rivers Healthy – 2020 focus**

2020 Planned Actions
Continue implementing major upgrades of Bonnybrook Wastewater Treatment plant.
Initiate ammonia toxicity study to inform guideline negotiations.
Make refinement to BRWQ model to improve to 2D-3D.
Complete a draft of the updated Stormwater Management Strategy by the end of 2020.
Continue riparian monitoring and evaluate progress on riparian health target in 2020.
Continue progressing on riparian restoration and fish habitat compensation projects.
Report to Council on progress on the Nose Creek Watershed Water Management.
Initiate Phase 2 of the Watershed Health Indicators project
A draft green stormwater infrastructure strategy will be completed by 2021.

## 5. GOAL #4: BUILD RESILIENCY TO FLOODING



### 5.1 RIVER FLOOD MITIGATION AND RESILIENCE PROGRAM

A comprehensive update on river and stormwater flooding efforts undertaken by The City can be found in the 2019 Flood Resiliency and Mitigation Annual Update (UCS2020-0372).

In 2019, the Water Utility focused on **working closely with communities to progress on key community mitigation projects** that are core to the Flood Resilience Plan. This focus **ensured that robust, comprehensive community engagement was undertaken so that community stakeholder concerns were both well understood and considered as projects progressed.** Community feedback is of importance for the proposed Sunnyside and Bowness flood barrier projects which are undergoing conceptual design and feasibility study, respectively.

The City's Flood Resilience Plan includes a combination of upstream, community, and property-level flood mitigation to ensure that Calgary becomes **more resilient to river flooding**, despite **climate uncertainty** and continued **urban development**.

payback  
on flood  
investments  
**10:1**



During 2019, construction of the Eau Claire Promenade continued, which will incorporate the Downtown Flood Barrier connect with flood barriers in West Eau Claire Park and the Centre Street Bridge to protect Calgary's Downtown from a 1:200 flood event (Figure 5.1). In 2019, The City advanced detailed design for the Downtown Flood Barrier and Upper Plateau Separation resilience projects.

Significant progress was also made on the gate upgrades at the Glenmore Dam. The gates will be operational before the 2020 flood season, minimizing flood damage from smaller more frequent flood events on the Elbow River.



**FIGURE 5.1 DOWNTOWN FLOOD MITIGATION COMPONENTS WILL CONNECT TO PROTECT CALGARY'S DOWNTOWN FROM A 1:200 FLOOD EVENT.**

The City continues to work closely with the Province to implement upstream mitigation on the Bow and Elbow Rivers. **Ensuring upstream mitigation is constructed remains the most crucial outstanding component of The City's overall flood strategy.** With the federal government's Environmental Impact Assessment (EIA) process for the Springbank Off-stream Reservoir (SR1) well underway, The City's advocacy efforts in 2019 were focused on mitigation on the Bow River.

In anticipation of future flood hazard mapping from the Province, the Water Utility has identified a need to develop policy direction that provides an optimal balance of flood resiliency outcomes in Calgary to ensure appropriate land use and policy measures to reduce Calgary's flood risk. Work to develop an initial policy framework that identifies potential policy tools and options to address future mapping changes was initiated in 2019 and will continue throughout 2020. This work is **intended to provide a consistent direction and application of policy and planning guidelines in flood risk areas to protect citizens, property, and Calgary's river valleys.** Work on developing an effective flood risk awareness and education program to support citizens was started in 2019.

## 5.2 LOCALIZED FLOODING AND THE COMMUNITY DRAINAGE IMPROVEMENT PROGRAM

The City manages stormwater to protect public safety and reduce damage to property from flooding and continues to address areas with high stormwater flooding risk through its Community Drainage Improvements (CDI) program.

The CDI program increases stormwater capacity to **minimize localized flooding** risks, address to address **climate impacts** and **future densification** in mature communities.

Starting in 2020, The City will **integrate successful lessons learned from its Integrated Stormwater Management Study** of Renfrew in 2019 into future CDI studies and projects. Integrating this approach will **ensure that factors such as water quality impacts, anticipating future redevelopment and densification, climate change impacts, enhanced asset management, and opportunities for green stormwater infrastructure are considered** and accounted for in future stormwater flooding mitigation opportunities.

In 2019, **The City integrated its prioritization of river flood and CDI projects to address all flooding as a single priority.** As new CDI studies are completed, additional projects will be added to the program list and prioritized based on their expected cost-benefit ratio and reduction of risk to communities

## 5.3 PRIORITIES FOR 2020

In 2020, The City will continue to build resiliency to river flooding and implement actions to reduce stormwater flooding, as summarized in Table 5.1.

**Table 5.1 Goal #4: Build Resiliency to Flooding – 2020 focus**

<b>2020 Planned Actions</b>
Continue to work with communities on design and construction of flood mitigation barriers.
Explore potential policy tools and options in advance of future flood hazard mapping updates from the Province.
Research and development of a future flood risk awareness and education program for Calgarians.
Continue advocacy efforts with the Province on the need for upstream mitigation, funding of flood mitigation projects and continuation of the TransAlta agreement.
Support delivery of the Community Drainage Improvement program and work on implementing integrated stormwater management initiatives within CDI and other drainage programs.



## **Residential Black Cart Collection Mixed Service Delivery Pilot Project Update**

### **EXECUTIVE SUMMARY**

The purpose of this report is for Waste & Recycling Services (WRS) to provide an update on the pilot project to compare service delivery models (public and private) for residential black cart collection, as directed by Council through Notice of Motion C2019-1467 on 2019 November 18. This project is called the Mixed Service Delivery Pilot.

The objective of the Mixed Service Delivery Pilot is to evaluate the performance of private-sector service delivery in comparison to public-sector service delivery for residential black cart collection. The principles guiding the pilot are: meaningful comparison; customer experience; and fairness. These principles will be considered through the project.

WRS is working with Supply Management and Law to develop the Request for Proposal (RFP) to contract out up to 25 per cent of residential black cart collection services in Calgary. A consultant is supporting with the review of RFPs from other municipalities, so the RFP can be developed more rapidly. Key elements of the RFP are under development and the target date to post the RFP is September 2020. Administration will provide another project report to Council in December 2020 on the result of the RFP.

### **ADMINISTRATION RECOMMENDATION:**

That the Standing Policy Committee on Utilities and Corporate Services recommend that Council:

1. Direct Administration to finalize and issue the Request for Proposals (RFP) to move forward with the Mixed Service Delivery Pilot for residential black cart collection; and
2. Direct that Attachment 3 be held confidential pursuant to Section 24 (Advice from officials) of the *Freedom of Information and Protection of Privacy Act*, and remain confidential until the RFP to contract out up to 25 per cent of residential black cart collection services is released publicly or to be reviewed by 2025 April 09.

### **PREVIOUS COUNCIL DIRECTION / POLICY**

On 2019 November 18, Council passed Notice of Motion C2019-1467: Residential Waste Collection Mixed Service Delivery Pilot (Attachment 1). Administration was directed to:

1. Report back to the SPC on Utilities and Corporate Services no later than April 2020 on the scoping and development of a pilot project to compare service delivery models on residential black cart collection through a Request for Proposal to contract out up to 25 per cent of residential black cart collection services;
2. Report back to the SPC on Utilities and Corporate Services no later than Q4 2020 on the results of the RFP and a timeline for an implementation goal of Q1 2022; and
3. Meet with the Mayor and Councillors around community support for this pilot program when considering the scoping and development of the Request for Proposal.

## **Residential Black Cart Collection Mixed Service Delivery Pilot Project Update**

### **BACKGROUND**

The City of Calgary (The City) provides Black, Blue, and Green Cart Programs for residential dwellings, and collections for these programs are delivered through a public-sector service delivery model with WRS providing collections.

WRS engaged a consultant to conduct a Collection Services Review (the Review) in 2018 (*UCS2019-0113: Waste & Recycling Services 2018 Residential Collection Services Review*). The Review identified that savings may be achieved through contracting out one-third of residential collections. It recognized a risk that initial savings might not be realized over the term of the contract and that contracting out could impact customer experience and safety. The Review recommended continuing to provide residential collections through a public-sector delivery model.

Council passed a Notice of Motion (C2019-1467) in 2019 November directing Administration to develop a pilot project to compare service delivery models for residential black cart collection. The intention for the pilot is to allow The City to evaluate the performance of private-sector service delivery in comparison to public-sector delivery in Calgary.

### **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

A more detailed update on project progress is provided as Attachment 2.

#### **Project objective, principles and timeline**

The objective of the Mixed Service Delivery Pilot is to evaluate the performance of private-sector service delivery in comparison to public-sector service delivery for residential black cart collection.

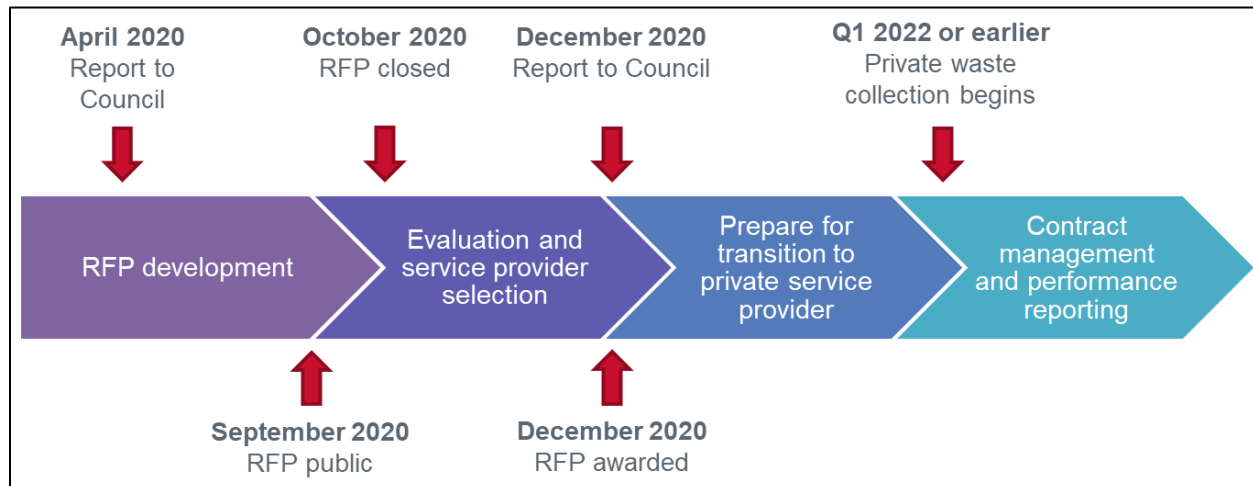
The principles guiding the pilot are:

- **Meaningful comparison** – the pilot will be designed and managed to allow for objective, measurable, and meaningful comparison between private-sector and public-sector residential collection services.
- **Customer experience** – WRS will design the RFP to maintain the same customer service levels in pilot and non-pilot communities and will maintain good communication and a positive customer experience during the transition in service providers and throughout the pilot.
- **Fairness** – a fair and transparent process will be used to evaluate submissions and select a private service provider. WRS will work to establish a productive partnership with the private service provider, and to ensure meaningful and fair reporting on performance.

The project timeline is shown in the figure below. WRS is working with Supply Management and Law to develop The City's RFP for private service delivery, with the support of an external consultant to research RFPs from other municipalities. The target date to post the RFP is September 2020. Given the complexities, current efforts in responding to the COVID-19 pandemic, and drawing upon the experiences of other municipalities, it is possible that timelines may need to be adjusted. Administration will provide a report to Council in December 2020 on the results of the RFP, as directed in *Notice of Motion C2019-1467*, and the report will address any adjustments to the timeline, if required.



## **Residential Black Cart Collection Mixed Service Delivery Pilot Project Update**



The time required to prepare for the transition to private-sector service delivery will depend on the readiness of the selected service provider. A little over a year has been scheduled for the proponent to prepare, but an earlier date may be negotiated if the service provider expects to be ready earlier. During this time, WRS will be preparing to ensure a smooth transition for customers and employees, and undertaking the appropriate changes in The City's fleet. Private waste collection is expected to begin in the pilot area no later than Q1 2022.

### **RFP development**

The objective of the RFP is to set the conditions for a successful partnership between The City and the private service provider in the interest of affordably providing excellent service. Some of the key elements of the RFP being developed are:

- Project scope.
- RFP evaluation criteria.
- Contract term.
- Customer care, environment and safety.
- Collections vehicles and employees.
- Performance measures, reporting and verification.
- Inspections, penalties and dispute resolution.

The area for the pilot project has been selected (Confidential Attachment 3) and will be released publicly as part of the RFP.

### **Stakeholder Engagement, Research and Communication**

Administration offered to meet with the Mayor and Councillors to receive input on community support for this pilot program, as directed by Notice of Motion C2019-1467. Meetings were held in 2020 February, March, and April with those who accepted the offer. A communication plan for customers in the pilot area will be created as part of this project, and customer satisfaction for collection services will continue to be monitored.

## **Residential Black Cart Collection Mixed Service Delivery Pilot Project Update**

### **Strategic Alignment**

This report aligns with the 2019-2022 Citizen Priorities of A Healthy & Green City and A Well-Run City.

### **Social, Environmental, Economic (External)**

The mixed service delivery pilot will aim to provide the same or better levels of customer service, environmental and safety performance for residential black cart collection services. Performance in these areas will be monitored and reported as part of the pilot. The pilot will also provide an opportunity for a private company to acquire a contract to deliver some of the residential black cart collection services.

### **Financial Capacity**

#### ***Current and Future Operating Budget:***

Operational costs associated with residential black cart collection in the pilot area will be replaced with contract costs for the private service provider to deliver service in the area. Costs will be monitored throughout the pilot to determine the amount of any operational savings or additional costs.

The pilot program will be funded as part of the Black Cart Program. No increase in the Black Cart Fee charged to customers is anticipated.

### **Risk Assessment**

A risk anticipated with approving the recommendation to move forward with the RFP at this time is organizations that are impacted by the COVID-19 pandemic may not be able to respond to the RFP as effectively as they would at a later date.

The anticipated risk associated with not approving the recommendation to move forward with the RFP is that the Mixed Service Delivery Pilot will be delayed, and it will be longer before The City is able to evaluate the performance of private sector service delivery in comparison to public sector service delivery.

**REASONS FOR RECOMMENDATION:** The scoping and development of the pilot project to compare service delivery models (public and private) for residential black cart collection is underway. Objectives, principles and a timeline have been identified to meet Council direction for this project, and a pilot area has been selected. Administration is seeking approval to move forward with the Request for Proposal (RFP) for the pilot project.

### **ATTACHMENTS**

1. Attachment 1 – Notice of Motion C2019-1467
2. Attachment 2 – 2020 April Project Update
3. Attachment 3 – Pilot Area – CONFIDENTIAL
4. Attachment 4 – Presentation



Report Number: C2019-1467

UCS2020-0440  
Attachment 1

Meeting: Combined Meeting of Council

Meeting Date: 2019 November 18

## NOTICE OF MOTION

### RE: RESIDENTIAL WASTE COLLECTION MIXED SERVICE DELIVERY PILOT

**Sponsoring Councillor(s):** Cllr Sutherland, Cllr Davison, Cllr Magliocca, Cllr Chu, Cllr Keating, Cllr Jones, Cllr Gondek, Cllr Demong, Cllr Farkas, Cllr Chahal

WHEREAS The City of Calgary provides Black, Blue, and Green Cart Programs for residential single detached dwellings, and collections for these programs which are delivered through a public-sector service delivery model;

AND WHEREAS a mixed-service delivery model of private and public-sector collection services would foster competition, and could lead to a more cost-effective way of doing business;

AND WHEREAS Waste & Recycling Services engaged consultants to conduct a Collection Services Review (the Review) (UCS2019-0113, Waste & Recycling Services 2018 Residential Collection Services Review);

AND WHEREAS the possible benefits and risks associated with contracting out a portion of collection services cannot be definitively settled without undertaking a mixed service delivery model;

AND WHEREAS contracting-out a portion of collection services would allow The City to objectively evaluate the performance of private-sector service delivery in comparison to public-sector delivery;

AND WHEREAS contracting-out a limited portion of services would allow The City to maintain oversight of the overall customer experience and mitigate risks associated with a change in service provider;

AND WHEREAS the Review found that:

- Estimated annual savings of \$850,000 (\$425,000 to \$1,275,000) may be achieved through a one-third mixed service delivery model, equating to approximately \$2.59 (\$1.30 to \$3.90) per household per year, and
- The pay rate for Waste & Recycling residential collection drivers is approximately 10% above the market median, and
- It is likely private companies would pay less for fleet due to a lower fleet labour rate, greater standardization of vehicles and lean operational practices.

NOW THEREFORE BE IT RESOLVED that Council Direct Administration to:

1. Report back to the SPC on Utilities and Corporate Services no later than April 2020 on the scoping and development of a RFP to contract out up to 25% of residential black cart collection services; and
2. Report back to the SPC on Utilities and Corporate Services no later than Q4 2020 on the results of the RFP and a timeline for an implementation goal of Q1 2022.



# Residential Black Cart Collection Mixed Service Delivery Pilot

## 2020 April Project Update



## Introduction

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This report provides an update on the pilot project to compare public and private service delivery models for residential black cart collection. This project is called the Mixed Service Delivery Pilot (the Service Pilot)

Council directed Administration on 2019 November 18 through a Notice of Motion (*C2019-1467: Residential Waste Collection Mixed Service Delivery Pilot*) to:

1. Report back to the SPC on Utilities and Corporate Services (UCS) no later than April 2020 on the scoping and development of a pilot project to compare service delivery models on residential black cart collection through a Request for Proposal to contract out up to 25 per cent of residential black cart collection services;
2. Report back to the SPC on Utilities and Corporate Services no later than Q4 2020 on the results of the RFP and a timeline for an implementation goal of Q1 2022; and
3. That Administration meet with the Mayor and Councillors around community support for this pilot program when considering the scoping and development of the Request for Proposal.

This report has been created to fulfill the first direction from Council. The second direction will be fulfilled with a report in Q4 2020. Administration offered to meet with the Mayor and Councillors to fulfill the third direction from Council, and meetings were held in 2020 February, March, and April with those who accepted the offer.

## Project Objective, Principles and Timeline

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### Objective

The objective for the Mixed Service Delivery Pilot is **to evaluate the performance of private-sector service delivery in comparison to public-sector service delivery for residential black cart collection.**

As described in *Notice of Motion C2019-1467*, the Service Pilot shall assess of the costs and benefits associated with private-sector service delivery for residential black cart collection services.

### Principles

The Service Pilot will be guided by three principles as shown in Figure 1 and described below.



**Meaningful comparison:** To accomplish the Service Pilot’s objective, it will be designed to allow for a measurable and meaningful comparison between private and public-sector residential collection services.

Selecting a pilot area that is representative of Waste & Recycling Services’ (WRS’) residential collection services will support a meaningful comparison. The Request for Proposal (RFP) will identify performance measures and service requirements allowing meaningful and objective comparison between service delivery models.



FIGURE 1. PRINCIPLES FOR THE PILOT PROJECT

**Customer experience:** The City of Calgary’s (The City’s) commitment to high quality customer service shall govern the Service Pilot. WRS will design the RFP to maintain the same customer service levels afforded non-pilot communities, and work to ensure good communication and a positive customer experience during the transition in service providers and throughout the pilot.

**Fairness:** Fairness for all companies that bid on the RFP and for the private-sector company that is selected for the Service Pilot will be essential for a successful project. The RFP will follow a fair and transparent process and will be open to all qualified bidders. Submissions will be assessed according to Supply’s best practices. Administration will work to establish a productive partnership with the private-sector company that is selected, and to ensure meaningful and fair reporting on performance.

**Timeline**

The project timeline is shown in Figure 2. The area for the pilot project has been selected, and WRS is researching private-sector residential waste collection approaches in other municipalities to develop content for the RFP. The target date to post the Service Pilot RFP is September 2020. Experience from other cities indicates that this timeline is ambitious. More detail on the development of the RFP is provided in section 3 of this report. Administration will provide a report to Council in December 2020 on the results of the RFP, as directed in *Notice of Motion C2019-1467*.

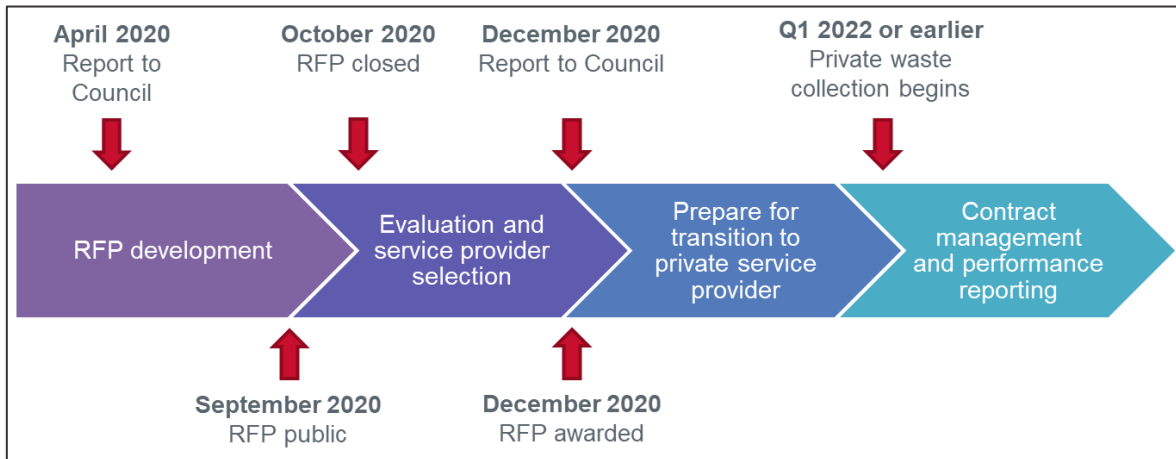


FIGURE 2. PROJECT TIMELINE

The time required to transition to the private-sector service provider will depend on the readiness of the successful service provider. They will have to design routes, hire employees, and source collection vehicles. It can take up to one year to source collection vehicles, so a little over a year has been scheduled for the private service provider to prepare. If the successful proponent does not require as much time, an earlier transition date can be negotiated. During this time, WRS will be preparing to ensure a smooth transition for customers and employees, and undertaking the appropriate changes in The City’s fleet. Private waste collection is expected to begin in the pilot area no later than Q1 2022.

Once the private-sector company is providing service, WRS will actively manage the contract and oversee performance reporting for the private-sector and public-sector collection operations. Updates will be provided to Council.

## RFP Development

The objective of the RFP is to set the conditions for a successful partnership between The City and the private service provider in the interest of affordably providing excellent service. The Service Pilot principles (Meaningful comparison, Customer experience, and Fairness) are being considered for all elements of the RFP.

WRS is working with Supply Management and Law, with the support of an external consultant, to develop the Service Pilot RFP. The RFP is critical for communicating requirements to prospective bidders and creating the framework for the contract to be negotiated with the successful proponent. RFPs that other cities have used to contract waste collection services are being reviewed and these cities are being engaged to understand the lessons they have learned through their experience contracting out this type of service.

Some of the key elements of the Service Pilot RFP being considered are described below.  
ISC: Unrestricted



**Project scope**

The RFP will provide detailed project specifications for companies to prepare bid submissions with a competitive price and innovative approaches for service delivery and service efficiencies. The RFP shall strike a balance between:

- Providing detailed requirements for accurate bids to be prepared and submitted to The City; and
- Allowing enough scope flexibility for companies to develop bids that set them apart.

This will minimize the risk of obtaining inaccurate bids that do not include costs for all elements of the service and that could put the contract in jeopardy during the pilot.

**Contract term**

The City intends to proceed with a contract term that allows the successful private service provider to recover capital costs over a reasonable period. This will also allow The City to gather information on the contract costs over a timeframe that is indicative of industry standards. Options for contract extensions and options to terminate the contract early will be disclosed in the RFP.

**RFP evaluation criteria**

To guarantee The City obtains the best value for money, criteria for how the bid submissions will be evaluated will be clearly communicated within the RFP. A minimum threshold tool may be used for decisive project requirements (e.g. experience and qualifications), and consideration will be given to value-added items such as innovation, technology, social, and environmental benefits.

**Customer care, environment and safety**

As part of WRS' engagement with private waste collection companies reported in UCS2020-0248 (*Residential Collection Services Review: Industry Engagement and Service Efficiency Opportunities*), industry representatives emphasized that it is important for the RFP to specify service level requirements for customer care, environmental and safety performance. The RFP will request service level commitments that match what The City provides in non-pilot communities.

Customer care requirements include collection days and hours of collection, what materials to collect, special collections support for home health needs and customers with special needs, customer education such as tagging carts, and how to respond to adverse weather conditions and other service barriers. The RFP will set out the respective roles and responsibilities of The City and the private service provider for how customer requests are received, managed, and recorded. Environment and safety considerations shall include relevant City policies, which WRS collections employees also follow.

**Collections vehicles and employees**

Specifications for collection vehicles and employees that ensure the safety of our contractors and the community will be included. This may include proper maintenance and/or safety inspections for vehicles, driver qualification requirements, onboarding and

training, and protocol for responding to driving incidents. Potential future technology needs for vehicles related to pay-per-tip billing will also be considered.

### **Performance measures, reporting and verification**

As the primary objective of the Service Pilot is to evaluate the performance of private-sector service delivery in comparison to public-sector service delivery, performance measures will be selected that provide a meaningful comparison. Measures identified by the consultant in the *2018 Residential Collection Services Review (UCS2019-0113)* are being reviewed. Performance measures and the frequency of reporting will also be considered in relationship to how onerous the reporting requirements may be for the private service provider, how frequently and when performance evaluations will be made, and how the data may be verified.

### **Inspections, penalties and dispute resolution**

Through the RFP and contract negotiation process The City will aim to reduce the risk of disputes with the private service provider during the contract. However, an approach for resolving disputes will be specified in the RFP and subsequent contract to manage situations as they arise. The City will also reserve the right to perform inspections and apply penalties for situations where the private service provider does not meet specific contractual requirements.



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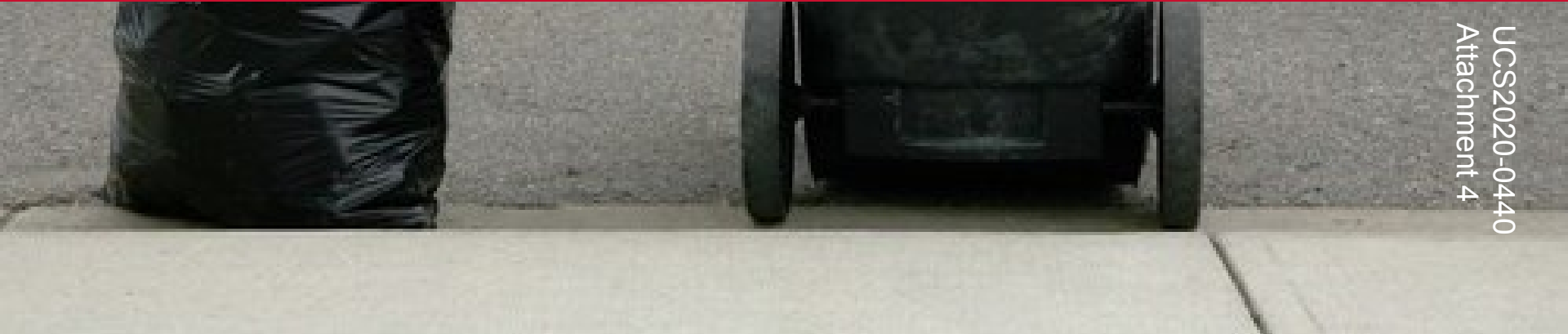
## Residential Black Cart Collection Mixed Service Delivery Pilot Project Update

UCS2020-0440

ISC: Unrestricted

Standing Policy Committee on Utilities and Corporate Services

15 April 2020



UCS2020-0440  
Attachment 4



## Council Direction – 2019 November 18

### Notice of Motion C2019-1467: Residential Waste Collection Mixed Service Delivery Pilot

1. Report back to the SPC on Utilities and Corporate Services no later than April 2020 on the scoping and development of a pilot project to compare service delivery models on residential black cart collection through a Request for Proposal to contract out up to 25 per cent of residential black cart collection services;
2. Report back to the SPC on Utilities and Corporate Services no later than Q4 2020 on the results of the RFP and a timeline for an implementation goal of Q1 2022; and
3. That Administration meet with the Mayor and Councillors around community support for this pilot program when considering the scoping and development of the Request for Proposal.



## Project Objective

**To evaluate the performance of private-sector service delivery in comparison to public-sector service delivery for residential black cart collection.**

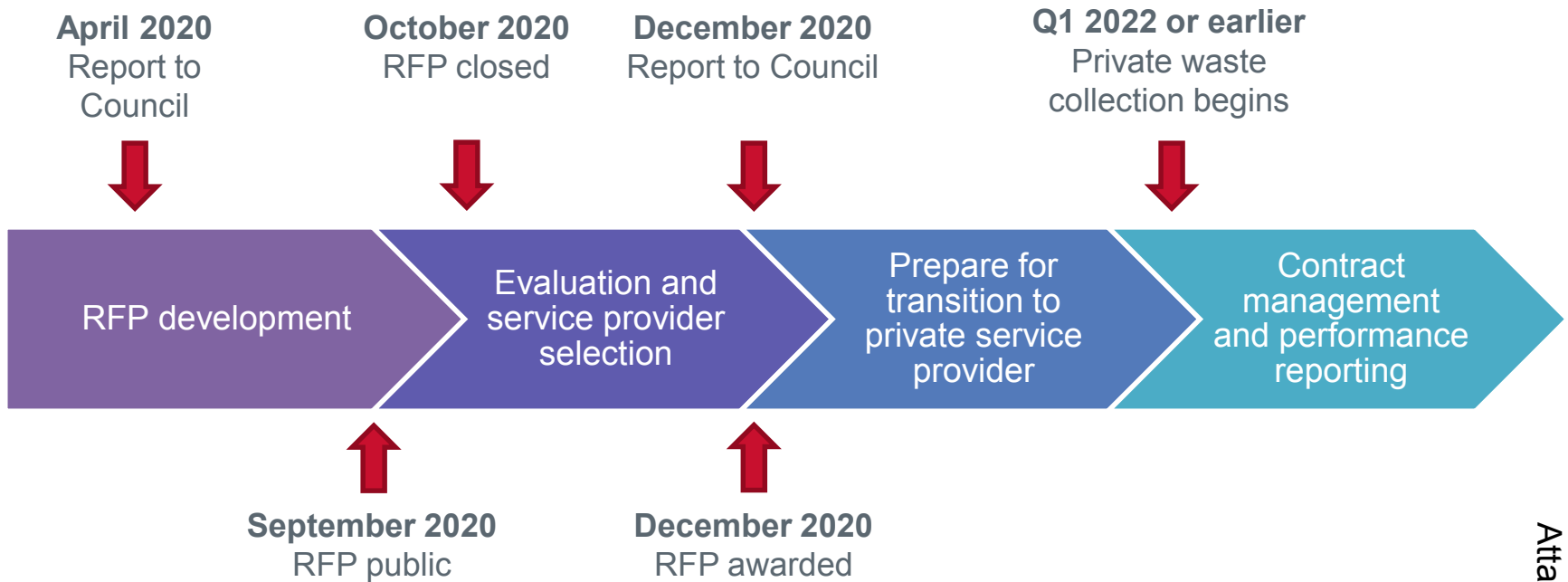


# Principles





# Timeline





## Key RFP Elements

Key elements of the RFP are being developed, including:

- Project scope
- Contract term
- RFP evaluation criteria
- Customer care, environment and safety
- Collections vehicles and employees
- Performance measures, reporting and verification
- Inspections, penalties and dispute resolution





## Risks

### If recommendation is approved:

Organizations that are impacted by the COVID-19 pandemic may not be able to respond to the RFP as effectively as they would at a later date.

### If recommendation is not approved:

The Mixed Service Delivery Pilot will be delayed and it will be longer before The City is able to evaluate the performance of private sector service delivery in comparison to public sector service delivery.



## Recommendations

That the Standing Policy Committee (SPC) on Utilities and Corporate Services (UCS) recommend that Council:

1. Direct Administration to finalize and issue the Request for Proposals (RFP) to move forward with the mixed service delivery pilot for residential black cart collection; and
2. Direct that Attachment 3 be held confidential pursuant to subsection 24(1)(a)&(b)&(c) of the Freedom of Information and Protection of Privacy Act, and remain confidential until the RFP to contract out a portion of residential black cart collection services is released publicly.

**Utilities & Environmental Protection Report to  
SPC on Utilities and Corporate Services  
2020 April 15**

**ISC: UNRESTRICTED  
UCS2020-0308**

## **Climate Resilience Strategy Update 2019**

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### **EXECUTIVE SUMMARY**

The purpose of this report is to provide an update on implementation of The City of Calgary's Climate Resilience Strategy (The Strategy) in partnership with community partners, business units and service owners. The Strategy's 10-year Mitigation and Adaptation Action Plans focus on The City's role in carbon and energy management and reducing climate risks in Calgary and includes 244 actions across the corporation.

More than one year into implementation, many actions are underway, with some on-going actions embedded into business processes or programs. While progress has been made (i.e. risk and carbon reduction framework for infrastructure projects to energy efficiency in new affordable housing units) much work remains to ensure Calgary is a climate-resilient community. Since 2005, Calgary's greenhouse gas emissions have increased by 18 per cent which presents a major challenge in achieving the climate goals. However, on a per capita basis over that period, emissions are lower by 12 per cent. In 2019, emissions were essentially unchanged from the previous year.

Preparing and responding to the risks of climate will require years of action as opposed to months, and therefore different actions have different timelines. Greater internal governance will be required for effective decision-making in implementing the Climate Strategy and reducing our climate risks.

Calgary's climate governance includes the Calgary Climate Panel (CCP) as an advisory network. The Panel now includes 18 organizations collaborating with The City and their independent report, including feedback for The City's Climate Program, is an attachment to this report. Key CCP feedback includes an ask for continued City commitment to funding and support, effective scoping of climate actions to align outcomes with goals, leveraging partners' resources and continued leadership from City Council to advance the conversation, change policy and action initiatives.

The focus within the past year has been on establishing the CCP, energy and emission reductions, riparian protection and enhancement, flood mitigation, community outreach and education and corporate leadership. Calgarians have a growing expectation that decision-makers will take climate change into account when planning, building, and operating infrastructure.

Building upon efforts already underway in Calgary, Administration will be seeking more collaboration through partnerships in the community to achieve results. For instance, the Climate team will connect with external expertise on adaptation to guide investment and identify financial liability. There will also be an increased effort to reduce energy use & GHG emissions in both residential and commercial buildings.

Administration will strengthen its own governance to ensure effective delivery of the Climate Strategy. As programs and projects to build climate resilience are developed and evaluated, budgetary implications will be considered and brought forward, as necessary.

## Climate Resilience Strategy Update 2019

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### ADMINISTRATION RECOMMENDATION:

That the Standing Policy Committee on Utilities and Corporate Services recommend that Council direct Administration to return to Standing Policy Committee on Utilities and Corporate Services between annual reports with a briefing report update, as required.

### PREVIOUS COUNCIL DIRECTION / POLICY

On 2018 June 25 (UCS2018-0688 – Climate Resilience Strategy and Actions Plans) Council approved a strategy and 10-year action plans focusing on climate mitigation and adaptation for The City of Calgary.

### BACKGROUND

The changing climate poses an evolving risk to The City's ability to deliver services to Calgarians. The City of Calgary and its partners are striving to increase the capacity of individuals, communities, institutions, businesses, and systems within the city to survive, adapt and grow, despite the chronic climate stresses and acute shocks they may experience.

Calgary's emissions are greatly influenced by our demographics and economic growth, including a growing population, ongoing development and transportation mode choices, as well as available technologies, energy supply choices and individual behaviours. For example, Calgary has grown from just under one million in 2005 to 1.29 million people in 2019, which has resulted in a substantially increased land footprint.

Between 2005 and 2018, Calgary's carbon footprint has grown by 18 per cent. The share of emissions from different sectors over those 13 years has been fairly consistent; non-residential buildings remain the largest source of greenhouse gas emissions.

Council approved The Calgary Climate Resilience Strategy (The Strategy) in 2018, including 10-year action plans focusing on climate mitigation and adaptation. The strategy builds on a history of actions building resiliency to climate change and provides a coordinated approach to align management practices, business and budget prioritization and strategic oversight. Across the corporation, 244 actions were identified to work toward the program goals over a 10-year period. Actions range from policy updates, guidelines and process change, to multi-year projects. Council's priorities for 2019 to 2022 included a greater focus on climate change, reducing vulnerabilities and pursuing economic benefits.

Climate risk is increasing globally:

- Citizens have joined a growing global movement that seeks to mobilize action by all orders of government, industry, and individuals.
- Countries have begun re-assessing their national goals (Canada has not yet re-stated its target).
- Various levels of government have made 'climate emergency' declarations to initiate society-wide mobilization for action. Over 1,100 jurisdictions in 22 countries have made a declaration, including 460 in Canada.
- The new UN Principles for Responsible Banking received commitment from 130 banks holding US\$47 Trillion in assets (about one-third of the global banking sector) to

## Climate Resilience Strategy Update 2019

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strategically align their business with goals of the Paris Agreement and Sustainable Development Goals.

### **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

This section summarizes key progress within the first year of Calgary's Climate Resilience Strategy implementation and upcoming opportunities. Of the 244 actions detailed within the 10-year action plans, 36 have been completed with 166 other actions underway, embedded into business processes or programs. Calgary's carbon footprint has increased by 18 per cent from 2005 to 2019. The emissions are a result of overall city growth in conjunction with economic and population growth with the largest source of emissions from buildings and transportation. However, on a per capita basis over that period, emissions are lower by 12 per cent. In 2019, Calgary's emissions were essentially flat.

The external governance of Calgary's Climate Resilience Strategy includes the Calgary Climate Panel (CCP), which was established in November 2018 and now includes 18 organizations. The CCP has prepared an independent report summarizing feedback on the first year of The City's Climate Program, which is included as an appendix to the Climate Resilience Strategy Annual Report 2019 (Attachment 1). Key CCP asks include continued City commitment to funding and support, effective scoping of climate actions to align outcomes with goals, leveraging partners' resources and continued leadership from City Council to advance the conversation, change policy and action initiatives.

Internal governance of the Climate Resilience Strategy has not yet been formalized, and finding the balance with other Administrative priorities has been challenging. The experience of distributed climate governance and implementation has delivered fewer expected results and certainty of future results than expected.

### Progress and Opportunities

Notable progress since The Strategy was approved in 2018 includes:

- Installations of solar photovoltaic (PV) systems have grown by 42 per cent. The City made amendments to the Land Use Bylaw in June 2019 to exempt building owners from development permits for most small-scale PV installations. This is a first step to be ready for increased demand in future years.
- Calgary Transit began service on four new MAX bus rapid transit lines in 2019. The MAX lines offer more frequent service, fewer stops, dedicated bus lanes, and more direct connections to people's destinations to help make public transit a preferred travel mode, reducing the number of cars on the road and subsequent emissions.
- Calgary Transit is shifting to lower carbon fuels for buses, with a growing number of vehicles running on compressed natural gas. This is motivated by cost savings and also as an ongoing commitment to improving environmental performance.

The City is also working towards greater climate resilience in response to the forecast risks and the impacts we're already seeing. Some of the highlights from the past year are:

- *Natural Asset Management.* The City is investigating how we can better protect and manage our natural infrastructure, including classifying it as a formal asset, and enabling valuation to inform investment decisions. The *Resilient Calgary Strategy*, approved June 2019, also highlights municipal natural infrastructure as a key pillar in a resilient City.

## Climate Resilience Strategy Update 2019

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- *Riparian Restoration Project:* Three riparian restoration projects were completed with native plants and watered with fit-for-purpose river water through temporary diversion licenses, solar powered water pumps and drip irrigation water delivery systems in 2019. This low cost, low energy solution, helped establish healthy riparian areas that are more resilient to flooding, a future climate driven risk projected to increase.
- *Flood risk mitigation* projects are being built to protect Calgary. The West Eau Claire project was completed in 2019 and provides an increased level of flood protection to the downtown core. Flood barrier improvements are completed at Centre Street, which includes groundwater flood protection as well as overland river flooding.
- *Climate Education:* In the community, the first cohort of students began a new Integrated Water Management diploma program at Southern Alberta Institute of Technology. It includes the first course on campus explicitly dedicated to climate adaptation.

Another major area of focus is community outreach and education. Progress highlights in the last year included:

- Calgary Emergency Management Agency (CEMA) launched their Disaster Risk Explorer, a web-based education tool designed to share information on the types of disasters that Calgary could experience and what The City and CEMA are doing to help mitigate potential impacts.

### Moving Forward

Preparing and responding to the risks of a changing climate requires years, not months. While Calgary has made progress in the first year, much work remains to ensure Calgary is a climate resilient community. In the upcoming year actions will focus on corporate energy and risk management, engaging citizens, collaborating with local partners and increasing internal governance.

### **Stakeholder Engagement, Research and Communication**

A main focus in 2019 was to establish the Calgary Climate Panel. The Panel, established in November 2018, is a diverse group that offers valuable guidance to The City in prioritizing a workplan and finding collaboration opportunities.

Working groups have been developed within the Climate Program and include various Panel members and other interested organizations, working on specific, focused program outcomes. Currently three working groups are active (Education, Utilities and Commercial Energy Benchmarking), with more planned to begin in 2020.

In September 2019, The City commissioned a survey with Calgarians to better understand their perceptions, attitudes and actions in terms of a changing climate. Over two thirds of Calgarians are concerned about climate change and thinks that we need to act now to address climate change.

The survey was conducted by NRG Research Group from September 16 – 23, 2019 with 504 Calgarians via telephone using random digit dialing. To ensure the data was gathered from a representative group of Calgarians, sample quotas were set by age, gender, and city quadrant of the general population aged 18 and older. Data were then weighted to the 2016 Civic Census for age and gender.

## **Climate Resilience Strategy Update 2019**

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In November 2019, The City hosted the second annual Calgary Climate Symposium, which featured panel discussions, demonstrations and other public speaking events. The Symposium was fully registered with 1,230 attendees and a social media reach of 52,345.

### **Strategic Alignment**

The Climate Resilience Strategy aligns with or provides direction to other corporate strategies and policies underway or approved by Council including but not limited to:

- Council Priorities for 2019-2022 – A Green and Healthy City: Priorities H1 and H2
- Municipal Development Plan and Calgary Transportation Plan update
- Resilient Calgary Strategy
- Stormwater Strategy and Plan (Update)
- Water Efficiency Plan
- Corporate Flood Resilience Plan

### **Social, Environmental, Economic (External)**

Economic challenges will increase, especially with additional pressures from pandemics, such as the current Covid19 crisis. Climate change will exacerbate pressures on society with increasing impacts, including carbon emissions. Timely and well-chosen economic measures can be extremely cost-effective and reduce the severity of climate impacts. Early planning and investment in climate resilience are a better use of public funds than delayed and reactive responses to climate change impacts.

The City is looking towards supporting and growing the clean technology market, creating high quality local jobs, and the attraction and retention of businesses are all areas that benefit from a low carbon economy. This includes benefits such as cost savings from energy efficiency, financing and funding options to support innovative projects, and greater resilience through locally generated energy supply.

The natural environment plays a key role in developing resilience, for example established vegetation helps to reduce the detrimental impacts of flood and/or drought. The natural environment is frequently impacted by severe weather events and takes years to recover. Planning and investing in this key asset is crucial to maintain and enhance the natural environment in Calgary.

Calgarians expect that The City and other levels of government will guide and support them in their efforts to combat climate change and manage their energy. This will include policies and bylaws to enable them to get funding and support their ability to protect themselves.

### **Financial Capacity**

#### ***Current and Future Operating Budget:***

As programs and projects intended to build climate resilience are developed and evaluated, budgetary implications will be considered and brought forward, as necessary.

#### ***Current and Future Capital Budget:***

As programs and projects to build climate resilience are developed and evaluated, budgetary implications will be considered and brought forward, as necessary. Any capital budget

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## **Climate Resilience Strategy Update 2019**

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adjustments due to provincial, federal or other grants or funds will be reported to the Administrative Leadership Team and Council, as required.

### **Risk Assessment**

Calgarians who depend on municipal services have a growing expectation that decision-makers will take climate change into account when planning, building, and operating infrastructure. Climate mitigation and adaptation measures will also create new opportunities for job growth and revenue, such as innovative engineering solutions, efficiencies, and cost savings.

Risks related to implementation remain high. Inaction or unintentional management could lead to confusion within the community or negative perceptions within the investment, insurance, development or building industries.

### **REASON(S) FOR RECOMMENDATION(S):**

In June 2018, Administration committed to reporting to Council annually with an update on the Climate Resilience Strategy and Action Plans. Administration will come back between annuals reports to update Council on any challenges and risks, as required.

### **ATTACHMENT(S)**

1. Attachment 1 – Climate Resilience Strategy Update 2019
2. Attachment 2 – Climate Resilience Strategy Update 2019 Presentation





**2019 UPDATE**

# **Climate Resilience Strategy**

Environmental & Safety Management



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# Introduction

This report provides an update to the end of the first year (2019) of The City of Calgary's Climate Resilience Strategy and Action Plans.

In partnership with service owners, business units and community partners, The City of Calgary (The City) has begun implementing the actions identified in the 10-year Mitigation and Adaptation Action Plans.

The issues surrounding climate change have continued to evolve, both globally and locally and citizens, governments, and businesses have responded. The City will focus on corporate leadership and community engagement on greenhouse gas (GHG) reduction, planning for

and managing adaptation risks, establishing partnerships, and ongoing education efforts.

The City's Mitigation and Adaptation Action Plans contain defined actions, outline The City's role in carbon and energy management and climate risk reduction over the next 10 years. These plans include 244 actions across the corporation and build on the strength and initiative of existing partnerships, and new, developing collaborations. One year into implementation most actions are underway, with many on-going actions now embedded into business processes or programs. By the end of 2019, 36 actions were completed.



## **244** TOTAL ACTIONS

**36** Actions completed

**166** Actions in progress

**42** Actions not started

- 1. Buildings, infrastructure and energy**
- 2. Transportation and land use**
- 3. Consumption and waste**
- 4. Natural infrastructure**
- 5. Integrated watershed management**
- 6. Community outreach and education**
- 7. Leadership and governance**



The governance of Calgary's Climate Resilience Strategy includes the Calgary Climate Panel (The Panel) as an advisory network. The panel includes 18 organizations from a range of sectors including the University of Calgary, industry associations like Building Industry and Land Development (BILD) Calgary Region and Building Owners & Managers Association (BOMA), the Calgary Airport Authority, ENMAX and ATCO. The Panel has prepared an independent report on its view of The City's Climate Program, which is included as Appendix 1 to the Climate Resilience Strategy Update 2019.

Climate actions are ongoing in three purposeful ways: City-led actions, partnerships with industry, and projects that are directed entirely by the community. Preparing and responding to the risks of climate change requires decades, not months. While Calgary has made progress, much work remains to ensure Calgary is a climate resilient community. Calgarians who depend on municipal services have a growing expectation that decision-makers will account for climate change when planning, building and operating infrastructure.

The City's constrained budget environment has had an impact on staff capacity to deliver programs in 2019. Administration will be seeking more collaboration through partnerships in the community to achieve results. As programs and projects to build climate resilience are developed and evaluated, budgetary implications will be considered and brought forward as necessary.

The ability of Administration to take on the challenges of climate change and integrate it into its business has been challenging. It requires intentional governance and inter-departmental collaboration to ensure The City leads and supports the community in meeting its climate obligations.





# Background and context

Increasing global temperatures are leading to a myriad of impacts on Earth's biodiversity and societies and geographically-scaled climate responses. Climate change is contributing to more severe and more frequent environmental and weather hazards, including increased flooding, drought, wild fires and extreme weather events across the globe. These hazards have serious implications for cities, including impacts on natural resources, infrastructure damage and/or failure, effects on human health, economic disruption and increased intensity and frequency of disaster events.

In today's globally interconnected society, the impact of climate change in other parts of the world affects life in Calgary. While the land-ocean temperature index has increased by 0.99°C globally, Alberta's mean temperature has increased by 1.4°C.<sup>1</sup>

Regional changes in the climate pose a serious risk to Calgarians and the ability of The City to provide services cost effectively. The inevitability of climate change requires The City of Calgary (The City) to integrate a climate response focused on decreasing the cause of climate change (Greenhouse Gas (GHG) emissions) and reducing risk to The City's services, operational costs, financial losses and citizen wellbeing. The Resilient Calgary Strategy that includes social, environmental and economic considerations for a resilient community recognizes the Climate Resilience Strategy as a key pillar.

Climate resilience requires collaboration with The City, other levels of government, industry, academia, environmental organizations and citizens. Success is dependent on active prioritization of the Climate Resilience Strategy's implementation by The City's Administration, including supportive funding and resourcing. Continued measurement, verification of targets, identification of external impacts and feedback-loops on Calgary's Climate Strategy are vital.

Preparing and responding to climate risks requires years, not months. While Calgary has made progress in implementing the Strategy since approval in June 2018 to the end of 2019, much work remains to holistically implement the 244 actions identified in the Climate Mitigation and Adaptation Action Plans. Ensuring Calgary is a climate resilient community will require not only the successful achievement of the Climate Resilience Strategy but the integration of climate risk into standard City and community practice.

Calgary's progress is a reflection of the commitment of The City's leaders and staff working with citizens, local communities and partner organizations to make Calgary a more resilient and prosperous city for the citizens we serve. The path toward an 80 per cent GHG reduction will require both financial and organizational changes to ensure Calgary is a low-carbon economic hub that is attractive to investment and less vulnerable to climate change impacts.

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<sup>1</sup> NASA's Goddard Institute of Space Studies (NASA/GISS)





## The evolving climate change context

### Did you know?

The annual average temperature in Canada has increased by 1.7°C between 1948 and 2016, while average winter temperature has increased by 3.3°C.

The issues surrounding climate change have evolved rapidly over the past year. This section describes the changes that are occurring, from the global to local level. The City has been active since June 2018 in delivering the Climate Resilience Strategy. Key actions have focused on corporate leadership and community engagement on GHG reduction, planning for and managing adaptation risks, establishing partnerships and ongoing education efforts.

Climate change is observable on a global level. 2018 was the fourth warmest year globally since records began, and the forty second consecutive year that global land and ocean temperatures have been above the twentieth century average.<sup>2</sup> In 2018, the

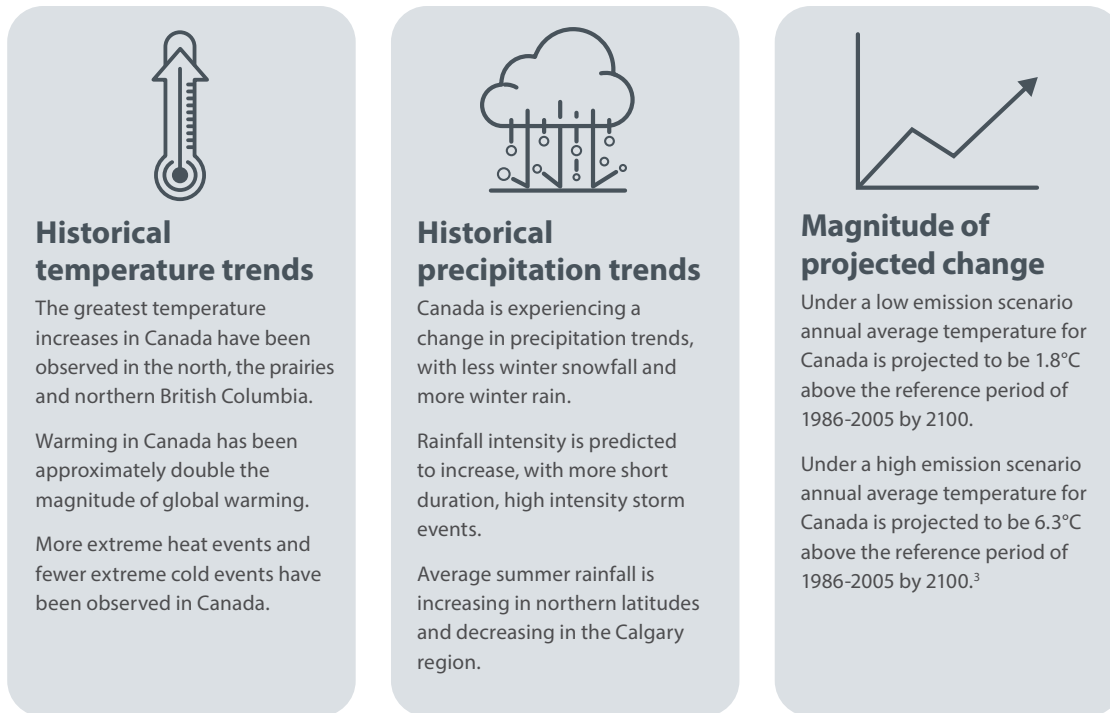
Intergovernmental Panel on Climate Change (IPCC) released a report that detailed the risks associated with greater warming. This resulted in an internationally accepted target for climate action to limit global temperature rise to 1.5°C, not 2°C as previously proposed in the 2015 Paris Agreement.

### Canada's climate

Driven by global emissions from human activities, Canada's climate has warmed and will warm further in the future. Environment and Climate Change Canada released Canada's Changing Climate Report (CCCR) in April 2019 to assess the climate change impacts to Canada and how Canadians are reducing risks. This

<sup>2</sup> <https://climate.nasa.gov/news/2841/2018-fourth-warmest-year-in-continued-warming-trend-according-to-nasa-noaa/>

document is the first in a series of resources to be produced to advance adaptation decisions and actions. The following graphic is a high-level summary of the CCCR:



## Public opinion and political stance

Scientists, media, climate activists and industry are increasingly mobilizing to adapt to and reduce the impacts of climate change.

### Climate emergency declaration

A growing global climate emergency movement has been observed. As of January 28, 2020, over 1,300 jurisdictions in 26 countries have declared a climate emergency, including 460 in Canada.<sup>4</sup>

### Global climate strikes

Youth climate activist Greta Thunberg staged a protest in August 2018, sparking an international movement of student strikes to demand action on climate change. In 2019, similar demonstrations took place elsewhere in the world, with roughly 4,500 marches and rallies across 150 countries.

Young Calgarians have also been participating in ‘Fridays for Future’ student strikes. During the ‘Global Week for Future’ climate strikes in September 2019, hundreds of Calgarians joined in the series of international strikes to demand action on climate change, including two citizen-organized climate parades starting at City Hall.

### Calgarians’ climate change perspective

The City commissioned a Citizen Perspectives Survey in September 2019 to ask more than 500 Calgarians by phone about their attitudes on climate change, impacts on their lives and the actions they’re taking. To ensure the data was gathered from a representative group of Calgarians, sample quotas were set by age, gender and city quadrant of the general population aged 18 and older. The results found that Calgarians are concerned about climate change and support increased climate action.

<sup>3</sup> <https://changingclimate.ca/CCCR2019/chapter/executive-summary/>

<sup>4</sup> <https://climateemergencydeclaration.org/>



## In 2019, Calgarians shared their perceptions on climate change

**77%** “I think we need to act now to address climate change.”

**76%** “I am concerned about climate change.”

**73%** “I want to do more personally to help prevent climate change.”

**72%** “I think Calgarians should be doing more to help prevent climate change.”

### Extremes in 2019

February 2019 was the **third coldest** on record with an average daily temperature of  $-18.7^{\circ}\text{C}$ , and 25 out of 28 days recorded snowfall. September 27, 2019, set a new September **single day snowfall record** of 24.6 cm in Calgary.

Calgary recorded the **hottest day ever** on August 10, 2018 at  $36.5^{\circ}\text{C}$ . Summer 2019 brought **71 days of rain, tied for a record**, with nearly 80 mm more than average through June, July and August.

In 2019, Alberta saw 23 tornadoes touch down, **nearly double the 30-year average** of 12 to 15.

## Government policy in transition

This year two important elections occurred that affected the Climate Policy context for The City of Calgary. The federal election in the fall of 2019 resulted in a minority Liberal government, which has continued the climate change policy enacted under the Pan-Canadian Framework for Clean Growth and Climate Change.

The election of a new provincial government in spring 2019 resulted in changes in climate policy including the removal of the provincial carbon tax. Bill 19 (*Technology Innovation and Emissions Reduction Implementation Act*) was introduced to the legislature in the fall and targets emission reductions for large GHG emitters. Bill 19's implementation will focus on the reduction of emissions from electrical generating facilities (meeting best in class natural gas fired standards) and other facilities exceeding 100,000 tonnes of carbon dioxide emissions (10 per cent reduction by 2020 and one per cent reduction each year thereafter). The current Carbon Competitiveness Incentive Regulation will be phased out on January 1, 2020. The Technology Innovation and Emissions Reduction (TIER) system will utilize levied funds to advance new and cleaner Alberta-based technologies that reduce emissions.<sup>5</sup>

The City of Calgary adheres to policy set by other orders of government and works to coordinate with any energy and climate

programs that are active provincially and federally. In 2019, The City made adjustments to climate programming based on the new mandates, for example the changes in provincial energy efficiency and renewable programs and federal electric vehicle programs.

## Industry accounting for climate change

### Investment industry

According to the National Round Table on the Environment and the Economy report, *Paying The Price: The Economic Impacts of Climate Change for Canada*,<sup>6</sup> timely and well-chosen measures can be extremely cost-effective and reduce the severity of climate impacts. Reports conclude that early planning and investment in climate resilience are a better use of public funds than delayed and reactive responses to climate change impacts.

On September 22, 2019, the United Nations (UN) launched the Principles for Responsible Banking with 130 banks across 49 countries, representing about one third of the global banking sector. The signatories commit to strategically align their business with goals of the Paris Agreement on Climate Change and the UN's Sustainable Development Goals and increase their contribution to achieve both goals with the Principles for Responsible Banking.

<sup>5</sup> <https://www.alberta.ca/technology-innovation-and-emissions-reduction-engagement.aspx>

<sup>6</sup> <http://nrt-trn.ca/wp-content/uploads/2011/09/paying-the-price.pdf>

## Insurance industry

On September 26, 2019, the Federation of Canadian Municipalities (FCM) and the Insurance Bureau of Canada (IBC) released a report, stating that avoiding the worst impacts of climate change at the municipal level will cost an estimated \$5.3 billion per year shared amongst all three orders of government.

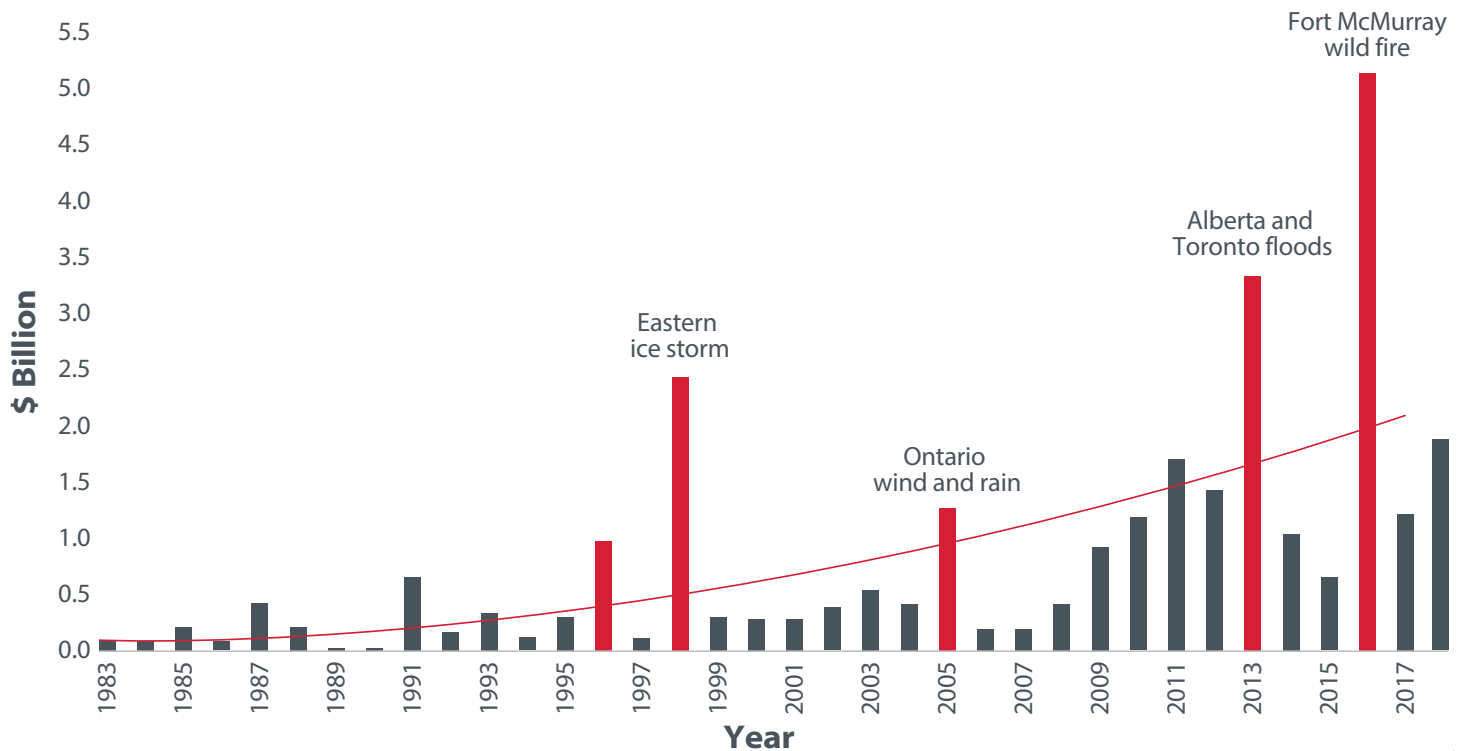
The IBC has found that “property and casualty insurance payouts from extreme weather have more than doubled every five to ten years since the 1980s,” with water-related losses contributing to more than 50 per cent of the increase.<sup>7</sup>

Flooding is the most pervasive and costly risk impacting Canadian communities. Catastrophic losses were responsible for \$1.9 billion in insured damage in 2018, the fourth highest year on record.<sup>8</sup>

For Calgary, these changes in the finance sector will have impacts over time. Investments in infrastructure and buildings will consider the climate impacts on a per-project basis. For anyone relying on insurance, the real-world risk factors specific to Calgary are beginning to be priced-in.

Investments in adaptation are critical for local communities as **every dollar invested today** in local resilience **saves six** in future costs.

### Catastrophic losses in Canada and trend – 1983 to 2018



<sup>7</sup> <https://www.intactcentre.ca/wp-content/uploads/2017/09/Preventing-Disaster-Before-It-Strikes.pdf>

<sup>8</sup> <http://www.ibc.ca/on/resources/media-centre/media-releases/severe-weather-causes-190-million-in-insured-damage-in-2018>

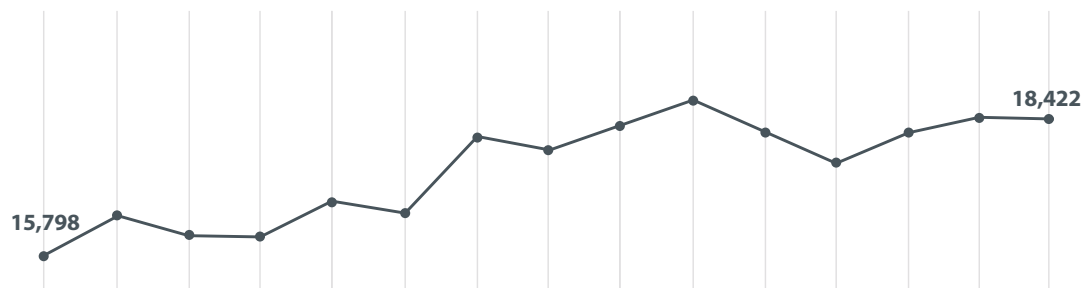
<sup>9</sup> [http://assets.ibc.ca/Documents/Facts%20Book/Facts\\_Book/2019/IBC-2019-Facts.pdf](http://assets.ibc.ca/Documents/Facts%20Book/Facts_Book/2019/IBC-2019-Facts.pdf)

# The state of Calgary's emissions

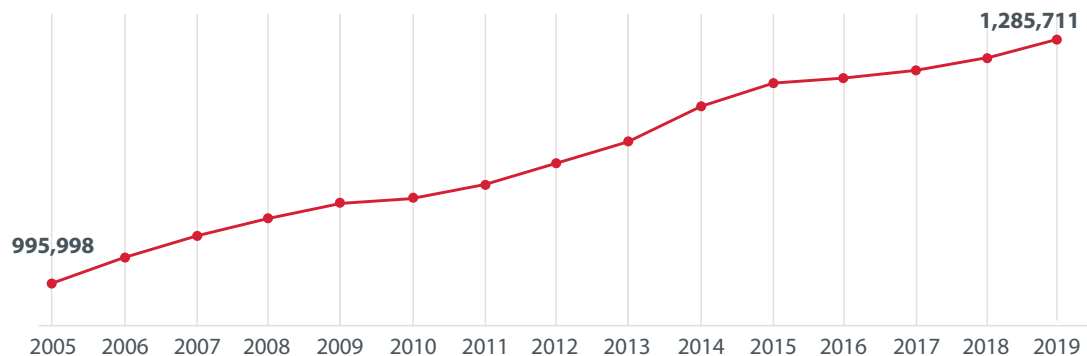
Calgary's carbon footprint has grown by 18 per cent between 2005 and 2019. The state of Calgary's emissions between the years of 2005 and 2019 can be characterized by overall city growth in conjunction with economic and population growth. The share of emissions from different sectors over those 14 years has been consistent, with non-residential buildings remaining as the largest source of

GHG emissions. For comparison, The City of Calgary contributed four per cent of the Calgary community-wide GHG emissions. Emissions are reported annually to the Carbon Disclosure Project including building and energy use (electricity and natural gas), transportation (on-road and off-road vehicles) and waste (solid waste and wastewater).

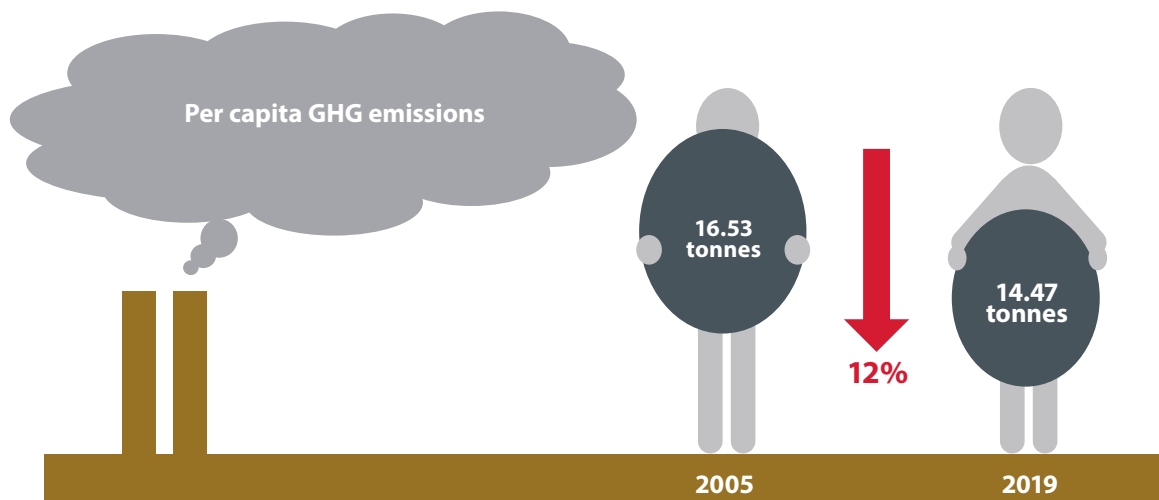
## Calgary community-wide GHG emissions (kilotonnes CO<sub>2</sub>e)



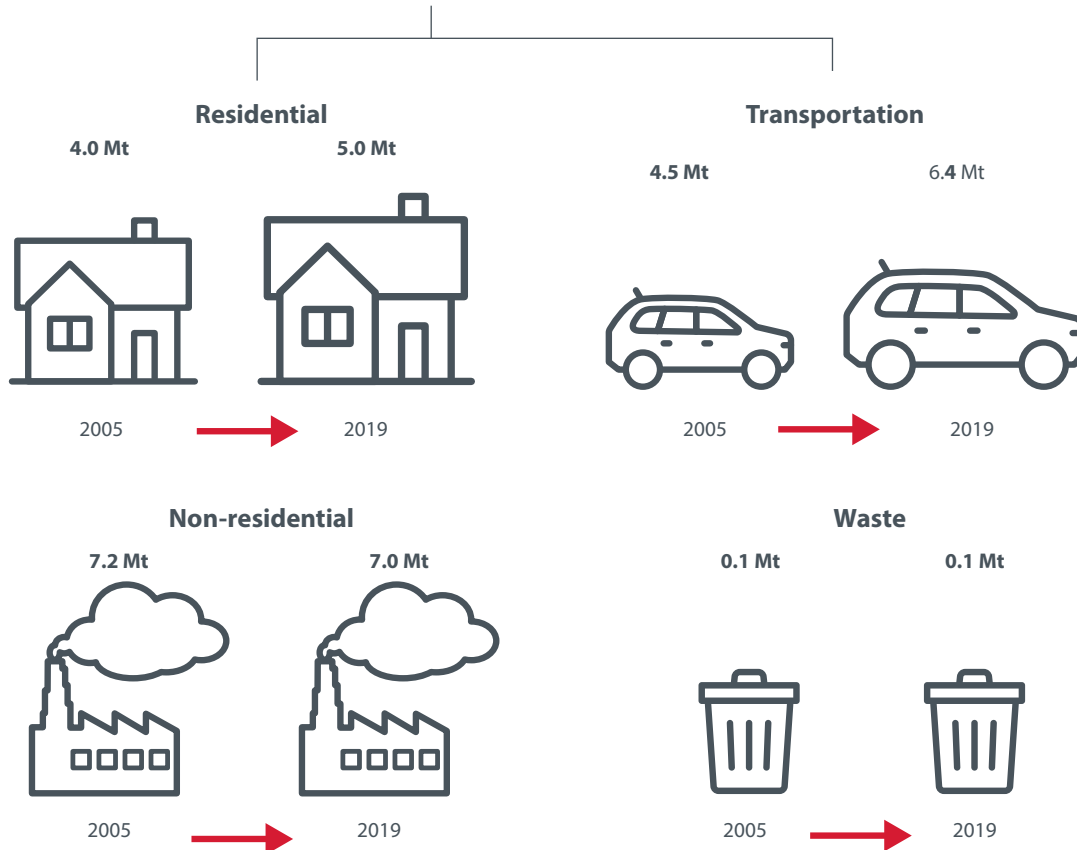
## Calgary population



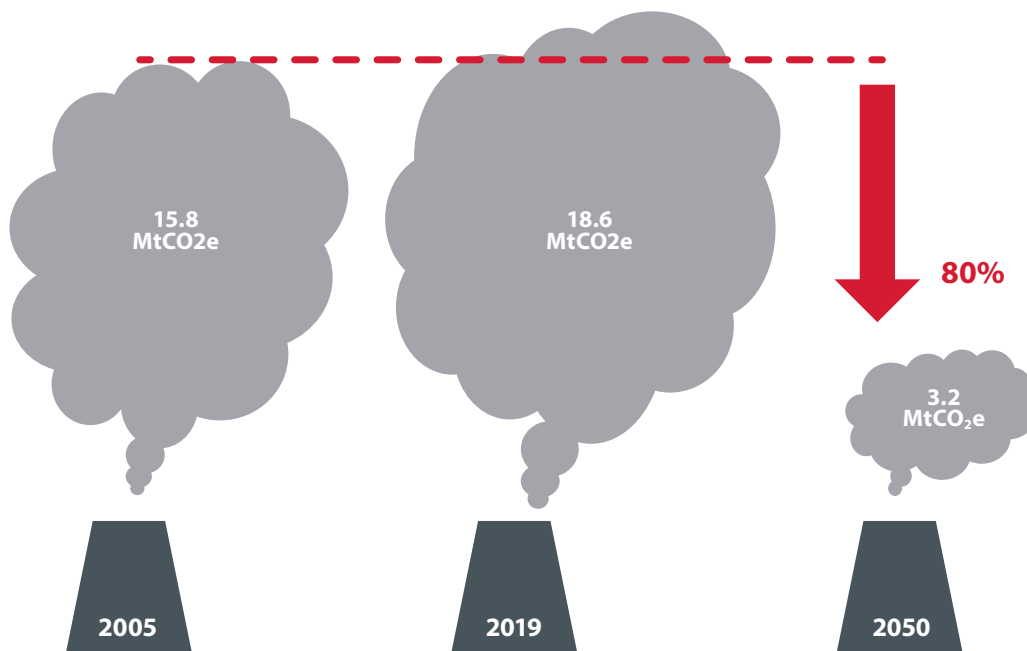
## Despite the overall upward trend, GHG emissions per capita have decreased since 2005



**City-wide GHG emissions change: +18 per cent**

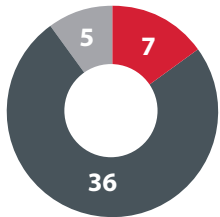


**The City of Calgary's 2050 target is to reduce GHG emissions 80 per cent below 2005 levels**



# The Climate Resiliency Strategy – Progress update

In 2019, The City of Calgary had its first full year under the 2018 Calgary Climate Resilience Strategy. Progress update areas are organized by the same themes identified in the Strategy. The number of actions are shown along with status updates and certain City of Calgary projects are highlighted. Some specific community-led climate actions are noted as well, but are not included in the count of City completed actions.



- Completed
- In progress
- Not started

## 1. Buildings, infrastructure and energy – 48 actions

Accounting for 65 per cent of Calgary’s overall GHG emissions, the built environment represents the largest portion of citywide emissions. The mitigation action plan focuses on three programmatic areas for buildings: energy performance standards in new and existing buildings, energy consumption information and on-site and neighbourhood scale renewable energy systems.

### City actions

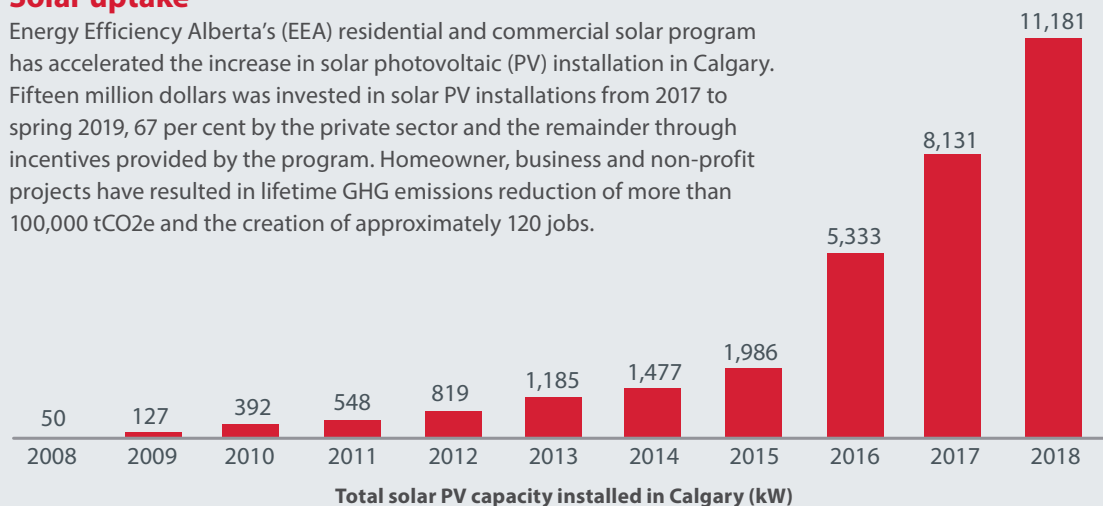
#### New development design for Affordable Housing in Calgary

Across the city, more than 1,000 new affordable housing units are targeting 16 per cent improved energy efficiency compared to National Energy Code for Buildings (NECB) 2017 guidelines. This includes 62 townhomes

and stacked townhomes in Bridlewood with 42 per cent more energy efficient design than NECB 2015. An additional 437 multifamily units integrated with a fire station, child care, corporate offices and a public library are in progress to achieve 26 per cent better energy efficiency than NECB 2015.

### Solar uptake

Energy Efficiency Alberta’s (EEA) residential and commercial solar program has accelerated the increase in solar photovoltaic (PV) installation in Calgary. Fifteen million dollars was invested in solar PV installations from 2017 to spring 2019, 67 per cent by the private sector and the remainder through incentives provided by the program. Homeowner, business and non-profit projects have resulted in lifetime GHG emissions reduction of more than 100,000 tCO<sub>2</sub>e and the creation of approximately 120 jobs.





## Reducing barriers for energy efficiency

Calgary Building Services have focused efforts on reducing barriers to energy efficiency for those who want to implement change. The relaxation of minimum separation requirements is a practical and enabling solution for building owners to improve building envelope insulation. To facilitate passive house construction in Calgary, the Passive House Planning Package was recognized by The City as energy code compliant.

## Partnerships

The commercial and institutional energy benchmarking program has drawn upon expertise from a broad range of stakeholders with an interest in advancing energy consumption information. A working group was established in 2019 to guide the development of the program, which included both Calgary Climate Panel members and other important stakeholders. This ongoing working group includes: ATCO, BILD Calgary Region, BOMA Calgary, Calgary Board of Education, ENMAX, Siemens, and Strategic Group.

## In the community

**Carbon capture technology as an option for new construction.** Carbon capture and storage technology is being used at Calgary International Airport in the construction of new deicing aprons. This is a collaboration between WestJet, Air Canada, Canadian North and the Calgary Airport Authority.

**Producing renewable power while protecting from extreme weather.** Audi Royal Oak was the first car dealership to install a solar canopy in Canada. The project provides 60 per cent of the car dealership's annual energy, while protecting its inventory from costly hail damage.

### Did you know?

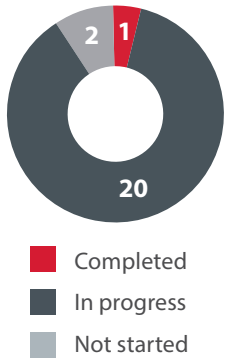
The total annual energy cost for all of Calgary is **\$2.6 billion**. That's three per cent of all money earned in the city. Energy efficiency directly reduces costs and translates to fewer carbon emissions.

### Did you know?

In 2018, installations of solar photovoltaic (PV) systems grew by 42 per cent. The City made amendments to the Land Use Bylaw in June 2019 to exempt building owners from development permits for most small-scale PV installations. This is a progressive step that prepares The City for increased demand in future years.

Solar photovoltaic panels installed at a local car dealership. *Source: Audi Royal Oak*





## 2. Transportation and land use – 23 actions

The transportation sector is the second largest emissions source in Calgary, primarily from the use of diesel and gasoline fuels. Switching to more energy efficient transportation modes, as well as lower carbon, cleaner fuel and electric vehicles, is an important step to reduce GHG impacts. Effective planning and policy decisions on transportation infrastructure and services impacts the ability to endure climate and extreme weather events throughout the intended service life.

### City actions

#### Implement and support rapid transit corridors as defined in RouteAhead

In November 2018, Calgary Transit began service on three new MAX bus rapid transit (BRT) lines, with the fourth MAX line launched in Q4 2019. Benefits of the MAX lines include more frequent service, fewer stops, dedicated bus lanes, signal priority, heated shelters, real-time information displays and more direct connections to destinations to help make public transit a preferred travel mode. Planning and design work for the Green Line light rail transit (LRT) is also ongoing. All of these initiatives enhance our public transit system to encourage transit ridership, provide mobility choices for Calgarians, and reduce the number of cars on the road.

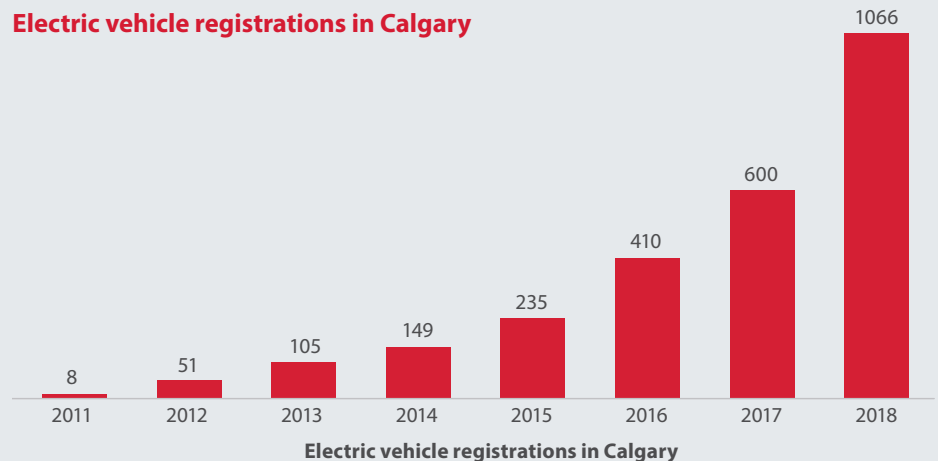
#### Review and update design guidelines for transportation infrastructure to increase resilience to changing climate conditions

The Transportation department updates design guidelines for transportation infrastructure and is continuing to make adjustments, where necessary, to account for changing climate conditions. City employees actively participate in national organizations, such as the Transportation Association of Canada, that set design standards and codes for Canada. Several areas that are being updated to address climate changes include bridges and structures, transit maintenance facilities, snow and wind loading on roadway infrastructure and equipment, as well as asphalt and concrete mix designs.

### Electric vehicle uptake

The increase in electric vehicles (EVs) registered in Calgary has grown from single digits at the start of this decade to slightly above 1,000 by the end of 2018. This trend tracks both battery electric vehicles and plug-in hybrid electric vehicles. With limited electric models available on the market to date, the adoption rate in Calgary is still low, however, 2020 looks to be a breakthrough year, with most major auto manufacturers committing to deliver more EV models. There are no provincial incentives to purchase EVs, but effective May 1, 2019, the federal government has a rebate up to \$5,000 for zero-emission vehicles.

#### Electric vehicle registrations in Calgary







### Energy savings from green building design of transit facilities

The focus of transit facility development in 2018 was on continuing construction of the Stoney Compressed Natural Gas (CNG) Bus Storage and Transit Facility. This was delivered through a Design-Build-Finance-Maintain procurement model of public-private partnership and opened for service in March 2019.

The state-of-the-art Stoney CNG Transit Facility provides indoor storage and servicing for The City's diesel buses and for a new and expanding fleet of buses fueled by CNG. It has a design capacity of 450 buses (40-foot equivalent) in total. The CNG fleet is being procured for lifecycle replacement of existing diesel buses in the fleet. With a 550 pound per square inch feed off of the ATCO high pressure gas line nearby, the energy consumption required for gas compression on site is much reduced. It is the largest indoor CNG bus fueling facility in North America at 44,300 m<sup>2</sup>. Having achieved a Leadership in Energy and Environmental Design (LEED) Gold facility rating, the Stoney CNG Transit Facility is water and energy efficient. It includes a combined heat and power system (CHP) that utilizes waste heat and is designed to allow solar photovoltaic panels to easily be installed on the roof. The storage capacity of this facility supports diesel bus operations and

provides space for buses that are currently stored outside at other garages. This additional indoor storage reduces idling time for buses before leaving the garage, and associated fuel consumption and emissions.

### Shifting to lower carbon fuels for buses

Calgary Transit monitors the evolution of technology and product availability for its fleet through involvement with the Canadian Urban Transit Association and other industry networks. The fleet comprises approximately 1,000 buses and shuttles fueled by diesel and gasoline, plus a growing number of CNG buses. Shifting to CNG fuel from diesel is motivated by fuel cost savings and a commitment to continual environmental performance improvement. There are significantly reduced tailpipe emissions, including nitrogen oxides



### Transportation-related indicators

**Bike lanes:** As of April 2019, Calgary's total cycling network includes 1,219 km of lane kilometres, with 905 km being off-street pathways.

**EV charging stations:** As of September 2019, Calgary has 168 Level 2 Stations and six Level 3/DC Fast Charging stations.

**Public transit:** For transit ridership, there were 105,348,000 total trips in 2018.

**Fuel consumption:** In 2018, Calgarians consumed 1,493 million litres of gasoline and 943 million litres of diesel.

**Total GHG emissions emitted from transportation sector in 2018:** 6.4 million tonnes CO<sub>2</sub>e or 5.05 tonnes CO<sub>2</sub>e per capita.





### Did you know?

According to the 2019 Civic Census, Calgary's active suburbs continue to absorb the largest share of city-wide population growth. In 2019, 79 per cent of city-wide population growth occurred in Calgary's 29 active suburbs, while 13 per cent and 8 per cent of city-wide population growth occurred in established area communities and Centre City communities, respectively.

(NOx) that contribute to smog formation, as well as reduced GHG emissions.<sup>10</sup> By the end of 2019, Calgary Transit added 84 new CNG buses to its fleet and an additional 30 are expected in Q1 2020. Future bus purchases will focus on the use of alternative fuels including CNG to operate out of Stoney Transit CNG Facility. Calgary Transit continues to explore emerging technologies like electric battery powered buses to achieve, among other benefits, reduced GHG emissions as well as reduced tailpipe emissions affecting local air quality.

### Implement Calgary's Electric and Low Emissions Vehicles Strategy

In 2019, The City published its Electric and Low Emissions Vehicle (EV) Strategy. The document provides additional detail on how The City



will implement multiple actions in the Climate Resilience Strategy related to electric vehicles and alternative fuels, which were identified as the single largest opportunity to reduce emissions from the transportation sector in Calgary. The EV Strategy is also closely linked with the Transportation Department's Future of Transportation portfolio.

The City has participated in several partnerships with other Alberta municipalities and private companies to increase access to public charging infrastructure and assess new regulatory requirements for home and workplace charging, as described in the Partnerships section below. Additional opportunities to pilot public charging infrastructure at several City facilities are being pursued in early 2020. The City is also increasing efforts to engage businesses and the general public to build awareness and understanding of electric and low emission vehicle technologies.

### Expand pedestrian infrastructure along the Primary Transit Network, and complete missing links in transit oriented developments, Main Streets and high intensity industrial areas

A range of different programs are being undertaken to enhance pedestrian infrastructure in high demand locations.

As part of the One Calgary 2019-2022 Budget, new funding was approved to upgrade the 42nd Avenue S.E. 'Barley Belt' walking and cycling corridor. Partial funding has also been approved to continue piloting the installation and use of adaptive sidewalks where regular sidewalks are not present. These use low concrete curbs with white posts installed on the roadway to separate pedestrians from traffic.

### Design Guidelines for Subdivision Servicing

Pathway guidelines in the Design Guidelines for Subdivision Servicing have been updated to better support the cycling network and account for alternative transportation routes in the event of roadway closures. New regional pathway

<sup>10</sup> While the actual combustion of CNG fuel has reduced GHG emissions compared with diesel fuel, the compression required for CNG (to boost from 550 psi to 3500 psi) normally may offset the reduction to a degree, however, compression is powered by electricity, and The City has GHG emissions-free electricity supply as described above.

connections that form part of the primary cycling network should be routed outside of the 1:100 year floodway, where applicable.

### **Municipal Development Plan and Calgary Transportation Plan Update – Next 20**

As of February 2020, The City is engaging the public on the recommended updates to the Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP). The scope of the Next 20 project was revised in July 2019 to focus on text and plain language edits, without new targets or policies. Previously approved Council direction will be incorporated in the MDP and CTP as needed, including direction from Calgary’s Climate Resilience Strategy.

The MDP will continue to support the city-wide parks and open space network, watershed management, green infrastructure and growth in compact urban centres supported by an accessible transportation network.

The CTP places increasing emphasis on sustainable mobility options such as public transit, walking and cycling, in coordination with natural infrastructure. Consistent with the Climate Resilience Strategy, amendments to the CTP would direct The City participate in and promote actions that will achieve a 100 per cent zero-emission community vehicle fleet by 2050.

## **Partnerships**

### **Peaks to Prairies Network**

Peaks to Prairies is a new southern Alberta electric vehicle fast-charging network. The City of Calgary is one of the founding partners, along with the Alberta Southwest and SouthGrow regional economic development agencies, the Cities of Lethbridge and Medicine Hat, and Medicine Hat College. The Federation of Canadian Municipalities and the Province of Alberta are major funding partners. The non-profit agency Community Energy Association is project managing development of the network on the partner’s behalf, and ATCO has been hired to own and operate the network using renewable energy sourced from southern Alberta.



The City has provided seed funding as well as project planning and procurement support over the course of the project. Buildout of the network began in 2019, with fast charging stations installed across southern Alberta. The entire network is expected to be complete by spring 2020.

### **Charging infrastructure in downtown**

In April 2019, 42 new electric vehicle charging stations were installed in three Calgary Parking Authority (CPA) parkades in downtown Calgary (City Hall, McDougall Parkade and the Convention Centre). The charging stations were provided by Tesla, with 28 of the stations being for Tesla vehicles, and the remaining 14 usable by all types of electric vehicles. This brings the total number of charging stations provided by the CPA in the downtown to 48.

By the end of 2019, there were approximately 180 public charging stations available across Calgary, including several fast charging stations. This is in the target range for public charging infrastructure as identified in Calgary’s Electric and Low Emissions Vehicle Strategy.



## Home and Workplace Charging Infrastructure Study

As one of the key actions from the EV Strategy, The City of Calgary is collaborating with the City of Edmonton on an electric vehicle home and workplace charging readiness study. In spring 2019, the cities hired ICF Canada to review current best practices in comparable North American jurisdictions and to engage a range of stakeholders to develop recommendations for Calgary and Edmonton. Stakeholders included the building development industry, building managers, utility companies and electric vehicle users.

ICF Canada is in the process of finalizing their report, which is anticipated to be publicly available in late March of 2020. The report will include recommendations on EV Ready charging requirements for new developments, preliminary concepts for community charging hubs and information to develop informational

brochures for home owners and building managers on how to install charging stations. Additional work will need to be completed by both The City of Calgary and the City of Edmonton on how to finalize and implement the recommendations of the study.

## In the community

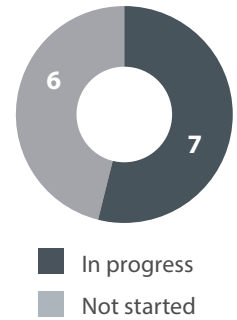
### Electric scooters

The shared electric scooter pilot program started in July 2019 and will be running for 16 months. The pilot program has 1,500 scooters from two companies, Lime and Bird, available for use around the downtown core. Since implementation, 540,000 rides covering more than 1.1 million kilometres were logged. A portion of these rides replace the use of vehicles for short journeys, thus reducing emissions. More data will be available on the impacts in 2020.



### 3. Consumption and waste – 13 actions

The City of Calgary’s waste-related facilities contribute about one per cent of total city-wide GHG emissions. Emissions are primarily from landfills, the composting facility and the wastewater treatment plants. Actions to reduce waste related emissions focus on waste volume reduction and the capture and processing of landfill gas. The City of Calgary’s aspirational waste management goal is to achieve zero waste, where all discarded materials are resources that can be reused (recycled, composted, repurposed, etc.) and no garbage sent to landfills. The current target is 70 per cent diversion of waste from landfills by 2025.



#### City actions

##### Landfill cover technology for reduced infiltration and emissions reduction

At the Spyhill Waste Management Facility, The City has completed two novel evapotranspiration (ET) landfill covers with several more under construction. These ET covers use natural processes to better manage potential risks of water infiltration, while also being more resilient than traditional clay covers to long-term changes in climatic conditions. The ET covers are expected to reduce landfill methane emissions by promoting a robust microbial community that will consume methane before it is emitted.

##### Alternative fuel assessment for waste collection trucks

A study of alternative fuel waste collection vehicles was underway in 2019. It is considering the economic, environmental and social impacts for different technologies and scenarios. This study is intended to support The City’s decision-making on the transition to a greener fleet, which will help achieve reductions in GHG emissions and air contaminants, improve community health and maintain the natural



environment. The technologies being compared are: diesel, diesel hybrid (diesel-electric powertrain with electrically powered collection lift/collection/compaction), battery electric and compressed natural gas. The final report will be completed in 2020 Q1.

#### Did you know?

**Landfill waste:** In 2018, 345 kg of total waste was sent to The City of Calgary landfills per person. **55 per cent** of residential waste was diverted from landfills through the Blue and Green Cart programs.

**Total greenhouse gas emissions emitted from City waste facilities in 2018:** 0.14 million tonnes CO<sub>2</sub>e or 0.11 tonnes CO<sub>2</sub>e per capita.



**Did you know?**

In Canada, the equivalent of **30 to 40 per cent** of the food produced is lost along the value chain, with much of it finding its way to landfill or composting. (*Uzea, Gooch & Sparling, 2014, p. 5*)



**Landfill gas capture**

The City has constructed a landfill gas (LFG) collection facility at each of our active landfills (East Calgary, Shepard and Spyhill) in Calgary, with the last LFG facility construction at Spyhill completed in late 2018. With the addition of the Spyhill LFG facility, The City will reduce GHG emissions by approximately 70,000 tCO<sub>2</sub>e annually. That’s about the same amount of emissions produced by 4,837 Calgarians in a year.

The City recently completed a feasibility study for converting LFG to energy at each of the LFG facilities. The study reviewed five technologies, finding that electricity generation at East Calgary and Spyhill landfill sites provided the highest rate of return. At the Shepard landfill site, due to low landfill gas rates, leachate evaporation was most feasible. The City is currently reviewing potential funding opportunities for project implementation.

**Partnerships**

**Reduction of food waste with local restaurant**

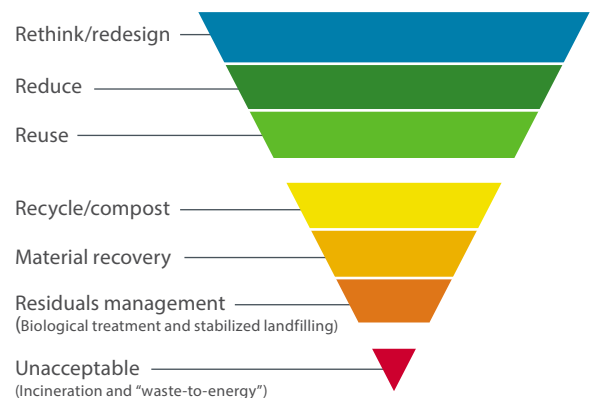
The City partnered with a local Chinese buffet restaurant to reduce food waste over a one-year project period. Waste assessments guided by the waste hierarchy were completed, focusing on food waste reduction at all stages:

Storage, preparation, serving, consumption and discarding to identify opportunities and problem areas. This project is an example of managing food waste at the point of consumption to achieve GHG and resource conservation benefits.

**In the community  
University of Calgary**

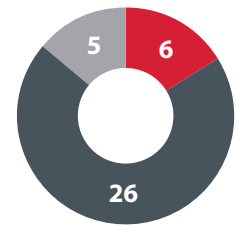
The University of Calgary strives to become a zero-waste community. By 2020, the University is committed to diverting 80 per cent of its waste from landfill while hosting 30,000 to 35,000 people per day.

**Zero waste hierarchy of highest and best use 7.0**



## 4. Natural infrastructure – 37 actions

The Climate Resilience Strategy highlights the climate adaptation and mitigation benefits found in a native-type of urban landscape and the multiple benefits that are provided by natural infrastructure. Natural infrastructure includes a range of assets, from natural through engineered, which rely on ecological and hydrological processes to provide municipal, ecosystem and social services.



### City actions

#### Resilient Calgary Strategy

The Resilient Calgary Strategy (June 2019) highlights municipal natural infrastructure as a key pillar in a resilient city. We will better protect and manage the natural systems we rely on for municipal services through:

- Understanding the multiple benefits provided by natural infrastructure.
- Incorporating natural infrastructure in the asset management process.
- Embedding the value of natural infrastructure into core decision-making processes and policy.

The natural infrastructure program is a multi-year initiative involving cross-corporation collaboration. Over 100 municipal, not-for-profit, academic and industry representatives from across Alberta and British Columbia were engaged in September 2019 to discuss

the value of including natural infrastructure within the municipal asset management and financial frameworks.

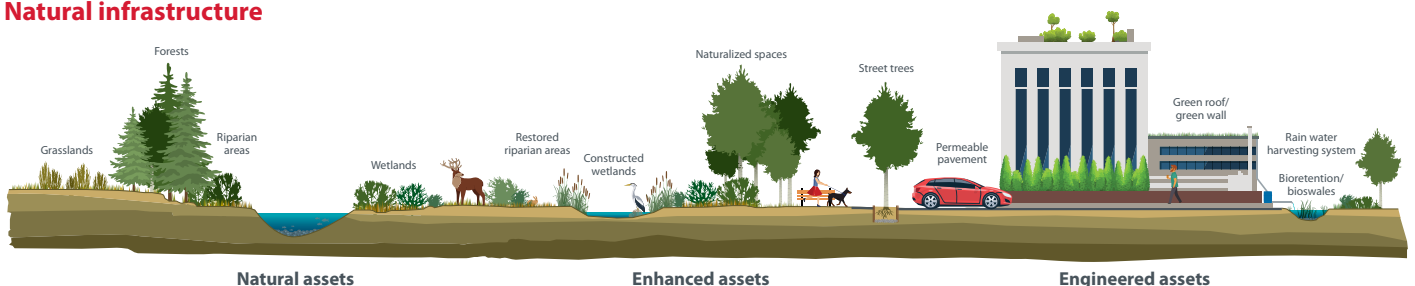
#### Biodiversity Action Plan (2020)

In 2015, Council approved *Our BiodiverCity: Calgary's 10-year Biodiversity Strategic Plan*, which provides direction for initiatives to improve and enhance biodiversity conservation actions. Its goal is to integrate biodiversity principles into the protection, development and management of Calgary's natural and built environments with one key benefit being urban ecosystems that are more resilient under future climate change stresses. In 2019, Calgary Parks initiated the development of a supplemental Action Plan which includes specific targeted actions to achieve the objectives of the Our BiodiverCity strategy. The Action Plan is projected to be completed in mid-2020.

### Desired outcomes of the Natural Infrastructure Program

- To **avoid** an unfunded liability.
- To **enhance** natural functions and ecosystem services.
- To **adapt** to a changing climate.
- To **reduce** life-cycle costs for infrastructure.
- To **realize** the multiple social, economic and environmental benefits of natural infrastructure.

### Natural infrastructure



## 2019 feature projects

### West Springs community

The creation of a 3.5 ha conservation reserve was one of the first uses of the new Conservation Reserve Designation under the amended *Municipal Government Act* (MGA).

### Rockland Park community

The Haskayne Area Structure Plan included road alignment and slope rehabilitation considerations along the Bears paw Dam Road to protect and restore a section of Bow River native escarpment. This policy included a much larger escarpment slope setback (18 m) than standard practice.

## Urban conservation portfolio

Conservation of environmentally significant areas is critical to protecting existing natural assets, with benefits for biodiversity, climate resilience, stormwater management, and city livability. The Calgary Parks Urban Conservation Portfolio works in a number of areas that focus on the conservation, planning, management and restoration of natural environments in the City. Focus in 2019 was placed on natural area protection in new community development, improved invasive species management and restoration of natural environments.

## Habitat restoration

One of the key targets of the Biodiversity Strategic Plan is restoring 20 per cent of Calgary's open spaces by 2025. One way The City continues to achieve this goal is through the Biodiverse Communities Project, which is developing and formalizing the processes for planning and delivering restoration projects with community engagement and support. This involves working with citizens to improve understanding about the benefits that restored spaces provide to both citizens and wildlife. Restoration projects incorporate a variety of native and drought-tolerant species, which has a

number of benefits including improved control of invasive species, lowering of long-term maintenance costs and improved ecological resilience in the face of climate change.

Climate change is expected to make it more challenging for preferred vegetation to thrive, particularly in the urban landscape. In 2019, vegetation trials were conducted throughout the city to select drought and salt tolerant species of grasses, shrubs and trees to build a more resilient urban landscape. Hardy native vegetation with a wide tolerance for suboptimal conditions may contribute to cost effective landscapes, as they can survive with limited watering and less frequent mowing, leading to a reduction in water use and maintenance costs.

## Urban forestry portfolio

Healthy trees are more resilient to the effects of a changing climate. Additionally, they provide mitigation of GHG emissions, improve air quality, provide shade and relief from the urban heat island effect, absorb stormwater, and decrease risks of damage in a storm event.

In 2019, City trees were pruned based on a new tree condition assessment risk matrix. A new staff training program, implemented in 2019,





ensures pruning practices maximize public and worker safety and optimize tree health. To improve the health of street trees, when underground work is required, tree vaults are removed and replaced with trenches where possible to increase the soil volume available to the trees.

Calgary's urban forest was damaged by the 2013 flood, the snow event in 2014 and several wind events in 2017. Meeting the Municipal Development Plan long-term target of 16 per cent tree canopy coverage is at risk given our current level of 8.25 per cent. The target includes both public and private trees, therefore, public education and tree stewardship promotion is an important piece of the urban forestry portfolio. Calgary's urban forest has an estimated value of \$1.3 billion. The City utilizes an online tool to illustrate the location, value, ecological benefit and condition of Calgary's urban trees. In 2019, Calgary Parks began developing a similar tool to quantify the benefits provided by grasslands and wetlands.

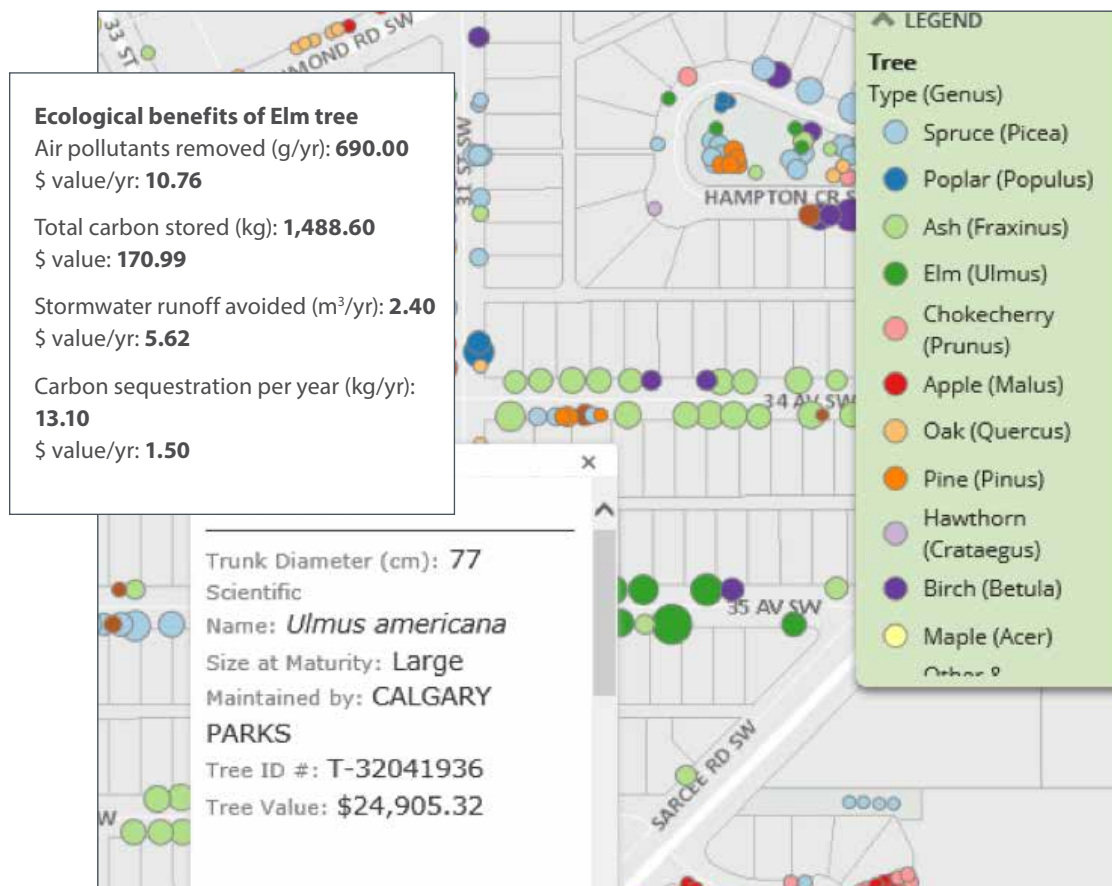


**Indicators:  
Habitat  
restoration**

**Active restoration area (Parks):** 143 ha

**Completed restoration area (Parks):** 23 ha

**Goal of restoring 20 per cent by 2025**



**Indicators:  
Tree canopy**

**Percent of land covered by tree canopy:** 8.25 per cent

**Tree canopy cover goal:** 16 per cent

**Number of trees planted in 2019 by Urban Forestry:** Approximately 25,000

**Number of assessed street trees:** Over 50,000

**Number of pruned street trees:** Over 13,000



## Development Guidelines and Standard Specifications: Landscape Construction (DGSS)

The DGSS are updated annually and include the following guidance:

- The 2020 version is proposed to contain a recommended plant list to guide restoration projects.
- Soil Management Guidelines were included as a companion to the 2019 DGSS.
- City of Calgary seed mixes were included as a companion to the DGSS in late 2018 to recommend seed mixes based on habitat type and maintenance regime along with best practices regarding timing, application rate, methodology, seed storage and project design.

The noted updates to the DGSS will help to direct developers and The City towards the construction of a more climate resilient landscape, improve restoration efficiency and minimize operational costs.

## Partnerships

The Alberta Low Impact Development Partnership in conjunction with the University of Calgary, The City and other partners are conducting stormwater bioretention research at a site located at the Town of Okotoks Operations Centre. In 2019, specific research on the performance of various media types, plant species and soil amendments to bind phosphorous are being investigated for water quality and water quantity outcomes. The research is intended to improve stormwater management tools and practices to provide for a more flood resilient community and healthier waterways.

The Calgary Metropolitan Regional Board is working to regionally define Environmentally Sensitive Areas to better align guidelines for their improved protection.

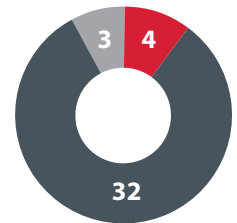


## 5. Integrated watershed management – 39 actions

Increased pressure from regional growth and the impacts of climate change make integrated watershed management one of Calgary’s critical resiliency challenges. Climate change not only impacts the quality and availability of water supply, but also the demand for water.

A special session of Council was held on 2019 May 13, to explore water supply security and the future of stormwater management in a changing climate.

Details on The City’s integrated watershed management activities are highlighted in the 2019 IWM Update.



■ Completed  
■ In progress  
■ Not started

### City actions

#### Water efficiency

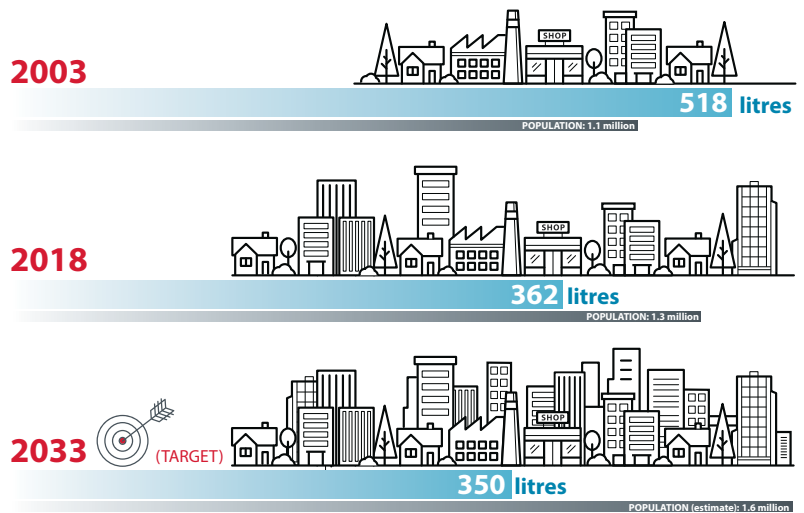
Water efficiency and conservation is a tool to use water more wisely, as well as a method of decreasing energy consumption in water treatment and distribution. The City has actively focused on water conservation and plant efficiency since the 1980s. This foresight has helped prepare Calgary for population growth and a changing climate. The Water Efficiency Plan is a key program which aims to hold withdrawals from the river steady at the 2003 baseline level, despite a growing population. In 2018, Calgarians used 362 litres per capita per day, on track to meet the 2033 target of 350 litres per capita per day.

The City has monitored water loss for many years. A targeted Water Loss Strategy is being developed by the City to better quantify non-revenue water including water loss through leakage and authorized municipal purposes. Ninety-seven per cent of water customers are metered. Metering combined with improved access to billing data and water consumption information has led more informed customers and a resulting reduction in water use.

#### Drought management

Drought is a key risk to water supply in the Calgary region that will be intensified by climate change. The City’s internal Drought Risk and Vulnerability Assessment was substantially completed in 2019. The City examined future climate scenarios and evaluated the risks and vulnerabilities to seven drought impacted

#### Total water use by community, per person, per day



Total water used by the community = water used by residents, businesses, institutions, as well as water lost through leaks, unaccounted for, or not billed. This total is then divided by the number of people living in Calgary.

systems. This work will help prioritize systems which may have significant consequences, determine which critical operations and customers may be impacted and better plan to manage these increasing risks due to climate change.

#### Riparian Action Program

Climate change is projected to increase flood risk in the future. Healthy riparian areas are more resilient to flooding and flood related damage. The City’s Riparian Action Program (RAP) aligns to the natural infrastructure pillar of the Resilient Calgary Strategy and the Climate Resilience Strategy. The RAP implements a comprehensive



### Energy and water efficient riparian restoration

Three riparian restoration projects were completed with native plants and watered with river water through solar-powered drip irrigation systems in 2019. This low cost, low energy solution helped establish healthy riparian areas.

and coordinated approach to protect riparian areas in Calgary and contains three specific program areas:

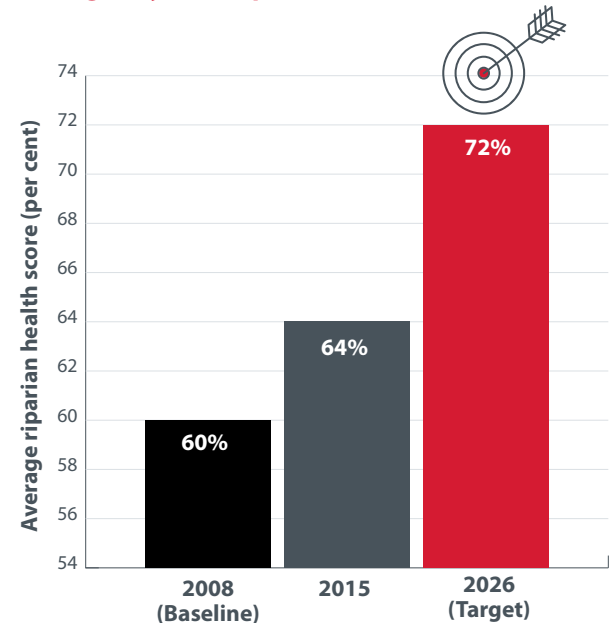
1. Riparian health restoration and monitoring
2. Riparian land use planning
3. Outreach and education

In 2019, The City continued its efforts to improve riparian health and restore riparian areas through bioengineering using a combination of vegetation and built components. Approximately thirty bioengineering and riparian planting projects were implemented in 2019. The City is now implementing a long-term five-year Riparian Monitoring Program to measure the improvement of riparian health over time and to evaluate the efficiency of restoration practices.

### Stormwater Management Strategy update

Since the 2005 Stormwater Management Strategy was implemented, municipal stormwater management practices have advanced and the potential impacts of climate change on stormwater runoff are better understood. The City has also implemented an integrated watershed management approach to providing customer-centric services and policies. The City

### Average city-wide riparian health score



is updating the 2005 Stormwater Management Strategy to incorporate these elements and to set a strategic course forward for how stormwater is managed over the next twenty years. The Strategy will also align with other corporate strategies and policies such as The City's Climate Resilience Strategy, the Corporate Resilience Strategy, Municipal Development Plan, Our BiodiverCity and Wetland Policy.

### Flood mitigation

Building flood resilience remains a top priority for The City of Calgary. The City's Flood Resilience Plan includes a combination of upstream, community and property-level flood mitigation to ensure that Calgary becomes more resilient to flooding, considering climate uncertainty and continued urban development. Seven years after the 2013 flood, many projects have been completed, reducing Calgary's flood risk. In 2019, construction of the Eau Claire Promenade continued, incorporating the downtown flood barrier and connecting with flood barriers in

### The community of Renfrew Integrated Stormwater Management Study (2019)

A test case that considers future climate change and redevelopment is underway to formulate potential design criteria and solutions to flood control, storm water quality and stream bank erosion. Information from this test case may inform integrated stormwater management practices throughout redevelopment areas.



West Eau Claire Park and the Centre Street Bridge to provide an increased level of protection to Calgary's downtown.

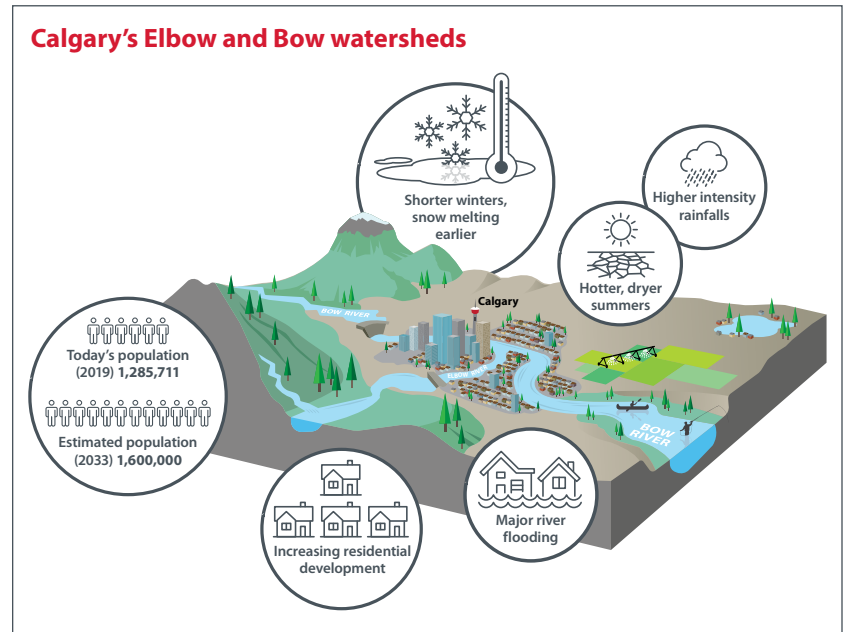
### Environmental measurement, modelling and monitoring

Drinking water infrastructure, including treatment plants and distribution systems are long-term assets that must be resilient to changing demand. The City's GoldSim Water Demand Forecasting Model has been updated to integrate the impacts of climate change, economic conditions, water rates, and distribution water loss with population growth. This model is one tool used to determine infrastructure requirements based on future water demand.

For the Calgary region, it is expected that climate change will cause changes in seasonality, shifting peak river flows earlier in the year and causing reduced summer flows<sup>11</sup> and water availability. The Bow River Water Quality model is being refined to address changes in waterflow conditions and pollutants entering the waterways. This model informs design of wastewater and stormwater infrastructure to protect water quality for downstream users and aquatic life, while maintaining regulatory compliance.

Similarly, climate change is shifting the frequency and intensity of precipitation events. The City has partnered with the Calgary Airport Authority on a project to produce a comprehensive climate change dataset to develop updated Intensity Duration Frequency (IDF) curves for the Calgary region. Updated IDF curves can aid in designing stormwater drainage systems, minimizing the risks posed by stormwater flooding, protecting public safety and preventing infrastructure damage.

Extensive monitoring across the Calgary region provides data that improves the understanding of local weather and river systems. Continuous improvement in precipitation and stream level monitoring enhances data capture to support decision making, modelling and provide early flood warning.



## Partnerships

### Source Water Protection

A changing climate is predicted to increase the frequency and intensity of forest fires in western Canada. One of the greatest risks to Calgary's source water is contaminated run-off from landscapes burned by wildfires in our watersheds. Collaboration at the provincial and regional level is on-going to ensure the source of our high-quality drinking water is protected from risks exacerbated by climate change. The City spearheaded a Wildfire Source Water Partnership Task Force. In 2019, this group worked to enhance understanding of critical wildfire impacts in the source watershed.

### Watershed management

The City is an active stakeholder in the province's Bow Basin Water Management Options Project, which is examining options for a reservoir on the Bow River. A new reservoir would be a major component in flood mitigation and potentially improve the availability of water for the region during drought. A new reservoir is crucial as we expect more extreme climate events in the future. The province hosted three public open houses in

<sup>11</sup> Bonsal, B.R., Peters, D.L., Seglenieks, F., Rivera, A., and Berg, A. (2019): Changes in freshwater availability across Canada; Chapter 6 in Canada's Changing Climate Report, (ed.) E. Bush and D.S. Lemmen; Government of Canada, Ottawa, Ontario, p. 261-342.



October 2019 to present the public with initial information on three options. The scope of the current work includes identifying engineering, environmental, social, economic, cultural and traditional land use factors that should be considered for the projects. The province has completed this conceptual study.

### **Bioengineering and education**

Construction of a demonstration project in Inglewood was completed in 2019 as a partnership with Alberta Environment and Parks to restore the riparian area, improve fish habitat and stabilize slopes using a variety of bioengineering techniques. Healthy and intact riparian areas can protect many City assets and infrastructure such as roads, pathways, utilities and buildings during flood events. The project now moves into post-construction monitoring of fish and habitat, wildlife, riparian health and bioengineering structure integrity over a 10-year period. In 2019, a number of education initiatives related to the project were piloted including a one-day parks school, in partnership with Calgary Parks and Trout Unlimited Canada. Interpretive signage and a website are in development and will be completed in 2020.

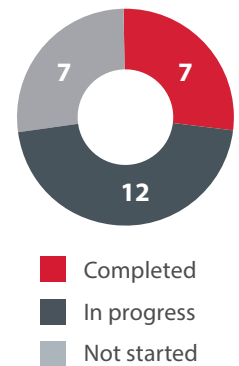
### **In the community**

The new Integrated Water Management diploma at SAIT had its first course on campus explicitly dedicated to climate adaptation. The climate course is solution-oriented and aims to develop competencies in planning, policy, technology, risk management, emergency response and natural infrastructure. SAIT focuses on applied skills and works closely with multiple sectors to develop graduates aligned with industry needs. Students will possess an awareness of the complexity of the different elements, interfaces and approaches that need to be considered to support practical integrated water management.



## 6. Community outreach and education – 26 actions

The City of Calgary is not able to achieve our climate change mitigation and adaptation targets solely through our own activities. It is important to communicate climate change information, to provide education opportunities for Calgarians, and to enable innovation and collaboration with citizens and the private sector. Climate change education workshops and support have been provided for City of Calgary public educators in Waste & Recycling Services, Water Resources, Transportation Planning and Parks to support the integration of climate change information into existing City public education programs.



### City actions

#### Eco-Leaders and Mayor’s Environmental Expo

Climate change is the theme of the 2019-2020 Eco-Leaders Program, a City youth environmental leadership program that helps school-based student teams research, design and implement curriculum-linked projects in their community. Thirty student teams were chosen to implement projects related to climate change mitigation or adaptation. Climate change will be the primary theme of the 2020 Mayor’s Environmental Expo, which will now be conducted virtually due to social distancing measures related to the COVID-19 pandemic.



#### Calgary Emergency Management Agency (CEMA)

CEMA shares disaster risk information, including current highest priority climate risks, with citizens via their Disaster Risk Explorer (launched in 2019), Disaster Risk Report, GetReady website and community outreach programming. CEMA continues to update this public information as Calgary’s disaster risk environment changes.

#### Calgary Neighbourhoods

In late 2018, Calgary Neighbourhoods established a Non-profit Organization Liaison to enhance communication and coordination between non-profit organizations and CEMA for emergency response and preparedness planning. The Integrated Non-Profit Business Continuity Project provides capacity development opportunities for non-profit

organizations to adapt to risks including climate change. These initiatives will better protect vulnerable populations who are most at risk from the impacts of climate change.

#### Climate change training for City planning and policy service line

Climate change training was provided to community planners in late 2019 and will continue into 2020 with additional onboarding training. This will help to enhance their understanding of the critical role Community Planning has in achieving The City’s climate mitigation and adaptation goals. It includes information on how to encourage applicants to incorporate climate action into development applications and how to include climate action into planning reports to Commission, Committee and Council.

“Over the past year more than 22,000 Calgarians have been educated about home energy efficiency, over 980 energy savings kits have been provided to multicultural and multi-lingual Calgarians, over 144 energy-savings workshops have been facilitated and greenhouse gas emissions have been reduced by 7,538 tonnes in Calgary due to behaviour changes inspired by the Empower Me program.

This is equivalent to taking 1,600 cars off the road for one year, or the energy used by 870 homes for one year. Empower Me would like to thank The City for their strong partnership that has helped to make this possible”

– Yasmin Abraham,  
Vice President  
Empower Me



## Partnerships

### Energy efficiency education for new Canadian audiences

Since 2018, The City has supported a home energy conservation and behaviour change program facilitated by Empower Me. This program is administered by members of multicultural and multilingual communities in their native language via presentations, workshops and individual home visits. This successfully delivers energy efficiency, water conservation, waste reduction and climate change messages to the region’s diverse populations within a trusted context.

### Canadian Parks and Wilderness Society Southern Alberta Chapter – City of Calgary Partnership

To inspire youth to learn about local issues surrounding climate change, and what they can do to help, The City has partnered with the Canadian Parks and Wilderness Society (CPAWS) Southern Alberta Chapter to deliver climate change specific programs through classroom workshops and wilderness hikes. In addition, The City of Calgary climate change messaging is now infused into environmental literacy

community workshops and interpretive hikes for adult new Canadians. In total, CPAWS anticipates reaching approximately 8,125 students and approximately 950 adult new Canadians with The City of Calgary climate change-specific messaging in the 2019-2020 school year.

### Calgary schools for climate action working group

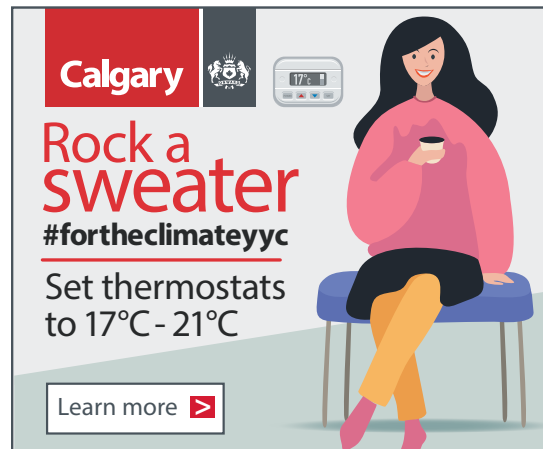
As the principal providers of education for Calgary’s youth and cumulatively the second largest landowner in Calgary, school districts have a large role to play in climate mitigation and adaptation. In 2019, The Alberta Council of Environmental Education (ACEE) and The City of Calgary established the Calgary Schools for Climate Action initiative, along with the Calgary Board of Education, the Calgary Catholic School Division, the Calgary Regional Consortium, the Calgary City Teachers’ Convention Association and the University of Calgary. The aim of this group is to build a program that helps schools reduce greenhouse gas emissions while providing new learning for students around climate and energy, using The City’s Climate Resilience Strategy as an organizing framework for collective action.

## In the community

### Calgary Climate Symposium

**2018:** The City of Calgary hosted the first annual Calgary Climate Symposium in 2018, with five public events and a breakfast session for Council and the Administrative Leadership Team. The goal of the symposium was to increase climate literacy for informed decision-making at all levels of society including City Council, City Administration, business, organizations, community and individuals. All events were fully subscribed with 1,230 attendees.

**2019:** In November 2019, The City hosted the second annual Calgary Climate Symposium, which featured eight free public events including speakers, panel discussions and demonstrations designed to increase awareness about the local impacts of climate change, empower Calgarians to reduce their contributions to climate change, and help residents prepare for and adapt to a changing climate. Similar to 2018, all events during the second annual Calgary Climate Symposium were sold out with a total of 1,729 attendees.



### Climate actions public information campaign

The Climate Program's first public information campaign was launched on November 4, 2019, coinciding with the Calgary Climate Symposium, to empower Calgarians with knowledge about everyday actions they can take to manage their energy use and take action on climate change. Climate program staff rated more than 40 actions on a spectrum from one for good impact, up to five for greatest impact based on greenhouse gas emissions data for Calgary, and created an online resource at [calgary.ca/climateaction](http://calgary.ca/climateaction). This solutions-focused campaign combined guerrilla marketing, traditional and new media, and partnered with social media influencers to spark discussion and connect with audiences, reaching almost one in five Calgarians.

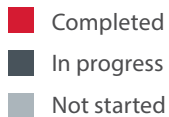
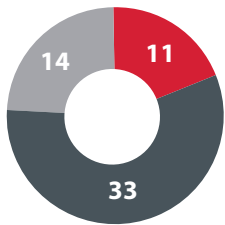
### Community outreach

The 2018 and 2019 Calgary Climate Symposiums were sold out attracting more than 3,000 attendees. The 2019 climate actions campaign empowered almost one in five Calgarians with information on how to manage energy use and take climate action. Annual visits to [calgary.ca/climateprogram](http://calgary.ca/climateprogram) and [calgary.ca/climateaction](http://calgary.ca/climateaction) have increased to approximately 25,000. These activities gained positive media coverage from CBC Calgary Television News, CBC Radio Calgary's The Eyeopener and The Homestretch, CBC Calgary Online, 660 News Radio, CTV Calgary Television News and the Daily Hive.





## 7. Leadership and governance – 58 actions



The City of Calgary has a responsibility to be a leader in the implementation of the Climate Resilience Strategy and Actions. Embracing collaboration, enabling innovation and demonstrating leadership in climate actions are the keys to success.

### City actions

#### Sustainable Building Policy

One of the ways The City has demonstrated leadership to Calgarians and industry is through the updated Sustainable Building Policy (SBP). The updated SBP implements mitigation and adaptation actions for owned and funded building projects by The City. To date, The City's SBP has resulted in the LEED certification of 58 projects.

Some climate-related SBP updates include:

- **Optimize energy performance:** To achieve an energy use and energy cost performance improvement of at least 40 per cent above the National Energy Code for Buildings
- **Future resiliency planning:** Design the facility to be solar PV-ready and electric vehicle charging station-ready at minimum.
- **Stormwater management:** Manage stormwater for the 90th percentile of rainfall events on-site using green stormwater infrastructure to reduce flood risk.
- **Responsible landscaping:** Reduces potable water use, manages stormwater, promotes biodiversity and makes landscaping accessible for facility occupant and visitor use.

#### Corporate Emissions and Energy Plan

The City is developing the Corporate Emissions and Energy Plan, which will provide a coordinated approach to manage The City's emissions risks while reducing operating costs. This will be presented to Council in late 2020. By integrating both carbon emissions and energy management considerations into operational decision-making processes, The City can be better prepared to manage carbon risks and become more resilient in its service delivery while reducing energy costs.

#### Climate Lens Assessment

The federal government's Climate Lens requires a climate change mitigation and adaptation evaluation for large infrastructure projects seeking federal funding to realize their contribution to GHG emissions reduction and demonstrate consideration of climate change risks. The intention is to improve decision making, reduce climate impacts and develop more resilient infrastructure by avoiding future damages and disruptions. In 2019, The City began to develop its Climate Lens Assessment guidance and tools for the first group of projects to be subject to the new requirements.

This process will improve consideration of climate in decision-making processes and better align with provincial and federal grant priorities to maximize funding leverage.

#### Partnerships

It is valuable to bring together the leading thinkers from industry, business, academia, funding agencies, different levels of government and the wider public to share knowledge and leverage expertise to accelerate the collective pace of GHG emission reductions and climate risks to Calgary. In 2019, The City began collaboration with the Calgary Airport Authority to develop a regional climate projection dataset, to be delivered in the first half of 2020. This robust and regionally-specific dataset will be used to inform infrastructure design, resource allocation requirements and to shape operational decision making to adapt to shifting climate driven risks.

**Current CCP working groups**

Commercial and Institutional Building  
Benchmarking  
Climate Action and Education in the Calgary  
School Community  
Utilities and Industry Working Group

**Calgary Climate Panel**

The governance of Calgary's Climate Resilience Strategy includes an external body called the Calgary Climate Panel as a strategy and advisory network. The Panel provides broad strategic advice and communications regarding progress on Calgary's Climate Resilience Strategy. The Calgary Climate Panel was established in November 2018 and includes 18 organizations collaborating with The City.

The Panel's role:

- Each member sees value in working together to advise on priorities and share best practices.
- Strategic guidance for initiatives including prioritization, funding and financing opportunities.
- Communication of research findings, best practices and general information exchange on climate mitigation and adaptation.
- Representation from key organizations in public, private, not-for-profit and academic sectors that can directly contribute to climate mitigation and adaptation with organizational support to engage in action.

Working groups, made up of CCP members, City Administration and additional partners, pursue actions that require close partnership for success. Those collaborative efforts are happening in industry, educational institutions, and the broader community toward the goal of lowering carbon emissions and developing a more resilient city. The Calgary Climate Panel's report on their work and the City Climate Program is included as Appendix 1 to this document.

**Academia**

Local post-secondary institutions and The City have been collaborating to support student research projects on climate issues as well as to support corporate climate initiatives. Since 2018, graduate students from the Sustainable Energy Development (SEDEV) Program at the University of Calgary have been examining real world problem statements with The City such as Barriers and Incentives for Residential Solar PV Adoption in the Calgary Area and Food Waste Reduction at the Grocers in the city of Calgary.

**QUEST Smart Energy Communities Benchmark**

As a community, learning from other cities in Canada through consistent indicators and identifying gaps will help Calgary to achieve smart energy community status. The Smart Energy Communities Benchmark is a prototype tool, completed by QUEST that municipalities may use to benchmark progress toward becoming a Smart Energy Community. Throughout 2019, The City of Calgary has been supporting this benchmark prototype tool development. The results for the first nine pilot communities, including Calgary, are available at <https://smartenergycommunities.ca/>.

"We appreciate that the students had the opportunity to work with organizations to help research issues of concern to the city. Working on real issues allows them to apply their knowledge base experientially, similar to a work place setting. We hope we can continue this relationship in the future. Our students have enjoyed their association with The City of Calgary and the opportunity to do their part in helping to make our city an even more sustainable place to live."

~ Dr. Irene M. Herremans,  
Professor at the  
SEDEV Program, CPA  
Managerial Faculty  
Fellow, Haskayne  
School of Business,  
University  
of Calgary

"The City of Calgary participated in the Smart Energy Communities Benchmark Pilot Project, contributing to the development of a prototype benchmarking system for community energy planning across Canada. The City worked closely with QUEST, alongside eight other pilot communities, and convened local utilities – ENMAX and ATCO – in collaborative working sessions to provide detailed feedback that directly influenced the benchmarking framework." – Michael Lee, Senior Lead, Analytics & Services, QUEST

## Funding

### Federation of Canadian Municipalities

Low Carbon Cities Canada (LC3) is an initiative that will enable and accelerate urban carbon-reduction solutions.



The partnership between seven local centres and the Federation of Canadian Municipalities (FCM) will be self-sustaining – safeguarding and leveraging the federal investment and generating ongoing revenue for grants, projects and operations.

The Calgary LC3 centre received \$22 million from FCM in 2019 to accelerate and scale local projects that focus on deep energy retrofits in the commercial and residential sectors and local deployment of renewable energy. The funding is not provided directly to The City, but rather to this new entity, which has a mandate to support Calgary’s Climate Resilience Strategy goals through partnering with local organizations.

The fund is intended to be self-sufficient once it is established. The Calgary LC3 Centre will work with The City and community partners to ensure low-carbon actions generate valuable local equity. The establishment of the LC3 will enable and attract business investment by helping businesses find efficiencies and de-risk projects leading to innovative solutions.

### Municipal Climate Change Action Centre

The Municipal Climate Change Action Centre, a partnership between the Alberta Urban Municipalities Association, Rural Municipalities of Alberta and the Government of Alberta, supports municipalities across Alberta in developing and implementing energy efficiency and renewable energy solutions. Since 2016, The City has received \$2.9 million for 11 energy projects with a total installed energy generation capacity of 5.6 MW. These projects, mostly solar photovoltaic installations, are projected to produce 6.75 GWh of electricity per year and have a total estimated lifetime emissions reduction of 108,055 tonnes CO<sub>2</sub>e. The City is also exploring upgrades to recreation facilities including lighting, building automation systems, sensors and heat recovery solutions.



### Municipal Climate Change Action Centre

“By harnessing the hidden fuel of energy efficiency, Calgary’s actions are adding up to real dollars saved. As they travel the path of green growth, The City is inspiring other municipalities and sectors to make changes that create resilient and sustainable communities.”  
– Trina Innes, Director, Municipal Climate Change Action Centre





# Moving forward

## Climate risk

To ensure Calgary maintains its high standard of living, social and economic wellbeing and reputation, climate risk should be quantified, modelled and managed into the future. Climate risk reduction will look at addressing both the cause of climate change, increasing GHGs, and the effect of direct and indirect climate impacts.

Climate change is being recognized as a major threat to the insurance and finance industries and to municipalities' economic investment value. Climate regulations that support economic resiliency have not yet been implemented due to a lack of precise understanding of what impacts will be felt and how to best manage them. Work is ongoing in these areas and will evolve through the efforts of organizations such as the Task Force on Climate-Related Financial Disclosures (TCFD), Global Risk Institute, Insurance Bureau of Canada and the Intact Centre for Climate Adaptation.

## Addressing challenges in moving forward

Meeting the Calgary Climate Resilience Strategy's objectives will require ongoing prioritization of climate change within municipal operations, steadfast commitment, and appropriate resourcing. The economic outlook for 2020 indicates that future budget will continue to be constrained and that, consequently, implementation timelines and priorities will need to be re-evaluated to match the resources available.

The Calgary Climate Panel noted within their 2019 Annual Report (Appendix 1), that while the creation of the Panel was a vital first action following the adoption of the Climate Strategy and that they play an important role in moving the Strategy forward, delays have arisen in partnership actions due to The City's staff resourcing constraints. In 2020, the Panel

is looking to cement a common vision and specific 2020 goals, actions, accountability, resources and contingencies to move projects forward. They have identified that The City's support and resources are critical for the Panel to collaboratively evolve, provide benefit to their own organizations and leverage their partner resources to build initiatives that are not possible for The City to undertake alone.

Climate Governance within City Administration was a demonstrated challenge in 2019. The experience of distributed climate governance and implementation has not delivered the expected results or certainty of future results. Complex challenges such as climate change mitigation and adaptation require integrated, systems level solutions. The Climate Resilience Strategy cannot be successfully implemented without strong senior leadership, commitment across the departments and clear accountability. If any of these elements is lacking, the initiative will not meet the goals in the expected timelines. The Corporation is looking for greater assurance, consistency and efficiency of work plans, and to continue developing a culture of collaboration. During 2020 new climate governance structures will be studied and recommended for implementation.

Understanding and recalibrating investments in infrastructure, people and systems will become

more important for not only The City of Calgary, but also for the community. The City will need to ensure infrastructure and development integrate climate risk reduction approaches and reduced carbon strategies. In the community, the new Low Carbon Canada Centre for Calgary will start to assess opportunities for the investment of \$20 million into significant carbon reduction projects. Collaboration and alignment with City and other community low carbon projects will provide additional large scale capacity for carbon reductions and meeting the 80 per cent target.

## Climate Program – 2020 workplan

Building upon efforts already underway in Calgary, the Climate Team will continue to reach out and engage internal and external stakeholders to help address the challenges of climate change. The Climate Team will identify, coordinate and with work with other departments for implementation of actions within their service areas throughout 2020. In addition to the current actions already underway, several other initiatives have been identified for development by the Climate Team in 2020. A high-level summary and examples are described below.

Climate strategy outcome	Strategy/approach	Activity examples Note: these are high level descriptions of the activities, many of which are multi-year
<b>An efficiently, effectively and consistently managed climate program</b>	Reporting on climate program results	<ul style="list-style-type: none"> <li>• Annual update of Climate Resilience Strategy</li> <li>• One Calgary reporting</li> </ul>
	Internal corporate climate governance	<ul style="list-style-type: none"> <li>• Establish corporate climate action accountability and decision making</li> <li>• Lead internal cross-functional working groups to holistically implement the Climate Action Plans</li> </ul>
	External climate governance	<ul style="list-style-type: none"> <li>• Coordination of Calgary Climate Panel and working groups</li> </ul>
	Funding and financing	<ul style="list-style-type: none"> <li>• Low Carbon Cities Canada (LC3)</li> <li>• Disaster Mitigation and Adaptation Fund (DMAF)</li> <li>• Infrastructure Canada (IC) Climate Lens Assessment for major capital projects: (GHG assessment and climate resilience assessment, e.g. Green Line)</li> </ul>
	Collaboration with Infrastructure Calgary	<ul style="list-style-type: none"> <li>• Capital project climate prioritization and investment criteria (internal Climate Lens Assessment)</li> </ul>

Climate strategy outcome	Strategy/approach	Activity examples Note: these are high level descriptions of the activities, many of which are multi-year
<b>Reduce corporate and community GHG emissions</b>	GHG and carbon offset management	<ul style="list-style-type: none"> <li>Annual GHG reporting through Climate Disclosure Project (CDP)</li> <li>Corporate GHG and carbon cost forecast/guidance</li> <li>Carbon offset governance</li> </ul>
	Implementation of corporate climate actions	<ul style="list-style-type: none"> <li>Corporate Emissions and Energy Plan</li> <li>Technical specifications (i.e. low-carbon concrete, EV charging stations)</li> <li>Coordinate Infrastructure Canada (IC) Climate Lens GHG Assessments for major capital projects</li> </ul>
	Reduce energy use and GHG emissions in buildings	<ul style="list-style-type: none"> <li>Commercial and Institutional Building Energy Benchmarking Program</li> <li>Residential Building Energy Labeling Program</li> <li>Update/improve existing solar potential map</li> <li>Lead the industry partner group on developing energy policy</li> <li>Integrate climate actions into planning and development</li> </ul>
	Support other corporate-led and community-led GHG projects	<ul style="list-style-type: none"> <li>Energy planning for Victoria Park re-development with Utility Working Group</li> <li>Affordable housing energy/cost savings project(s)</li> <li>Electric vehicle adoption</li> <li>Replacement of buses with lower carbon options</li> </ul>
<b>Reduced corporate climate risk and vulnerability</b>	Measurement and verification of climate adaptation	<ul style="list-style-type: none"> <li>Development of performance measures and metrics that can drive future adaptation scoring/budgets</li> </ul>
	Develop corporate staff climate risk reduction programs	<ul style="list-style-type: none"> <li>Continue to develop an internal staff heat and air quality management, response and business continuity programs for business units (with a climate lens)</li> </ul>
	Connect with external expertise on adaptation to guide investment and identify financial risk and liability	<ul style="list-style-type: none"> <li>Establish mutual working and advisory relationships with the insurance and banking/finance investment industries</li> </ul>
	Develop and implement corporate infrastructure climate risk reduction program & projects	<ul style="list-style-type: none"> <li>Integration of a climate vulnerability and risk assessment, and gap analysis process into corporate asset management and facility management</li> <li>Develop climate informed infrastructure typologies and risk criteria to inform engineering standards</li> <li>Climate vulnerability and risk analysis on IC funded capital projects</li> </ul>
	Support other corporate-led adaptation projects	<ul style="list-style-type: none"> <li>Co-lead Natural Infrastructure (NI) Program with Resilience Program</li> <li>Collaborate on the development of water management strategies (drought, stormwater, and source water protection)</li> <li>Collaborate on the corporate habitat restoration program</li> </ul>



Climate strategy outcome	Strategy/approach	Activity examples Note: these are high level descriptions of the activities, many of which are multi-year
<b>Reduced community climate risk and vulnerability</b>	Community infrastructure climate risk reduction programs and projects	<ul style="list-style-type: none"> <li>Collaborate to integrate a climate risk lens/ assessment into the Green Line and Victoria Park Redevelopment projects</li> </ul>
	Community development climate risk avoidance and reduction projects	<ul style="list-style-type: none"> <li>Co-develop a climate risk matrix on development in flood hazard areas (financial indicators)</li> <li>Integrate a climate risk lens advisory service into various planning and development processes</li> </ul>
	Community health climate risk reduction projects	<ul style="list-style-type: none"> <li>Develop a holistic extreme heat management strategy for the community</li> </ul>
<b>Calgarians aware, engaged and action-ready on climate change</b>	Internal business units focused climate education courses	<ul style="list-style-type: none"> <li>Provide Climate 101 Education Program to internal business units to enhance internal climate change literacy</li> </ul>
	Community focused Calgary climate campaign (awareness, education and choice campaign)	<ul style="list-style-type: none"> <li>Development of multi-media material, website update, public workshop series and events, Climate Symposium and Calgary Schools classroom programming</li> <li>Climate themed EcoLeaders Conference and Mayor's Expo</li> </ul>
	Citizen climate action campaign	<ul style="list-style-type: none"> <li>Implementation of Empower Me program (climate change, energy efficiency and water/water reduction information)</li> </ul>
	Climate data sharing and education material for public consumption	<ul style="list-style-type: none"> <li>Develop an online climate dashboard</li> <li>Creation of an online climate technical data centre/library</li> </ul>

# Appendix 1

## Calgary Climate Panel Annual Report 2019

## Executive Summary

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The Climate Resilience Strategy is in the early stages of implementation. Panel members recognize the urgency of taking action on climate change and know that the Panel is an important pillar for effective climate action in Calgary.

Most of the first year's efforts focused on building strong partnerships and a platform for collaboration that is needed to achieve success over the long term. Panel members have come together from across sectors and communities in Calgary in support of the Climate Resilience Strategy, and are committed to working together to achieve the Strategy's goals through a range of specific initiatives and by aligning our broader strategies. Each organization represented has taken its own steps to advance climate adaptation and mitigation.

Several key collaborative initiatives that emerged in the Panel's first year are:

- Calgary Schools for Climate Action
- Utilities and Energy Working Group
- Commercial and Institutional Energy Benchmarking Program Working Group

Progress has been made during the Strategy's start-up year, which included some setbacks and resourcing challenges. Some first small steps toward implementation have been made representing a positive direction with growing awareness that much work is yet to be accomplished.

The Panel recognizes the urgency for quick and decisive action by not only The City, but all Calgarians. To accomplish this, the Panel has identified strategic level, next steps to ensure success going forward:

1. A focus on implementation
2. Prioritizing for delivery of desired outcomes
3. Ramping up partnerships
4. Aligning climate actions with other City initiatives
5. Communicating effectively and regularly with stakeholders and the public
6. Establishing priorities and clear, precise targets and performance measures

Calgary can be a leading community in climate action, and the panel is a foundational part of future successes. Continued City leadership and resourcing of the Climate program is necessary to gain real momentum and leverage external partner resources.

## Calgary Climate Panel

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The Calgary Climate Panel was created by The City as the first major action following adoption of the Strategy. The Strategy is City-led and supported; and requires significant community and industry effort to implement. The Panel's strength comes from its diverse and dedicated membership.

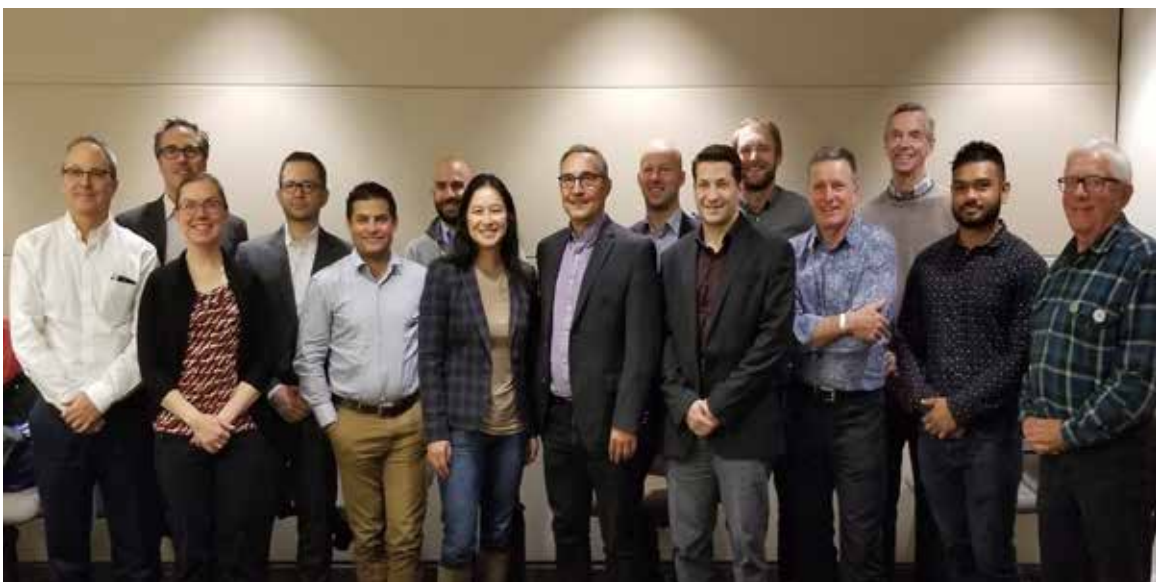
Panel members support the Climate Resilience Strategy and have committed to the Panel's dual roles: advisor to The City and a partner in implementation.

As an advisor, the Panel provides guidance to The City on climate opportunities, risks, policy options and priorities. The Panel provides insights on climate action that Administration may not be aware of; and offers industry and community perspective on implementation opportunities and challenges. As a partner, Panel members join with The City in climate action and, through their leadership, strengthen the climate actions of their own organizations.

Upon reflection of the last year, the Panel members are in agreement that the Panel provides strong value in moving the Strategy forward and they are dedicated to continuing their efforts.

### 2019 Membership

- Alberta Council for Environmental Education
- Alberta Ecotrust
- Alberta Health Services
- ATCO
- BILD Calgary Region
- BOMA
- Brookfield Residential
- Calgary Airport Authority
- Calgary Board of Education
- Calgary Chamber of Commerce
- Calgary Climate Hub
- Calgary Emergency Management Agency
- ENMAX
- Fuse Collective
- Public Member
- Siemens Canada
- The City of Calgary
- University of Calgary



## Progress on the City's Climate Resilience Strategy

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The first year of the Strategy has seen progress on some initiatives and delays on others. There are two types of initiatives to consider:

- 1. Existing projects:** A number of internal City initiatives are completed or underway (see Administration's Climate Resilience Strategy Update 2019). These tended to be initiatives that existed prior to the Strategy's approval and projects that could easily be modified to include a climate action.

In the Panel's opinion, many of these internal projects did not include substantial climate goals that engaged external partners. Some climate actions appeared to be siloed efforts that risk not being implementable because the project did not consider the full scope of climate goals and implementation factors. For example, recent land use bylaw updates and proposed policy amendments intended to encourage greater adoption of solar energy in housing; however, did not consider a wholistic approach that would require solar easements or considerations where there are potential conflicts between density goals and solar policy.

- 2. New projects:** Delays have arisen on new, externally focused projects where stakeholders were prepared to contribute resources, but The City could not contribute due to resource constraints. These tended to be the more complex projects with higher likelihood of significant impact.

## Calgary Climate Panel: Contributions

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As 2019 was a start-up year there was strong focus on:

- The Panel's advisory role to The City
- How the annual report would provide an independent voice
- Contributions to ongoing prioritization efforts based on each member organization's readiness and interest in collaborating
- Active participation in the City-led working groups

Panel members made substantial and meaningful contributions to three working groups:

### 1. Calgary Schools for Climate Action:

- The Alberta Council for Environmental Education led this initiative with The City and Calgary Board of Education and brought together 7 organizations (including Calgary Catholic School Division, the Calgary Regional Consortium, Calgary City Teachers' Convention Association, and the University of Calgary) to engage Calgary's educational community in climate change solutions.
- A framework will be developed to enable student-developed, school-wide climate action plans which students can then implement with the help of teachers, school administrators, and parents.
- Teachers will be engaged in climate-related professional development, such as a four-part climate series and a full-day climate workshop at the 2020 Calgary City Teachers' Convention.

## 2. Utilities and Energy Working Group:

- Panel members initiated a working group in the fall of 2019 to focus on the role utilities play in achieving the climate goals. For example, electric vehicles along with consumer generated energy and energy storage are likely consumer driven trends and a significant market moving forward. These evolving market conditions are anticipated to spur a significant shift in the ways consumers and utilities interact. Continued coordination and cooperation between customers, utilities, community stakeholders and The City of Calgary is required to maximize the benefit of these technologies.
- In 2020, the Utilities and Energy Working Group will focus on topics such as:
  - Energy Needs, Sources and Transmission Outlook: alignment of major partners with long-term plans and policy direction
  - Renewable and Distributed Energy Generation: practical and feasible energy options to support development projects
  - Residential Building Labelling: creating public and industry energy literacy tools

## 3. Commercial and Institutional Energy Benchmarking Program Working Group:

- Panel members provided advice and guidance through the program development phase and will promote the implementation phase.

## Calgary Climate Panel: Delayed Initiatives

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Panel members had planned to move forward with more partnership actions in 2019. Project delays stemmed largely from The City's staff resourcing constraints. The delays were further exacerbated by budget assessment and cuts during the summer. Examples of delayed initiatives are:

- **Residential Building Labelling:** Commercial and Institutional Energy Benchmarking Program was prioritized first in this program area with the residential building labelling intended to start mid-2019. City staff resources were impacted by budget cuts, resulting in a delay to the start of the initiative. Industry partners have been in a holding pattern and may lose momentum.
- **Climate Developer Advisory Group:** While preliminary discussions and events have been hosted, the working group has not yet been formally struck. The building and development industry is willing to provide some resourcing to assist on prioritized actions. These types of delays risk losing the confidence of the partners and stakeholders that this initiative is a priority.
- As a result of staff resource limitations, communication flow between The City and the Panel has been hampered which has resulted in the Panel not having clarity on:
  - How areas of work are being identified and aligned with other City initiatives
  - Whether/how prioritization was happening across The City's organization
  - What the Strategy's specific action plan is and how implementation will be coordinated



## Panel Next Steps and Resources Required

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### The Panel's Next Steps

Over the past year, the Panel members have realized they can contribute even greater value through active project partnerships. The partnership approach will take advantage of external resources and create collective solutions. 2020 work planning is underway and will confirm a common vision and specific 2020 goals, actions, accountabilities, resources and contingencies for acceleration on projects such as:

- Residential Energy Building Labelling
- Climate Developer Advisory Group
- Education: continued support for education offerings through future professional development workshops, and convention day teachings

### Resources Necessary to Succeed

- **City resources:** Continued City support for the Panel is critical to engage the Panel in a meaningful way resulting in direct benefits for all parties. City resource support continues to be required to support the alignment of efforts across City departments and with external partners on jointly identified priorities.
- **External funding:** The Panel will continue to work with funders to bring external funding resources to City and Panel initiatives.
- **Leverage partner resources:** Panel members will assess how to leverage their own organizations' efforts to align with the Climate Resilience Strategy and build initiatives that are not possible for The City to undertake alone.

## Implementation Recommendations for 2020

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The Panel recognizes the urgency for quick and decisive action by not only The City, but all Calgarians. To accomplish this, the Panel has identified strategic level, next steps to ensure success going forward:

1. A focus on implementation
2. Prioritizing for delivery of desired outcomes
3. Ramping up partnerships
4. Aligning climate actions with other City initiatives
5. Communicating effectively and regularly with stakeholders and the public
6. Establishing priorities and clear, precise targets and performance measures

### What Does that Mean

- **A focus on implementation.** Past and current efforts have been hampered by resource challenges. Calgary's current GHG emission trend indicates that we need to act quickly and effectively to achieve the climate goals. Execution is vital in maintaining momentum and credibility as further delays will likely undermine The City's ability to convey to community and industry that climate goals are truly a priority.
- **Prioritizing for delivery of desired outcomes.** Prioritize projects and focus on successfully completing initiatives before taking on new ones unless new capacity has been created.
- **Ramping up partnerships.** Collaboration builds buy-in, enables partnerships to leverage efforts on climate actions, and is necessary to implement the Strategy. With the Panel moving towards a stronger partnership role with The City, it is still imperative that The City continues to support the Council-approved Strategy.
- **Aligning climate actions with other City initiatives.** Current and future City initiatives should develop climate project goals (Climate Lens) in conjunction with external stakeholders. Using climate goals as a project driver will ensure that project processes review all options and solutions. City policies, programs, and projects should be planned and implemented using a Climate Lens where applicable.
- **Communicating effectively and regularly with stakeholders and the public.** Strong communication will keep key partners and stakeholders invested and clear on what are priorities, next steps and why projects may be delayed. Better communication creates motivation to keep the actions moving forward and demonstrates progress to public as well as stakeholders.
- **Establishing priorities and clear, precise targets and performance measures.** Targets and performance measures for initiatives requires focus on how funds are spent (private and public) to yield the best results (\$/GHG reduction or \$/risk reduction).

“The City has played and should continue to play a leadership role in bringing stakeholders with common interests in the climate resiliency arena together through The Panel. If The City wishes to be successful in implementing the Climate Resiliency Plan, this committee and the Working Groups, in particular, will be critical!”

## Council's Support

### 1. Funding and Resources:

Funding is key. Successful outcomes will be directly tied to continued City staffing and resource support. The Climate Change and Environment business unit will require full staff resourcing to implement the Strategy's commitments.

The Panel advises against any future reductions in staff positions or funding.

If resource reductions are required, they should be assessed alongside an understanding of the commensurate reduction program deliverables, and should be communicated publicly.

### 2. Leadership and Alignment in Decision-making:

The Panel recognizes the leadership of City Council in approving the Strategy. Council's leadership in climate decision-making is central to advancing the conversation, changing policy, and action on the ground. Lead faster, further and together.

Additional Panel recommendations are provided in Appendix B for context.

## Final Thoughts

Calgary competes with other world class cities to attract new talent and diversify its economy. Climate action progress is an integral part of competing globally which cannot be neglected nor delayed. The City and the Panel have an opportunity to work together in unprecedented ways - with a solution mindset, a partnership mentality, and a practical bent that will get us to our goals. Calgary can be a leading community in climate action, and the panel is a foundational part of future successes.

These are the first small steps and there are many challenges and opportunities that lie ahead. With the appropriate resources and the desire to grow momentum, The City, alongside their partners, will be well positioned to achieve the Strategy's climate goals and target.

## Appendix A: Minority Report Comments

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The Calgary Climate Panel uses a consensus decision-making model and reports on our common perspectives. The report includes an opportunity for Panel members to provide any additional context or comments where they may not be in full agreement. There are no additional panel member comments for this report.

## Appendix B: Additional Recommendations

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The Panel's annual report process also resulted in ideas that will be considered for future climate actions or for the Panel's future success. The ideas are provided here for context. The panel members will review these options alongside the other commitments for the 2020 work plan.

- Additional interaction between panel meetings is required to explore and advance initiatives across panel members.
- Clear expectations on deliverables within set time expectations are needed (e.g. what it hopes to be able to achieve in a year or quarter).
- Additional insight and alignment with other short, mid and long-term initiatives underway through different corporate departments that complement the Strategy.
- Reallocate funding as needed to support climate actions.
- Continue to support education initiatives. It is through education that community members will understand what they can do to the make the necessary changes to decrease their own consumption rates.
- The City should encourage ongoing 'AND' conversations about Canada's potential to be a leader in natural resource development and fight global climate change simultaneously, this includes how parties can work together going forward.
- The City of Calgary should implement by 2022, programs to achieve by 2030 the financially neutral and positive measures identified in the Economics of Low Carbon Development report.
- The City of Calgary should implement by 2022 a progressive fee structure for electrical, heating, water, wastewater, and road use within the City.
- The City of Calgary should refine and develop tools to inform Calgarians of their carbon footprint and assess their housing and locational choices.
- The City of Calgary should provide moral and, where appropriate, resource support to other jurisdictions in their efforts to eliminate human contributions to climate change.
- Integration of climate criteria into development planning decisions.
- Ensuring new infrastructure, asset purchases or retrofits are always done in a manner than considers climate mitigation and adaptation in procurement and design criteria.
- Energy storage is a key area of market development and should be prioritized.

## Appendix C: Calgary Climate Panel Overview

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With the adoption of the Climate Resilience Strategy, Council provided direction to immediately begin collaboration efforts by working with partners through a Climate Resilience group to focus on implementation; finance and funding; and monitoring progress and reporting.

### Climate Panel Purpose, Strategic Priorities and Scope

The Calgary's Climate Panel purpose, strategic purpose and scope was determined early in the process and forms the basis of the Terms of Reference.

*Purpose:* The Calgary Climate Panel (the Panel) is expected to provide broad, strategic advice and communications regarding the Climate Resilience Strategy's process.

#### *Strategic Priorities and Scope:*

The Calgary Climate Panel

- Acts as an independent voice providing advice on climate strategy opportunities, risks and policy options to The City
- Is responsible for contributing to The City's annual reporting to measure progress of the Climate Resilience Strategy
- Identifies and connects working group members resulting in direct climate action
- Acts as strategic advisors for working group initiatives – participate in coordination when necessary and act as a problem-solving forum for testing ideas
- Connects initiatives to funding and financing opportunities by building a robust network of funding partners and searching out new opportunities
- Acts as a strategic guide for distribution of research findings, best practices and general information exchange on climate mitigation and adaptation

### Panel Structure, Role and Responsibilities

To achieve the Strategy's goals, targets and governance objectives, the governance model identifies the Calgary Climate Panel as a strategic panel, and the working groups as implementation groups, that effectively deliver approved actions and achieve the climate goals.

Panel Members are to act as champions of the Climate Resilience Strategy and actively participate and contribute to the Panel's strategic priorities. Members are expected to act in the shared interest of the Strategy and be solution-oriented. The Panel is co-chaired by a City of Calgary member and an external member.

To fulfill the responsibilities of the Panel, members have met quarterly through 2019, contributed to the prioritization of working groups, and the content of this annual report.



## Appendix D: Membership/Partners

The Panel is represented by 18 members from a diverse range of business, non-profit, government, and post-secondary organizations. Membership for the first year also represents diversity of the Climate Resilience Strategy's action themes:

- Building and Energy Systems
- Transportation and Land-Use
- People
- Natural Infrastructure
- Infrastructure
- Water Management
- Governance
- Climate Education

The 2018/2019 membership included:

Organization	Member
Alberta Council for Environmental Education	Gareth Thomson
Alberta Ecotrust	Rod Ruff
Alberta Health Services	Dr. David Strong
ATCO	Ryan Germaine
BILD Region Calgary	Grace Lui
BOMA	Lloyd Suchet
Brookfield Residential	Doug Owens
Calgary Airport Authority	Harris Switzman
Calgary Board of Education	Olena Olafson
Calgary Chamber of Commerce	Duncan Webster / Jayeful Islam
Calgary Climate Hub	Bob Morrison
Calgary Emergency Management Agency	Chief Tom Sampson
ENMAX	Mirela Hiti / Justin Jacober
Fuse Collective	Ben Huang / Ben Walsh
Public Member	Rev Bill Phipps
Siemens Canada	Adrian Francese
The City of Calgary - UEP General Manager	David Duckworth / Dan Limacher
The City of Calgary - Councillor	CIlr Peter Demong
University of Calgary	Dr. Jennifer Winter



Calgary



# Climate Resilience Strategy Update 2019

UCS2020-0308

ISC: Unrestricted

Utilities and Corporate Service (UCS)

15 April 2020





# Context 2019



## 'Catastrophic' climate change is accelerating faster than predicted



Climate change is accelerating, with carbon dioxide levels increasing, sea levels rising and ice sheets melting faster than ever, experts have warned.





## What are Calgarians saying?

**In 2019 Calgarians shared their perceptions on climate change:**

**77%** “I think we need to act now to address climate change”

**76%** “I am concerned about climate change”

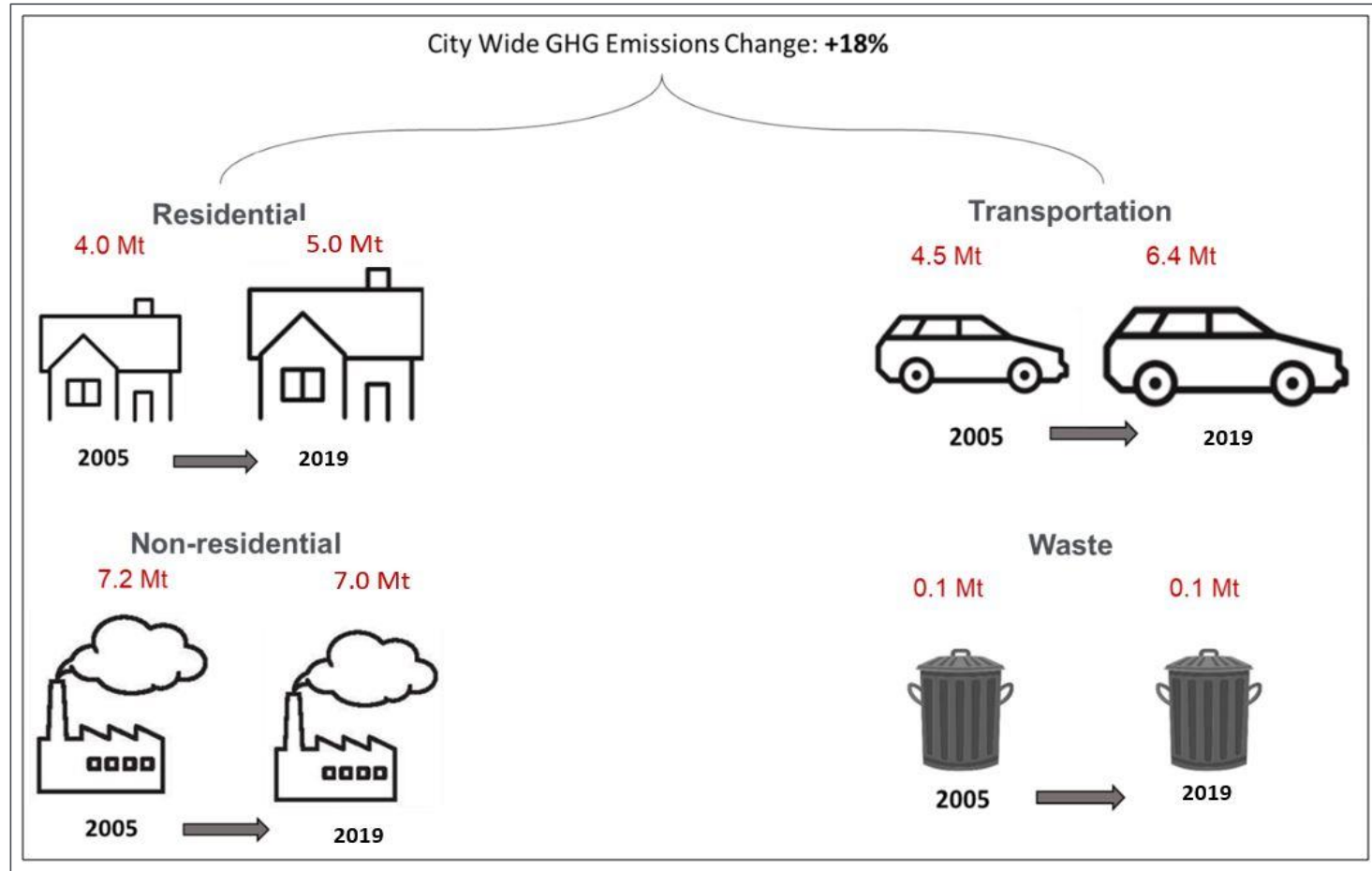
**73%** “I want to do more personally to help prevent climate change”

**72%** “I think Calgarians should be doing more to help prevent climate change”

A *Citizen Perspectives Survey* was conducted from 16-23 September 2019, asking 504 Calgarians by phone about their opinions on extreme weather events, measures taken to mitigate impacts of these events, and climate change. Questions in the climate change section were new in the 2019 survey and as such, do not have corresponding 2018 data.



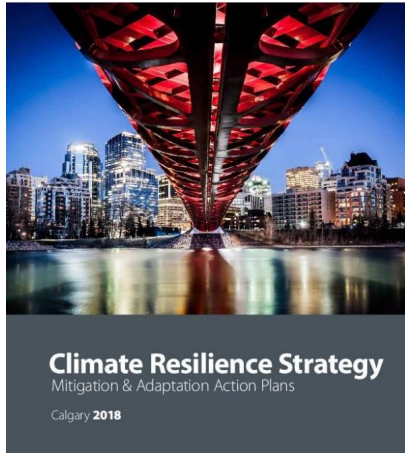
# Status of GHG Emissions







# Progress



**244** Total Actions

**36**  
Actions completed

**166**  
Actions in progress

**42**  
Actions not started

## Progress Areas

1. Buildings, Infrastructure and Energy
2. Transportation and Land Use
3. Consumption and Waste
4. Natural Infrastructure
5. Integrated Watershed Management
6. Community Outreach and Education
7. Leadership and Governance



# Climate Actions in 2019

### Climate Resilience Strategy - Transportation

**What are the climate risks impacting Transportation?**

**Risks**

- The evidence-based vulnerability and risk assessment for Calgary, completed in 2017, indicated the following climate risks that are more likely to have a direct impact on transportation:
  - extreme weather (short duration-high intensity storms)
  - heavy snow, ice & blizzards
  - flooding (river & stormwater)
  - high wind events
  - heat waves & temperature fluctuations (freeze & thaw)

**Impacts**

- These high-risk scenarios can lead to:
  - damage to Calgary Transit & Roads infrastructure
  - temporary loss of transportation corridors
  - compromised citizen & staff safety
  - critical infrastructure failure
  - service disruption
  - increased capital, operating & maintenance costs

**Climate Mitigation Initiatives (Examples)**

**Heavy Transit's shift to low-carbon fuels**

Calgary Transit is in the process of adding 114 new CNG buses to its fleet. Future bus purchases will focus on the use of alternative fuels including compressed natural gas.

**Green Building Design of Transit Facilities**

The LEED Gold certified Stony Oak Transit Facility includes a combined heat and power system that utilizes waste heat to create power and is constructed with solar PV-ready.

**Climate Adaptation Initiatives (Examples)**

**Updating Calgary Transportation Plan**

The 2018 Plan is being updated to include effective planning and policy related to the service line's ability to endure future climate and extreme weather events.

**Design Guidelines for Subdivision Servicing**

Guidelines are being updated to better support the existing and future transportation routes in areas of roadway closures. New regional pathway connections should be located outside of a 1100 year floodway.

**Boulevard Naturalization Project**

Transportation and Parks are seeking funding to naturalize

### Climate Resilience Strategy - Utilities & Environmental Protection

**What are the climate risks impacting Utilities and Environmental Protection?**

**Risks**

- The evidence-based vulnerability and risk assessment for Calgary, completed in 2017, indicated the following climate risks that are more likely to have a direct impact on utilities and environmental protection:
  - extreme weather (short duration-high intensity storms) & blizzards
  - flooding (river & stormwater)
  - high wind events
  - heat waves & temperature fluctuations (freeze & thaw)

**Impacts**

- These high-risk scenarios can lead to:
  - damage to personal property & City infrastructure
  - limited water supply
  - increased water demand
  - compromised citizen & staff safety
  - critical infrastructure failure
  - service disruption
  - increased capital, operating & maintenance costs

**Climate Mitigation Initiatives (Examples)**

**Institutional Energy Benchmarking Program**

Calgary is supporting a variety of energy management and lower GHG emissions within the private sector by developing a voluntary energy benchmarking program.

**Climate Adaptation Initiatives (Examples)**

**Sourcing Regionally-Specific Climate Data Projections**

To reduce the impacts of extreme weather events, Calgary specific climate change projections are being developed to support appropriate design standards and practices for climate-resilient infrastructure.

### Climate Resilience Strategy Deputy City Manager & Chief Resilience Officer

**Program Highlight**

**Resilient Calgary Strategy: Natural Infrastructure**

The natural infrastructure program is a multi-year initiative involving cross-corporation collaboration. Over 100 municipal, not-for-profit, academic and industry representatives from across Alberta and British Columbia were engaged in September 2019 to discuss the value of including natural infrastructure within the municipal asset management and financial frameworks.

**What are the climate risks impacting the Deputy City Manager's Office?**

**Risks**

- The evidence-based vulnerability and risk assessment for Calgary, completed in 2017, indicated the following climate risks that are more likely to have a direct impact on the Deputy City Manager's Office:
  - extreme weather (short duration-high intensity storms)
  - heavy snow, ice & blizzards
  - flooding (river & stormwater)
  - drought (prolonged low precipitation and low water levels)
  - heat waves & temperature fluctuations (freeze & thaw)

**Impacts**

- These high-risk scenarios can lead to:
  - damage to City infrastructure
  - compromised citizen & staff safety
  - critical infrastructure failure
  - service & supply chain disruption
  - increased capital, operating & maintenance costs
  - social inequity in risk

**Climate Mitigation Initiatives (Examples)**

**Electrification of Corporate Fleet**

Both Supply Management and Fleet Services are investigating the demonstration of electric vehicle options along with corporate charging.

**Climate Adaptation Initiatives (Examples)**

**Climate Lens Approach**

Infrastructure Calgary is collaborating with ESM to develop an internal climate lens approach to inform corporate investment. The lens is to include an assessment of projected

### Climate Resilience Strategy - Community Services

**Program Highlight**

**Improving Calgary's Ecological Resilience and Natural Carbon Sequestration**

Through implementing *Our Biodiverse City* (2015) plan by integrating biodiversity principles into the protection, development and management of Calgary's natural and built environments our urban ecosystems are becoming more resilient to climate change stresses.

**Natural Asset Management**

Resilience & Infrastructure Calgary is continuing to collaborate with CPAM & ESM to integrate Natural Infrastructure into The City's corporate Asset Management Plan Framework to determine asset valuation, condition performance, risk understanding and lifecycle management.

**What are the climate risks impacting Community Services?**

**Risks**

- The evidence-based vulnerability and risk assessment for Calgary, completed in 2017, indicated the following climate risks that are more likely to have a direct impact on community services:
  - extreme weather (short duration-high intensity storms)
  - heavy snow, ice & blizzards
  - flooding (river & stormwater)
  - drought (prolonged low precipitation and low water levels)
  - heat waves & temperature fluctuations (freeze & thaw)

**Impacts**

- These high-risk scenarios can lead to:
  - damage to infrastructure
  - limited water supply
  - shift in societal mobility and landscape function
  - compromised citizen & staff safety
  - critical infrastructure failure
  - service disruption
  - increased capital, operating & maintenance costs

**Climate Mitigation Initiatives (Examples)**

**Implementing Energy Efficiency in Affordable Housing**

437 multifamily units in a mixed-use development are under construction with a target of 20% improved energy efficiency compared to the 2015 National Energy Code for buildings.

**Village Square Leisure Centre Power Project**

A power factor correction project contributed to an improvement from 84% to 98% ratio of real power to apparent power flow to the Village Square Leisure Centre.

**Rosedale Affordable Housing Development**

Calgary Housing is developing 15 affordable modular housing units within the community of Rosedale. These homes will be sustainably constructed off-site and delivered to provide secure, energy efficient, affordable housing in the area.

**Climate Adaptation Initiatives (Examples)**

**Improving Calgary's Ecological Awareness**

Calgary Parks is engaging and informing residents on the value of biodiversity: communities, native plants, trees, pollinators, sustainable landscape design and maintenance through various interactive programs.

**Improving Protection for Vulnerable Populations**

The Calgary Neighbourhoods Non-profit Organization (Calgary NPO) provides communication and coordination between non-profit organizations and CEMA for preparedness planning and emergency response.

**Improving Citizen Awareness of Risks**

The Disaster Risk Explorer developed by CEMA shares information on hazards and risk mitigation measures that Calgaryans can take to prepare and respond to natural hazards and infrastructure failure.

### Climate Resilience Strategy - Planning & Development

**Program Highlight**

**Reducing the low carbon trends for Planning & Development**

Land efficient use of land, transit, communities, and greener choices that include transit and bikes can significantly reduce trips and associated greenhouse gases.

**Climate Mitigation Initiatives (Examples)**

**Reducing Barriers for Energy Efficiency**

Calgary Building Services is reducing the minimum separation distances between buildings to allow improvements to building envelope insulation and is supporting building renovation through the development of their energy code-compliant Passive House Planning Package.

**Land Use Bylaw Changes to Support Solar PV Systems**

The Land Use Bylaw has been amended to exempt most new installations of solar photovoltaic (PV) systems from requiring a Development Permit, making it easier for Calgaryans to adopt this technology.

**Collaboration with Industry**

Community Planning collaborated with Audi Royal Oak to approve the first solar canopy full shelter as a car dealership in Canada. These shelters protect inventory from extreme weather (hail events) while producing renewable energy as an added financial benefit.

**Climate Adaptation Initiatives (Examples)**

**Climate Change Training & Process Improvements**

In partnership with ESM, Community Planning is undertaking climate change training to help staff incorporate climate change goals into application reviews and policy development. Process improvements, such as including a climate change section into reports to CPC and Council, are under development.

**Municipal Development Plan (MDP) Update**

The MDP is being updated to incorporate new climate language and supporting policies that aim to reduce GHG emissions and address climate risks to people, communities, and infrastructure.

**Enhanced Process Support**

Through new policy, Calgary Approvals is prioritizing the review of development applications that provide significant environmental benefits, including projects on the City's climate mitigation and adaptation goals.

**What are the climate risks impacting Planning & Development?**

**Risks**

- The evidence-based vulnerability and risk assessment for Calgary, completed in 2017, indicated the following climate risks that are more likely to have a direct impact on planning & development:
  - extreme weather (short duration-high intensity storms)
  - heavy snow, ice & blizzards
  - flooding (river & stormwater)
  - high wind events
  - heat waves & temperature fluctuations (freeze & thaw)

**Impacts**

- These high-risk scenarios can lead to:
  - an enhanced urban heat island effect
  - damage to public & private buildings & infrastructure
  - compromised citizen & staff safety
  - loss of use or enjoyment of public spaces & major civic facilities
  - staff resources diverted to address acute events
  - risk to urban canopy and habitats



# Calgary Climate Panel Recommendations

## Challenges

Implementation  
and Credibility

Resources and  
Funding

Alignment –  
Policy and  
Initiatives

## Opportunities

Leadership &  
Effective  
Governance

Resource  
Capacity and  
Funding  
Opportunities

Project  
prioritization  
and  
Partnerships



## Climate Actions for 2020 (Examples)

A Well-Managed Program	Reduced Corporate and Community Risk and Vulnerability	Reduced Corporate and Community Emissions	Awareness and Education
<ul style="list-style-type: none"><li>• Low Carbon Cities Canada (LC3)</li><li>• Internal Corporate Governance</li><li>• Climate Investment Criteria</li><li>• Measurement and Reporting</li></ul>	<ul style="list-style-type: none"><li>• Review engineering design guidelines</li><li>• Training and technical assistance</li><li>• Collaborative actions with development industry</li></ul>	<ul style="list-style-type: none"><li>• Residential Energy Labelling</li><li>• Utilities and development opportunities</li><li>• Corporate Emissions and Energy Plan</li><li>• Climate in Planning and Development</li></ul>	<ul style="list-style-type: none"><li>• Climate 101 – Internal awareness</li><li>• Climate campaign – community awareness</li><li>• Citizen Action</li><li>• Climate data sharing</li><li>• Working with other cities</li></ul>

\*continue with existing programs



## RECOMMENDATION:

That the Standing Policy Committee on Utilities and Corporate Services recommend that Council direct administration to:

1. Direct Administration to return to Standing Policy Committee on Utilities and Corporate services, as required, between annual reports with a briefing report update.





Utilities & Environmental Protection Report to  
SPC on Utilities and Corporate Services  
2020 April 15

ISC: UNRESTRICTED  
UCS2020-0372

## **2019 Flood Resiliency and Mitigation Annual Update**

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### **EXECUTIVE SUMMARY**

The purpose of this report is to provide an update on The City of Calgary's (The City's) flood resiliency activities in 2019. Updates focus on the Government of Alberta's (GoA's) upstream mitigation work, community-level mitigation projects and the 2019 October provincial budget impacts. The City's flood resilience strategy remains a top priority and continues to successfully work towards building watershed, community, and property-level resilience initiatives to ensure Calgary is resilient to flooding.

Major progress in 2019 includes:

- Installation of the new gates at the Glenmore Dam. The gates will be functional for the 2020 flood season, doubling Glenmore Reservoir's storage capacity.
- Conceptual assessment of three potential new reservoir sites upstream of Calgary for flood mitigation and water supply through the GoA's *Bow River Reservoir Options* project. Additionally, the GoA is working to extend its operating agreement with TransAlta, which will end in 2021 March. This agreement is critical for flood mitigation on the Bow until a new reservoir is built.
- Continuation of the Impact Assessment Agency of Canada's Environmental Impact Assessment (EIA) for the Springbank Off-stream Reservoir (SR1). Once the EIA is completed, the GoA anticipates it will begin construction of SR1.
- Community engagement on Downtown, Sunnyside, and Bowness barriers to support the detailed design, preliminary design, and feasibility assessment of respective projects.

The City assessed the impacts of the GoA's early termination of the Alberta Community Resilience Program (ACRP) funding and recommends prioritizing the Downtown Flood Barrier and Upper Plateau Separation projects in the Water Utility's stormwater investment plan. This will result in a delay of up to one year to previously scheduled Community Drainage Improvement (CDI) projects, barring additional funding or increases to stormwater utility rates. After completing technical studies and comprehensive community engagement, proceeding with the Sunnyside Flood Barrier project with a 1:100-year service level is also recommended. This will result in an additional delay up to one business cycle to previously scheduled CDI projects. Budget adjustments will be presented no later than 2020 November mid-cycle adjustments.

The GoA continued to update flood hazard area (FHA) maps in 2019, in collaboration with The City. The City anticipates updates to its land use and development policies will be required following the release of the provincial maps and subsequent internal engagement.

Utilities & Environmental Protection Report to  
SPC on Utilities and Corporate Services  
2020 April 15

ISC: UNRESTRICTED  
UCS2020-0372

## **2019 Flood Resiliency and Mitigation Annual Update**

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### **ADMINISTRATION RECOMMENDATION:**

That the Standing Policy Committee on Utilities and Corporate Services recommend that Council direct Administration to:

1. Proceed with the Sunnyside Flood Barrier project at Administration's recommended service level;
2. Return to Council with budget adjustments for ACRP-impacted projects no later than the 2020 November mid-cycle adjustments; and
3. Report back to the Standing Policy Committee on Utility and Corporate Services no later than Q4 2020 with recommendations regarding the Bowness barrier project.

### **PREVIOUS COUNCIL DIRECTION / POLICY**

On 2014 March 17 City Council received the 2015-2018 Drainage Financial Plan (UCS2014-0022) which included service levels and targets. A progress report on the Drainage Financial Plan (UCS2016-0414) was received for information on 2016 June 20.

On 2014 June 26, Council approved the River Flood Mitigation Panel Final report (PFC2014-0512), which included direction to provide annual updates to City Council on The City's flood resilience work. City Council approved The City's Flood Resilience Plan on 2017 April 10 (UCS2017-0266). The latest annual update was received for information 2019 May 15 (UCS2019-0653). A separate update was provided to Council regarding the GoA's upstream flood mitigation work on the Bow River on 2018 May 27 (UCS2018-0600), where Council directed Administration to pursue advocacy efforts with Council to continue upstream mitigation progress on the Bow River.

On 2020 January 27, Council approved The City's capital budget recast, which included provisions to address budget impacts as a result of the 2019 October Provincial budget.

### **BACKGROUND**

The City of Calgary's Flood Resilience Plan (the Plan) identified the following key outcomes to ensure Calgary remains resilient to river flooding:

- Springbank Off-stream Reservoir (SR1) upstream of Calgary on the Elbow River, which the Government of Alberta (GoA) remains committed to.
- Upgraded gates at the Glenmore Dam, completed for Spring 2020.
- An upstream reservoir on the Bow River and continuation of the 2016 Ghost Reservoir operating agreement between the GoA and TransAlta, which will reduce seasonal flooding on the Bow River.
- Community flood barriers in Sunnyside, Bowness, and in Downtown, which the Water Utility remains committed to despite the loss of provincial ACRP funding.
- Continuation of the Community Drainage Improvement (CDI) program, which reduces stormwater flooding in established communities.
- Property-level mitigation measures including land use regulations, flood mapping, policy changes, and flood awareness education for property owners.

## **2019 Flood Resiliency and Mitigation Annual Update**

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Significant progress on The City's Plan was made in 2019, advancing key community mitigation projects such as the Downtown Flood Barrier and in the community of Sunnyside. This work is expected to continue in 2020. More information on the Plan and key projects can be found in Attachment 1.

### **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

The following summarizes specific key projects or developments that occurred in 2019. Some of these items could result in risks to progress in 2020.

#### *Watershed-level mitigation*

The City continues to advocate for the extension of the TransAlta operating agreement with the GoA and the Bow River Reservoir Options (BRRO) project, as these are critical components of the Plan. The TransAlta agreement expires in 2021 March, and if not renewed, would result in immediate flood risk on the Bow River. The BRRO project has received \$15M in funding in the GoA's 2020 February budget, which will support the next phase of work.

Completion of the Glenmore Gates will mitigate flooding for up to 20 per cent of the flood risk from a 2013-level flood on the Elbow River and is the most significant milestone for the Plan to date. Once SR1 is operational, a 2013-flood on the Elbow River will be fully mitigated. The gates will be operational for the Spring 2020 flood season. The GoA continues to be supportive of the Springbank Off-stream Reservoir (SR1) through the Environmental Impact Assessment (EIA) process. Once this process is complete, construction on the project will begin.

#### *Community flood resilience work*

Through the Alberta Community Resilience Program (ACRP), the GoA announced \$15M in 2019 May for the Downtown Flood Barrier (\$6.9M) and Upper Plateau Separation (\$8.1M) projects. Funding for these projects will be received in full by 2021. The GoA's announcement that ACRP funding will be ending three years early in 2021 results in an \$81M shortfall to complete outstanding projects, specifically the Sunnyside Flood Barrier and Bowness Flood Barrier projects.

The following financial levers were assessed to continue these and other ACRP-impacted projects:

- Seek alternative funding through federal programs;
- Prioritize the flood mitigation projects within the Water Utility's investment plan and delay CDI scheduled projects to later dates;
- Increase stormwater rates to deliver all projects as scheduled; or
- Request funds from eligible City reserves.

All flood related projects have been reprioritized to address funding impacts. A revised list can be found in Attachment 1. Administration recommends proceeding with the Downtown Flood Barrier and Upper Plateau Separation projects, as scheduled. Prioritizing these projects will currently result in a one-year delay to CDI projects in Sunnyside, assuming no additional external funding or increases to stormwater rates. With Provincial endorsement, the Downtown Flood Barrier and Upper Plateau Separation projects were submitted to Infrastructure Canada for funding under the Investing in Canada Infrastructure Program on 2020 March 31. Additional

## **2019 Flood Resiliency and Mitigation Annual Update**

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opportunities for federal funding, such as the Disaster Mitigation and Adaptation Fund, are being investigated.

The City is actively working with the communities of Sunnyside and Bowness as part of the preliminary design and feasibility phases of the Sunnyside Flood Barrier and Bowness Flood Barrier projects. With the conclusion of the ACRP, The City will be required to fully fund these projects.

### **Sunnyside Flood Barrier**

Based on community feedback, technical studies, and consultant designs, Administration recommends proceeding to detailed design of the project with a 1:100 service level design, instead of the initially proposed 1:20 service level design. A 1:100 service level reflects input feedback received through community engagement, will ensure that a 2013-level flood is managed within the community, will minimize social and environmental impacts caused by construction of a larger barrier, and will support climate resiliency with the addition of a new reservoir on the Bow River. Prioritizing this project is possible within the Water Utility's existing investment plan by delaying scheduled CDI projects by up to one full business cycle.

### **Bowness Flood Barrier**

The City continues to investigate the viability, constructability, and benefit-cost of several design options for a barrier in the community of Bowness. This includes conducting technical studies to assess project feasibility and working with the community to gather feedback and address concerns. A recommendation whether to proceed with a flood barrier will be brought to Council by Q4 2020. Potential budget implications will be known once the current feasibility assessment is completed.

### ***Flood Hazard Area mapping and flood policy***

The City is working closely with the GoA, sharing technical information to support updating provincial Flood Hazard Area (FHA) maps. The City anticipates formal municipal engagement before final maps are released by the GoA. Internal engagement with relevant business units will be required as The City's land use and development policies will require updating following the release of FHA maps.

## **Stakeholder Engagement, Research and Communication**

Administration and Council's coordinated advocacy in 2019 focused on ensuring the GoA's continued upstream mitigation efforts on the Bow and Elbow rivers. Through these efforts, the GoA has confirmed it will fund and advance the next phase of the BRRO project. In 2020, Administration will focus on advocating for the GoA to extend its operating agreement with TransAlta before it expires. Council's support and advocacy for this work is appreciated.

Citizen engagement throughout 2019 informed The City's triple bottom line assessment of preliminary barrier design options in Sunnyside. The recommended service level reflects technical study results as well as community feedback. Community feedback was collected through engagement activities, including:

- Six meetings with the Community Association,
- Two community open houses and two community pop-ups, and
- Online surveys.

## **2019 Flood Resiliency and Mitigation Annual Update**

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Community feedback in Bowness is informing The City's feasibility assessment. Engagement will continue for these and other projects.

### **Strategic Alignment**

Flood resilience remains a top priority for Council and is identified in the stormwater management line of service in One Calgary. Flood resilience supports key action areas in The City's Resilient Calgary Strategy and Climate Resilience Strategy. 86 per cent of citizens surveyed in the 2019 citizen satisfaction survey identified protection from river flooding as important.

### **Social, Environmental, Economic (External)**

The Plan is informed by The City's Triple Bottom Line Policy, One Calgary, Resilient Calgary Strategy, Climate Resilience Strategy, and the Water Utility's integrated watershed management goals. Individual community projects adhere to The City's Triple Bottom Line Policy and evaluation of social impacts are supported by community engagement.

### **Financial Capacity**

#### ***Current and Future Operating Budget:***

There are no operating budget implications from this report.

#### ***Current and Future Capital Budget:***

The \$81M reduction in provincial ACRP funding will impact the Water Utility's capital budget. Mainly, prioritizing impacted ACRP projects will likely delay the delivery of CDI projects scheduled in the Water Utility's investment plan by up to one business cycle without increasing stormwater utility rates. Detailed budget adjustments will be available no later than 2020 November mid-cycle adjustments.

### **Risk Assessment**

The majority of Calgary's outstanding flood risk is on the Bow River. Extending the TransAlta agreement after 2021, actively supporting the BRRO project, and completing community mitigation projects will address this risk. SR1 continues to progress as anticipated and will reduce the majority of the Elbow River's remaining risk, once completed. The loss of ACRP funding impacts flood resilience projects in Calgary and will require some combination of alternative funding and delay of CDI projects, increasing flood risk in the short-term.

#### **REASON(S) FOR RECOMMENDATION(S):**

The recommendations mitigate impacts from the GoA's elimination of ACRP funding for community flood mitigation projects being undertaken by The City of Calgary. Recommendations regarding flood mitigation in Sunnyside ensure that flood risk is managed by The City and will be further reduced by the GoA's upstream mitigation efforts.

### **ATTACHMENT**

1. Attachment 1 – 2019 Flood Resiliency and Mitigation Update
2. Attachment 2 – Public Submissions





# FLOOD RESILIENCY AND MITIGATION



2019 Update Report

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## EXECUTIVE SUMMARY

This report provides a comprehensive update to The City of Calgary's (The City's) flood resiliency and mitigation program in 2019. Building flood resilience remains a top priority for The City and recognizes the importance of reducing flood risk to its citizens.

The City's Flood Resilience Plan focuses on a combination of watershed, community, and property-level mitigation initiatives to reduce flood risk in Calgary. Originally approved in 2017, The City continued to make positive progress on flood mitigation efforts in 2019, and efforts in 2019 will support continued progress on major flood resilience initiatives in 2020. Building flood resilience continues to be a collaborative effort, and The City continues to work closely with the Government of Alberta and citizens to achieve this goal.

Major highlights in 2019 include:

- Installation of the new gates at the Glenmore Dam. The gates will be functional for the 2020 flood season, doubling Glenmore Reservoir's storage capacity and addressing up to 20 percent of the risk of a 2013-level flood event.
- Continuation of the Impact Assessment Agency of Canada's Environmental Impact Assessment for the Government of Alberta's Springbank Off-stream Reservoir. The Government of Alberta anticipates it will begin construction of the Reservoir once the Environmental Impact Assessment is completed and, combined with the new gates at the Glenmore Dam, will be able to mitigate a 2013-level flood event on the Elbow River.
- Initiation of the Government of Alberta conceptual assessment of three potential new reservoir sites upstream of Calgary for flood mitigation and water supply through its *Bow River Reservoir Options* project. An upstream reservoir on the Bow River remains a significant piece of The City's Flood Resilience Plan.
- Community engagement on the Downtown, Sunnyside, and Bowness barriers to support the detailed design, preliminary design, and feasibility assessment of the respective projects. These projects will address flood risk in three flood-prone areas on the Bow River.

This report also addresses projects impacted by the Government of Alberta's October 2019 budget, announcing the early termination of the Alberta Community Resilience Program, which supported the construction of some of The City's community mitigation projects. The City has assessed the impacts and reprioritized the Water Utility's stormwater investment plan to address these impacts. Barring additional external funding or increases to stormwater utility rates, The City anticipates that its Community Drainage Improvements program will be delayed by up to one business cycle to prioritize critical river flood mitigation projects in the downtown and Sunnyside community.

## 1. INTRODUCTION

Seven years after the devastating 2013 flood, building flood resilience remains a top priority for The City of Calgary (The City) and many projects have been completed to reduce Calgary's flood risk. However, the risks associated with a large-scale flood remain until key projects are constructed. Implementing The City's flood resilience plan, approved by City Council in 2017, continues to reflect The City's strategy of using a combination of watershed, community-level, and property-level mitigation to reduce damages from flooding. This strategy is designed to ensure that flooding in Calgary is managed, that The City is capable of adapting to ongoing climate uncertainty, and can support continued urban development.

In 2019, The City maintained its focus on working with communities to progress community flood resilience projects. Much of this ongoing work is being done to ensure that communities are thoroughly engaged, and any potential mitigation recommendations consider citizen concerns.

## 2. 2019 FLOOD SEASON

### 2.1 2019 SEASONAL CONDITIONS

Spring 2019 started off with a slightly below average snowpack and precipitation. Water levels on the Bow and Elbow River stayed within the normal range throughout most of the year, apart from one precipitation event in late June.

Calgary experienced peak flow through Calgary on the Bow River (300 m<sup>3</sup>/s) and Elbow River (107 m<sup>3</sup>/s) on June 21, mainly due to a combination of precipitation and snowmelt in the Bow watershed, and mainly precipitation in the Elbow watershed. Alberta Environment and Parks' River Forecast Centre issued a High Streamflow Advisory during this period, and The City issued a boating advisory June 19 to June 30 as a result. No emergency response activities were required in 2019.

Flow on the Bow and Elbow River remained in the normal range from the summer through fall, and the Glenmore Dam was able to refill from its drawdown for the flood season by mid-July.

### 2.2 2019 FLOOD READINESS

The City of Calgary continues to promote its flood readiness campaign annually from May 15 to July 15. The information-based campaign is an opportunity for The City to inform citizens about its flood resilience plan, and their role in building flood resilience in Calgary, and to help citizens understand, prepare, and stay informed before, during, and after a flood event.

In 2019, The City introduced flood mitigation walking tours along the Bow River to replace open house events during the campaign, which had seen falling attendance in recent years. The walking tours provided valuable face-to-face interactions with the public to explain what actions they could take to increase their personal flood resilience while highlighting the flood resilience work completed by The City in West Eau Claire.



**Understand your flood risk.  
Be prepared. Stay informed.**

**Calgary is most at risk of river flooding  
from May 15 to July 15.**

*THE CITY OF CALGARY'S FLOOD READINESS CAMPAIGN TO INFORM CALGARIANS OF THEIR ROLE IN BUILDING FLOOD RESILIENCE AND HELP THEM UNDERSTAND, PREPARE, AND STAY INFORMED BEFORE, DURING, AND AFTER A FLOOD EVENT.*

Additional activities undertaken in 2019 included:

- Year-round media coverage on flood and climate-related topics, with a focus on the May-July flood season
- Continued publication of a biweekly flood e-newsletter, distributed to over 1,500 subscribers from April to July
- Enmax bill inserts with actions citizens can take to protect against river and stormwater flooding
- Over 40 presentations delivered by City staff to the public

In addition to the campaign events, The City has begun scoping a citizen-focused, action-oriented flood risk awareness and education program. Design and development will continue for this program in 2020. More information on this work can be found in Section 3.5 below.

### 3. FLOOD RESILIENCE PLAN

#### 3.1 BACKGROUND

The City's flood mitigation strategy continues to pursue a combination of watershed, community-level, and property-level mitigation components (Figure 1) to build comprehensive flood resilience throughout Calgary. The City's Flood Resilience Plan (the Plan) reflects this strategy which, informed by The City's Flood Mitigation Measures Assessment (FMMA), Council approved in 2017. The strategy is consistent with international best practices and recognizes that no single piece of mitigation can address all flood risk in Calgary.

The City continuously reviews and evaluates the Plan based on the best information available. Part of this includes ongoing investments in The City's flood forecasting capabilities, continual updates to The City's flood emergency response plans, year-round monitoring of conditions, and annual preparedness training for staff to ensure The City is ready to respond to a potential flood event. This supports The City's abilities to take an adaptive approach to its flood resilience work based on information gained about the hydrology of Calgary's watersheds and changing climate, while still reflecting a layered strategic approach to risk reduction.

The Plan was developed based on the recommendations of the 2014 *Expert Management Panel on River Flood Mitigation* report. More information on these recommendations and The City's progress on the panel's recommendations can be found in Appendix A.

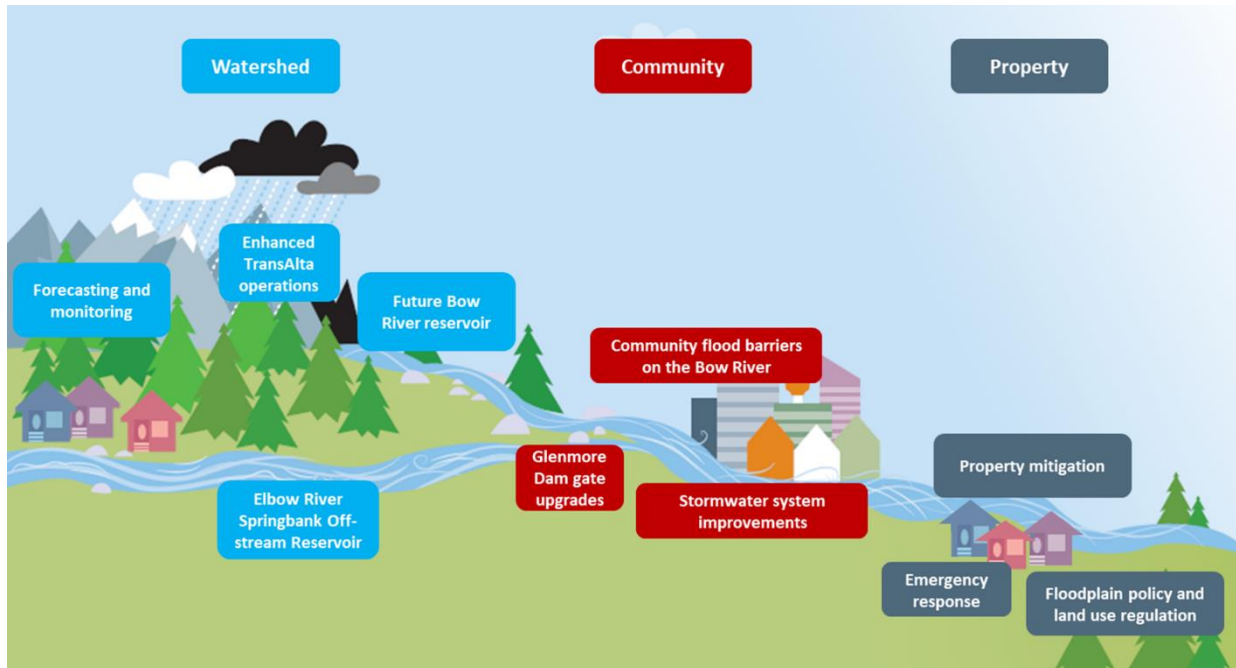


FIGURE 1: THE CITY'S FLOOD RESILIENCE STRATEGY CONSISTS OF WATERSHED, COMMUNITY-LEVEL, AND PROPERTY-LEVEL FLOOD RESILIENCE COMPONENTS TO ACHIEVE RESILIENCE THROUGHOUT CALGARY.

## 3.2 2019 PROGRESS

In 2019, The City focused on working closely with communities to progress key community-level mitigation projects that are core to The City's Plan. This focus ensured that robust, comprehensive community engagement was undertaken, and community stakeholder's concerns were both well understood and considered by The City. Community feedback is a key component for the proposed Sunnyside and Bowness flood barrier projects which are undergoing preliminary design and feasibility study, respectively.

Ensuring upstream mitigation is constructed remains the most crucial outstanding component of The City of Calgary's overall flood strategy. The City continues to work closely with the Government of Alberta (GoA) to support progress on the implementation of upstream mitigation on the Bow and Elbow Rivers. With the Impact Assessment Agency of Canada's (IAAC) Environmental Impact Assessment (EIA) process for the Springbank Off-stream Reservoir (SR1) well underway, The City's advocacy efforts in 2019 were focused on mitigation on the Bow River.

## 3.3 ELBOW RIVER MITIGATION

Significant construction progress was made in 2019 on the gate upgrades at the Glenmore Dam, including delivery of the new gates for installation. The gates will be operational for the 2020 spring runoff season, with all work at the Dam completed before the end of 2020. This work is the most significant advancement for flood protection along the Elbow River since the Dam was built 85 year ago. With the new gates in place, 2005-level floods can now be able safely managed, and accounts for a reduction in 20 per cent of the total risk in a 2013-level flood.



The Springbank Off-stream Reservoir (SR1) remains a key mitigation component on the Elbow River, and will account for as much as an 80 per cent reduction in flood risk (Figure 2) once completed. Combined with the upgraded gates at the Glenmore Dam, The City anticipates that events as large as a 2013-level flood event will be fully mitigated. The EIA for the SR1 remains ongoing in 2019. The GoA submitted three additional information packages, based on the IAAC's 2019 July 24 request, in 2019 November and 2019 December.

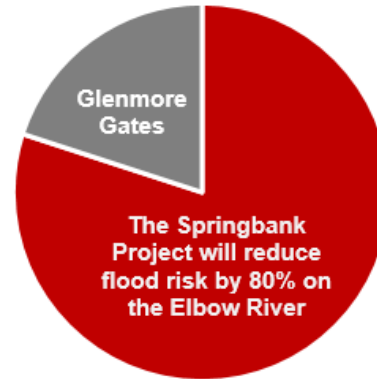


FIGURE 2: SR1, ALONG WITH GLENMORE GATES, WILL REDUCE FLOOD RISK ON THE ELBOW RIVER UP TO A 2013 SIZE FLOOD

As of 2020 February, IAAC is still in the process of reviewing the additional information. The GoA anticipates starting construction of SR1 after the EIA is completed. Throughout this work, The City continues to participate on the project's Technical Advisory Group that is led by the GoA and continues to advance the potential design of SR1.

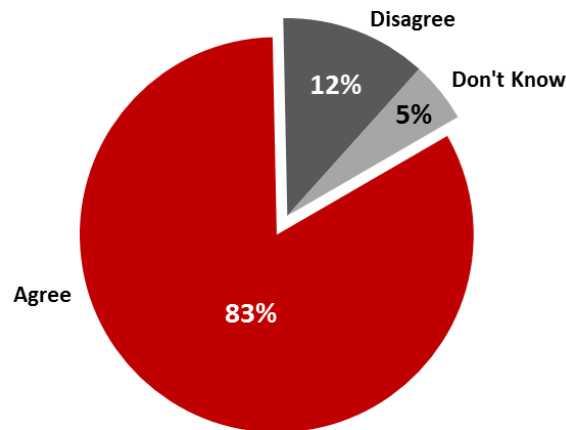
### 3.4 BOW RIVER MITIGATION

As SR1's EIA continues to progress, mitigating flood risk on the Bow River is The City's priority in 2020.

The GoA announced 2018 November that it would undertake the *Bow River Reservoir Options* (BRRO) project, which includes a conceptual assessment for three potential upstream reservoir sites on the Bow River. The GoA continued this work throughout 2019, hosting three public open houses in 2019 October to provide information on the three potential sites. The scope of the current conceptual study includes identifying engineering, environmental, social, economic, cultural and traditional land use factors that should be considered for the projects. The conceptual study was completed in 2020 March, with a public report expected later in 2020. The GoA announced \$15M in funding for the next phase of the project as part of its 2020 February budget, with the next phase beginning before the end of 2020.

The five-year seasonal Ghost Reservoir operating agreement between the GoA and TransAlta, originally signed in 2016, expires in 2021 March. Currently serving as the core piece of mitigation on the Bow River for Calgary, failure to extend the TransAlta agreement will result in an immediate increase in flood risk on the Bow River. The City's advocacy efforts continue to urge the GoA to begin work on the next phase of the BRRO project as soon as possible and extend its operating agreement with TransAlta. This is consistent with the results of The City's 2019 March YYCMatters campaign, which found that 83 per cent of Calgarians surveyed agree that upstream mitigation on the Bow River should be funded by the GoA (Figure 3).

**The Province Should Fund Upstream Flood Infrastructure on the Bow River in Order to Protect Calgary's Downtown from Future Floods**



**FIGURE 3: THE CITY, AS PART OF ITS YYCMATTER CAMPAIGN, CONDUCTED A SURVEY 2019 APRIL AND FOUND 83% OF CITIZENS SUPPORT THE GOA FUNDING UPSTREAM MITIGATION.**

### 3.4.1 COMMUNITY MITIGATION

The City of Calgary continued to advance its community flood mitigation work throughout 2019. This included:

- Beginning construction of two stormwater liftstations in the community of Sunnyside (Sunnyside Pumpstation #1 and #2)
- Initiating construction of the 9 Avenue SE bridge replacement using a new flood resilient design
- Continuing the construction of the Heritage Drive flood barrier
- Advancing detailed design for the Downtown Flood Barrier and Upper Plateau Separation resilience projects
- Community engagement on preliminary design of the Sunnyside Flood barrier, and
- Community engagement on the feasibility of a barrier in the community of Bowness.

As part of its 2019 October budget, the GoA announced that funding for flood resilience projects, through the Alberta Community Resilience Program (ACRP) would be ending in 2021, three years earlier than anticipated. As of 2019, The City received \$69.1M of the GoA’s total \$150M commitment announced in 2015 October, resulting in a final shortfall of \$81M from the original commitment. The loss of funding has resulted in direct funding impacts for the Downtown Flood Barrier and Upper Plateau Separation projects, which have partial funding and are underway.

Both projects are critical to Calgary’s flood resilience. The Upper Plateau Separation project will address stormwater flood risk in the community of Sunnyside and the Downtown Barrier project protecting Calgary’s central business district from flooding up to a 1:200 event, ensuring Calgary’s economy stays resilient and continues to grow. Despite the provincial funding impacts, The City remains committed to

*The City remains committed to delivering the Downtown Barrier and Upper Plateau Separation, with both projects scheduled to*

delivering the Downtown Barrier and Upper Plateau Separation, with both projects scheduled to begin construction before the end of 2020. This will delay previously scheduled Community Drainage Improvement (CDI) project by one year.

The City planned to leverage ACRP funding to deliver the Sunnyside and Bowness Flood Barriers, which were identified as key components of the Plan, once the projects were ready to proceed. Since receiving Council approval to proceed with these projects, The City spent 2019 working with Sunnyside to advance preliminary design of a barrier in their community, while working with community members in Bowness to explore the feasibility of a potential barrier.

### 3.4.2 SUNNYSIDE FLOOD BARRIER

As part of ongoing engagement with the community on the Sunnyside Flood Barrier project, The City hosted and attended several events with the community in 2019. These events were an opportunity to provide citizens with information on the project, its current status, ongoing studies, and helped The City gather feedback on potential barrier options for the project. Events included:

- Three pop-up booths in the community between April and October,
- A community open house in September,
- Meetings with the Hillhurst-Sunnyside Community Association, and
- Online engagement and feedback between September and October.

Four potential service level options were presented to the community, providing different levels of risk mitigation for the community and ranging from an estimated 1:20 service level to an estimated 1:200-year service level. At these events, participants were asked to rank the importance of various social criteria to help inform The City's triple-bottom line assessment. Participants were also asked to comment on the potential impacts and tradeoffs that the various potential options presented.

The City received feedback from 130 open house attendees and 415 online comments as part of the engagement period. Concerns for the previously proposed 1:20 barrier were raised by the community, on the grounds that the proposal did not address enough of the flood risk on its own. While the barrier, with a future upstream reservoir, would provide a 1:200 service level, community members felt the estimated time to completing a new reservoir would result in significant risk for the community until upstream mitigation was completed.

Different members of the community voiced support for either the 1:100 or 1:200 options, citing a preference to mitigate as much risk as possible while also recognizing the combined mitigation provided by both a barrier and upstream operations, costs, and environmental and social impacts. A full *What We Heard Report* for 2019, including activities and feedback from citizens, can be found at <http://engage.calgary.ca/sunnyside-flood-barrier-project>.

In addition to gathering feedback from citizens, The City also undertook several technical studies to inform the potential options presented to the community and address feedback received during engagement. Studies included:

- Groundwater condition studies, including hydrogeological and geotechnical studies to understand how groundwater flows through the community and seepage risks,
- Hydraulic studies using different river conditions to inform potential barrier heights and riverbank protection,
- Tree inventories and environmental reviews, and
- Cost-benefit analysis of the four potential options.

This work has been used to inform The City's understanding of conditions in the community, community members' values and concerns, the extent of flood risks, mitigation costs, and preliminary design considerations to ensure the project is effective. Based on feedback received from citizens and the technical and environmental studies, a 1:100 barrier is now being recommended. A 1:100 service level will ensure that a 2013-level flood is managed within the community. It will also minimize social and environmental impacts caused by construction of a larger barrier, such as reduced views and access to the river, and additional loss of trees. The barrier will support climate resiliency with the addition of a new reservoir on the Bow River. Prioritizing this project is possible within the Water Utility's existing investment plan, but will delay scheduled CDI projects by up to one business cycle.

*Based on feedback received from citizens and the technical and environmental studies, a 1:100 barrier is now being recommended for the*

### 3.4.3 BOWNESS FLOOD BARRIER

The City continues to work with residents and assess the feasibility of a flood barrier in the community of Bowness. Information events and pop-up booths were held in 2019 to increase awareness within the community of the current project phase and provide information about upcoming milestones. Over 100 one-on-one meetings with riverfront residents were also completed in 2019 to provide clearer information on the project's current status, next steps, and directly address any concerns residents might have. Door knocking was conducted in fall 2019 to increase awareness among non-riverfront residents, and a community session was also held in November with staff from The City of Calgary available to answer questions from residents at the event.

The City undertook several studies in 2019 to better understand the feasibility of a project in Bowness, including:

- A detailed groundwater study to understand groundwater seepage in the community and the relationship between groundwater seepage and river flows
  - A third-party technical review of the study was conducted to confirm the results. This was completed at the request of homeowners
- Hydrotechnical modeling of river flows

- Stormwater management studies
- Geotechnical investigations
- A biophysical field survey

To facilitate conversations with the community and residents, the Bowness Flood Mitigation Working Group was formed in 2019 May to review and provide input on studies and engagement, with a focus on delivering the best flood mitigation solutions for the community of Bowness. The group is made up of members from the Bowness Community Association, Bowness Business Improvement Area, Bowness Responsible Flood Mitigation Society, Bowness Senior’s Association, the Ward 1 Councillor’s office, and the general community. The City’s project team has attended the monthly working group meetings, providing information on The City’s overall flood resilience plan. The City’s project team has also engaged the Working Group to gather detailed feedback to augment and enhance the studies being undertaken. These meetings are expected to continue in 2020.

*Any recommendations in Bowness will reflect community feedback, comprehensive technical study results, and triple-bottom-line*

Results from the studies are currently being shared with the Working group at monthly meetings as they become available. Results will also be shared with the riverfront residents and the broader community for feedback. The City recognizes concerns raised by the community around upstream flows and potential impacts on homeowners caused by a barrier. The City is considering these concerns as it works to complete the feasibility assessment. A recommendation on whether to proceed with the next phase of the project will be brought to Council by Q4 2020. Any recommendations will reflect community feedback, comprehensive technical study results, and triple-bottom-line evaluation.

### 3.5 PROPERTY MITIGATION, POLICY AND MAPPING

Flood resilience for Calgary remains a shared responsibility amongst The City, the GoA, the federal government, and citizens. To support citizens in building their personal flood resilience, The City holds its Flood Readiness Campaign annually. In addition to the campaign, The City also began scoping and conducting research on the development of a potential Flood Risk Awareness and Education program in 2019. As part of the program, The City conducted research to better understand citizens’ flood risk with support from Public Safety Canada’s National Disaster Mitigation Program (NDMP). This research included 21 in-depth interviews with key stakeholders with flood response experience such as flood experts, academics, and first responders. These interviews were used to gather insights and lessons learned on the information required by citizens to increase level of resilience during a flood. Also included in this research was a random telephone survey of 801 citizens both inside and outside the flood zone, which was completed to better understand citizens’ view on flood resilience, level of knowledge, actions taken and barriers to action. Once completed, The City will begin developing a framework in 2020 that will inform future programming for citizens and identify opportunities to support citizens in building their flood awareness and flood resilience.

Up-to-date flood maps are an important component of helping citizens understand their flood risk. Accurate maps are also critical for The City's ability to implement appropriate land use regulations and policy measures to reduce Calgary's flood risk. In 2019, The City provided inundation mapping information to the GoA based on its flood models to inform the GoA's ongoing flood mapping work. Updated maps from the GoA are still pending as of 2020 March. The City anticipates that updates to the Land Use Bylaw and relevant development policies will be needed following the release of updated Flood Hazard Area (FHA) maps and internal engagement with relevant business units.

## 4. STORMWATER FLOODING

In addition to river flooding, Calgary is at risk of local stormwater flooding due to intense rainfall or sudden snow and ice melt overwhelming existing stormwater systems. This typically occurs in established communities with older, undersized stormwater infrastructure and can be compounded by river flooding risks. Localized flooding can also occur due to poor surface grading, causing water to pool. Though 2019 did not see any unexpected stormwater flooding due to spring melt conditions, some areas with noted concerns did experience localized, temporary flooding. The City is working towards addressing risks in these areas 2020.

The City of Calgary continues to address areas with high stormwater flooding risk through its CDI program. Starting in 2020, The City will integrate successful lessons learned from its 2019 Integrated Stormwater Management Study of Renfrew into future CDI studies and projects. In addition to addressing stormwater flooding, the approach also considered opportunities to reduce water quality impacts, plan for future redevelopment and densification, manage climate change impacts, enhance asset management, and identify opportunities for green stormwater infrastructure. This approach will ensure that future stormwater infrastructure investments remain resilient and able to withstand future challenges brought on by climate uncertainty and urban development.

In 2019, The City of Calgary reprioritized all flood projects into a single list. A summary of identified projects under the river flood resilience and CDI program can be found in Appendix C. As new CDI studies are completed, additional projects will be added to the program list and prioritized based on their expected cost-benefit and reduction of risk to communities.

### 4.1 COMMUNITY DRAINAGE IMPROVEMENTS PROGRAM

In 2019, The City invested approximately \$20M in CDI projects, with \$5M in support from the GoA. As part of this work, the following projects were completed:

- The Christie Park (Westgate Optimist Park) Dry Pond, a multi-use stormwater storage facility that includes an off-leash dog park and pathways when not being used to store stormwater;
- The Braeside Dry Pond, a multi-use stormwater storage facility located on a school site that includes soccer playing fields when not being used to store stormwater;
- Most of the Woodlands Woodbine Secondary Drainage Improvements to improve stormwater management in Woodlands, Woodbine, and Cedarbrae; and



- The Confederation Regional Drainage Study. Based on the report’s recommendations, monitoring will be set up at key locations for two years, starting in 2020. This will inform future steps for stormwater management in the area. No other work is planned at this time.

In addition to the above projects, construction started or continued to progress on:

- The Bebo Grove Wet Pond, located in Fish Creek Provincial Park; and
- Sunnyside Stormwater Lift Stations #1 and #2.

Design also advanced for the following projects:

- The Upper Plateau Separation detailed design, which provides stormwater and river flooding benefits; and
- Preliminary design work for numerous Northwest Inner-city CDI improvements (7 Avenue NW, 1 Avenue NW, 19 Street and 9 Avenue NW, 19 Street and 6 Avenue NW, 10 Street SW and Crescent Road, and South of Riley Park and Kensington Close).



***THE BRAESIDE DRY POND WILL ADDRESS FLOODING CAUSED BY RAINFALL IN THE COMMUNITY OF BRAESIDE WHILE ALSO SERVING AS COMMUNITY RECREATION FACILITIES WHEN NOT STORING STORMWATER***

Value engineering was undertaken by The City for the Upper Plateau Separation project, resulting in an estimated cost savings of \$10M. Additional cost savings of approximately \$2M for Woodlands Woodbine Secondary Improvements and \$1M savings for Sunnyside Stormwater Lift Station #2 were also identified in 2019. Further work on the Northwest Inner-city CDI improvements will be delayed as a result of prioritizing the Downtown Flood Barrier, Upper Plateau Separation, and Sunnyside Barrier projects, unless additional funding is secured or stormwater utility rates are increased. Estimated delays are included in Appendix C.

#### **4.1.1 OTHER STORMWATER IMPROVEMENTS AND PROJECTS**

The City of Calgary continues to improve its understanding of stormwater issues affecting areas in Calgary. The City received funds from Public Safety Canada and Alberta Emergency Management Association to develop models to identify extreme rainfall flooding risks throughout Calgary in 2017. The City successfully mapped Calgary’s terrain to further identify low areas that are potentially at higher risk of rainfall related flood damages in 2019, and these maps will support modelling to identify low areas in Calgary at risk of severe stormwater flooding. Starting in 2020, The City intends to use this work to identify and support future CDI studies and stormwater infrastructure investments.

The City also recognizes that poor stormwater drainage on individual residential lots can cause localized flooding, property damage, impacts to public infrastructure, and public safety concerns. Significant progress was made by The City in 2019 to support Calgarians improve lot drainage and minimize damages from stormwater flooding, including:

- Publishing the Guide to Lot Drainage in September 2019. The Guide, available to the public, provides an overview of lot grading, drainage regulations and processes, and outlines tools and best practices to follow when planning, designing, constructing or maintaining stormwater drainage patterns in residential development, reducing the risk of flooding.
- Updating the Lot Grading webpage on Calgary.ca. Along with the Guide to Lot Drainage, these updates support ongoing public education to relevant stakeholders, with a focus on roles and responsibilities, to reduce flooding issues caused by poor lot drainage.



Guide to Lot Drainage

Residential Development  
September 24, 2019

In 2020, The City will continue to proactively identify opportunities to collaborate with industry and community stakeholders to identify issues relevant to lot drainage and development, such as through corporate initiatives like the Established Areas Growth and Change Strategy. Working with stakeholders will help The City identify relevant lot drainage and redevelopment issues and identify opportunities to improve future drainage regulations or processes.

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**THE CITY'S GUIDE TO LOT DRAINAGE PROVIDES HOMEOWNERS INFORMATION ABOUT BEST PRACTICES TO FOLLOW WHEN PLANNING, DESIGNING, CONSTRUCTING, OR MAINTAINING STORMWATER DRAINAGE PATTERNS ON THEIR PROPERTY**

## 5. ACTIONS FOR 2020

Significant flood resilience progress continued to be made in 2019 and efforts to increase flood resilience in 2020 will continue. Major community infrastructure projects are expected to be completed, provincial initiatives will continue to advance, and efforts to develop property-level supports will be pursued. The City has also begun preparations for the May-July flood season, and is monitoring conditions in the mountains and seasonal forecasts to ensure it is ready to respond to a potential flood event. In addition to this work, The City will be focusing on advancing the following items in 2020:

### Watershed:

- Continue advocating for upstream mitigation on the Bow and Elbow Rivers and extension of the TransAlta agreement beyond 2021 with the GoA
- Monitor developments related to the GoA's *Bow River Reservoir Options* project
- Continue participating in the Impact Assessment Agency of Canada's Environmental Impact Assessment for SR1
- Completion of Glenmore Dam Infrastructure Improvements Program, including operation of upgraded gates for 2020 flood season

### Community:

- Initiate construction on the Downtown Flood Barrier
- Complete detailed design for the Upper Plateau Separation
- Continue engagement efforts with communities to advance the Sunnyside Flood Barrier project and feasibility study of a flood barrier in Bowness
- Complete construction of the Bebo Grove Wet Pond, Sunnyside Pumpstation #1, and Sunnyside Pumpstation #2 CDI projects and complete new studies with integrated stormwater management principles

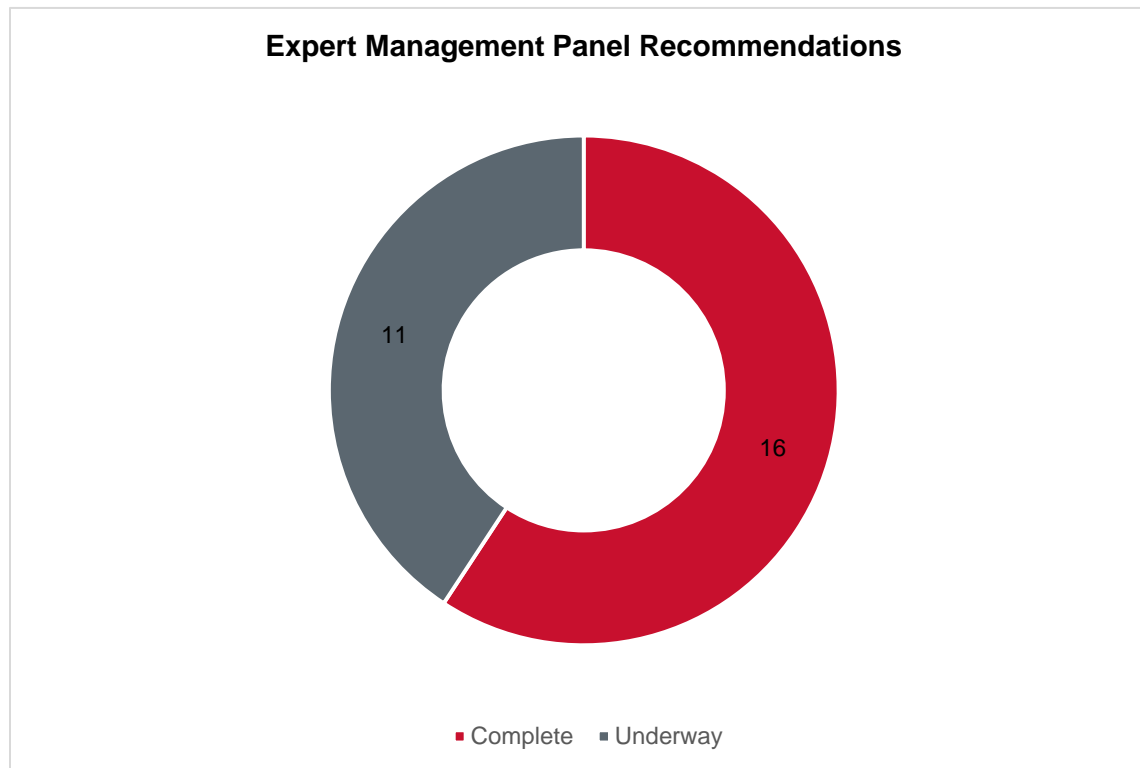
### Property:

- Develop components of The City's flood risk awareness and education program
- Prepare for review of updated flood mapping from the GoA, and implications on The City's services
- Establish a framework to support future policy potential policy options and tools in anticipation of future flood hazard mapping from the GoA

## APPENDIX A – EXPERT MANAGEMENT PANEL RECOMMENDATIONS

The 2014 Expert Management Panel on River Flood Mitigation remains the foundational document for The City’s flood resilience program. Seven years after the 2013 floods, The City has undertaken significant work in various areas to make Calgary more flood resilient. This includes continuing to progress on the panel’s 27 recommendations.

As of 2020, 11 of the Expert Management Panels 27 recommendations remain underway, with the rest completed. The City continues to monitor progress on these recommendations in addition to working on advance its overall flood resilience strategy.



## INVESTING IN FLOOD PROTECTION

Expert Management Panel recommendation	Status	Timeline	2019 update
Prepare a time-phased plan to modify structures that constrain river flow during flood events, such as pathways and bridges. (4b)	Underway	Ongoing	<p>Flood levels are currently considered as part of lifecycle project planning and implementation. Repair and reconstruction of bridges and pathways after 2013 were designed to withstand the 100+ year level flood, as are current bridge construction projects. The City anticipates that updates to the Land Use Bylaw and relevant development policies will be needed following the release of updated FHA maps and internal engagement with relevant business units.</p> <p>Future construction or replacement of existing structures will be informed by future land use planning and development policy work.</p>
Develop a comprehensive climate adaptation plan and implementation tools to reduce The City's infrastructure and operational vulnerabilities. (6d)	Underway	2020+	The City released its Climate Resilience Strategy in 2018. Flood resilience work continues independently but remains aligned with The City's overall climate resilience strategy and corporate resilience strategy.
Connect with the provincial body overseeing flood protection and loss reduction and support the GoA's continuing analysis of flood mitigation options and implementation of appropriate measures through the watersheds. (6b)	Underway	Ongoing	<p>The GoA commissioned the <i>Bow River Reservoir Options Study</i> in 2019 to examine the feasibility of an upstream reservoir on the Bow River. Three potential sites are currently being studied, with initial results expected in the first half of 2020. The City continues to be supportive of this work and is advocating for continuation into the next phase once the study is completed and released.</p> <p>The City actively participates in the GoA's SR1 Technical Advisory Committee, to support the implementation of upstream mitigation on the Elbow.</p>
Increase the operating water storage capacity of the Glenmore Dam on the Elbow River through modifications to the Glenmore Dam. (3b)	Complete	2020	<p>The upgraded gates at the Glenmore Dam have been installed and will be operational for the 2020 flood season. The infrastructure improvement program at the reservoir remains ongoing and all work will be completed in 2020.</p> <p>The elevated gates will increase capacity at the Glenmore Dam and, operated in tandem with the proposed Springbank Reservoir, will provide mitigation for a 2013-level flood on the Elbow River.</p>
Construct additional or higher flood barriers in key locations throughout the city and update temporary flood barrier plans to protect against higher flood levels. (3d)	Underway	Ongoing	<p>The City's flood mitigation plan is currently underway and being implemented. As of 2020, detailed design for the Downtown Flood Barrier and Upper Plateau Separation projects are underway, with construction tentatively scheduled for 2020. The City has also identified a recommended service level for the Sunnyside Flood Barrier.</p> <p>Discussions with the communities of Sunnyside and Bowness regarding potential barriers is ongoing. The City is working with these communities to align potential mitigation measures with community values and will be discussing potential trade-offs in mitigation options as it works with</p>



			communities on these projects. Temporary barrier planning continues to be updated on an annual basis as part of The City's flood emergency response procedures.
Provide an annual update to City Council on progress related to the recommendations from the Expert Management Panel on River Flood Mitigation. (6f)	Complete	Ongoing	Annual updates are provided by Water Resources to Council's Standing Policy Committee on Utilities and Corporate Services.
Evaluate social, economic and environmental impacts of flood mitigation options. (6c)	Complete	2015-2016	A triple bottom line approach was used to assess possible flood mitigation measures as part of the FMMA. The Assessment determined that a combination of upstream mitigation, community level mitigation, and property level mitigation was the most cost-sustainable approach to reducing Calgary's flood risk. The recommendations generated from this assessment were approved by Council in April 2017 (UCS2017-0266)
In partnership with the GoA, compare the three major capital works options for mitigating floods on the Elbow River. (3a)	Complete	2015-2016	The Springbank Off-stream Reservoir (SR1) was announced by the GoA in 2015 and is currently undergoing a federal Environmental Impact Assessment by IAAC. The City is participating on the Technical Advisory Committee for the Environmental Assessment of SR1.
Establish a permanent team within The City to oversee flood preparedness and resilience. (6a)	Complete	2015-2016	Funding requests for a permanent team were approved in December 2014. The Watershed Planning Division was established in 2015 and supports this team.



## UNDERSTANDING FLOOD RISK

Expert Management Panel Recommendation	Status	Timeline	2019 update
Urge the GoA to regularly review and update official flood hazard maps. (5b)	Underway	2020+	The City remains in communication with the GoA on their work regarding new Flood Hazard area (FHA) maps. The City continues to advocate for the completion and release of the new FHA maps to the public once thoroughly reviewed. In 2019, The City requested that any potential future draft FHA updates be shared with The City prior to release by the GoA to address any potential technical inconsistencies with The City's existing inundation mapping. The City anticipates that updated drafts will be shared by the GoA in 2020.
Develop a suite of watershed-scale climate models to capture various weather event scenarios, with input from regional partners, post-secondary institutions and other orders of government. (5d)	Underway	Ongoing	Projected trends in precipitation and temperature were developed for the 2050s and 2080s and were used to conduct a vulnerability and risk assessment to identify high risk climate scenarios for Calgary and region. Further climate analysis is required to support the update of design standards in preparation for changing climate conditions. Considering climate uncertainty remains a core consideration in The City's flood mitigation work and understanding climate implications on flood continue in alignment with The City's corporate resiliency strategy and climate resilience plan.
Collaborate with academic and other partners to develop computer models that identify groundwater movement in Calgary in relation to flood conditions. (5e)	Complete	2017	In 2016, The City completed two assessments on groundwater impacts relating to flooding, which were included in The City's updated Flood Damage Assessment.  In 2019, site-specific groundwater studies, which include on-site sampling, were included as part of the initial feasibility studies for the Downtown, Sunnyside, and Bowness barrier sites. The results of these studies will be received in 2020 and will inform any future decisions on these projects and could further inform The City's overall understanding of groundwater.
Maintain a comprehensive flood risk database integrated with existing geographic information systems (GIS). (5c)	Complete	2015-2016	In 2016, The City produced a GIS based flood risk damage profiles at the community level. This data was created as part of The City's Flood Damage Assessment and has been incorporated into The City's GIS database.  The City continues to update this information as additional data is collected.
Publish up-to-date, graduated flood maps for public information. (5a)	Complete	2015	Inundation maps prepared by The City for up to 100-year return periods have been posted to <a href="http://Calgary.ca/floodinfo">Calgary.ca/floodinfo</a> and are available to the public. Work continues to make this information easier to access for Calgarians.

## STRENGTHENING FLOOD-RELATED POLICIES

Expert Management Panel Recommendation	Status	Timeline	2019 update
Create graduated flood protection level requirements for City infrastructure. (1b)	Underway	Ongoing	<p>Flood levels are currently considered as part of lifecycle project planning and implementation. For the Flood Mitigation Measures Assessment, a target 1:200 flood level was used as reference. Flood protection requirements may be considered after the GoA updates FHA maps and policy changes are assessed. The City anticipates that updates to the Land Use Bylaw and relevant development policies will be needed following the release of updated FHA maps and internal engagement with relevant business units.</p> <p>This action aligns with The City's corporate resilience strategy and climate resilience plan.</p>
Expand the review of the Land Use Bylaw and other development regulations to update flood resiliency requirements for private property in flood risk areas. (1c)	Underway	2020+	<p>Flood resilience considerations will be included as part of the Municipal Development Plan and Land-use Bylaw reviews that started in 2019. The City continues to pursue this work in 2020 and is looking to explore potential additional options to reduce potential damages to development in areas of flood risk.</p> <p>This action aligns with The City's corporate resilience strategy and climate resilience plan.</p>
Review The City's existing land-use planning documents and develop amendments, new guidelines or policies that will minimize development in the floodplain over time. (4a)	Underway	2020+	<p>The City is working on potential changes to floodplain development guidelines as part of the Municipal Development Plan and Land-use Bylaw reviews that started in 2019. This work will also be affected by any updates to the FHA mapping currently being undertaken by the GoA.</p> <p>This action aligns with The City's corporate resilience strategy and climate resilience plan.</p>
Perform a social, economic and environmental analysis to evaluate the need for a minimum flood protection level above the 1:100 flood for land-use planning and structural protection across Calgary. (1a)	Complete	2017	<p>The FMMA completed in 2016 and 2017 analyzed a variety of scenarios up to a 1:200 flood event. The City continues to look at community projects in terms of potential mitigation and considers potential service levels in the context of The City's overall strategy, which includes a combination of upstream, community, and local flood mitigation.</p> <p>The City currently reviews all Area Structure Plans, Area Redevelopment Plans, building permits, and City projects to identify flood risks and structural requirements based on various flood protection levels.</p>

## PARTNERING FOR A FLOOD RESILIENT CALGARY

Expert Management Panel Recommendation	Status	Timeline	2019 update
Pursue a common river forecasting platform with Alberta Environment and Parks (AEP) and TransAlta for faster and more accurate information and alerts about future flood events. (2a)	Underway	2020+	The GoA is currently developing a new forecasting platform that will be used by both The City and the GoA and will facilitate sharing of forecasting data. Throughout 2019, the GoA completed work on developing the platform. City-staff have received training on the platform for potential future integration into The City's forecasting operations.
Strengthen partnerships with utility providers to improve resiliency of their infrastructure and operations, with first priority to energy supply and communication networks. (1d)	Complete	2017	The Flood Emergency Response Manual is updated annually to ensure maximum protection of critical city infrastructure and vulnerable communities. CEMA has developed a critical infrastructure strategy to support CI owners in their understanding of disaster risk and how to reduce their risk. CEMA has identified core utility providers and businesses as key stakeholders.
In partnership with Alberta Environment and Parks and TransAlta, expand the network of river and weather monitoring stations upstream of Calgary and protect stations from damage during flooding. (2b)	Complete	2017	This recommendation is considered complete. However, as part of forecasting platform discussions, expansion and modernization of The City's forecasting platform is being done in partnership with the GoA. The City also continues to identify opportunities to install additional monitoring stations to improve data collection, including a new permanent monitoring station on Nose Creek in 2019, which was completed with support from Public Safety Canada's National Disaster Mitigation Program.
In partnership with the GoA, develop a time-phased plan to remove buildings from areas with high flood risk, while minimizing the disruption to affected communities. (4c)	Complete	2017	The voluntary Provincial buy-outs program is complete, and the GoA has begun demolition of properties. No further Provincial buyouts are planned at this time.
Continue to cooperate with TransAlta and the GoA to increase flood storage on the Bow River through operation of existing TransAlta facilities. (3c)	Complete	2016	The GoA and TransAlta have a 5-year agreement in place for Ghost Reservoir operations, ending in 2021 March. The Bow River Working Group has recognized the importance of this agreement for flood mitigation and identified extending the agreement as a "quick-win" opportunity. The City continues to communicate the critical value of this agreement to the GoA and the need to continue this agreement as it enters its final year.
Host a national flood risk workshop to share best practices & develop a networking group. (6e)	Complete	2015	The City hosted the 2015 Livable Cities Forum on Building Flood Resilient Communities in September 2015 in partnership with Canadian Water Resources Association and ICLEI Canada. The City is involved in national initiatives that bring together various stakeholders to share and develop new practices, mapping and guidelines to reduce flood risk.

## COMMUNICATING WITH CALGARIANS

Expert Management Panel Recommendation	Status	Timeline	2019 update
Develop programs that support building owners to implement flood resiliency measures. (2e)	Underway	2020+	<p>The City continues to support building and homeowners understand their flood risk through annual communication through its Flood Readiness Campaign.</p> <p>The City received funding from Public Safety Canada’s National Disaster Mitigation Program in 2019 to develop additional educational programs on flood awareness for citizens and received approval for sources as part of One Calgary to support this work. This work will continue in 2020.</p>
Incorporate lessons learned from the 2013 flood to enhance communication channels to keep Calgarians informed of conditions that may lead to high river levels. (2c)	Complete	Ongoing	<p>The City established a cross-corporate communications plan and flood readiness communications plan. Updates, information, and general communications are provided annual through The City’s social media, local media and advertising, information sessions, and e-mail flood newsletter. The City continues to use lessons learn to improve its communication with citizens and enhance its Flood Readiness Campaign each year.</p>
Expand the flood risk communication strategy and provide information and tools that empower Calgarians to make informed choices and better manage their personal flood risk. (2d)	Complete	2015-2016	<p>The City established a cross-corporate communications plan and flood readiness communications plan, including providing information through annual open houses scheduled during flood season and regular newsletter and website updates.</p> <p>The City received funding from Public Safety Canada’s National Disaster Mitigation Program in 2019 to develop additional educational programs on flood awareness for citizens and received approval for sources as part of One Calgary to support this work. This work will continue in 2020.</p>

## APPENDIX B –CURRENT FLOOD MITIGATION PROJECTS

Project Name	Project Status	Project Description	Estimated Completion Date
Centre Street Bridge Lower Deck Flood Barrier Improvements	Completed	Construction of removable flood barriers that will be installed in the lower deck of Centre Street Bridge to prevent flooding into Chinatown.	2018
West Eau Claire Flood Barrier	Completed	Construction of a flood barrier along the Bow River downstream of Eau Claire to the Peace Bridge.	2018
Roxboro Sanitary Liftstation Replacement	Completed	Replacement of sanitary liftstation in the community of Roxboro.	2018
Stormwater Outfall Improvements	Completed	Resilience upgrades to fifteen stormwater outfalls to prevent potential back flooding into affected communities.	2018
Western Headworks Site Condition Improvements	Completed	Area improvements to allow operation of a nearby outfall gate, reducing flood risk for Inglewood, the Calgary Zoo, Deerfoot Trail, and Pearce Estate Park. Additional improvements for emergency road access for river emergencies and gate operations during a flood event.	2018
Glenmore Dam Elevated Hoists	Ready for 2020 flood season	Installation of 2.5m high automated steel gates to replace the existing 1.5m manual stop log system to increase storage at the Glenmore Dam.	2020
Bonnybrook Wastewater Treatment Plant Flood Mitigation	Underway	Construction of a flood barrier on the eastern perimeter of the Bonnybrook Wastewater Treatment Plant, with groundwater and stormwater management enhancements to protect the plant from flooding.	2020
Heritage Drive Permanent Flood Barrier	Underway	Construction of an earth-filled berm along Glenmore Trail at Heritage Drive and Glendeer Circle SW (underneath Graves bridge) to prevent flooding of major infrastructure and roadways in the area.	2020
Sunnyside Pump station #1	Underway	Construction of a new, flood dedicated, two-storey pump station to dewater the community of Sunnyside during high water events for river and stormwater management.	2020
Sunnyside Pump station #2	Underway	Flood resilience improvements associated with an upgraded pump station in the community of Sunnyside.	2020
9 <sup>th</sup> Avenue Bridge Replacement	Underway	Raising of the 9 <sup>th</sup> Avenue Bridge to prevent damage during high water events and maintain access for fire and emergency services for the community of Inglewood.	2020
Downtown Flood Barrier	In design	Construction of a permanent flood barrier from Jaipur Bridge to Reconciliation bridge.	2022+
Upper Plateau Separation	In design	Partial separation of Hillhurst-Sunnyside's stormwater system from communities located above in the upper plateau catchment area.	2022+
Sunnyside Flood Barrier	In design	Construction of a permanent flood barrier in the community of Sunnyside.	2022+
Bowness Flood Barrier	Feasibility study	Construction of a permanent flood barrier in the community of Bowness.	2024+
Pearce Estate Park Flood Barrier	Cancelled	Construction of a permanent flood barrier in Pearce Estate Park near the community of Inglewood.	No longer required

## APPENDIX C – COMMUNITY DRAINAGE IMPROVEMENT AND FLOOD MITIGATION PROJECT PRIORITIZATION LIST FEBRUARY 2020

<u>Project Name</u>	<u>Cost Estimate (\$000's)</u>	<u>Project Status</u>	<u>Original CDI Estimated Construction Date<sup>1</sup></u>	<u>Revised Estimated Construction Date (Reduced ACRP Funding)<sup>1</sup></u>	<u>Revised Estimated Construction Date (Reduced ACRP and Sunnyside Prioritized)<sup>1</sup></u>
Woodlands/Woodbine Bebo Grove & 24th Street SW Diversion (formerly Pond D)	\$21,200	Completed	2018-2020	2018-2020	2018-2020
Woodlands/Woodbine - Braeside Dry Pond (formerly Pond A)	\$6,282	Completed	2018-2019	2018-2019	2018-2019
Woodlands/Woodbine - Local Improvements	\$3,889	Construction	2018-2020	2018-2020	2018-2020
North West Inner-City - Pump Station #1 – Sunnyside <sup>2</sup>	\$12,300	Construction	2019-2020	2019-2020	2019-2020
North West Inner-City - Pump Station #2 – Sunnyside <sup>3</sup>	\$9,500	Construction	2018-2020	2018-2020	2018-2020
North West Inner-City - Upper Plateau Separation <sup>5</sup>	\$49,400	Design	2020-2022	2020-2022	2020-2022
Downtown Flood Barrier	\$21,073	Design	2020-2022	2020-2022	2020-2022
Sunnyside Flood Barrier	\$27,900	Design	N/A	N/A	2021-2023
North West Inner-City - South of Riley Park	\$11,200	Design	2022-2024	2023-2025	Beyond 2023
North West Inner-City - Kensington Close	\$2,200	Design	2022-2024	2023-2025	Beyond 2023
North West Inner-City - 10th Street <sup>4</sup>	\$10,900	Design	2021-2023	2022-2024	Beyond 2023
North West Inner-City -- Crescent Road	\$1,100	Design	2021-2023	2022-2024	Beyond 2023
North West Inner-City - 19th Street & 9th Avenue	\$2,100	Design	2022-2024	Beyond 2023	Beyond 2023
North West Inner-City - 19th Street & 6th Avenue	\$600	Design	2022-2024	Beyond 2023	Beyond 2023
North West Inner-City - 7th Avenue	\$2,000	Design	2023-2024	Beyond 2023	Beyond 2023
North West Inner-City - 1st Avenue <sup>4</sup>	\$2,040	Design	2023-2024	Beyond 2023	Beyond 2023
Tuxedo/Mount Pleasant - Phase 1, Phase 2, and local Improvements	\$14,196	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
North West Inner-City - Pump Station #4 - Hillhurst	\$11,700	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
North West Inner-City - Pump Station #3 - Hillhurst	\$8,400	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Pineridge / Rundle Dry Pond B	\$4,175	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Palliser/Oakridge - Phase 1 and 2	\$18,326	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Pineridge / Rundle Storage Duct #2	\$2,824	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Macleod Trail Project C – Meadowview Pond	\$1,972	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Shawnessy Stormwater Upgrades	\$20,197	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
North West Inner-City - 14th Street	\$14,900	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Macleod Trail Project A – Manchester Yards	\$2,692	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Palliser/Oakridge - Phase 3	\$11,247	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
North West Inner-City - 17th Street & 23rd Avenue	\$3,800	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
Oakmount Dry Pond (Oakmont Way Rev Report)	\$492	Study complete -- to be funded	Beyond 2023	Beyond 2023	Beyond 2023
<b>Total</b>	<b>\$298,605</b>				

1 – Schedules subject to change based on external funding availability, new studies, and dependencies on other projects  
 2 -- With funding from ACRP and the New Building Canada Fund.  
 3 -- With funding from ACRP  
 4 -- These projects are linked via dependency to projects above.





## Public Submission

City Clerk's Office

Please use this form to send your comments relating to matters, or other Council and Committee matters, to the City Clerk's Office. In accordance with sections 43 through 45 of Procedure Bylaw 35M2017, as amended. The information provided may be included in written record for Council and Council Committee meetings which are publicly available through [www.calgary.ca/ph](http://www.calgary.ca/ph). Comments that are disrespectful or do not contain required information may not be included.

### FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT

Personal information provided in submissions relating to Matters before Council or Council Committees is collected under the authority of Bylaw 35M2017 and Section 33(c) of the Freedom of Information and Protection of Privacy (FOIP) Act of Alberta, and/or the Municipal Government Act (MGA) Section 636, for the purpose of receiving public participation in municipal decision-making. Your name, contact information and comments will be made publicly available in the Council Agenda. If you have questions regarding the collection and use of your personal information, please contact City Clerk's Legislative Coordinator at 403-268-5861, or City Clerk's Office, 700 Macleod Trail S.E., P.O. Box 2100, Postal Station 'M' 8007, Calgary, Alberta, T2P 2M5.

\* I have read and understand that my name, contact information and comments will be made publicly available in the Council Agenda.

* First name	Jean
* Last name	Woeller
Email	jwoeller@shaw.ca
Phone	403-606-7100
* Subject	Written submission for consideration as part of Apr 15 Annual Flood Mitigation Update to SPC-UCS
* Comments - please refrain from providing personal information in this field (maximum 2500 characters)	Please accept the attached letter from the Bowness Responsible Flood Mitigation Society (BRFM) to be included in the public record as part of the Water Services Annual Flood Mitigation Update to SPC-Utilities & Corporate Services on April 15, 2020. Please forward to council committee members.



## Bowness Responsible Flood Mitigation Society

April 8, 2020

City Clerk's Office  
via online Public Submission Form

### **RE: Water Services Annual Flood Mitigation Update to SPC-UCS April 15 2020**

Dear Members of the SPC-UCS,

Please accept this letter from the Bowness Responsible Flood Mitigation Society (BRFM) to be included in the public record as part of the Water Services Annual Flood Mitigation Update to SPC-UCS on April 15, 2020.

#### **The Bowness Responsible Flood Mitigation Society**

BRFM is an advocacy organization that promotes responsible and effective flood mitigation measures on the Bow River, upstream of Calgary. Information about BRFM's efforts to advocate for upstream flood mitigation can be found at [www.bownessrfm.ca](http://www.bownessrfm.ca)

Following are BRFM's comments regarding Water Services plan to construct overland flood barriers in the Community of Bowness along the Bow River ("the project").

#### **The project is ill-conceived**

BRFM believes that the project, at this time, is ill-conceived. After careful consideration of the reports that have been commissioned by the City (e.g. Flood Mitigation Measures Assessment report, 2017 ("the FMMA"); City of Calgary Permanent Flood Barrier Protection Assessment, April 2018, "the AE Report") and Province of Alberta (e.g. Advice to Government on Water Management on the Bow River, May 2017) as well as attending City information sessions and one-on-one sites visits for property owners, we believe that the City has decided to undertake a project that will do little to mitigate against flooding of Bowness homes and will be destructive to the natural river environment and general enjoyment of private property.

First we believe the Project is premature. The FMMA states: *"The Assessment confirmed that to provide an equitable level of service on the Bow as on the Elbow, a new reservoir on the Bow River upstream of Calgary is recommended, along with complementary barriers in select communities and continuation of the Provincial TransAlta operational agreement."*

Based on its own report, the minimum conditions to make the proposed berm on the Bow River appropriate are not present. Most importantly, an optimistic estimate of when construction could be completed, by the Province is 12 or more years. The City's FMMA provided that *"if a new Bow Reservoir is not built, fortification of the Bow River by barriers is not desirable, as it would require higher barriers with large footprints along the length of the Bow River within Calgary, resulting in dramatic impacts on the community"*.

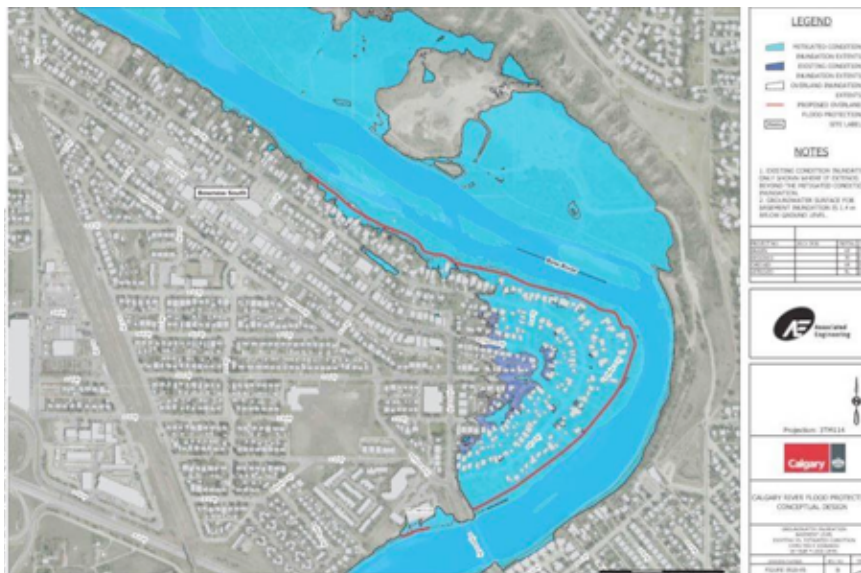
Further, the evidence is that the Project will not work. The AE Report provides a general assessment of groundwater flooding potential and uses average inputs for their groundwater flood modelling; for example, the study assumes a standard subsurface for all community berms planned along the Bow River. Bow Crescent residents who have rebuilt their homes have found deep deposits of gravel, 30-40 feet or more, when driving piles into the bedrock.



The AE report shows through flood modelling (using its conservative inputs) that groundwater flooding for a 1:20 year event with a berm in place will do very little to protect homes in the area from groundwater flooding. Figure 1 and 2 show that even with the berm in place (the red line), extensive groundwater flooding will occur in Bowness. The dark blue areas of the map in figure 2 show that very few homes would not experience groundwater flooding.



**FIGURE 1 - BOWNESS NORTH**



**FIGURE 2 - BOWNESS SOUTH**



**Equality of protection**

BRFM expects the protection in Bowness to meet or exceed the 1:100 year flood risk. As per the FMMA all communities are to be have equality of protection. The BRFM’s request is simple, provide damage protection to Bowness which is afforded other communities. BRFM expects the City to mitigate to that risk in their design and to advocate with the Province of Alberta for increased upstream mitigation to limit peak flow rates to 800 m3/sec as the City’s own evidence supports (see later discussion for details).

This means if the residents in Elbow park are not expected to have basement flooding during a 1:75 year flood, then Bowness residents should not be expected to be flooded by a 1:75 year flood, regardless of if that is overland or by groundwater

We are requesting the committee direct Water Services to provide this as a minimum requirement of any design options.

**Project costs are grossly underestimated**

After the “conceptual design” phase, Water Services estimates the cost to construct the 3-4 km flood barrier to be \$24.7 million (a Class 5 estimate). The City’s cost estimate for land acquisition and flood protection (construction) appear to be grossly underestimated. Only **\$4.4 million has been estimated for direct costs constructing** the flood barrier and \$13.5 million for land acquisition (see table 1 - taken from the 2017 Alberta Community Resilience Program application).

**TABLE 1 - COST ESTIMATE SUMMARY (OVERLAND PROTECTION)**

Item	Amount (\$ 000s)
<i>General</i>	1,010.0
<i>Removals and Site Demolition</i>	382.3
<i>Property Acquisition</i>	13,425.0
<i>Flood Protection</i>	4,410.0
<i>Site Restoration</i>	1,371.1
<b>Subtotal</b>	<b>20,598.4</b>
<i>Engineering</i>	717.4
<i>Material Testing</i>	358.7
<i>Permitting</i>	100.0
<i>Contingency</i>	2,875.5
<b>Total</b>	<b>24,650.0</b>

Contrast these cost estimates to that of Bragg Creek where there are plans to construct a flood barrier of similar length in a rural setting. The project website (<https://www.rockyview.ca/BuildingPlanning/PlansUnderReview/BraggCreekFloodMitigation.aspx#LatestNews>) explains that the total budget was assigned to two stages: stage 1 - \$16.8 million for planning, design, land acquisition & regulatory approvals; stage 2 - **\$16 million for construction and 3rd party services**. In October 2019 Rocky View County closed their tender for construction of the flood barrier and the lowest bid exceeded the construction budget allocated by the Province.

We would expect that the Bragg Creek berm should be less costly to build than the Bowness berm for the following reasons: (i) it has no storm water management system requirements; (ii) construction will occur



in a rural setting so the land acquisition costs are expected to be lower; and iii) physical access to the river bank is expected to be easier than it will be in Bowness.

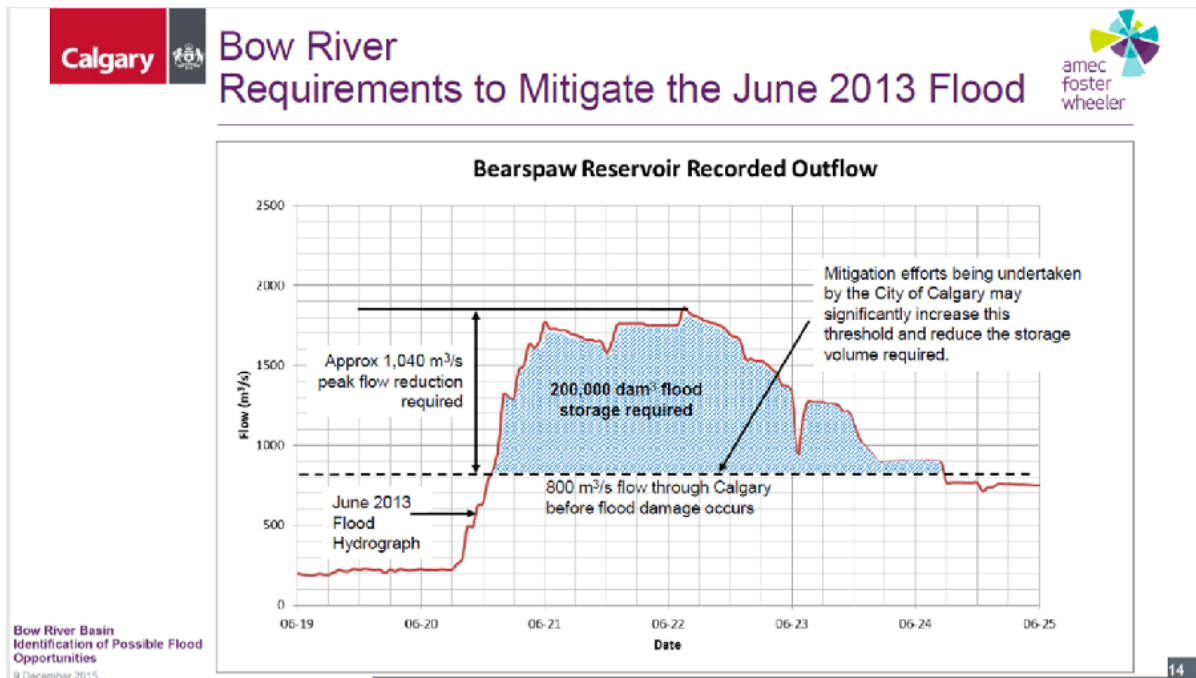
BRFM believes that the City’s estimate for land acquisition is wildly underestimated at \$13.2 million. The estimate is based on the expectation that the City will negotiate easements with all 100 - 130 property owners whose land is required for the project. The majority of property owners do not support the project and therefore the City will incur additional costs in legal fees and as a result of expropriation.

Given that the community will still experience flooding from groundwater, despite the barrier, and the expectation that project costs will escalate, BRFM is of the opinion that the project is irresponsible and a complete waste of taxpayers money.

**Flooding is best addressed through effective upstream mitigation**

The overarching premise of the FMMA is that effective flood mitigation is a combination of upstream, community level and property level mitigation. We support this strategy. However as the FMMA relates to the Bow River, we conclude that the implementation of this strategy over emphasizes the potential benefit of community mitigation and under emphasizes the optimal contribution from upstream mitigation.

The graphic below is taken from a City of Calgary presentation from 2015.



This graphic speaks to the compromise. The conclusion stated here is that based on current conditions, peak flow rates over 800 m3/sec on the Bow River can be managed before significant flood damage occurs. The experience of river front residents in Bowness, is aligned with this threshold.

In 2015, the City postulated that community-based mitigation projects, such as the Bowness Barrier may significantly increase the peak flow threshold and reduce the volume required for upstream storage. Although unproven and untested at the time, this aspiration led to the apparent understanding between the Province of Alberta and the City of Calgary that the Province of Alberta would be responsible for the development of upstream mitigation to control peak flow rates to 1200 m3/sec and the city would develop community barriers that will protect these communities from flood damage at flow rates up to 1200 m3/sec. In the 5 years since this presentation, through BRFM, affected Bowness property owners





have asked for but have not been provided objective evidence that the development of the Bowness Barrier will safely permit an increased peak flow rate above 800 m<sup>3</sup>/sec.

During the last annual flood mitigation update in May 2019 property owners were assured that a barrier design and alignment would be provided within 6 months. A year later this has not been delivered, nor has any further technical evidence been provided to support the assertion that the barrier will increase this peak flow rate. A number of technical reports including the already referenced AE Report, the personal experience of residents and analysis supports that with this flood mitigation strategy, residents will continue to experience significant damage as flow rates exceed 800 m<sup>3</sup>/sec and at 1200 m<sup>3</sup>/sec, damage comparable to 2013.

A survey of river front residents, conducted by BRFM, concluded that about 85% of the property damage that occurred during the 2013 flood was caused by groundwater flooding and/or sewer backup. Discussions with residents reveal that even if overland flooding had not occurred, groundwater flooding preceded or would have resulted in the same level of damage.

This same conclusion was cited for the Elbow River Communities by the University of Calgary geoscience paper in 2018 that has been quoted by a number of technical studies done for the City of Calgary. They state: *“A survey of 189 homes along the Elbow River in Calgary examined the basement flooding water characteristics and the initial route of floodwater entry. In homes where the initial route of entry was known, 88% were initially flooded by groundwater, and 12% reported exclusively groundwater flooding.”*

It's likely that this conclusion strongly contributed to the flood mitigation plan for the Elbow River that relies 100% on upstream mitigation, delivering a controlled peak flow rate of 160 m<sup>3</sup>/sec for a 200-year return period flood event. At this flow rate, Elbow River communities are given effective protection from overland and groundwater damage and can remain living in their homes with fully functioning services (water, electricity, gas, stormwater and sanitary systems). The peak rate of 160 – 180 m<sup>3</sup>/sec was set as a design criterion for upstream mitigation based on ensuring the system would deliver groundwater protection. As already stated, Bowness expects equitable protection as enshrined as a principle within the FMMA, however residents have received no evidence that this protection will be provided by the proposed barrier. In order to deliver this equitable level of protection for Bow River Communities, upstream storage capacity would need to be increased, reducing peak flow rates to 800 m<sup>3</sup>/sec or the barrier would need to be designed to control groundwater ingress into the community, which BRFM believes to be technically not feasible for Bowness.

BRFM has been actively engaged with the Province of Alberta's Bow Basin Water Management Options Conceptual Assessment to evaluate upstream reservoir options. Through our engagement we have advocated for a level of upstream mitigation that will control peak flow rates in Calgary to below 800 m<sup>3</sup>/sec as we have no evidence from the city of Calgary that the Bowness Barrier will protect our community from flood damage at flow rates exceeding that rate. We note that there are single reservoir options that can provide this level of flood mitigation (storage in excess of 200,000 dam<sup>3</sup>) being considered in this study in addition to the Benchlands Dam option that BRFM has developed as an option to reduce the peak flow rate<sup>1</sup>. In response to our advocacy for this higher level of upstream mitigation, the Province has stated that the City of Calgary has committed to provide flood protection up to 1200 m<sup>3</sup>/sec and therefore the upstream mitigation need not be developed to a lower target peak flow rate.

In making the commitment to protect Bowness from flood damage up to 1200 m<sup>3</sup>/sec, the City of Calgary administration has overstated what can be reasonably achieved through community barriers. In order to provide effective and equitable protection, the cost and complexity of the Bowness Barrier will significantly escalate well above the financial capacity of the City of Calgary.

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<sup>1</sup> the Benchlands Dam option was presented at the last year's annual flood mitigation update





The Province has denied funding for the Bowness barrier project under the Alberta Community Resilience Program (ACRP). Their decision could be viewed as the prioritization of upstream flood and drought mitigation above with community barriers. The City of Calgary should also acknowledge that they cannot deliver effective and efficient flood mitigation for the Bow River communities up to 1200 m<sup>3</sup>/sec and advocate with the Province for increased upstream mitigation to limit peak flow rates to 800 m<sup>3</sup>/sec, as the City's own evidence supports.

Thank you for the opportunity to share our position on the ill-conceived, costly and ineffective Bowness Barrier Project.

Sincerely,

Jean Woeller  
Chair, Bowness Responsible Flood Mitigation Society  
jwoeller@shaw.ca  
403-606-7100



POSTPONED REPORT

Summary of Real Estate Transactions for the Fourth Quarter 2019, UCS2020-0357

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Report UCS2020-0357 was postponed from the Regular Meeting of the Closed Meeting of the 2020 March 18 Standing Policy Committee on Utilities and Corporate Services meeting, which was cancelled on 2020 March 16.

The Report will remain confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act*.

**Review By: 2020 April 30**