



100 John West Way
Aurora, Ontario
L4G 6J1
(905) 727-3123
aurora.ca

Town of Aurora

Memorandum

Planning and Development Services

Re: Climate Change Adaptation Plan – Implementation Plan

To: Environmental Advisory Committee

From: Sebastian Contarin, Energy and Climate Change Analyst

Date: June 22, 2022

Recommendation

1. That the memorandum regarding Climate Change Adaptation Plan – Implementation Plan be received; and
2. That the Environmental Advisory Committee comments regarding Climate Change Adaptation Plan – Implementation Plan be received and referred to staff for consideration and further action as appropriate.

Executive Summary

The Town of Aurora has been undertaking the development of a Climate Change Adaptation Plan (CCAP) which aims to conduct a climate change vulnerability and risk assessment and develop an implementation plan that informs asset management planning and increase the resilience of the Town of Aurora's infrastructure. The Implementation plan represents the last phase of the Public Infrastructure Engineering Vulnerability Committee (PIEVC) protocol and provides recommended adaptation actions to be addressed across the Town's four respected asset types: linear infrastructure (roads, stormwater), water infrastructure, parks and natural heritage and facilities. The following report presents an update of the implementation plan, specifically involving the plan's recommended adaptation actions and their respective details for successful implementation.

The preliminary results of the risk and vulnerability assessment identified medium risks areas to Town infrastructure but no high-risk areas.

- **Linear Engineered Assets (10 action items):** Actions focus on improving the resilience of the stormwater system and road maintenance and operations to extreme shifts in precipitation and temperature events respectively;
- **Water Infrastructure Assets (7 action items):** Actions focus on understanding the capacity and vulnerability of water and sanitary networks to manage risk related to heavy precipitation and severe weather events;
- **Parks and Natural Heritage System Assets (7 action items):** Actions focus on operations and maintenance changes and exploring solutions, such as green infrastructure, to improve water use and storage for landscaping as well as moderating extreme temperature and stormwater runoff events.
- **Facilities (9 action items):** Actions focus on incorporating future climate projections into future cooling system upgrades and improving operation and maintenance procedures to identify and correct weather-related damage to facilities before major repairs are required.

Background

The Climate Change Adaptation Plan (CCAP) is informed by a climate change risk and vulnerability assessment completed using the Public Infrastructure Engineering Vulnerability Committee (PIEVC) protocol. The PIEVC protocol is a nationally recognized tool for assessing infrastructure risk due to climate change. It is represented as a five-step process including project definition, data collection, risk assessment, engineering analysis, and conclusions and recommendations. The Implementation plan represents the last phase of the PIEVC protocol and provides recommended adaptation actions to be addressed across the Town's four respected asset types,

- Linear Engineering Assets (Roads and Stormwater);
- Water Infrastructure;
- Parks and Natural Heritage Systems; and
- Facilities (Buildings).

Potential adaptation actions are proposed for all risks rated medium or above identified through the risk assessment process. These actions are informed by feedback from the risk workshop and input from the WSP project team with expertise related to each risk.

In addition to the list of proposed actions, the plan also includes the associated implementation details required for successful implementation. These details including

priority, approximate duration, cost, and the Town staff lead responsible for implementation.

Actions and Justifications

Descriptions of the recommended adaptation actions and how and why these contribute to resilience in the specific infrastructure category.

Risk Rating

The rating of the highest risk that the action is aimed to address. For this project, risk was classified under four (4) categories:

- i. **Low Risk:** interactions represent no immediate vulnerability associated with the infrastructure component. No further action is recommended for low risks.
- ii. **Medium Risk:** interactions represent a potential vulnerability. Medium risks may require mitigative action. Medium risks are further broken down into low-medium and high-medium risks to aid in the prioritization of mitigation measures.
- iii. **High Risk:** interactions represent an identified vulnerability. Mitigative actions are required to ensure the viability of the infrastructure.
- iv. **Special Cases:** may warrant specific mitigative measures due to either a severe outcome and low probability of occurrence, or a high probability and low severity event.

Risk Range	Threshold	Response
0 - 11	Low Risk	No action necessary.
12 - 36	Low medium risk (12-25)	Action and/or an engineering analysis may be required.
	High medium risk (26-36)	
= 7	Special Case	Requires special attention in risk assessment to determine if action is necessary.

Priority

Relates to the urgency with which the action should be pursued. It consists of three types:

- i. **Short-term:** Actions should be implemented within the next 1-5 years;

-
- ii. **Medium-term:** Actions should be planned and budgeted soon, but implemented in the next 5-10 years; and
 - iii. **Long-term:** Actions should be evaluated and planned for over time and implemented on an ongoing basis or in the long-term (>10 years).

Duration

An estimate of the required timeline based on the action type to help inform planning and budgeting.

Cost Range

Order of magnitude cost estimates for the adaptation actions. These have been developed with input from SMEs and are based on similar projects, current marketing conditions, and costs. Cost ranges are broken down as follows:

Symbology	Cost Range
\$	<\$10,000
\$\$	\$10,000-\$100,000
\$\$\$	\$100,000-\$1M
\$\$\$\$	\$1M+

Analysis

The preliminary results of the risk and vulnerability assessment identified low and medium risks areas to Town infrastructure but no high-risk areas.

The climate change risk assessment completed using the PIEVC protocol resulted in 60 medium risks and no high risks. The highest risks identified in this assessment were associated with the stormwater and sanitary systems due to potential risk of flooding and backups, HVAC systems in facilities needing to manage higher temperatures in the future and playing field maintenance after both heatwaves and flooding events which may become more frequent in the future.

Linear Engineered Assets

Most risks related to Linear Assets are caused by an increase in extreme precipitation that may overwhelm stormwater systems leading to localized flooding and erosion of stormwater channels and roadsides. Actions for this asset category focus on improving the resilience of the stormwater system to both extreme precipitation and drought

events. Actions are also directed at improving road maintenance and operations to manage increasing degradation from shifting temperatures and extreme events.

Water Infrastructure Assets

The highest rated moderate risks to the water and sanitary networks relate to increasing precipitation and flooding during extreme events. Actions for this asset category focus on understanding the capacity and vulnerability of water and sanitary networks to manage risk related to heavy precipitation and severe weather events that may damage components, overload systems capacity, or cause indirect issues like power outages.

Parks and Natural Heritage Systems

Most risks associated with Parks and Natural Heritage are related to damaged landscaping from increasing temperatures and severe weather events. Increasing temperatures may also impact the operation of recreation facilities like ice rinks, requiring more maintenance and increasing operating costs. Actions to adapt parks and natural heritage assets to climate change focus on operations and maintenance changes and exploring solutions, such as green infrastructure integration, to improve water use and storage for landscaping needs. Green infrastructure assets serve as a dual benefit to climate action, providing adaptation and mitigation-based solutions to combat rapid changes in temperature and precipitation. Common functions such as stormwater management, canopy shading, evaporative cooling, and carbon sequestration allow green infrastructure to provide support in moderating extreme temperature and stormwater runoff events.

Facilities (Buildings)

The highest rated moderate risks for facilities are related to increases in extreme summer temperatures, which may exceed building cooling capacities. Risks are also present for damage related to heavy precipitation and severe weather events.

Adaptation actions for facilities focus on incorporating future climate projections into future cooling system upgrades and improving operation and maintenance procedures to identify and correct weather-related damage to facilities before major repairs are required.

Attachments

Attachment 1 – DRAFT CCAP Implementation Plan

Attachment 2 – DRAFT Climate Change Adaptation Plan