

Alternative Practices to Address Snow and Ice Control

Recommendation:

That Community and Public Services Committee recommend to City Council:

That revised City Policy C409J, Edmonton's Snow and Ice Control Policy, as set out in Attachment 4 of the October 3, 2018, City Operations report CR_6320, be approved.

Executive Summary

The City of Edmonton's Snow and Ice Control Policy (C409I) sets winter snow and ice control standards to provide a safe and reliable transportation network while protecting the environment and providing excellent customer/citizen service.

Preliminary results of the anti-icing pilot were shared with Committee on July 4, 2018 (CR_5033). The report showed improved accessibility of the paths, roads, bus stops and bike lanes during the winter, reduced operational costs, and significantly reduced sand application with the addition of the anti-icing pilot. When the report was presented to Committee, the environmental results of the anti-icing pilot and the remaining public engagement results were unavailable.

This report is a follow-up to CR_5033 and includes information on:

- The newly available environmental results which demonstrate that the pilot had no discernable impact on the quality of the city's stormwater that discharged into the North Saskatchewan River.
- The newly available public engagement data showed respondents from the Edmonton Insight Community were in favour of the pilot. The results from an open link survey available to the broad public was not as positive.
- Proposed updates to the current Snow and Ice Control Policy which are intended to reflect achieving bare pavement for prioritized roads, bike lanes, paths and bus stops.
- New monitoring processes Administration is initiating to collect Edmonton-based evidence about the results of winter road activities and potential for future improvements. This monitoring will capture the impact of salt

and calcium chloride on different types of infrastructure, including concrete and asphalt, metal and vegetation.

- Operating practices that are being adjusted for the 2018-2019 winter season in order to minimize the amount of salt and calcium chloride needed to achieve bare pavement, which includes adding a corrosion inhibitor to the road salt being applied.

Report

Updated Pilot Results

In July 2018, Administration presented initial results of the 2017-2018 anti-icing pilot to Committee. Updated results from the environmental monitoring and engagement surveys are now available and are presented below.

Environmental Monitoring:

Administration conducted an environmental evaluation to measure the results of the anti-icing pilot on the storm water and snow storage sites. Monitoring was conducted using:

- The City's historical use of winter road maintenance materials;
- Environmental monitoring data at four major storm water outfalls to the North Saskatchewan River; and
- Environmental monitoring at the City's snow storage sites.

Administration considered historical data with similar snowfall years, with a primary focus on chloride concentration at snow site outfalls. Chloride is a key environmental indicator for dry salt (sodium chloride) and wet brine (calcium chloride), making it the focal point of this study. As it was available, snowmelt data up to the end of July 2018 was used in the chloride evaluation for 2017-2018.

Summary of Environment Monitoring Findings (see Attachment 1 for complete findings):

- 4.5 percent of the total chloride applied to Edmonton roads in 2017-2018 was related to the application of anti-icing brine.
- The reduction of winter sand application during the pilot was accompanied by an increase in dry salt use.
- The anti-icing pilot produced no apparent impact on the quality of the city's stormwater that discharges into the North Saskatchewan River. The increase in dry salt application in 2017-2018 was not obvious in the data, potentially due to overland flow, discharge to other outfalls, and/or contributions of de-icers from other sources such as private businesses and citizens.

- There was no apparent impact to dissolved organic material entering the North Saskatchewan River due to the anti-icing pilot project .

The City will continue to monitor the local ecosystem to see if there are any changes as a result of the pilot.

Public Engagement:

Administration contracted Leger to better understand the perceived effectiveness of implementing alternative practices to address snow and ice control. The initial market research study included two methods: a survey with 1,054 Edmontonians using Leger's online panel, and five focus groups comprised of four types of road users and one stakeholder group. Findings from this initial study were provided to Council in July 2018 (CR_5033). Additional engagement data is now available.

Summary of Additional Public Engagement Findings (for full findings see Attachment 2):

An online survey asking the same questions as the initial study was sent to the Edmonton Insight Community and was also available to the public via an open survey link on the City's website. 1,906 responses were collected from the Edmonton Insight Community and 4,211 responses were collected from people who accessed the open survey.

- 88 percent of Edmonton Insight Community respondents and 95 percent of open survey respondents were aware that the City was using anti-icing product this past winter.
- Prior to being provided with benefits and downsides of the anti-icing pilot, 31 percent of the Edmonton Insight Community respondents, and 21 percent of open survey respondents had a positive opinion about the pilot program.
- After being provided with benefits and downsides of the anti-icing pilot, 44 percent of the Edmonton Insight Community respondents, and 25 percent of open survey respondents had positive opinions about the anti-icing pilot;
- After being provided with benefits and downsides of the anti-icing pilot, 66 percent of the Edmonton Insight Community respondents, and 37 percent of open survey respondents felt the anti-icing pilot should continue;
- After being provided with benefits and downsides of the anti-icing pilot, 58 percent of the Edmonton Insight Community respondents, and 34 percent of open survey respondents thought the pilot should be expanded.

Updates to the Snow and Ice Control Policy

Administration proposes making updates to the Snow and Ice Control Policy to reflect results of the winter 2017-2018 pilot. Service levels will continue to be calibrated

during winter 2018-2019 to determine the optimal service level targets based on costs and how long it takes to remove the snow.

Attachment 3 outlines each of the proposed policy updates and the current policy practice in detail. Highlights include:

- Updating policy language to include service levels for prioritized sidewalks, trails, and priority bike routes, as well as bus stops adjacent to City property;
- Removing the Roadway Sanding and Street Sanding Recycling sections from the current policy;
- Reclassifying Roadway Priority Hierarchy to include bus stops, paths, bike lanes and roads; and
- Include reaching bare pavement as the service level objective.

Attachment 4 contains the City of Edmonton Snow and Ice Control Policy C409J with the changes outlined above for Committee consideration.

New Initiatives

Administration has undertaken new initiatives for the upcoming winter season in an effort to continually improve the Snow and Ice Control program and gather Edmonton-based evidence on the results of anti-icing/de-icing activities.

Additional Monitoring:

Administration has initiated an on-site monitoring process to capture the results of salt and calcium chloride on different types of infrastructure.

- Concrete and Asphalt Study - Administration will use an external consultant to conduct a field study that can measure the impact of chloride on concrete and asphalt.
- Metal Corrosion Study - Administration will use an external consultant to conduct a corrosion study to monitor the impact of chloride on vehicles and other metal-based infrastructure such as bridges.
- Vegetation Study - In partnership with a research institute, Administration will conduct a study that can investigate the effects of anti-icing and de-icing agents on urban plants and tree species, in controlled and real-time field conditions.
- Traffic Safety Study - Administration will continue monitoring traffic safety through an online dashboard that captures daily collision trends on routes where anti-icing material is applied. The study will also include an historical comparison of collisions on controlled sites and a jurisdictional review of traffic safety trends where anti-icing is used for snow and ice control.
- Internal Engagement - During the spring and early summer, Administration began conducting an internal engagement of City staff regarding the anti-icing

pilot. The focus group studies are underway and will be continued in the upcoming winter season.

- Jurisdictional Review - Administration has expanded its review of industry best practices across similar municipalities and road jurisdictions.

Operational Changes:

Along with monitoring processes, Administration is implementing several operational changes to improve the efficiency and effectiveness of the Snow and Ice Control program for the 2018-2019 winter season. These changes include:

- Contracting a third party for High-Speed Arterial Roads - Administration has requested a new procurement for snow removal and ice control on major arterial roadways. Targets from the 2017-2018 winter season were not achieved with the current labour and equipment resources. The procurement of this service would provide labour, materials, appropriately sized equipment, and operations management for Whitemud Drive, Yellowhead Trail, Calgary Trail/Gateway Boulevard, and Manning Freeway. Administration will use existing staff and equipment to focus efforts on achieving targets for existing lower volume arterial and collector roadways where current City equipment is better suited. This contract will be accommodated within the existing operating budget.
- Pilot Expansion - Administration plans to expand the anti-icing pilot to cover additional arterial and collector roads during the 2018-2019 winter season. Anti-icing will be expanded to all priority 1 and 2 arterial and collector roads, which is an inventory of 3,134 km. This includes adding 295 km to the previously piloted 2,839 km. Priority bus stops and protected bike lanes will continue to be piloted in 2018-2019. Staffing will be adjusted to leverage existing resources to consolidate the previously separated snow and ice operations for bus stops, bike lanes, stairs, multi-use trails, and sidewalks.
- Wetting Road Salt - Administration will be implementing a procedure to pre-wet road salt before use to increase the consistency of application and reduce the quantity of salt needed. The amount of salt used will be monitored and reported back to Council at the end of winter 2018-2019, in the summer of 2019.
- Use of Corrosion Inhibitor - The current supply of calcium chloride contains an organic corrosion inhibitor that reduces the corrosion rate by 70 percent compared to salt. A new corrosion inhibitor is being evaluated by the supplier that allows for a higher concentration of calcium chloride, making the product more effective at lower temperatures. Preliminary results show zero percent corrosion compared to sodium chloride.
- Align Shift Scheduling - Administration is in the process of optimizing shift scheduling to improve operational efficiency. Shift length and timing is anticipated to deliver significant improvements in the service delivery of Snow

and Ice Control programs as it optimizes equipment use through a more evenly distributed workforce over a 24/7 period.

Residential Public Engagement:

Administration plans to engage residents in the upcoming winter season to understand their expectations for snow removal, road clearing, seasonal parking bans and service level improvements in residential areas. The purpose is to develop and deliver a pilot program that is based on the engagement feedback aimed specifically at residential snow and ice control.

Next Steps

To better understand the results of achieving bare pavement for Snow and Ice Control, Administration recommends the following path forward:

- Collect data from monitoring studies to track the results of anti-icing and de-icing agents on different types of infrastructure;
- Work with Traffic Safety to establish a public education campaign on the benefits of achieving bare pavement as part of the Snow and Ice Control program;
- Continue expanding the anti-icing pilot for the 2018-2019 winter season, and collect data to inform the Snow and Ice Control Policy and service levels;
- Analyze public engagement feedback for residential areas and launch a residential snow and ice pilot for the 2019-2020 winter season; and
- Collaborate with the City’s bridge engineers to identify opportunities to pilot the anti-icing program on select City bridges and establish a process to monitor them.

Budget Implications

Administration is requesting an estimated capital profile of \$4,070,00 for the 2019-2022 Capital Budget, including additional funding to purchase equipment necessary to optimize the application of anti-icing and de-icing products. Attachment 5 gives the description, quantity, cost breakdown, and procurement requirement for each type of equipment needed under this profile.

Corporate Outcomes and Performance Management

Corporate Outcome(s): Edmonton is a safe city			
Outcome(s)	Measure(s)	Result(s)	Target(s)
The City promotes improved mobility and	Average number of collisions on anti-icing routes compared to	To be determined	Decrease in collisions

traffic safety through the anti-icing pilot	previous years with similar snowfall.		
Corporate Outcome(s): The City of Edmonton has sustainable and accessible infrastructure			
The City promotes increased accessibility by adhering to established directives, policies and guidelines, Snow and Ice Control Policy C409I	Average time from the end of a snowfall to when arterials and freeways are cleared to bare pavement.	48 hours (2017-2018)	36 hours Note: Target will continue to be calibrated in winter 2018-2019 to determine optimum service levels
	Average time from the end of a snowfall to when bus stops adjacent to City property are cleared to bare pavement.	24 hours (2017-2018) Note: This was just for the 167 prioritized bus stops within the pilot	48 hours
	Average time from the end of a snowfall to when prioritized sidewalks, trails and bike routes are cleared to bare pavement.	24 hours (2017-2018)	24 hours

Risk Assessment

Risk Element	Risk Description	Likelihood	Impact	Risk Score (current)	Current Mitigations	Potential Future Mitigations
4 - Customers /Citizens	Reclassifying Roadway Priority Hierarchy and updating policy language to include service levels for prioritized sidewalks, trails and bike routes, as well as bus stops adjacent to City property	2 - Unlikely	2 - Moderate	4 - Low	Optimize crew routes, leverage existing resources and adjust staffing to achieve additional service levels for the entire mobility network.	Review industry's best practices and continuously improve: shift schedules, equipment utilization, process and training.
7 - Environmental	Removing the Street Sanding Recycling section from the current policy	1 - Rare	2 - Moderate	2 - Low	Recycling sand has currently stopped, with collected sand being stockpiled at City yards.	Secure contract with local landfills to use collected sand as covers (Costs will reduce compared to recycling sand).

Attachments

1. Environmental Monitoring and Metrics Report
2. Anti-Icing Pilot Evaluation - Public Engagement Report
3. Snow and Ice Control Policy - Proposed Updates
4. Snow and Ice Control Policy C401J
5. Capital Profile

Others Reviewing this Report

- S. Padbury/R. Kits, Acting Deputy City Managers, Financial and Corporate Services
- C. Owen, Deputy City Manager, Communications and Engagement
- A. Laughlin, Deputy City Manager, Integrated Infrastructure Services
- P. Ross, Acting Deputy City Manager, Urban Form and Corporate Strategic Development
- K. Armstrong, Deputy City Manager, Employee Services