



## INFORMATION ITEM

### MEMORANDUM

To: Mayor and Members of Council

From: Jane S. Brautigam, City Manager  
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Date: September 15, 2020

**Subject: Information Item: Snow and Ice Control Program and Sidewalk Snow Removal Enforcement Plan for the 2020-2021 Season**

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#### EXECUTIVE SUMMARY

This memorandum provides City Council with an overview of the Public Works Snow and Ice Control Program and the Police Department's enforcement of the Sidewalk Snow Removal code provisions for the 2020-21 season. The city's snow and ice control efforts:

1. Support safe travel for all modes during snow events. Snow and ice control is an important element in the city's focus on travel safety and Vision Zero goals to reduce serious injury and fatal crashes.
2. Focus on efficiency, effectiveness and safety, in alignment with Transportation Master Plan and Boulder Police Department Master Plan goals.
3. Provide informative and timely communication to community members.

This memo summarizes key approaches for program improvement, provides an overview of operations and describes enforcement of the sidewalk snow removal code.

## **FISCAL IMPACT**

The Snow and Ice Control Program is managed by the Public Works - Transportation & Mobility Department, with an adopted 2020 budget of \$1.3 million. This annual budget is developed each year for normal weather patterns and events. One or more significant snowfall events, or extenuating circumstances, can increase costs in excess of those allocations. If additional funding is required, reserves can be allocated through the city's supplemental appropriations process. The 2020 Budget for the Boulder Police Department accounts for costs involving sidewalk snow removal enforcement.

## **COMMUNITY SUSTAINABILITY ASSESSMENTS AND IMPACTS**

- **Economic:** Safe and efficient travel via local streets, sidewalks, multi-use paths and the transit network affects the overall economic health of Boulder. The Snow and Ice Control Program seeks to limit impacts to the economy due to snow storm events; however, significant events may result in a reduction of economic activity.
- **Environmental:** Snow and ice control operations and sidewalk snow removal efforts support multimodal transportation, which benefits air quality. The Snow and Ice Control Program utilizes pre-treatment, anti-icing and de-icing materials that provide a reduced environmental impact when compared to other products. The street sweeping program seeks to remove and safely dispose of residual de-icing material from all snow routes within 72 hours following a storm event when weather allows.
- **Social:** Snow and ice control operations and sidewalk snow removal efforts support mobility for a diversity of travelers and provides accessibility to employment centers, schools, recreational opportunities and shopping centers.

## **BACKGROUND**

During snow events, 17 Public Works plow trucks operate on Boulder streets. Four pairs of trucks plow four primary routes, and nine plow trucks operate on the other nine routes (8 secondary routes and one additional primary route). Primary and secondary plow routes cover approximately 328 lane miles (52.6%). An additional two smaller trucks and a Utility vehicle address the multi-use paths. All snowplows are equipped with Automatic Vehicle Locator (AVL) technology to provide tracking of vehicle locations and material usage.

For the past several years, when the forecast called for more than eight inches of snow or three days of temperatures below freezing, some additional residential streets are plowed as “conditional routes.”

Approximately 164 lane miles (83%) of on-street bike lanes and designated on-street bike routes, and approximately 76 miles (100%) of hard-surface multi-use paths are plowed by Public Works and partners including Parks and Recreation, CU, HOAs, Boulder County and other private entities.

Current routes may be viewed online at <https://bouldercolorado.gov/public-works/snow-map>.

## **Anti-icing and Deicing materials**

Public Works uses existing and predicted weather conditions to determine what type of materials should be used and in what locations. For example, staff may pretreat streets before snowfall and this begins with a liquid anti-icing material, which can help reduce the buildup of snow and ice. However, this application is not done if the snowfall is preceded by rain which will wash away the de-icing materials. In some less severe storms, staff may only pretreat a subset of streets that tend to have more challenging conditions due to factors such as slope and shading.

Materials are used to minimize water quality impacts. Materials used include a liquid magnesium chloride solution, Meltdown Apex, which is costlier but less corrosive than traditional formulations of magnesium chloride; a granular material called Ice-Slicer RS, composed of complex chlorides that dissolve over time; and liquid salt brine.

Salt brine is a liquid solution containing water and salt (sodium chloride) that aides in reducing the adhesion of snow and ice on road/path surfaces. This is not intended to replace some of our other options, as each material has limits on effectiveness based upon storm conditions. During the first year of using salt brine we experienced the following benefits:

- Expansion of pre-treatment practices, allowing for increased time between the start of a storm and the accumulation of snow and ice accumulation on surfaces;
- Lessened water quality impacts, due to the dilution rate of the salt;
- Reduction in operational costs based upon less material costs and less quantities.

Staff continue consulting with many other Front Range communities to understand their practices and the benefits that they identify in using this material. Other agencies using this include Fort Collins, Longmont, Denver, Loveland and the Colorado Department of Transportation.

Residents will continue to see pre-treatment activities occur prior to storm events. Trucks will apply the materials prior to storm events to allow for the chlorides to bond to the road and path surfaces. Residents may also see stripes that appear along these areas as the materials dry.

## **Sweeping**

Street sweepers travel all snow routes to remove remaining residual de-icing material within 72 hours following a storm event as weather allows. Removal of this material, which may otherwise wash into storm drains and/or volatilize into the air, is critical for meeting stormwater and air quality regulations.

## **Sidewalk snow removal**

City contractors' hand-clear certain areas of the Public Works–maintained rights of way, including frequently used crosswalks and bus stops. Additionally, private contractors are responsible for snow removal through or around construction zones during snow events. Public Works and other city departments clear sidewalks adjacent to city-owned properties. Public Works coordinates with other partners responsible for clearing snow in certain areas of Boulder, including the University of Colorado (CU) and the Regional Transportation District (RTD). Section 8-2-3, B.R.C., 1981 requires that sidewalks adjacent to both residential and commercial properties be cleared of snow and ice no later than 24 hours after snowfall stops. Property owners, tenants and property managers can each be held responsible for failure to remove snow. Violation of the ordinance can result in a municipal court summons and fine (\$100 for first

offense) or abatement, in which the city hires a contractor to clear the sidewalk at the property owner's expense. Enforcement of the sidewalk snow removal ordinance is handled by the Code Enforcement Unit in the Boulder Police Department.

The National Weather Service website (<http://w1.weather.gov/data/obhistory/KBDU.html>) is the official resource for local weather conditions. The information is updated every 20 minutes. To learn when the "24 hours after snowfall stops" time period begins, community members can go to the website and look for the "Weather" column (with descriptions ranging from "Fair" to "Snow", etc.) and corresponding time, check Inquire Boulder or call the code enforcement line at 303-441-1875.

Code Enforcement may begin enforcing the snow removal ordinance 24 hours after the last mention of snow listed on the National Weather Service website. During consecutive storms, the original stop of snowfall will be enforced if no apparent effort is made to keep the sidewalks cleared for safe passage.

When a Code Enforcement Officer identifies a violation of the sidewalk snow removal ordinance, the officer attempts to make contact at that location to have the snow removed. A 24-hour notice of violation is posted on the front door of the property and mailed to the owner of record.

Only one notice will be issued to a property per snow season. After the expiration of the notice, an officer will reinspect the property to confirm compliance. Should a property remain in violation and for repeat offences, the address will be added to a list that is forwarded daily to a contractor for abatement of the hazardous condition. The property owner is then billed for all snow removal charges and assessed an administrative fee.

Officers use a daily enforcement GPS map that shows the snow enforcement history for every property in the city. This allows officers to quickly determine if a property should receive a notice or be abated for repeat offenses during the current snow season.

As they conduct parking patrols, parking service officers post courtesy notices to snow violations within their 11 assigned Neighborhood Parking Permit zones. These notices increase the ability of the city to contact properties that have not shoveled and encourage voluntary compliance for the remainder of the snow season.

The Code Enforcement Unit partners with the CU-Boulder Off-Campus Housing and Neighborhood Relations department, as well as other community and neighborhood groups for a "Make It Clear" educational campaign that focuses on:

- Increasing community awareness of each person's role in ensuring that sidewalks including adjacent curb ramps are cleared and safely passable after snow events.
- The requirements of the sidewalk snow and ice removal ordinance.
- The liability should a violation remain on private property.

Education materials are delivered door-to-door in areas that have a high volume of new residents each season and a history of repeat violations. Information is also made available on the city website and through outreach to local media sources. "Make it Clear" will also direct people to resources for snow removal assistance and to volunteer opportunities to assist others in the community.

Additional code enforcement information can be found on [www.inquireboulder.com](http://www.inquireboulder.com) under “Police Code Enforcement Unit,” which includes a link to the National Weather Service report for Boulder.

## **Communication**

The Public Works communication team works to ensure access to current information regarding snow and ice safety and operations. This includes proactive notification of residents, property owners, businesses, commuters and visitors regarding weather forecasts, what the city is doing to prepare and respond to the event and what people can do to stay safe during the event.

Communication staff uses channels including the Snow and Ice Control Program [website](#), social media, the community newsletter, Inside Boulder News, press releases and a utility bill insert.

## **ANALYSIS**

The 2018 Community Survey asked Boulder residents to evaluate city livability with respect to a variety of services. Responses were then compared to a national benchmark of responses to such questions. Of the respondents, 58 percent rated snow removal positively, compared to 54% in 2016. While this response remained similar to the national benchmark, it did indicate room for improvement.

Informed by this and other feedback and building on lessons learned during previous snow seasons, three overarching goals were identified in 2017 to continue to evolve the Snow and Ice Control Program. Those goals were: 1) Support safe travel for all modes during snow events; 2) Operate the program efficiently, effectively and safely, in alignment with the Transportation Master Plan and Boulder Police Department goals; 3) Provide informative and timely communication. Staff will continue to work toward these goals. The table below summarizes operational approaches to achieve each of the three program goals.

Goal	How we operationalize goals
<p>1. Support safe travel for all modes during snow events.</p>	<p>Snow removal is prioritized as follows:</p> <ol style="list-style-type: none"> <li>a. Clear primary routes connecting hospitals and urgent care facilities and supporting first responders; as well as primary off-street multi-use paths and critical on-street connections.</li> <li>b. Clear secondary routes allowing provision of essential services throughout the city, including access to schools and multimodal facilities (e.g., frequently used bike routes and designated bus stops) and certain residential areas with significant shade and steep slopes.</li> <li>c. As conditions warrant, clear additional designated conditional residential routes.</li> </ol>
<p>2. Operate the program efficiently, effectively and safely, in alignment with Transportation Master Plan goals.</p>	<ol style="list-style-type: none"> <li>a. Continue to make improvements to the training program and evaluate performance.</li> <li>b. Use equipment best suited to needs, and maintain equipment to facilitate safety and efficiency.</li> <li>c. Consider environmental impacts in selecting traction materials and in post-storm materials sweeping.</li> <li>d. Analyze data and review factors affecting operations such as route criticality, service levels, materials usage, route coverage and plowing practices, and evaluate and support implementation of any needed changes in practices and/or routes.</li> <li>e. Support enforcement of sidewalk snow removal regulations. (Section 8-2-13, B.R.C. 1981).</li> </ol>
<p>3. Provide informative and timely communication.</p>	<ol style="list-style-type: none"> <li>a. Promote a shared (internal and external) understanding of service levels.</li> <li>b. Provide timely updates to the community before, during and after a snow event.</li> </ol>

**During the 2019-2020 snow season:**

- Boulder set several records during the 2019-2020 season including:
  - Snowiest season for Boulder receiving 152” of snow fall putting it ahead of the 1908-1909 winter, which was the snowiest season;
  - The third largest snowfall in one day on November 26, 2019;
  - The “Snowiest city in America” for cities larger than 50,000 residents, including cities in New York and Alaska.
- Approximately \$1.47 million was spent on snow and ice control for Public Works for 2019/2020. This includes snow removal on roadways and most multimodal paths. This was more than that the expenditures in 2018-2019.
- The snowfall amount was 152” during the 2019-2020 season, 67.1” more inches than the previous 2018/2019 season.
- During 24 storm events, approximately 76 response shifts were called.
- About 3357 tons of granular ice slicer, 68,000 gallons of magnesium chloride, and 126,000 gallons of Salt Brine were used.

- About 44 percent of 328 lane miles were swept following storms (within 72 hours following a storm's end).
- Department staff fielded 872 inquiries for snow removal assistance requests/complaints. 56% of which occurred in a 12-day period from November 23<sup>rd</sup> through December 4<sup>th</sup>. 46% of the total season requests were for roadways that are not on a route.

### ***Changes Implemented Before and During the 2019-2020 Season***

- In 2017-2018, snow removal practices were changed along four of the primary routes. In past years, the practice of windrowing (moving snow to the center of the street in order to minimize impacts to the outside shoulders and bike lanes) required staff to move the snow multiple times to minimize melting and freezing of the windrows into the roadway. This practice also created a safety hazard for turning vehicles, including emergency responders. Eliminating windrowing improved efficient use of resources, reduced overall costs and minimizes hazards to turning and crossing traffic. Due to the larger storms in 2019-2020, our staff did have to utilize this method on a few roads due to lack of snow storage. Further refinement of snow placement on secondary and conditional routes also occurred and minor changes along these routes will be implemented and tested this upcoming season.
- After-event debriefs were held to discuss how snow removal went for each storm and improvements that could be made.
- The weather station that was installed in 2018, continues to be a tool for our efforts. This year we were able to run and review reports after each storm event to see how plowing/ice mitigation efforts impacted the amount of time the road traction was impacted. This allowed us to see what methods were helpful in lessening that time, as well as how temperatures, and traffic play into these efforts.
- Additional personnel were trained as alternate snow removal drivers, expanding the driver pool to aide in the lack of staffing resources. However, we experienced staffing shortages for a few events. This was caused by injury, length of snow shifts and other unforeseen issues.
- The snow removal staff training program was enhanced and continues to be refined.
- The after-storm street sweeping procedures remained the same, however, we trained additional staff on equipment, so we had a slight increase of the percentage of roads that are swept after each storm event. The biggest hurdle we endured for this program was the multiple storm events that came back-to-back, preventing us from getting on the roads long enough between storms.
- Stakeholder and partner debriefs were conducted to continue to increase operational efficiencies and program communication. The increased collaboration, for example, during major CU Events involving road closures were communicated and conducted in unison allowing for an improved experience for both staff and attendees.

## *Lessons Learned and Next Steps*

- During the snow event that occurred around Thanksgiving of 2019 we received a large amount of community feedback. This storm posed several challenges for many communities along the front range. For Boulder, it included the 3<sup>rd</sup> heaviest snowfall in a day since 1898. The storm event lasted multiple days; it was accompanied by almost 5 straight days of temperatures below freezing. The storm also started as rain which prevented pretreatment tools. Due to the rate of accumulation, temperatures, moisture content, and the overall accumulation our efforts were not to a level some community members found satisfactory. City staff did an after-event debrief internally and had a visit with council on December 3<sup>rd</sup>. At that time, we provided some of the costs along with areas we could explore for expansion of the snow and ice control program to become more resilient to the possibilities of more frequent intense storms. Some of the areas initially looked at included:
  - Additional equipment costs to increase efficiency on existing plow routes;
  - Temporary snow storage alternatives;
  - Expansion of contracted service areas such as additional bus stops; curb ramps and crossings;
  - Route expansion, including more residential roads or heavier frequency along off-street transportation corridors.

Each of these expansion areas was initially explored. Preliminary costs were being captured with the intent that we provide some options and resource needs for expanding the snow and ice control program for 2020-2021. The initial findings correlated to significant cost increase and could not be accomplished without additional resources. This work effort paused in March of 2020 due to the COVID-19 pandemic. Due to the fiscal impacts of the pandemic, the department had to make budget reductions from many areas. The Snow & Ice control budget did not have any cuts, but there is not currently additional funding available with the department fund. Currently, the annual budget for the 2020 fiscal year is 99% spent as of the end of August. Depending on the weather for the remainder of 2020, overages will be covered through other operating programs or from the Transportation Fund Balance. The information gathered has been retained and the department looks to start this expansion exploration as funding levels start to return to a more normal state.

- Near the end of the 2019-2020 snow season, the pandemic also impacted how city staff operate in a storm event. During a typical snow response, city crews begin each shift as a large group and conduct a briefing that reviews temperatures, storm predictions, road conditions, equipment status, material choices and route coverage. Due to the guidelines from our health experts, staff had to conduct these, and any shift hand-off information via text or over the radios from each truck. The city also staggered the reporting time for staff slightly to ensure that each staff member had time to disinfect the truck for the next person, change their boots and leave the building prior to the next reporting shift. This causes reduced plow time and some communication barriers between shifts. It is assumed that these procedures will continue into this next season.
- Also due to the pandemic, the city experienced staffing shortages due to quarantining protocols. This may continue to be a hurdle in the upcoming season.

- Another area of change due to the pandemic are servicing our bus stops due to service level changes with RTD and the HOP. Staff have reprioritized some of the bus stops that receive snow removal to be in line with current bus services. The stops not receiving service this upcoming season have low ridership and/or are not currently an active stop for RTD/HOP.
- Staff believes that increased communication with the community is always helpful. Staff will be updating the program webpage to enhance more communication. An updated snow map, traffic cameras, and other information will be released soon. Targeted outreach to businesses is planned in addition to general sidewalk snow removal education.
- Efforts are underway with other departments and community partners to promote volunteer programs that could aide in mobility along pedestrian and multimodal transportation corridors as well as to provide options for community members who may not be able to easily address their snow removal responsibilities.
- The sweeping program and metrics improved from the previous year but will continue to be analyzed to increase frequencies as staffing and funding allow to support compliance with air quality regulations.
- The customer inquiries, requests and feedback were categorized and mapped to identify trends. Some minor adjustments will be implemented and monitored to see if the operations can improve the issues. These adjustments include snow placement, route adjustment, resource deployment.
- Salt brine will continue to be used. We will continue to monitor and test out pretreatment opportunities throughout the system.

## **NEXT STEPS**

The city's official "snow season" begins mid-September, based on the possibility that snow may fall that early in the year. Staff will be engaged in training and final preparation this fall and respond to snow events as described above. Staff will continue to evaluate the program and identify opportunities for continuous improvement and better coordination with partners throughout the season.

For more information, please contact Callie Hayden, Transportation Maintenance Manager, at 303-413-7116.