

NO: R134

COUNCIL DATE: July 8, 2019

REGULAR COUNCIL

TO: **Mayor & Council**

DATE: **July 4, 2019**

FROM: **Acting General Manager, Engineering**

FILE: **5400-45**

SUBJECT: **Snow and Ice Operations - Winter Maintenance Preparedness and American Public Works Association Excellence in Snow and Ice Control Award**

RECOMMENDATION

The Engineering Department recommends that Council receive this report for information.

INTENT

The intent of this report is to provide information with respect to the City's past performance and annual preparedness for public street snow and ice control for the upcoming 2019/2020 winter season and to advise that Surrey has won the prestigious American Public Works Association Excellence in Snow and Ice Control Award.

BACKGROUND

The City's current Snow and Ice Control Policy, attached as Appendix "I", was established to reflect the realities of the intermittent icy road conditions and relatively short duration snow events typical for the southwest region of British Columbia during winter months. In the interest of public safety as a priority, the City's resources are mainly equipped to levels required to ensure the effective management of snow and ice accumulations on arterial and major collector roads, as well as on streets with steep hills.

The City's snow and ice control service continues to evolve towards improving effectiveness through the experience obtained from previous winter seasons, new technology and continuous improvement to ensure the City is providing a high level of service to its residents.

The City takes all the necessary precautions with preparation of all its fleet and resources, along with ongoing monitoring and immediate deployment of snow and ice control during snow and ice events.

DISCUSSION

Snow and Ice Maintenance Award

This year, the City won the prestigious American Public Works Association (“APWA”) Excellence in Snow and Ice Control Award. It has only been won by two other Canadian cities, Calgary and Winnipeg. Mayor and Council will be presented with this award in the Fall of this year.

The APWA Excellence in Snow and Ice Control Award was established to promote excellence in the management and administration of public works snow and ice operations. The award panel evaluated the application on the following criteria:

- Materials/Handling: The City’s team has three strategically located facilities that offer both brine and salt, with industry leading storage and containment;
- Equipment: The City’s diverse fleet clears 4,727 lane kilometres of street infrastructure that is professionally calibrated by the City’s garage team;
- Technical: The City has established state of the art technologies, such as the Road Weather Information Systems and the Intersection Camera Network, all functioning together to establish the strongest municipal snow fighting network in the Province;
- Training: The City’s clear commitment to staff training is evident from annual snow fighting training as well as attendance at Provincial and National conferences;
- Community Outreach: Innovations, such as school snowplow painting and winter maintenance social media campaigns, demonstrate industry leadership; and
- Environmental: Environmental stewardship is at the heart of the City’s winter maintenance. This is demonstrated from the City’s natural gas fleet to pre-wetting salt controls, balancing public safety and impacts to the ecosystem.

Summary of Actions Implemented in Past Few Years

The following summarizes the items that staff have been implemented subsequent to the 2016/2017 winter season, to improve upon the City’s snow and ice clearing services:

1. Acquired additional equipment and made operational improvements to enhance the City’s response to winter storms, as detailed in Appendix “II”;
2. Improved response time for snow and ice clearing services on Priority 3 routes (residential streets) in the event of a prolonged snow event;
3. Increased business property owner compliance to snow clearing, particularly in high pedestrian commercial areas across the City;
4. Increased Bylaw Enforcement activities during snow events for the purpose of increasing awareness of property owner responsibility and compliance;
5. In the interest of public safety:
 - a. Maintain key pedestrian linkages (i.e., sidewalks, pathways, etc.) located adjacent to urban forests or other City-owned lands where snow clearing is not provided; and
 - b. Clearing of certain sidewalks and walkways under special circumstances;
6. Improved service to City’s frontage sidewalks and parking lots at Civic facilities and parks; and
7. Update of the City’s Snow and Ice Control Policy – staff will be seeking Council’s approval later this year to adopt a new policy.

The following sections provide more detail on the City's practices and actions for snow and ice clearing services.

Level of Service

In contrast to some municipalities in the region, the City of Surrey has not experienced a shortage of road salt since increasing its storage capacity to 17,000 tonnes of road salt. The large storage capacity was specifically designed to safeguard the City against intermittent harsh winters. Under a separate Corporate Report to be presented at the July 8, 2019 Regular Council Meeting, staff are seeking Council approval to award the 2019/2020 contract for the supply and delivery of bulk winter road salt.

In advance of a forecasted snow and ice event, City crews apply a brine solution to the road. The brine applied to the road surface dries, with the residual salt taking effect immediately when snow begins to fall or when frost begins to form. This approach effectively reduces the accumulation of snow and ice on treated pavement surfaces. By using brine, crews have an increased window of time to effectively mobilize regular snow and ice services and provide enhanced coverage when heavier snow events occur. Brine is a more efficient way to apply salt, requiring only about 25% of the volume that would need to be applied if it was being applied by traditional salt spreaders. This process has proven to be very effective; however, brine application is dependent on dry weather conditions preceding a snow/cold weather event.

The City's Snow and Ice Control Policy provides services once snow and ice conditions exist, and results in a relatively high level of municipal snow and ice removal service in comparison to other Lower Mainland municipalities with respect to the types of roads that are included as priority roads (4,727 lane kilometres) during snow clearing operations.

Response to Arterial and Collector Streets (Priority 1 and 2 Routes)

The City's snow and ice maintenance initiatives are proven beneficial in terms of the City providing timely clearing of Priority 1 and 2 routes, ensuring the safe movement of traffic throughout Surrey. In this regard, City crews consistently provide thorough coverage of these routes in snow events and have received well-deserved praise from the public in addition to favourable news coverage. Attached as Appendix "III" is a map identifying Priority 1 and 2 routes.

Response to Local Residential Streets (Priority 3 Routes)

During the 2016/2017 winter season, the region experienced a very long cold snap that stemmed from early December 2016 to mid-January 2017. For the first 10 days of the cold snap (early to mid-December 2016), many of the City's local residential streets were not addressed. Within these 10 days, several freezing rain events occurred followed immediately by sub-freezing temperatures, which caused a build-up of ice on local roads making vehicular passage difficult for area residents.

As a result of this experience, Engineering crews now immediately address local residential streets once arterial and secondary streets (Priority 1 and 2 routes) are cleared and the snow event has subsided. This key adjustment in the City's operations has improved response time and service level to local residential streets.

Sidewalks and Parking Lots

As per Section 80 of the *Highway and Traffic By-law, 1997, No. 13007* (the “Bylaw”), snow and ice clearing of sidewalks is the responsibility of the adjacent property owner. This is a long-standing Bylaw requirement in Surrey which mirrors similar requirements in municipalities within the region and many cities across Canada. This Bylaw is necessary as it would not be possible for the City to clear all sidewalks in a timely manner.

Due to the long duration snow and ice events of the 2016/2017 winter season, the City received a significant increase in Service Requests from the public regarding snow and ice clearing on sidewalks. Consequently, various City departments have looked at operations and adjusted accordingly.

- Engineering Operations have purchased a multi-purpose piece of equipment capable of clearing snow on sidewalks and have piloted this equipment in the City Centre area along key sidewalk linkages during the 2018/2019 winter season;
- Parks Operations staff have reprioritized the clearing of snow from the sidewalks along the perimeter of those parks adjoining a school property; and
- The Bylaw Division have used Community Patrol Officers to educate business owners regarding their responsibility with respect to clearing snow from the sidewalks fronting their respective businesses.

Engineering Snow and Ice Maintenance Budget

The Engineering Department’s 2019 Winter Maintenance Budget is \$3.7 million. Expenditures to date are \$2.8 million. Given that this budget is based on a calendar year, it is too early to project year-end expenditures. If seasonal temperatures remain favourable for the balance of this winter season, in late 2019, the Engineering Department will likely fall within the allocated budget for 2019.

The winter maintenance budget also includes an Emergency Fund reserve of \$5 million that is drawn upon to supplement the regular snow clearing budget in years when above average snowfall occurs. In years when the annual snow clearing budget is not fully expended, the residual funds are deposited in the Emergency Fund until the Emergency Fund reaches \$7.5 million (double the yearly average).

Community and Recreation Services Ice Control and Snow Removal

The Community and Recreation Services (“CRS”) Division manages all snow and ice control at their 31 facilities 24 hours a day, seven days a week.

This service is carried out by private contractors. Since the extended cold weather in 2016/2017, CRS has implemented several changes to the Community and Recreation Services Plan. The details of the changes are attached as Appendix “IV”.

Potholes

Prolonged subfreezing temperatures typically result in an increased number of potholes forming. The City becomes aware of potholes by City crews and through customer Service Requests. Once a request is received, crews will repair the pothole within 24 hours.

In cold weather, crews use a pliable material called “Aquaphalt” as a temporary measure to repair the pothole. The material is placed in the pothole and immediately hardens, allowing traffic to drive over the pothole. A proper asphalt repair is subsequently made in the spring when the weather is warmer and drier.

On average, City crews repair approximately between 6,000-9,000 potholes each year, depending on the weather. During the previous significant winter season (2008/2009), crews repaired over 13,000 potholes. The City’s budget to repair potholes is approximately \$1.2 million per year.

Communication and Community Engagement

The Engineering Department’s communication and community engagement utilizes the Surrey website, social media, newspaper ads and handouts to provide important and helpful winter information to residents and businesses including topics such as:

- Real time messaging of snow/ice conditions;
- “Track My Plow” App;
- City’s policies with respect to snow and ice control;
- Businesses’ and residents’ responsibilities for snow and ice control;
- A list of resources that residents should keep on-hand to deal with winter conditions;
- A reminder to install snow tires in advance of the winter conditions;
- Other resources (contractors) that can be retained by residents on a direct pay-for-service basis for clearing snow;
- Encouraging public reporting of trouble spots through the “My Surrey App”; and
- School Educational Programs & Snow Plough Painting Contest.

SUSTAINABILITY CONSIDERATIONS

The City’s winter snow and ice clearing services support the objectives of the City’s Sustainability Charter 2.0. In particular, these services relate to the Sustainability Charter 2.0 theme of Public Safety. Specifically, these services support the following Desired Outcomes (“DO”) and Strategic Direction (“SD”):

- Transportation Safety DO9: Transportation network supports and provides safe mobility for all ages and abilities;
- Transportation Safety DO10: Surrey is part of a coordinated effort to reduce the risk of harm for all road users, with attention to those who are most vulnerable, including pedestrians and cyclists; and
- Transportation Safety SD8: Ensure all public infrastructure is built and maintained to ensure community safety and well-being for all ages and abilities.

CONCLUSION

The City is well positioned to respond to snow and ice events this coming winter. The City has proven it has the appropriate level of equipment, manpower and material to ensure that snow and ice events are effectively managed on priority routes.

As in previous years, staff are ensuring that the public is notified through regular media releases and website information about the City's policies and procedures related to snow and ice control, resident responsibilities related to snow removal and ice control, and how residents can prepare for winter to minimize its impacts on their lives.

Furthermore, staff will provide Council with further updates of snow and ice operations as the 2019/2020 winter season approaches and as necessary throughout the winter.

Jaime Boan, P.Eng.
Acting General Manager, Engineering

JB/TA/MB/cc

Appendix "I" - City of Surrey Snow and Ice Control Policy

Appendix "II" - City of Surrey Winter Maintenance Quick Facts

Appendix "III" - Priority 1 and 2 Snow Removal Routes Map

Appendix "IV" - Community and Recreation Services Ice Control and Snow Removal Update



CITY POLICY

No. H-22

REFERENCE:

REGULAR COUNCIL MINUTES
28 JANUARY 1991
PAGE 5

APPROVED BY:

CITY COUNCIL

DATE: 10 MARCH 1997 (RES.R97-622)**HISTORY:**

28 JANUARY 1991
14 JANUARY
1991 9
JANUARY
1978

TITLE: SNOW & ICE CONTROL

1. Sanding/Salting and Snow plowing operations shall be conducted according to the following priorities:
 - a) First Priority: Arterial roads, major collector roads, bus routes and hilly areas (regardless of road classification) are given first priority. Sanding and plowing are carried out, around the clock, as long as poor conditions exist.
 - b) Second Priority: Secondary through roads in residential areas. These local roads exist between the arterial or major collector road grid. They are typically over 200 meters in length and connect local traffic with either an arterial or major collector roadway. All secondary priority work is performed during normal work hours only.
 - c) Third Priority: All remaining residential roads. Third priority routes will be only done as directed by the General Manger of Engineering or his delegate. The General Manager of Engineering shall inform Council of the decision to address third priority routes. These areas will be dealt with in a systematic manner starting with the more significant roads, hill areas, specific problem locations (as identified by the public and Area Managers). All third priority work is performed during normal work hours.
2. First priority routes are maintained until the conditions are under control; only then are resources redirected onto second priority routes. Surfaces shall be maintained as bare as possible through continued use of assigned personnel and equipment.
3. Once conditions are under control on secondary routes resources can be directed to third priority routes.

4. Third priority routes are only addressed under the direction of the General Manager of Engineering or his delegate.
5. As soon as conditions deteriorate on any of the previous priority routes, resources are moved back to those routes.
6. All sanding/salting and plowing operations with the exception of first priority routes are to be completed within normal working hours unless directed by the General Manager (or designate) of Engineering. First priority routes are addressed around the clock.
7. Snow removal and snow plowing occurs when the snow depth exceeds 10 centimeters (4 inches).
8. Snow removal from sidewalks is the responsibility of the adjacent property owners.

APPENDIX “II”

City of Surrey Winter Maintenance Quick Facts

Equipment:

The City’s Snow and Ice Clearing equipment has over doubled since the 2008/2009 Winter.

<u>Equipment Type:</u>	Number of Units		
	2008/2009	2016/2017	2018/2019
	<u>Winter</u>	<u>Winter</u>	<u>Winter</u>
Tandem Axle Dump Trucks:	20	24	23
Crane Trucks:	1	1	0
One-Ton Trucks:	9	22	28
Graders:	3	5	4
Brining Units:	0	10	16
Sidewalk Plows	0	0	2
Total Snow Clearing Equipment:	33	62	73

One new CNG Tandem Axle Dump Trucks will be added to the City’s fleet, replacing an existing unit, and will be in operation for the 2020/2021 winter season, if approved by Council under a separate corporate report.

Total Kilometers of Road in Surrey:

2017	2019
2,031 km	2,364 km

Surrey Snow & Ice Priority and “Lane” Kilometres:

	2017	2019
x Priority 1 lane km:	1,500	1,359
x Priority 2 lane km:	1,200	1,368
x Priority 3 lane km:	<u>1,800</u>	<u>2,000</u>
x Total lane km:	4,500	4,727

Winter Maintenance Budget:

2017: \$3.6 million – includes plowing, salt spreading, anti-icing and salt supply
 2019: \$3.7– includes plowing, salt spreading, anti-icing and salt supply

Road Salt:

- City of Surrey Road Salt Storage Facility Capacity: 17,000 metric tonnes
- Road salt use in a typical winter: 6,000 metric tonnes
- Road salt use this 2018/19 winter: 8,000 metric tonnes

Improvements to Snow and Ice Operations since 2008/2009:

1. **Road Salt Storage Facility:** Over the course of a typical winter season, the City uses approximately 6,000 tonnes of road salt. During the 2008/2009 winter season, the City used over 14,000 tonnes of road salt. The City had struggled (then) to keep up to salt demands due to the lack of local supply combined with the City's previous salt storage capacity of 4,000 tonnes. As a result, the City's new salt storage facility, constructed in 2010, contains a storage capacity of 17,000 tonnes to safeguard the City against intermittent harsh winters.

2. **Road Brining Operations:** Salt brining allows crews to apply a brine/salt solution to the surface of major roads in advance of forecasted snow and ice conditions. The brine application dries on the road, with the residual salt taking effect immediately when snow begins to fall or when freezing temperatures occur (i.e., activated by the moisture). This approach reduces the accumulation of snow and ice on treated pavement surfaces, which increases the window of time for the City's crews to effectively mobilize snow and ice services when snow events occur.

3. **Salt Spreader and Application System:** The City's new salt spreaders are technologically advanced. Based on the spreader's GPS position on the route, the spreading is automatically controlled, which ensures 100% consistent material spreading every time.

In addition to this, the City's new salt spreader technology includes pre-wetting capabilities. Pre-wetting is the process of spraying road salt with a brine solution before spreading the salt on the roadway. When temperatures drop below freezing there is no moisture on the road, and salt alone is therefore less effective. Pre-wetting the salt ensures that there will be enough moisture to facilitate the melting process. Pre-wetted salt works faster and at a lower temperature than dry salt alone and with less waste, thereby shortening the time required for salt to activate its snow melting properties.

4. **Automatic Vehicle Location ("AVL") System:** The new salting equipment has the ability to monitor the period and quantity of salt placed. This, combined with the GPS information, reduces waste by efficient deployment of vehicles and placement of salt/brine.

5. **GPS Turn-by-Turn Route Assistance:** Over the winter of 2018/2019, the City's fleet was equipped with a pilot GPS Turn-by Turn Route assistance technology. The solution is unique by locking drivers to a specified route. This forces a driver to complete the route in its pre-defined, sequential order. Should the driver require a route change or is requested to pick up another, all routes are downloaded to the device for easy access. When a driver accidentally deviates off the route, this solution uses an algorithm that has the drivers re-routed back to the point of deviation, ensuring completed routes every time.

6. **Sidewalk Multi-Purpose Tractor:** In the winter of 2018/2019, the Streets Section piloted a sidewalk multi-purpose tractor to clear key pedestrian sidewalk linkages in the City Centre. The pilot program was found to be very successful as the multi-purpose equipment exhibited the ability to not only remove snow and apply salt to sidewalks, but also sweep and pressure wash various areas at other times of the year.

7. **Intersection Cameras:** By accessing the City's network of street intersection cameras, the City's Central Dispatch staff, situated within the Operations Centre, can instantaneously observe (live) snow impacts across the City during a snowfall event. Rather than simply remain on the same snowplow route for the duration of a shift, the snow maintenance fleet are dispatched to areas that may require more attention due to increased snowfall, i.e., due to high elevations, dropping temperatures, etc. The use of intersection cameras for this purpose has been one of the City's most significant efficiency increases.

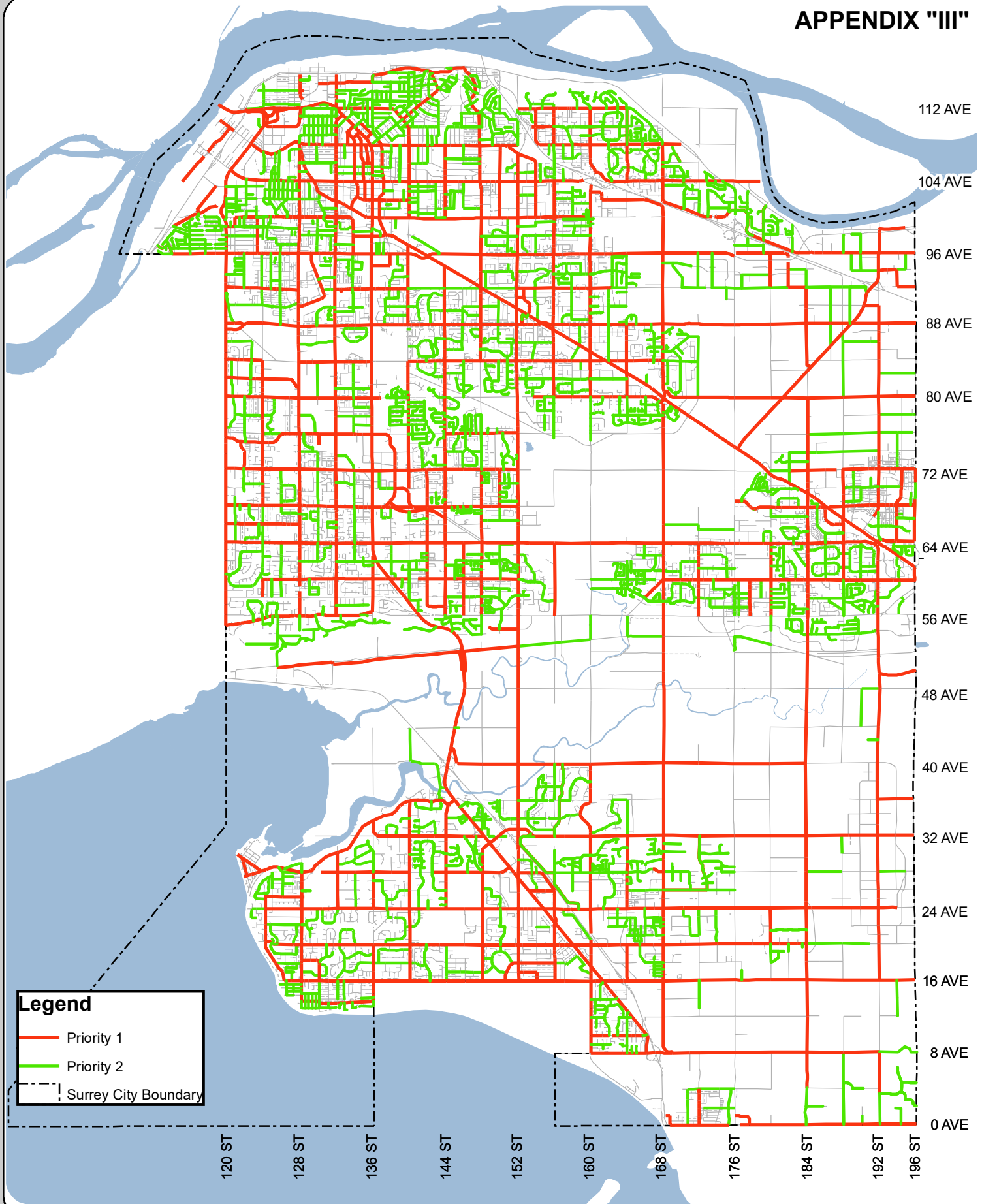
8. **Customer Communication Enhancements:** Over the past eight years, the City has introduced several improvements in the manner to which residents can communicate with staff, including access to submitting service requests 24/7 via the use of the "My Surrey App" and City website, as well as posting concerns via the City's social media channels. Conversely, the use of social media and the City website by staff to push out time sensitive information, both during and after regular business hours, has helped to keep the public informed in a timely manner.

New technology has advanced in the area of Road Weather Information Systems ("RWIS"). This technology monitors variables at the street level, for the below parameters:

- Ambient air temperature;
- Road Surface temperature;
- Road Friction Coefficient;
- Percentage of Salinity on the roadway; and
- Relative humidity.

Strategically located RWIS stations throughout the City's differing microclimates allow staff to access information and dispatch resources according to specific conditions. This improves efficiency and levels of service to the City's communities.

9. **South Operations Centre:** The Streets Section of the Operations Division is divided into three distinct geographical locations to provide appropriate and timely coverage throughout Surrey for road and winter maintenance services. In late 2017, the City re-established the South Operations Centre to efficiently service the community and decrease response time during winter events.



Legend

- Priority 1
- Priority 2
- Surrey City Boundary

Priority 1 and Priority 2 Snow Removal Routes

0 0.5 1 2 Kilometers
SCALE: 1:110,000



APPENDIX “IV”

Community & Recreation Services Ice Control and Snow Removal Update

Since the extended cold weather in 2016/2017, the Community and Recreation Services Ice Control and Snow Removal Plan has been updated in the following ways:

1. Decentralization of the Community & Recreation Services Plan.
In 2017, the plan included several Divisions such as Civic Facilities, Libraries, Bylaws, RCMP, the Animal Shelter and Arts and Heritage. In 2018, the plan was decentralized and now focuses primarily on the CRS facilities. The other Divisions operate independently of Community & Recreation Services, many with different contractors than Community and Recreation Services. This not only reduces the burden on one contractor, it also provides additional resources available to the City of Surrey during periods of extreme inclement weather.

2. In 2018 a complete review of the Community & Recreation Services Plan was completed. As a result, the following revisions were implemented:
 - Additional training for staff;
 - Updating and reformatting of all the facility maps;
 - The addition of sidewalk clearing as per The City of Surrey Bylaw 13007;
 - The implementation of inclement weather signage on the main access routes to the facilities;
 - Increased coordination with the Parks Division.

In addition to the above noted items, staff are investigating opportunities to further enhance the coordination of the plan for the upcoming season. The City of Surrey Collaboration Sites will provide information to all CRS staff about daily activation plans, current conditions and include near real time updates.

Staff continue to work with all stakeholders to ensure that the Community and Recreation Services Ice Control and Snow Removal Plan provides safe access and egress of staff and patrons during inclement weather.