Winter Operations Plan

The City of Barrie

Document History

Revision Number	Date	By	Comment
1	November 2016	RPF	Winter Operations Plan
2	January 22, 2018	KL	Update to winter control routes, equipment lists and calibration dates; Update to 5-year winter material usage; Update to Plan Improvement; Update to solid material application;
3	January 18, 2019	KL	Update to winter control routes, equipment lists and calibration dates; Update to 5-year winter material usage; Update to Plan Improvement; Update to solid material application; Updates to reflect the regulation changes of O. Reg. 239/02: Minimum Maintenance Standards for Municipal Highways
4	January 24, 2020	JSD	Update to winter control routes, equipment lists and calibration dates, and to 5-year winter material usage; general revisions
5	March 24, 2021	JSD	Update to winter control routes, equipment lists and calibration dates; general revisions
6	January 14, 2022	KLl	Added procedure for declaring a significant weather event to reflect O. Reg 239/02. Update to winter control equipment lists and calibration dates
7	March 02, 2022	KLl	Update to winter control routes, equipment lists and general revisions
8	February 08, 2024	SK	Update to winter control routes, equipment lists and general revisions

Table of Contents

1. Definitions

Anti-icing: means the application of liquid de-icers directly to the road surface in advance of a winter event.

Average Daily Traffic: is the volume of vehicles counted over a given time period which is greater than one day but less than one year.

De-icing: means the application of solids, liquids, pre-treated material to the road surface after the on-set of the winter event.

Highway: includes a common and public highway, street, avenue, parkway, driveway, square, place, bridge, viaduct or trestle, any part of which is intended for or used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof.

Paved Road: is a road with an asphalt surface, concrete surface, composite pavement, or portland cement.

Pre-treat: means the application of liquids (calcium chloride, sodium chloride, etc) to dry sand or salt prior to being loaded for storage or applied to the road surface.

Pre-wetting: means the application of liquids (calcium chloride, sodium chloride, etc) at the spinner of the truck just prior to application to the road surface.

Surface Treated Road: is road with bituminous surface treatment comprised of one or two applications of asphalt emulsion and stone chips over a gravel road.

Unpaved Road: is a road with a gravel, stone or other loose travelling surface.

Winter Event: is a weather condition affecting roads such as snowfall, wind blown snow, freezing rain, frost, black ice, etc to which a winter event response is required.

Winter Event Response: is a series of winter control activities performed in response to a winter event.

- **Continuous Winter Event Response**: is a response to a winter event with full deployment of manpower and equipment that plow/salt/sand the entire system.

- **Spot Winter Event Response**: is a response to a winter event with only a part deployment of manpower and equipment or with full deployment to only part of the system.

Winter Event Response Hours: are the total number of person-hours per year (plowing, salting/sanding, winging back, etc.) to respond to winter events.

Bicycle facility: means the on-road and in-boulevard cycling facilities listed in Book 18 of the Ontario Traffic Manual;

Bicycle Lane: means a portion of a roadway that has been designated by pavement markings or signage for the preferential or exclusive use of cyclists, or a portion of a roadway that has been designated for the exclusive use of cyclists by signage and a physical or marked buffer;

Significant Weather Event: means an approaching or occurring weather hazard with the potential to pose a significant danger to users of the highways within a municipality.

Weather Hazard: means the weather hazards determined by Environment Canada as meeting the criteria for the issuance of an alert under its Public Weather Alerting Program. O. Reg. 239/02, s. 1 (1); O. Reg. 23/10, s. 1 (1); O. Reg. 47/13, s. 1; O. Reg. 366/18, s. 1 (1, 2).

2. Purpose

This Winter Operations Plan sets out a policy and procedural framework for ensuring that the City of Barrie continuously improves on the effective delivery of winter maintenance services and the management of road salt used in winter maintenance operations, as outlined in Environment Canada's Code of Practice for the Environmental Management of Road Salts.

The plan is meant to be dynamic, to allow the City to evaluate and phase-in any changes, new approaches, and technologies in winter maintenance activities in a fiscally sound manner. At the same time, any modifications to municipal winter maintenance activities must ensure that roadway safety is not compromised.

3. Objective

The City of Barrie is committed to improving winter maintenance operations while continuing to ensure public safety. The City of Barrie will optimize the use of winter maintenance materials containing chlorides on all municipal roads, sidewalks, and parking lots while striving to minimize negative impacts to the environment. City of Barrie operations staff will strive, insofar as reasonably practicable, to provide safe winter road conditions for vehicular and pedestrian traffic as set out in the level of service policies and within the resources established by the Council of the City of Barrie.

4. Policy Statement

The City of Barrie will provide efficient and cost-effective winter maintenance to ensure, insofar as reasonably practicable, the safety of users of the municipal transportation network in keeping with applicable provincial legislation and accepted standards while controlling the use of road salt in an environmentally responsible manner, and minimizing the negative environmental effects of handling, storage and application of salt on the environment. These commitments will be met by:

- Adhering to the procedures contained within the Winter Operations Plan;
- Reviewing and upgrading the Winter Operations Plan on an annual basis to incorporate new technologies and new developments;
- Committing to ongoing winter maintenance staff training and education; and
- Monitoring, on an annual basis, the present conditions of the winter maintenance program, as well as the effectiveness of the Winter Operations Plan.

5. Winter Maintenance Program

To achieve they City's level of service and enable the safe use of the City's roads, sidewalks, and other transportation infrastructure, the Operations Department of the City of Barrie undertakes the following major activities as part of its winter maintenance program:

- snow plowing
- salt / sand application
- anti-icing
- snow removal
- snow storage
- salt, sand, and anti-icing liquid storage

5.1. The System Being Maintained

The City of Barrie is responsible for winter maintenance on the following infrastructure:

Roads: 1595.60 lane km

Sidewalks: 626.90 km

For the purposes of this winter operations plan, the highways under the jurisdiction of The City of Barrie have been classified (Class 1, 2, 3, 4, 5 and 6) as per the following table which is based on the Classification of Highways table included in O.Reg. 366/18.

Average Daily Traffic (number of motor vehicles)	Posted or Statutory Speed Limit (kilometres per hour)						
	91 - 100	81 - 90	71 - 80	61 - 70	51 - 60	41 - 50	1 - 40
53,000 or more	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	5
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

Note: All Class 6 roadways are treated as Class 5 roadways in Barrie.

5.2. Level of Service

The City of Barrie provides the following level of service during the winter maintenance season to respond to winter weather events.

5.2.1. Patrolling

(1) The standard for the frequency of patrolling of highways to check for conditions described in this Regulation is set out in the Table to this section. O. Reg. 23/10, s. 3 (1); O. Reg. 366/18, s. 3 (2).

(2) If it is determined by the municipality that the weather monitoring referred to in section indicates that there is a substantial probability of snow accumulation on roadways, ice formation on roadways or icy roadways, the standard for patrolling highways is, in addition to that set out in subsection (1), to patrol highways that the municipality selects as representative of its highways, at intervals deemed necessary by the municipality, to check for such conditions. O. Reg. 47/13, s. 2; O. Reg. 366/18, s. 3

(3) Patrolling a highway consists of observing the highway, either by driving on or by electronically monitoring the highway, and may be performed by persons responsible for patrolling highways or by persons responsible for or performing highway maintenance activities. O. Reg. 23/10, s. 3 (1).

(4) This section does not apply in respect of the conditions described in section 10, subsections 11 (0.1) and 12 (1) and section 16.1, 16.2, 16.3 or 16.4. O. Reg. 23/10, s. 3 (1); O. Reg. 366/18, s. 3 (3).

PATROLLING

Class of Highway	Patrolling Frequency
1	3 times every 7 days
2	2 times every 7 days
3	once every 7 days
4	once every 14 days
5	once every 30 days

O. Reg. 239/02, s. 3, Table; O. Reg. 23/10, s. 3 (2).

5.2.2. Procedure for Declaring a Significant Weather Event

(1) Trigger of a Significant Weather Event

The procedure for declaring a significant weather event (SWE) is to be followed whenever a SWE is occurring or is about to occur. The following criteria should be considered when deciding to declare a SWE:

- Environment Canada’s weather hazard warnings
- Road Weather Information System weather hazard warnings

It is prudent It is prudent to consider other weather forecast tools, including but not limited to, snow/ice fall intensity, sun light, temperature, dew point, time of day, etc. and actual site conditions. If there is any uncertainty as to whether a weather event is significant, treat it as significant.

The reasons for the declaration shall be documented and attached the Winter Control Daily Report.

If Roads Operations determines that the declaration of a SWE may occur through review of weather forecasts, and where possible, Roads Operations will notify Communications of this possibility to assist with advanced planning for the declaration.

The same steps in this procedure are to be used to declare the end of the SWE.

(2) Flowchart

a. Road Patrol Persons / On-Call Roads Operations Foreperson / Roads Operations Forepersons / Roads Operations Supervisor / Senior Manager – Roads and Fleet shall discuss the state of the weather event with each other and come to a consensus.
b. The Director of Operations, or designate, will authorize the declaration of the significant weather event. If the Director of Operations or designate is unavailable, the On-Call Roads Operations Foreperson shall make the final decision whether to declare a SWE and shall follow the declaration procedure described below.
c. The On-Call Roads Operations Foreperson shall also declare an end to the SWE at its conclusion through the same notification procedure below.

(3) Declaration Procedure for Significant Weather Events

The City's Standby Roads Operations Foreperson must immediately notify the following individuals of the SWE:

(a) Email the following:

1. Roads Operations Supervisor
2. Senior Manager of Roads & Fleet
3. Director of Operations
4. Executive Director of Access Barrie
5. Manager of Communications
6. Senior Communications Advisor
7. Service Barrie
8. General Manager of Infrastructure and Growth Management

(b) What to include in the Declaration Email:

- Type of SWE (i.e., snow, ice, or both).
- Accumulation of snow event and duration of storm (if any).
- Accumulation of rain / ice and duration of storm (if any).
- Copy of the most current weather forecast (7-Day RWIS Forecast).
- Copy of the most current Environment Canada Weather Warning (if any).
- Status summary of General Callout.
- What resources are required (if any) to mitigate the SWE; and
- Any other pertinent information.

(c) Public Communication

1. The Communications Team will notify the public and local media through a press release, posting on the City of Barrie website, and social media posts for both the declaration and the end of the declaration.

City of Barrie staff are not authorized to speak to the media without prior approval from Corporate Communications. Request for media interviews or communications must be directed to Communications.

5.2.3. Weather monitoring

(1) From October 1 to April 30, the Standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once every shift or three times per calendar day, whichever is more frequent, at intervals determined by the municipality. O. Reg. 47/13, s. 3, O. Reg. 366/18, s. 4.

(2) From May 1 to September 30, the Standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once per calendar day. O. Reg. 47/13, s. 3, O. Reg. 366/18, s. 4.

5.2.4. Snow accumulation on roadways

(1) The Standard for addressing snow accumulation is,

(a) after becoming aware of the fact that the snow accumulation on a roadway is greater than the depth set out in the Table to this section, to deploy resources as soon as practicable to address the snow accumulation; and

(b) after the snow accumulation has ended, to address the snow accumulation so as to reduce the snow to a depth less than or equal to the depth set out in the Table within the time set out in the Table,

(i) to provide a minimum lane width of the lesser of three metres for each lane or the actual lane width, or

(ii) on a Class 4 or Class 5 highway with two lanes, to provide a total width of at least five metres. O. Reg. 47/13, s. 4, O. Reg. 366/18, s. 5 (1).

(2) If the depth of snow accumulation on a roadway is less than or equal to the depth set out in the Table to this section, the roadway is deemed to be in a state of repair with respect to snow accumulation. O. Reg. 47/13, s. 4.

(3) For the purposes of this section, the depth of snow accumulation on a roadway may be determined in accordance with subsection (4) by a municipal employee, agent or contractor, whose duties or responsibilities include one or more of the following:

1. Patrolling highways.

2. Performing highway maintenance activities.

3. Supervising staff who perform activities described in paragraph 1 or 2. . O. Reg. 47/13, s. 4; O. Reg. 366/18, s. 5 (2).

(4) The depth of snow accumulation on a roadway may be determined by,

(a) performing an actual measurement;

(b) monitoring the weather; or

(c) performing a visual estimate. O. Reg. 47/13, s. 4; O. Reg. 366/18, s. 5 (3).

(5) For the purposes of this section, addressing snow accumulation on a roadway includes, but is not limited to,

(a) plowing the roadway;

(b) salting the roadway;

(c) applying abrasive materials to the roadway;

(d) any combination of the methods described in clauses (a) and (d). O. Reg. 366/18, s.15.

(6) This section does not apply to that portion of the roadway:

(a) designated for parking;

(b) consisting of a bicycle lane or other bicycle facility; or

(c) used by a municipality for snow storage. O. Reg. 366/18, s. 5 (4).

SNOW ACCUMULATION - ROADWAYS

Class of Highway	Depth	Time
1	2.5 cm	4 hours
2	5 cm	6 hours
3	8 cm	12 hours
4	8 cm	16 hours
5	10 cm	24 hours

O. Reg. 47/13, s. 4.

5.2.5. Snow accumulation on roadways, significant weather event

(1) If a municipality declares a significant weather event relating to snow accumulation, the standard for addressing snow accumulation on roadways until the declaration of the end of the significant weather event is,

(a) to monitor the weather in accordance with section 3.1; and

(b) if deemed practicable by the municipality, to deploy resources to address snow accumulation on roadways, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 7.

(2) If the municipality complies with subsection (1), all roadways within the municipality are deemed to be in a state of repair with respect to snow accumulation until the applicable time in the Table to section 4 expires following the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 7.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

(a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and

(b) address snow accumulation on roadways in accordance with section 4. O. Reg. 366/18, s.7.

5.2.6. Snow accumulation, bicycle lanes

(1) Subject to section 4.3, the standard for addressing snow accumulation on bicycle lanes is,

(a) after becoming aware of the fact that the snow accumulation on a bicycle lane is greater than the depth set out in the Table to this section, to deploy resources as soon as practicable to address the snow accumulation; and

(b) after the snow accumulation has ended, to address the snow accumulation so as to reduce the snow to a depth less than or equal to the depth set out in the Table to this section to provide a minimum bicycle lane width of the lesser of 1 metre or the actual bicycle lane width. O. Reg. 366/18, s. 7.

(2) If the depth of snow accumulation on a bicycle lane is less than or equal to the depth set out in the Table to this section, the bicycle lane is deemed to be in a state of repair in respect of snow accumulation. O. Reg. 366/18, s. 7.

(3) For the purposes of this section, the depth of snow accumulation on a bicycle lane and, if applicable, lane width under clause (1) (b), may be determined in the same manner as set out in subsection 4 (4) and by the persons mentioned in subsection 4 (3), with necessary modifications. O. Reg. 366/18, s. 7.

(4) For the purposes of this section, addressing snow accumulation on a bicycle lane includes,

(a) plowing the bicycle lane;

(b) salting the bicycle lane;

(c) applying abrasive materials to the bicycle lane;

(d) applying other chemical or organic agents to the bicycle lane;

(e) sweeping the bicycle lane; or

(f) any combination of the methods described in clauses (a) to (e). O. Reg. 366/18, s. 7.

SNOW ACCUMULATION – BICYLE LANES

Class of Highway	Depth	Time
1	2.5 cm	8 hours
2	5 cm	12 hours
3	8 cm	24 hours
4	8 cm	24 hours
5	10 cm	24 hours

O. Reg. 366/18, s. 7.

5.2.7. Snow accumulation on bicycle lanes, significant weather event

(1) If a municipality declares a significant weather event relating to snow accumulation, the standard for addressing snow accumulation on bicycle lanes until the declaration of the end of the significant weather event is,

(a) to monitor the weather in accordance with section 3.1; and

(b) if deemed practicable by the municipality, to deploy resources to address snow accumulation on bicycle lanes, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 7.

(2) If the municipality complies with subsection (1), all bicycle lanes within the municipality are deemed to be in a state of repair with respect to snow accumulation until the applicable time in the Table to section 4.2 expires following the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 7.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

(a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and

(b) address snow accumulation on bicycle lanes in accordance with section 4.2. O. Reg. 366/18, s. 7.

5.2.8. Ice formation on roadways and icy roadways

(1) The Standard for the prevention of ice formation on roadways is doing the following in the 24-hour period preceding an alleged formation of ice on a roadway:

1. Monitor the weather in accordance with section 3.1.

2. Patrol in accordance with section 3.

3. If the municipality determines, as a result of its activities under paragraph 1 or 2, that there is a substantial probability of ice forming on a roadway, treat the roadway to prevent ice formation within the time set out in the Table to this section, starting from the time that the municipality determines is the appropriate time to deploy resources for that purpose. O. Reg. 366/18, s. 8.

(2) If the municipality meets the standard set out in subsection (1) and, despite such compliance, ice forms on a roadway, the roadway is deemed to be in a state of repair until the applicable time set out in Table 2 to this section expires after the municipality becomes aware of the fact that the roadway is icy. O. Reg. 366/18, s. 8.

(3) Subject to section 5.1, the standard for treating icy roadways is to treat the icy roadway within the time set out in Table 2 to this section, and an icy roadway is deemed to be in a state of repair until the applicable time set out in Table 2 to this section expires after the municipality becomes aware of the fact that a roadway is icy. O. Reg. 366/18, s. 8.

(4) For the purposes of this section, treating a roadway means applying material to the roadway, including but not limited to, salt, sand or any combination of salt and sand. O. Reg. 366/18, s. 8.

(5) For greater certainty, this section applies in respect of ice formation on bicycle lanes on a roadway, but does not apply to other types of bicycle facilities. O. Reg. 366/18, s. 8.

ICE FORMATION PREVENTION

Class of Highway	Time
1	6 hours
2	8 hours
3	16 hours
4	24 hours
5	24 hours

O. Reg. 366/18, s. 8.

TREATMENT OF ICY ROADWAYS

Class of Highway	Time
1	3 hours
2	4 hours
3	8 hours
4	12 hours
5	16 hours

O. Reg. 366/18, s. 8.

5.2.9. Snow accumulation on sidewalks

(1) Subject to section 16.4, the standard for addressing snow accumulation on a sidewalk after the snow accumulation has ended is,

a) to reduce the snow to a depth less than or equal to 8 centimetres within 48 hours; and

b) to provide a minimum sidewalk width of 1 metre. O. Reg. 366/18, s. 15.

(2) If the depth of snow accumulation on a sidewalk is less than or equal to 8 centimetres, the sidewalk is deemed to be in a state of repair in respect of snow accumulation. O. Reg. 366/18, s. 15.

(3) If the depth of snow accumulation on a sidewalk exceeds 8 centimetres while the snow continues to accumulate, the sidewalk is deemed to be in a state of repair with respect to snow accumulation, until 48 hours after the snow accumulation ends. O. Reg. 366/18, s. 15.

(4) For the purposes of this section, the depth of snow accumulation on a sidewalk may be determined in the same manner as set out in subsection 4 (4) and by the persons mentioned in subsection 4 (3) with necessary modifications. O. Reg. 366/18, s. 15.

(5) For the purposes of this section, addressing snow accumulation on a sidewalk includes,

(a) plowing the sidewalk;

(b) salting the sidewalk;

(c) applying abrasive materials to the sidewalk;

(d) applying other chemical or organic agents to the sidewalk; or

(e) any combination of the methods described in clauses (a) to (d). O. Reg. 366/18, s.15.

5.2.10. Snow accumulation on sidewalks, significant weather event

(1) If a municipality declares a significant weather event relating to snow accumulation, the standard for addressing snow accumulation on sidewalks until the declaration of the end of the significant weather event is,

(a) to monitor the weather in accordance with section 3.1; and

(b) if deemed practicable by the municipality, to deploy resources to address snow accumulation on sidewalks starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 15.

(2) If the municipality complies with subsection (1), all sidewalks within the municipality are deemed to be in a state of repair with respect to any snow present until 48 hours following the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 15.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

(a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and

(b) address snow accumulation on sidewalks in accordance with section 16.3. O. Reg. 366/18, s. 15.

5.2.11. Ice formation on sidewalks and icy sidewalks

(1) Subject to section 16.6, the standard for the prevention of ice formation on sidewalks is to,

(a) monitor the weather in accordance with section 3.1 in the 24-hour period preceding an alleged formation of ice on a sidewalk; and

(b) treat the sidewalk if practicable to prevent ice formation or improve traction within 48 hours if the municipality determines that there is a substantial probability of ice forming

on a sidewalk, starting from the time that the municipality determines is the appropriate time to deploy resources for that purpose. O. Reg. 366/18, s. 15.

(2) If ice forms on a sidewalk even though the municipality meets the standard set out in subsection (1), the sidewalk is deemed to be in a state of repair in respect of ice until 48 hours after the municipality first becomes aware of the fact that the sidewalk is icy. O. Reg. 366/18, s.15.

(3) The standard for treating icy sidewalks after the municipality becomes aware of the fact that a sidewalk is icy is to treat the icy sidewalk within 48 hours, and an icy sidewalk is deemed to be in a state of repair for 48 hours after it has been treated. O. Reg. 366/18, s. 15.

(4) For the purposes of this section, treating a sidewalk means applying materials including salt, sand or any combination of salt and sand to the sidewalk. O. Reg. 366/18, s. 15.

5.2.12. Icy sidewalks, significant weather event

(1) If a municipality declares a significant weather event relating to ice, the standard for addressing ice formation or ice on sidewalks until the declaration of the end of the significant weather event is,

(a) to monitor the weather in accordance with section 3.1; and

(b) if deemed practicable by the municipality, to deploy resources to treat the sidewalks to prevent ice formation or improve traction, or treat the icy sidewalks, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 15.

(2) If the municipality complies with subsection (1), all sidewalks within the municipality are deemed to be in a state of repair with respect to any ice which forms or is present until 48 hours after the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 15.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

(a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and

(b) address the prevention of ice formation on sidewalks or treat icy sidewalks in accordance with section 16.5. O. Reg. 366/18, s. 15.

5.3. Winter Maintenance Season

The winter maintenance season referred to within this winter operations plan commences on November 15 each year and is completed on April 15 of the following year. The winter maintenance season is flexible; on an as-needed basis, the City of Barrie performs winter maintenance activities outside of the above dates.

5.4. Preparation for the Winter Maintenance Season

In the months, weeks, and days prior to the start of the winter maintenance season, the City of Barrie undertakes various tasks to prepare for the upcoming winter season. The sections below outline the preparation activities undertaken throughout the year.

As required, contracts and other documents will be prepared and released up to one year or more in advance for the supply of materials (salt, sand, liquid), replacement parts (for plows, solid and liquid application equipment), value added meteorological services (VAMS), and contracted equipment.

5.4.1. Three Months Prior to the Winter Season

1. Plan and conduct a mandatory training session for staff and contract operators where all policies, procedures, schedules, reporting procedures for callout, route maps, equipment training and safety precautions will be discussed. Any issues identified during the meeting shall be resolved prior to the winter maintenance season.

2. Train winter patrollers (or staff whose duties also include patrolling) on the route of representative roads to be patrolled between winter events, their duties during a winter event, record keeping requirements, callout procedures, and the deicing chemicals to be applied to address various road and weather conditions.

3. Inspect equipment to ensure proper working order. Schedule and complete any and all equipment repairs.

4. Arrange for the delivery of materials (salt, sand and liquid solution) and begin filling storage facilities. For liquid solution mixed on site, begin mixing and filling storage tanks.

5. Confirm that markers for all guiderails, catchbasins, and any other hazards, are in place. Any missing markers will be replaced prior to the winter session.

5.4.2. One Month Prior to the Winter Season

1. Post the winter shift schedule in accordance with the municipality's collective agreement.

2. Post the winter on call schedule in accordance with the municipality's collective agreement.

3. Assign equipment to staff.

4. Calibrate material application equipment.

5. Allow operators (staff and contract) time to familiarize themselves with any new equipment, material application rates, material application equipment, and their route (driving the route and noting obstacles along the route).

6. Have at least 30% of the fleet ready to respond to a winter event.

7. Have sufficient staff available to operate the fleet if conditions warrant a winter event response.

5.4.3. Two Weeks Prior to the Winter Season

1. Have the required complement of the City of Barrie fleet ready to respond to a winter event.

2. Have staff available to operate the required complement of the fleet if conditions warrant a winter event response.

5.4.4. At the Start of the Winter Season

1. Implement the winter shift schedule.

2. Implement the winter on-call schedule.

3. Begin patrolling representative roads in all maintenance classes.

4. Respond to winter events as per the winter operations plan.

5. All contractors' trucks are ready on November 15 as per the contract specification.

5.5. Operations

The sections below outline the key components of the City of Barrie's winter operations plan.

5.5.1. Facilities – Operations Centre

The City of Barrie provides winter maintenance services from the R.A. Archer Operations Centre located at 165 Ferndale Drive North. It is equipped with covered storage facilities for salt, sand, treated salt, salt brine, and organic-based de-icing/anti-icing liquid. The Operations Centre houses a state-of-the-art salt brine making system to ensure that brine is produced at the

optimum concentration for pre-wetting and anti-icing. After brine is made, the product is stored in two on-site 30,000L storage tanks. Indoor storage space is provided for City-owned snow plows, salting/sanding equipment, and loaders. Outdoor storage is provided on a paved lot for contractor-owned winter maintenance equipment. The facility is also equipped with oil-grit separator devices and a stormwater management pond to manage environmental impacts related to winter maintenance operations.

5.5.2. Equipment - Winter Maintenance Fleet

The City of Barrie uses a combination of internal staff and equipment as well as contracted services. City-owned winter maintenance equipment for roads is listed in Appendix A. The front end loaders used for loading the winter maintenance equipment are equipped with digital scales for monitoring the amount of materials used.

5.5.1. Material Application Rates

All City and Contractor winter operation vehicles are equipped with electronic spreader control systems. The vehicles are calibrated at the beginning of the season and again at other times when necessary.

Salt

The following application rates are currently used for rock salt, depending on pavement conditions, weather conditions, forecasted weather, and other factors:

- 50 kg/km
- 100 kg/km
- 130 kg/km
- 150 kg/km
- 195 kg/km

Sand

The following application rates are currently used for sand:

- 500 kg/km
- 650 kg/km

Pre-wetting

Salt is pre-wet as it is being applied using 70% salt brine and 30% Organic-based de-icing/anti-icing liquid at a rate of 30 L/tonne.

Direct Liquid Application

Direct liquid application is used for anti-icing purposes depending on pavement conditions, weather conditions, forecasted weather, and other factors. Salt brine is applied at a rate of 100 litres/lane km.

5.5.2. Winter Control Routes

The municipality provides winter maintenance services on 8 priority routes, 9 secondary routes, 13 residential plow routes, 11 residential sidewalk routes and 11 priority sidewalk routes. Appendix B contains maps of the current routes.

5.5.3. Staffing and Hours of Work

The City of Barrie has a full-time employee assigned to each vehicle used for winter operations. Each vehicle is assigned a route for sanding/salting and/or plowing. The City of Barrie adheres to the hours-of-service requirements as set out in the Highway Traffic Act, Reg. 555/06.

5.5.1. Winter Road Patrol

During the winter maintenance season the City of Barrie carries out winter road patrol on a route comprising a representative set of roads according to requirements set in Patrolling (O.Reg.239/02, s.3) of the Minimum Maintenance Standards for Municipal Highways. The current winter road patrol route is shown in Appendix C. If it is determined by the City that weather forecasts indicate that there is a substantial probability of snow accumulation on roadways, ice formation on roadways, or icy roadways, additional patrolling will be conducted at intervals deemed necessary to check for such conditions.

The purpose of the patrol is to monitor and record weather and road conditions and mobilize winter maintenance operators and equipment if a winter event response is required. On the approach of a winter event or during a winter event, the route of representative roads may be modified depending on the type and severity of winter event or the direction from which the storm approaches.

The patrol person will be familiar with local conditions in their patrol area and prepare a condition log of road and weather conditions as well as any actions taken during the shift.

Weather Monitoring

From October 1 to April 30, the minimum standard is to monitor the current weather as well as short term (24-72 hours) and long term (7-day) forecasts once every shift or four times per calendar day, whichever is more frequent.

From May 1 to September 30, the minimum standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once per calendar day.

In order to determine an effective winter event response and allocate the appropriate resources, The City of Barrie supplements road patrol information with weather information from various sources which include:

• Customized weather forecasts which are updated 4 times/day (between October 1 and April 30) from a Value Added Meteorological Service;

• A weather monitoring website which includes pavement conditions, weather conditions, snow depth, humidity, wind speed and direction, photos, and forecasts from the City's Road Weather Information System (RWIS) stations situated in five locations throughout the City;

• Observations from municipal staff; and

• Thermometers mounted on the road patrol and other trucks.

5.5.2. Call Out Procedures

Operational decisions will be made by Road Patrol or the Standby Foreperson or designate with the aid of available forecasting, Level of Service policy, patrolling etc. However, it should be emphasized that decisions will be subjective and that any external input, whether in this plan or elsewhere, merely acts as an aid in determining whether a call out of staff and equipment is warranted to respond to a winter event. It is vital therefore that the Road Patrol or the Standby Foreperson records the prevalent conditions and any other relevant information when a decision is made. Road Patrol or the Standby Foreperson will call in staff and/or contractors as necessary and relay the required operation instructions.

5.5.3. Road Closure Procedures

In the event a road must be closed due to a severe winter storm, Barrie Police will request signs be placed to close the road. Rb-92 "Road Closed" Signs on portable stands, TC-54 flexible drums, and barricades are available at the Operations Centre. Upon receiving a request from Barrie Police to close a road to traffic, the Patrol Supervisor or his/her designate will organize staff and equipment to place the signs and barricades. The Patrol Supervisor or his/her

designate will contact the Right of Way Activity group (ROWA) and request that notification be sent to stakeholders advising of the road closure. Roads will be deemed to be closed once the signs and barricades are placed. When it is physically impossible to place signs and barricades to close a road, the Patrol Supervisor or his/her designate will advise Barrie Police to close the road and request the City's Communications team to send the media release.

5.6. End-of-Season

After the winter season expires The City of Barrie undertakes the tasks outlined below to decommission winter operations.

5.6.1. Winter Season Ends

After April 15 of each year, all contracted vehicles are released in accordance with the contract terms. Contracted vehicles may be invited to work beyond the winter maintenance season if weather forecasts are predicting further winter weather.

5.6.2. Two Weeks After the Winter Season Ends

1. Cease regularly scheduled winter operations night patrols (regular road patrols continue)
2. Continue monitoring weather forecasts
3. Decommission 50% of the fleet

5.6.3. One Month After the Winter Season Ends

One month after the winter season ends, all winter maintenance operations are discontinued and the remainder of the equipment is decommissioned for the season unless there is a reason to expect weather that may warrant a winter response.

5.7. Training

The City of Barrie provides winter operations training for all staff involved in the delivery of winter services. Training is provided by Ontario Good Roads Association, the Association of Road Supervisors, and internally. Training records are kept on file.

The following are some of the winter operations training topics currently offered:

- Equipment Circle Check
- Equipment Calibration
- Record Keeping
- Health and Safety
- Level of Service – regulations, policies, practices and procedures
- Identification of Plow Routes - including and changes since the previous year and unusual issues identified along the route
- De-icing chemicals - application procedures, rates, storage, and handling
- Yard and Equipment maintenance
- Salt Management Plan
- Annual Snow School

5.8. Record Keeping

Full and accurate completion of the documents listed below ensures that the City is protected from liability by providing solid documentation that procedures have been followed.

Staff are responsible for keeping the following records:

Equipment Operators

- CVOR Time Card
- Material type used (sand, salt, liquids)
- Material usage
- Route Plowed and strategy used (plow only, sand/salt only, anti-ice, combination plowing/sanding/salting

Patrollers

- Winter Patrol Record
- Winter Control Report
- Patroller’s Diary
- Call Out Record
- Weather and/or RWIS Information Received

Operations Supervisors

- Operations Diary
- Winter Control Report
- Incident/Collision Reports
- Total materials used
- Equipment Calibration Records

Original copies of documents are to be retained regardless of their appearance. Writing must be legible for others to read and written in ink. Stains or dirt on the documents is not an issue. If a document requires correction, then a line is to be placed through the incorrect information without making it illegible and writing must continue on the original document. Corrections or changes to the colour of ink must be initialed. Records will be completed daily and forwarded to administration staff for retention.

6. Plan Improvements

The current winter maintenance policies, practices and procedures form the baseline or benchmark upon which improvements can be made to improve winter operations and/or the use and management of road salt. Future improvements that the City of Barrie plans to undertake are listed in the table below. This list is reviewed and updated annually.

Description	Implementation
Research on new de-icing and anti-icing materials and methods	Continuous
Route optimization – sidewalks	Continuous
Route optimization – roads	Annually
3rd Road Weather Information System	Installed in 2017/2018 Winter Season
4th and 5th Road Weather Information System	Installed in January 2019
Public Facing Plow Tracker Portal	Activated in 2018
Additional material storage building	2021-2022
New call-in/standby procedure	2023-2024

7. Plan Monitoring and Updating

The purpose of monitoring and updating is to provide a basis for continuous improvement of the winter operations plan and the winter maintenance policies, practices, and procedures of the City of Barrie.

At the end of each winter season, a meeting will be held with all winter operations staff to discuss issues that arose during the season and how these issues may be resolved. Prior to the start of the next winter season and with sufficient lead time to implement any changes, the City of Barrie shall train staff on any changes to equipment and/or winter maintenance policies, practices, and procedures.

Year over year performance will be monitored using the measures listed below. Performance measures will be used to determine whether the objectives of the Winter Operations Plan and/or winter maintenance policies, practices, and procedures are being met.

- total annual cm of snow accumulation
- total number of days with measurable snowfall
- total number of days with freezing rain
- number of days requiring a winter operations response
- total number of spot winter event response (hills, curves, and intersections)
- of salt applied annually per system km
- total number of winter event responses that meet or exceed the level of service policy

These performance measures may serve as a basis for further improvements to the Winter Operations Plan and the winter operations policies, practices, and procedures used by the City of Barrie.

APPENDIX A – Equipment

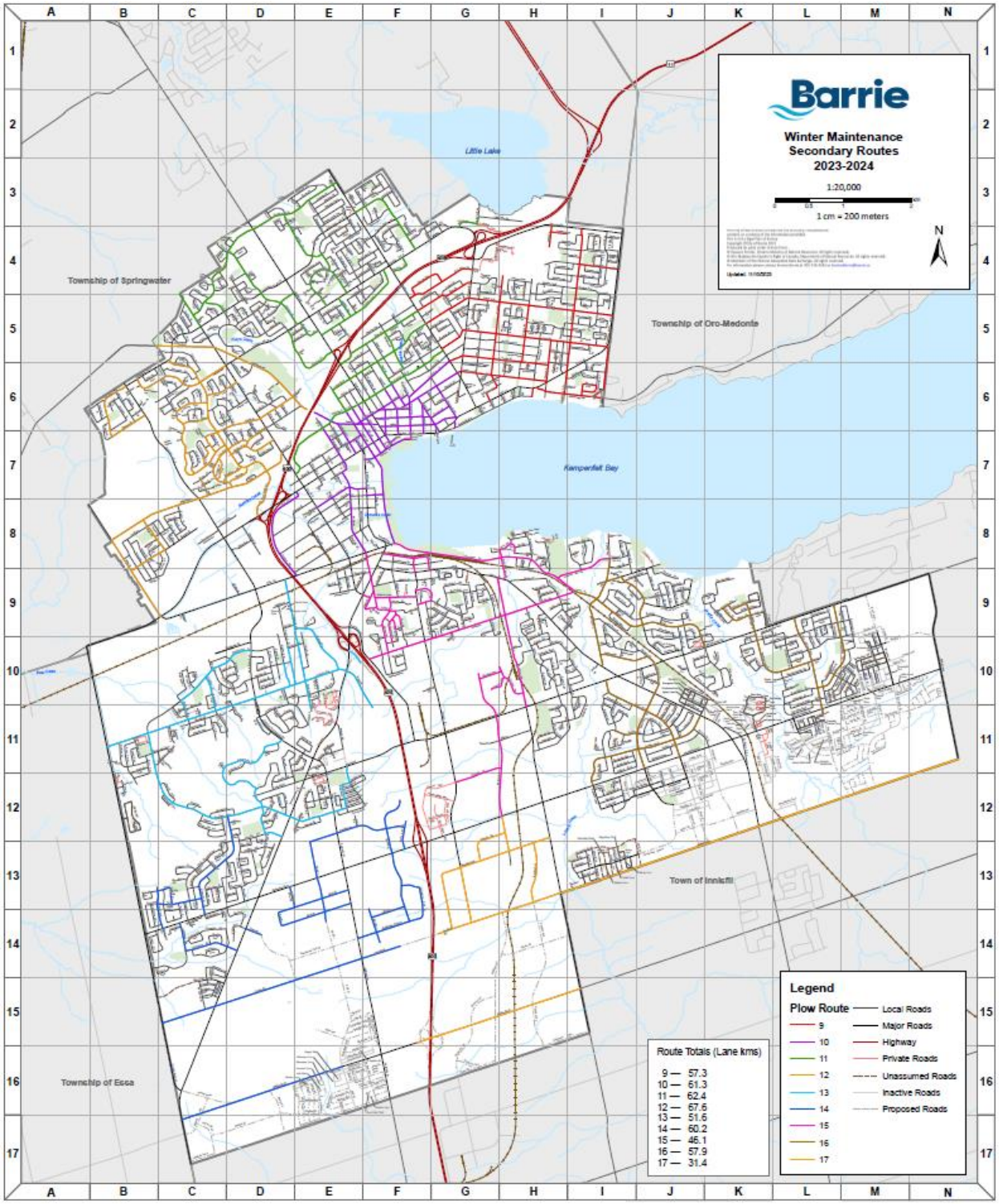
Salting/Sanding Equipment List

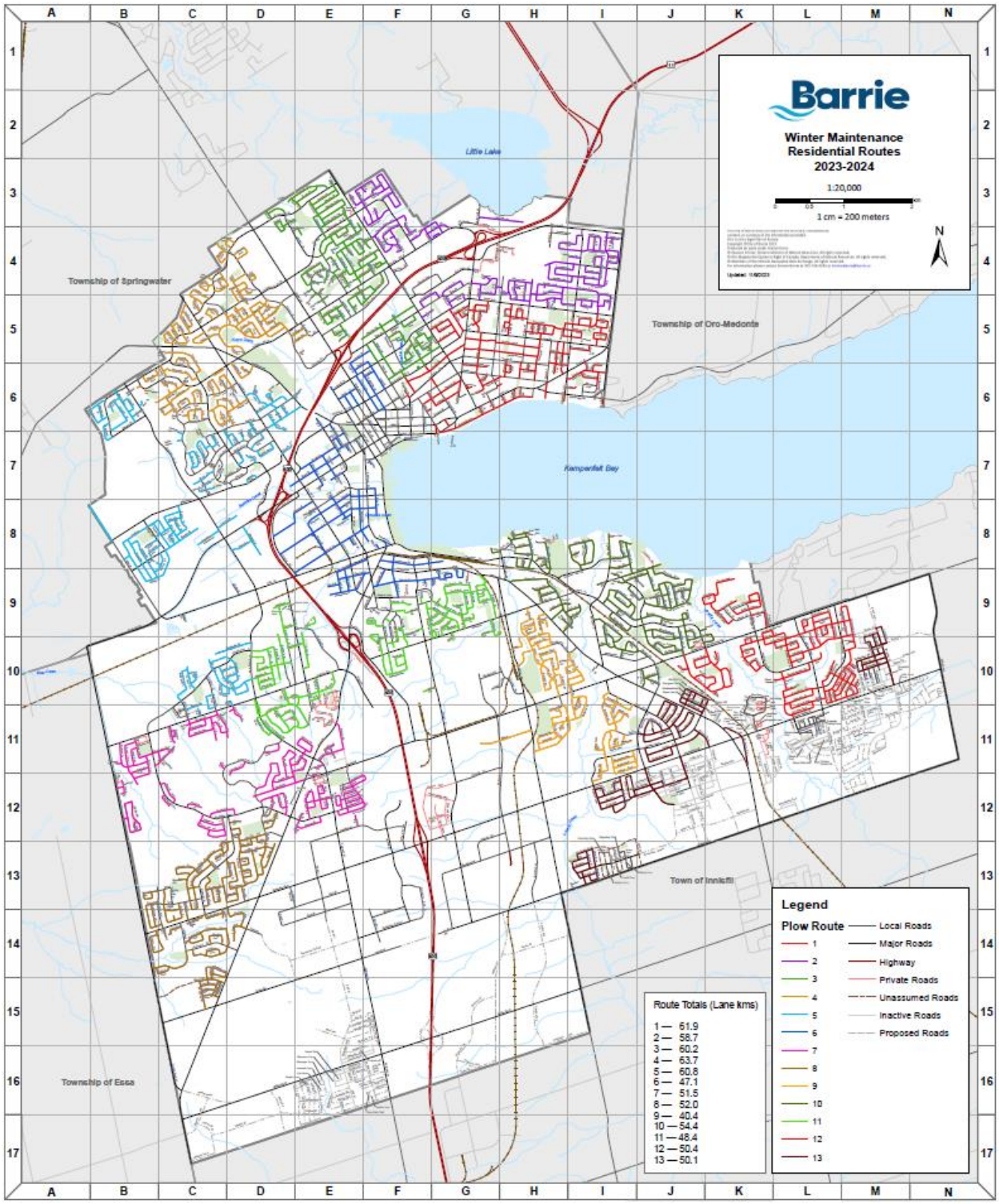
Route	Vehicle Number	Electronic Controller	Calibration Date	Pre-wet Capability	Anti-icing Capability	Liquid Capacity
1	5030	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	No	1100 L
2	5028	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	No	1100 L
3	5051	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	Yes	1800 L
4	5037	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	No	1100 L
5	5009	Yes	Jan. 9, 2024	Yes	No	1100 L
6	5044	Yes	Jan. 9, 2024	Yes	No	1100 L
7	5050	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	Yes	1800 L
8	5033	Yes	Jan. 9, 2024	Yes	No	1100 L
9	5049	Yes	Jan. 9, 2024	Yes	Yes	1800 L
10	5029	Yes	Jan. 9, 2024	Yes	No	1100 L
11	5034	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	No	1100 L
12	5041	Yes	Nov. 6, 2023	Yes	No	1100 L
13	5035	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	No	1100 L
Spare	5017	Yes	Jan. 9, 2024	Yes	No	1100 L
Spare	5007	Yes	Nov. 6, 2023 / Jan. 9, 2024	Yes	No	1100 L
Spare	5018	Yes	Nov. 6, 2023	Yes	No	1100 L
Spare	5008	Yes	Jan. 9, 2024	Yes	No	1100 L
Spare	5019	Yes	Out-of-service	Yes	No	1100 L

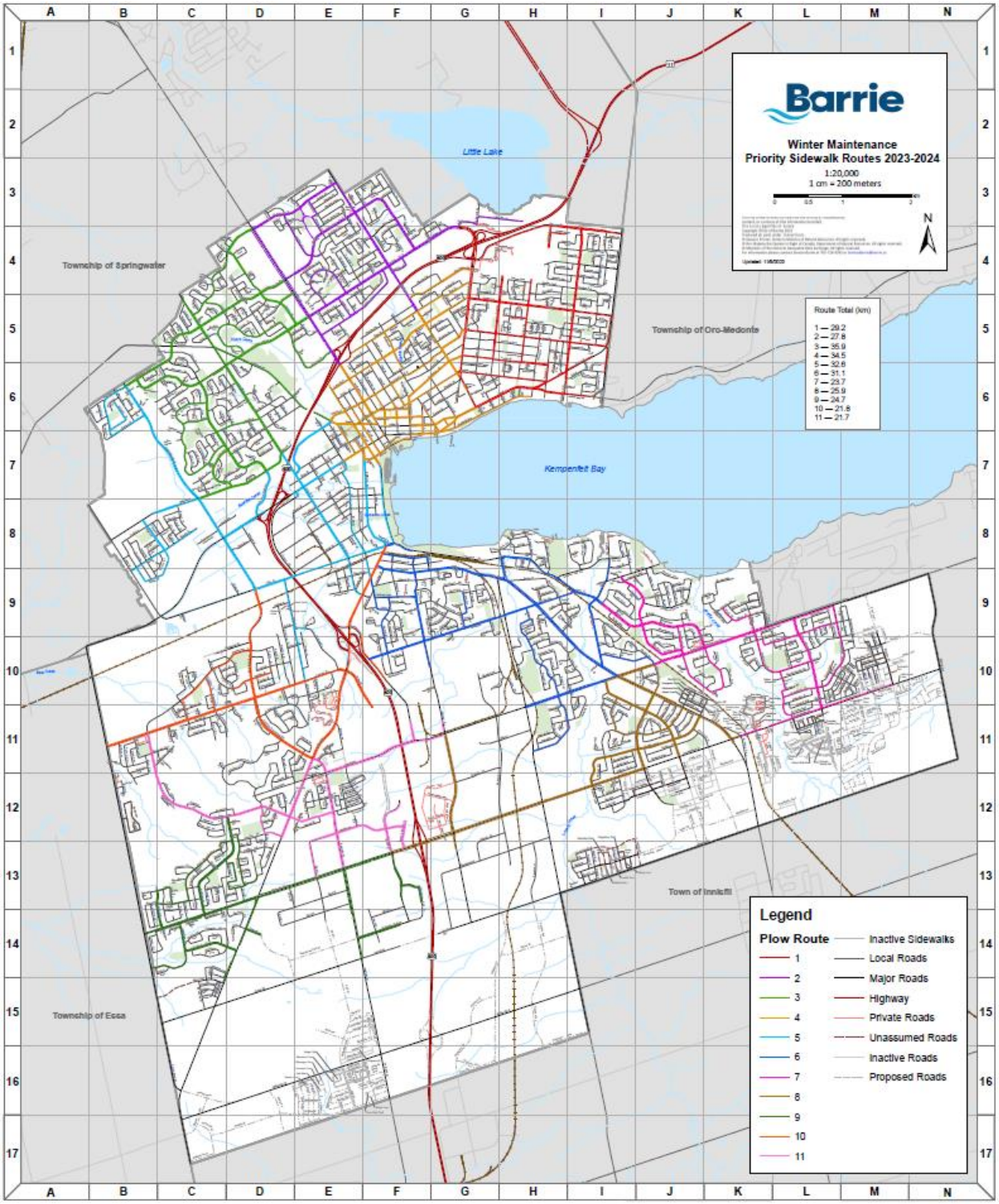
Snowplowing/Anti-icing Equipment List

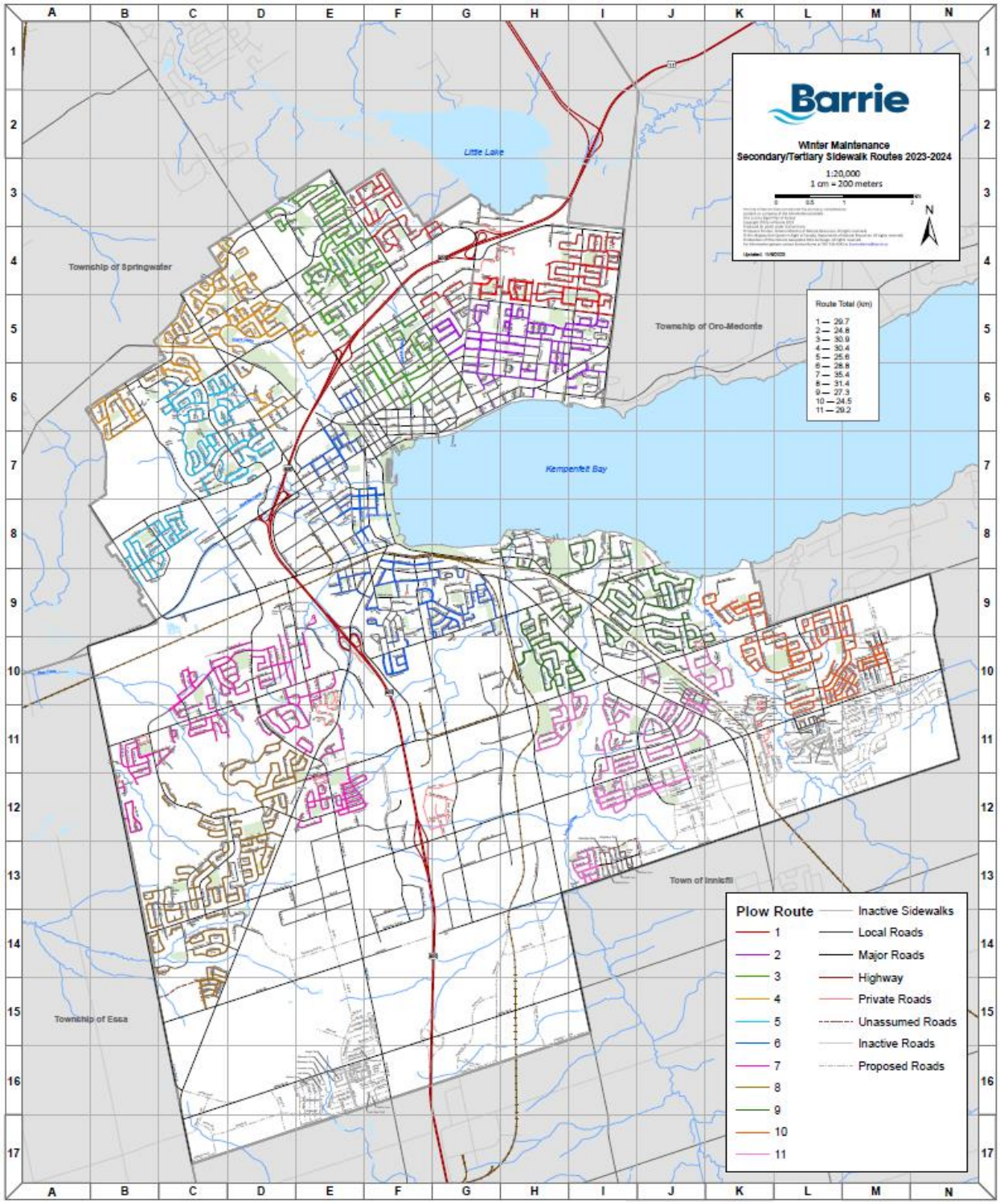
Route	Vehicle Number	Electronic Controller	Calibration Date	Pre-wet Capability	Anti-icing Capability	Liquid Capacity
2	5025	Yes	N/A	No	Yes	4921 L
3	5026	Yes	N/A	No	Yes	4921 L
4	5011	Yes	N/A	No	Yes	4921 L
5	5023	Yes	N/A	No	Yes	4921 L
6	5045	Yes	Jan. 9, 2024	No	Yes	4921 L
7	559	Yes	N/A	No	Yes	4921 L
9	5010	Yes	N/A	No	Yes	3785 L
11	5036	Yes	N/A	No	Yes	4921 L
12	5042	Yes	Jan. 9, 2024	No	Yes	4921 L
13	5012	No	N/A	No	No	None
14	5045	Yes	N/A	No	Yes	4921 L
SPARE	5024	Yes	N/A	No	Yes	4921 L
SPARE	548	Yes	N/A	No	Yes	4921 L
SPARE	556	Yes	N/A	No	Yes	4921 L
SPARE	560	Yes	N/A	No	No	4912 L

APPENDIX B – 2023-2024 Route Maps


Barrie
Winter Maintenance
Secondary Routes
2023-2024
1:20,000
1 cm = 200 meters
N
Little Lake
Township of Springwater
Township of Oro-Medonte
Kempenfelt Bay
Town of Innisfil
Township of Essa
Legend
Plow Route
9
10
11
12
13
14
15
16
17
Local Roads
Major Roads
Highway
Private Roads
Unassumed Roads
Inactive Roads
Proposed Roads
Route Totals (Lane kms)
9 — 57.3
10 — 61.3
11 — 62.4
12 — 67.6
13 — 51.6
14 — 60.2
15 — 46.1
16 — 57.9
17 — 31.4


Barrie
Winter Maintenance
Residential Routes
2023-2024
1:20,000
1 cm = 200 meters
N
Little Lake
Kempenfelt Bay
Township of Springwater
Township of Oro-Medonte
Town of Innisfil
Township of Essa
Legend
Plow Route
1
2
3
4
5
6
7
8
9
10
11
12
13
Local Roads
Major Roads
Highway
Private Roads
Unassumed Roads
Inactive Roads
Proposed Roads
Route Totals (Lane kms)
1 — 61.9
2 — 58.7
3 — 60.2
4 — 63.7
5 — 60.8
6 — 47.1
7 — 51.5
8 — 52.0
9 — 40.4
10 — 54.4
11 — 48.4
12 — 50.4
13 — 50.1


Barrie
Winter Maintenance
Priority Sidewalk Routes 2023-2024
1:20,000
1 cm = 200 meters
N
Little Lake
Township of Springwater
Township of Oro-Medonte
Kempenfelt Bay
Town of Innisfil
Township of Essa
Route Total (km)
1 — 29.2
2 — 27.8
3 — 35.9
4 — 34.5
5 — 32.8
6 — 31.1
7 — 23.7
8 — 25.9
9 — 24.7
10 — 21.8
11 — 21.7
Legend
Plow Route
1
2
3
4
5
6
7
8
9
10
11
Inactive Sidewalks
Local Roads
Major Roads
Highway
Private Roads
Unassumed Roads
Inactive Roads
Proposed Roads


Barrie
Winter Maintenance
Secondary/Tertiary Sidewalk Routes 2023-2024
1:20,000
1 cm = 200 meters
N
Route Total (km)
1 — 29.7
2 — 24.8
3 — 30.9
4 — 30.4
5 — 25.8
6 — 26.8
7 — 35.4
8 — 31.4
9 — 27.3
10 — 24.5
11 — 29.2
Little Lake
Township of Springwater
Township of Oro-Medonte
Kempenfelt Bay
Town of Innisfil
Township of Essa
Plow Route
1
2
3
4
5
6
7
8
9
10
11
Inactive Sidewalks
Local Roads
Major Roads
Highway
Private Roads
Unassumed Roads
Inactive Roads
Proposed Roads

APPENDIX C – Road Patrol Route