



Roadway Management Plan

Latest revision: October
2018

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1. Introduction

In August 2000, Environment Canada concluded a five year scientific assessment on road salt (sodium chloride). The Environment Canada report concluded that sufficient concentrations of road salt pose risks to plants, animals, water bodies, and groundwater. The Environment Canada report recommended that salt be designated as a toxic substance under the Canadian Environment Protection Act (CEPA). Although, Environment Canada has stated that although road salts were designated as CEPA toxic, they would not ban road salt but rather have users/municipalities be encouraged to develop a management strategy to reduce the amount used and implement alternatives. An outline of measures for a road salt risk management strategy was subsequently developed. The strategy culminated in the Syntheses of Best Practices for Road Salt Management which was developed by Transportation Association of Canada (TAC).

The Government of Canada on April 3, 2004 published a Code of Practice for the Environment Management of road salts. The Code of Practice was developed in consultation with a multi-stakeholder working group for road salts. The Code is intended to help municipalities and other road authorities by better optimizing the use of road salts while reducing the impacts of salt to the environment and preserving road safety.

Road authorities that use more than five hundred tonne of road salt in a winter season and that have vulnerable areas in their region will have to prepare and implement a salt management plan. The management plan shall cover all activities which may result in release of road salts to the environment, such as salt storage, application of salt on roads, and the disposal of snow containing road salts.

The report from Environment Canada led to ongoing research into the use of salt alternatives. The alternatives to road salt in some cases are more effective or less harmful to the environment. The costs of these alternatives regrettably are too expensive except for limited use in sensitive or high risk areas. Road salt continues to be the most cost effective deicer across Canada. Many salt management plans require that new technologies be investigated and trials conducted on any promising new development.

Salt management plans are designed to minimize the amount of salt entering the environment by including best salt handling practices and using new technologies to ensure it is the most effective solution for the road system. While Marathon is consistently under the 500t reporting threshold, this plan is implemented as a proactive measure that ensures proper use of salts as an environmental responsibility.

2. Objective

The purpose of the Town of Marathon's salt management plan is to set procedures aimed to ensure a safe, efficient and cost-effective roadway management system. The Town of Marathon will optimize the use of winter maintenance material containing chlorides on all municipal roads while striving to minimize negative impacts to the environment. Town of Marathon Works & Operations staff will strive 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 council.

As part of the salt management design itself will take in to account the best management practices used in today' s industry, most of the influence would be provided by Transportation Association of Canada (TAC) Syntheses of Best Practices - Road Salt Management. These practices are established to provide effective and measurable techniques for snow and ice control while minimizing road salt effecting the environment. As the salt management plan is influenced by best management practices the plan will always be evolving, as new technologies and ideas develop, the salt management plan will change to incorporate these ideas. The plan will set out guidelines for continually improving our methods for keeping the road safe and lower road salt use. The plan will also provide a benchmark from which we can monitor our progress.

Best management practices have focused on the following three objectives:

1. Salt Storage: The objective is the prevention or control of releases from existing and new sites. In pursuing this objective, the following practices should be considered: coverage of salt piles and blended salt-sand piles, handling practices that avoid uncontrolled releases, drainage management, wash water collection and treatment, training of personnel, and monitoring of the effectiveness of the facility.

Town of Marathon's Position: Our existing salt shed is a 9m long x 6m wide concrete slab and half walls protected from the elements by wood framed upper walls and metal roof. We attempt to minimize the volume stored during the summer months in order to further reduce exposure. Our salt-sand pile is stored in a 24m long x 19m wide x 9m high fabric dome sheltered from precipitation. By protecting the sand/salt mix stock from the weather we are also able to mix a lower ratio of 95%-5% since precipitation cannot dilute the mixture. Typical full inventory is approx. 1300t-1500t.

2. Snow Disposal: The objective is the control of releases from existing and new sites. In pursuing this objective, the following practices should be considered: location and construction of the sites to take into account operational and environmental factors, drainage management, training of personnel and monitoring of the effectiveness of the facility.

Town of Marathon's Position: Snow disposal locations (old driving range, gravel pit behind the water reservoir, in front of the mill property, trailer park, end of Hemlo

Drive) have been selected based on their distance away from our drinking wells, streams and lakes.

3. Salt Application: The objective is the reduction of the negative impacts of road salts by delivering the right amount of road salts in the right place at the right time. In pursuing this objective, consideration should be given to using the most recent advancements in the application of winter maintenance anti-icing and de-icing materials, winter maintenance equipment, and road weather information and other decision support systems. As well, the training of personnel and the monitoring of the effectiveness of road salt application techniques should be considered. Surface pre-wetting is not a procedure used in Marathon due to the lack of around the clock patrol and response.

Town of Marathon's Position: In 2018 we purchased a new sander which now tracks our salt and sand salt application. Our aim is to apply the proper amount of grip control materials to ensure vehicle safety while eliminating waste.

Regardless of whether salt is labeled toxic, the groundwater study done by Harden Environmental in 2002 (updated in June, 2009) reported that the town's groundwater is vulnerable to any contaminations, road salt being one of them. Implementing this salt management plan as part of the Roadway Management Plan would exhibit the ongoing protection of Marathon's valuable groundwater resource and meets the Federal Government incentive of reducing road salt that enters into the environment and receiving waterways.

While the goal in mind is to minimize effects of road salt on the environment through an effective winter maintenance program, the most important concern in the salt management plan is still not to compromise the safety of the motoring public.

3. Policy Statement

The Town of Marathon will provide efficient and effective winter maintenance to ensure the safety of users of the municipal road network in keeping with applicable provincial legislation and accepted standards while striving to minimize adverse impacts to the environment. These commitments will be met by:

- adhering to the procedure contained within the salt management plan
- reviewing and upgrading the salt management plan on a regular basis to incorporate new technologies and new developments
- committing to ongoing winter maintenance, staff training and education
- monitoring on a regular basis, the present conditions of the winter maintenance program, as well as the effectiveness of the salt management plan

4. Current Winter Maintenance Program

4.01 The System Maintained

The major activities related to winter maintenance are (please refer to Appendix E and F):

- street plowing
- parking lot plowing
- lane plowing
- sidewalk plowing
- snow storage
- snow removal
- salt spreading
- salt/sand spreading

The Town of Marathon is responsible for the maintenance in winter of approximately 86 lane km of roadway.

4.02 Level of Service Policy

The level of service policy for the Town of Marathon currently meets or exceeds the Minimum Maintenance Standards specified in the Ontario Regulation 239/02 (please refer to Appendix E for details), Municipal Act, 2001, for snow accumulation and icy roads. Bare pavement within 24 hours of response is the goal for class 3 roads. Bare is defined as bare to center bare or track bare. Bare to snow packed with grip control applied is the goal for class 4, 5, 6 roads and back lanes within 48 hours of response.

The code of practice for the environmental management of road salts, under the Canadian Environmental Protection Act, 1999 recommends that the salt management plan follows the Transportation Association of Canada syntheses of best practices for road salt management.

4.03 Winter Patrol

To meet and exceed the minimum maintenance standards, the Town of Marathon carries out winter patrol in two different ways:

1. Every weekday during the winter season a town employee performs a 4 am morning road patrol and then attends to snow removal activities as required. If a call-out of additional staff is required, the call-out is made to employees by means of a callout priority list.
2. Monitoring of road conditions is provided 3 times per day/7 days per week along with the ongoing constant patrol by the Ontario Provincial Police (OPP). During regular business hours road conditions are monitored by the Works and Operations Department. It is the Works & Operation's Supervisor's responsibility to assemble

staff for maintenance. After hours the on-call manager is responsible for an additional patrol and to call in staff if maintenance is necessary. During the weekends the on-call personnel patrol the main streets within town three times per day, giving special attention to main access egress roads and representative intersections/locations (i.e. Peninsula Road @ Hemlo, Peninsula @ Hwy 17, Peninsula @ Cemetery, Hemlo @ Barrick, Hemlo @ Michano). Operator's response time goal is 15 minutes during business hours and 30 minutes after hours.

3. The Town of Marathon has developed a Standard Operating Procedure (SOP) for Road Patrol (Appendix A). Road Patrols during winter ensure the detection of deteriorating driving conditions and to standardize documentation.

4.04 Winter Material

1. Sand

The Town of Marathon currently uses 100% sand application only at the airport.

2. Road Sand/Salt

Sand is purchased locally from Lafarge and delivered to the Works and Operations yard. Each year before snow arrives we stockpile all of our sand/salt mix needs in the aggregate dome at the Works & Operations yard (approximately 1300-1500 tonne). The Town of Marathon uses primarily a sand /salt mix with an approximate ratio of 5 % salt and 95 % sand for grip control on the roads and sidewalks. Salt is necessary to prevent the sand from freezing and hardening, which makes sander loading and dispensing difficult.

3. Road Salt

The following table indicates the amount of grip control materials purchased during each indicated winter season. In subsequent years applied tonnage will be tracked accurately via on board equipment in the sander.

| Winter Season | Road Salt (tonne) | Sand (tonne) |
|--------------------------------|-------------------|--------------|
| 2018 – 2019 Season (Purchased) | 87.95 | 896.69 |
| 2017 – 2018 Season (Purchased) | 442.66 | 913.65 |
| 2016 - 2017 Season (Purchased) | 318.23 | 641.12 |
| 2015 - 2016 Season (Purchased) | 404.66 | 1256.81 |
| 2014 - 2015 Season (Purchased) | 353.95 | 1394.99 |
| 2013 - 2014 Season (Purchased) | 438.94 | 1353.51 |

Note: chart is updated as of October, 2018

The road salt application schedule is shown in Appendix F.

4.05 Yard Facilities

The municipality has one patrol yard from which it dispatched equipment for winter maintenance, which is the Works & Operation's yard located at 2 Penn Lake Road.

1. Equipment and Technologies

The Town of Marathon current fleet used for snow maintenance consists of:

- 2006 John Deere 444 Loader, with angle blade or snow bucket (Town)
- 2014 John Deere 524 Loader, with snow bucket (Town)
- 1997 John Deere 544 Loader with attachments (blade and blower) (Airport)
- 2016 Trackless Machine with snow blower attachment (Town)
- 2010 Trackless Machine with plow and dump body attachment (Town)
- 2018 Western Star Sander (Town)
- 2017 John Deere 770 Grader (Town)
- 2000 Champion Road Grader (Town)
- 1998 International plow/sander (Airport)
- Sand spreader mounted in a trailer (Airport)
- 2017 410 John Deere Backhoe (used as a spare)
- 1990 John Deere 644 Loader, with snow bucket (WTS)
- 1 ton equipped with a V plow and carries a snow blower (Town)

2. Sand and Salt Storage

The Town of Marathon has been storing road salt at the Public Works yard in a small garage with a concrete floor. Our salt-sand pile is stored in a fabric dome sheltered from precipitation. By protecting the sand/salt mix stock from the weather we are also able to mix a smaller ratio of 95%-5% since precipitation cannot dilute the mixture.

3. Wastewater

Town of Marathon does not have any specialized wash bays, therefore most of the wastewater from vehicle & equipment washing, including any salt-laden runoff is directed to the nearest storm basin.

Chlorides found in wastewater are not treated to any significant extent by conventional methods of wastewater treatment plants and directing wash water to the sanitary sewer only relocates the problem. However, a reduction of salt usage should mean less salt being washed from vehicles. Other ways to minimize salt waste:

- Any outside pile of material containing chloride (salt) should be covered from the elements and be stored on top of impermeable material (ex. concrete pad or asphalt pad) Salt deliveries are promptly pushed into the shed to prevent prolonged exposure to the elements.
- Development of good housekeeping skill at the Works and Operation yard
- Washing of equipment is directed through an oil/grit separator prior to discharge to a storm water ditch.
- The placement of drainage at a tactical location at the works and operation site will also be investigated when the garage is rebuilt in its new location.

4.06 Snow Removal and Disposal

Currently, municipal staff removes and hauls snow to the nearest available town owned properties when accumulation of piled snow impedes traffic. Some snow dumping locations include old driving range, gravel pit behind the water reservoir, in front of the mill property, trailer park, end of Hemlo Drive etc. Also, the restriction of snow dumping within 100 meters of municipal wells is in practice as recommended by Harden Environmental. The exception would be where snow is piled on pavement that would direct runoff to nearby storm drains 100 m away from the well (Well #6).

There is currently no practical or economical way of removing chlorides, including those found in snow. Therefore protection of the town's groundwater is very important; one recommendation offered by Harden Environmental is to review snow dumping from all capture zones and remove from 2 years' "time of travel" (TOT) zone if possible. Please refer to Appendix G for further details on the ground water flow patterns.

4.07 Communications

All winter maintenance vehicles are equipped with two way radios for communications, and municipal staff are responsible for reporting changing winter weather and/or road conditions.

Communication is maintained 24 hours/7 days a week, during regular business hours the Town of Marathon offices serves as the main hub for in/outgoing calls from staff, emergency services and the general public. After hours, the on-call manager is responsible for all communication.

External communication with the general public ranges from media press releases by radio, community television, and newspaper by the Town of Marathon regarding winter maintenance services and issues.

4.08 Training

Currently the Town of Marathon winter maintenance staff, handle winter situations on a day to day basis, relying on past experience and training. Specific equipment knowledge is

imparted from senior to junior operators and operators are signed off when component task efficiency is achieved.

Training programs by outside sources are commissioned when practical. Certified training has taken place for grader operations, dump truck operations and other courses will be booked when available.

Training should be specific, learning goals should include the following:

- Salt management plan
- Principles of ice formation
- Science of freeze point depressants
- Road salt usage
- Plowing techniques
- Environmental Protection
- Maintenance Yards
- Spreader controls and calibrations
- Drift control
- Weather forecasts and decision-making
- Pavement temperatures
- Record keeping
- Snow removal equipment
- Snow disposal
- 5-R's Salt Management: right material, right amount, right time, right place, right person

Any current training that can be provided would be worthwhile, ensuring that personnel are competent to carry out their duties and are aware of the environmental impacts of road salts.

4.09 Weather Monitoring

The Town of Marathon supplements road patrol information to determine an effective winter storm response and allocation of resources with observations and past experience from municipal staff. In addition, winter maintenance employees monitor websites (The Weather Network) for weather forecasting. The Works & Operations Supervisor will review the weather forecast on weekdays at 7am and again near end of shift, based on this and the existing conditions at the time will assign additional staff to snow removal duties. On weekends the weather forecast is reviewed by the On-Call manager, as well the representative roads/intersections are checked three times per day.

- Peninsula Road @ Hemlo,
- Peninsula @ Hwy 17,
- Peninsula @ Cemetery,
- Hemlo @ Barrick,
- Hemlo @ Michano).

The Town of Marathon has developed an SOP for Weather Monitoring see appendix B and associated forms for consistent documentation

4.10 Record Keeping

The municipality retains records for the purchase of salt and sand for use in winter maintenance. Currently, records are also kept for application rates, plow or spreader routes, etc.

The development of a record keeping/assessment system to maintain an annual log that contains total quantities of sand and salt usage along with weather data reports from environment Canada. Shift reports shall comprise of the following:

- areas maintained
- material used (sand and/or salt)
- quantities of material used
- specified operator
- shift hours
- pavement and air temperature (when applicable)
- weather events (type, start, finish)
- video documentation via dash camera where available

5. Salt Management Goals

One of the primary goals of a salt management plan is still to provide safe transportation while striving to reduce the amount of salt being used in order to protect the environment. To identify sensitive areas affected by salt and find less harmful alternatives to further reduce their harm.

The following summarizes the goals of essential practices and strategies contained in the Salt Management Plan.

5.01 LOS (Level of Service) Policy

- Review the LOS policy on a regular basis to determine if any improvements can be made. Compare to other similar road authorities and the minimum maintenance standard when required.
- Train and inform staff, management and the public on the intentions and expectations in service delivery.
- Monitor and report on compliance with LOS policy annually.

5.02 Training (Ongoing)

- Update the winter maintenance employees with the latest training for winter maintenance activities.

- Training should incorporate salt management principles in accordance with TAC's Salt Management Synthesis of Best Practices for Training.
- Training should be provided in the fall of each year to all staff involved in winter maintenance operations.
- Ongoing training and improved technologies will be investigated and implemented to ensure an effective management of road salt.

5.03 Salt/Sand Storage

- Sand/Salt Mix storage in the fabric dome is adequate for one entire winter season. We have a capacity to store 1300-1500 tonne. Salt is stored in a smaller shed on a concrete floor. We have a capacity to store 80 tonnes

5.04 Record Keeping (To Be Completed)

- Establish and maintain a standardized record keeping system.
- Records of sand & salt material delivery and end of season material left over will be tracked for year-end audit of bulk material use.
- Development of reporting and summarize storm or "event" responses (including a definition of an event) by equipment.
- Training records are maintained by the Human Resources Dept. and be reviewed annually by the Works & Operations Manager.

5.05 Emergency Response Program

- When salt inventory reaches a low level, the emergency response is in place to acquire the extra material. In the event that primary supplier fails to perform or if the purchase quantities exceed the contract limit, or if winter material runs out and the primary supplier cannot supply material at an appropriate delivery time we will seek alternative sources from other suppliers.

5.06 Sand/Salt Mix Ratio

- Lowering the salt and sand mix ratio to approximately 5% by volume where possible.

5.07 Spreader Calibration

- A development of a calibration procedure. An SOP will be appended to the next revision of this plan.
- Standardized spreader rates for salt and sand / salt will have been developed, the rates are as follows;
 - Salt settings have a range between 170 and 100 kg/km (170,150,130 and 100).
 - Sand / Salt settings have a range between 600 and 300 kg/km (600,570,500,400,350,300 and 250).

- All spreader(s) will be properly calibrated after monthly readings are taken.

5.08 Good Housekeeping Practices

- Develop and implement a good housekeeping policy.
- Include a contamination section in the good housekeeping policy.
- Provide annual training on good housekeeping practices.

5.09 IRT's (Infrared Thermometer)

- At least one patrol/supervisor truck should have a truck mounted IRT installed.
- Provide annual training on the use of the IRT.
- Develop and implement a record-keeping program for the data supplied by the IRT, for future analysis purpose.

5.10 Electronic Spreader Controls

- 100 % of equipment used to spread material shall have the groundspeed regulated by electronic controllers with print out or download capability.
- Develop and implement a record-keeping program for the data supplied by the electronic controller, for future analysis purpose.

5.11 Salt Management Plan Review Program

- Tracking the performance of the required objectives and goals identified in the winter maintenance control program and the salt management plan will be ongoing to ensure roads are properly maintained and safe for the public while being committed to the reduction of road salt.
- Ensure the most recent technologies are studied, reviewed, tested and adopted when it's appropriate and financially feasible.
- Participate in conference and forums geared to the development of road salt best management practices.

6. Conclusion

The Roadway Management & Salt Management Plan is a continuous improvement document and should be incremental and ongoing. Monitoring and reviewing the Town of Marathon's technology needs and salt management strategies will be required to achieve continued safety for road users and the protection of the environment.

APPENDIX A

APPENDIX B

APPENDIX C

Works and Operations

Priority List for Plowing and Sanding

When dispatched to plow or sand, the main streets is prioritized in the following list followed by the side streets.

Grader One

1. Peninsula Road in it's entirety
2. Industrial Road
3. Stevens Ave
4. Yawkey
5. Abrams
6. Gilbert
7. McLeod
8. McCollough
9. Drake
10. King
11. Ross
12. Armour
13. Brown
14. Jones
15. Stewart
16. Howe
17. Bissell
18. Woodson
19. winton

Grader Two

1. Penn Lake Rd
2. Chisholm Trail
3. Barrick Gold
4. Hemlo in it's entirety
5. Steedman to Birch
6. Birch to Sund Cres
7. Sund cres from Birch to Peninsula Rd
8. Aspendale
9. Spruce
10. Steedman
11. Lloyd Irwin
12. McFarland
13. Griggs
14. Nicolet
15. Van Horne
16. Poplar
17. Laurier
18. Laverendrye
19. Nugget
20. Raddison
21. Graham
22. Michano
23. Graham
24. Bastedo
25. Jackson
26. Coveney
27. Wildwood Trail
28. Cedar
29. Godfrey
30. Gullwing
31. Pinewood Walk

Works and Operations Priority List for Loaders

When dispatched to Clear Snow, the following list illustrates the priority.

Loader One

20. Town Hall Parking
21. Police and Fire Hall
22. Stewart Back Lane
23. Howe St Back Lane
24. Bissell Back Lane
25. Pump house 3 and CPR walkway
26. CPR West emergency crossing
27. CPR west walkway at Stewart
28. End of Birch
29. End of Michano
30. Pump house 5
31. CPR east walkway
32. CPR East emergency crossing
33. End of Hemlo
34. Penn Lake Reservoir

Loader Two

32. Library/Clinic
33. Arena
34. Ross Back Lane
35. Yawkey Back lane
36. King back lane
37. Abrams Lane
38. McCullough back lane
39. McCullough lift station
40. McLeod back lane
41. Lakeview
42. Lookout parking
43. Museum
44. Pumphouse 6
45. End of Steedman
46. CPR East walkway Sund
47. Pump house 4

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

APPENDIX I