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Revision 1: Approved by Council – July 25, 2005**

SALT MANAGEMENT PLAN

PURPOSE

This Salt Management Plan (SMP) sets out a policy and procedural framework for ensuring that The Corporation of the Town of Kingsville 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 SMP is meant to be dynamic to allow the municipality 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.

As specified in the Code of Practice for the Environmental Management of Road Salts, the SMP is endorsed by The Corporation of the Town of Kingsville Council.

OBJECTIVE

The Corporation of the Town of Kingsville is committed to improving winter maintenance operations while continuing to ensure public safety. The Corporation of the Town of Kingsville will optimize the use of winter maintenance materials containing chlorides on all municipal roads while striving to minimize negative impacts to the environment. The Corporation of the Town of Kingsville Public Works 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.

POLICY STATEMENT

The Corporation of the Town of Kingsville 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 procedures contained within the Salt Management Plan;
- reviewing and upgrading the Salt Management 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 Salt Management Plan.

1.1.2 Winter Patrol

The Corporation of the Town of Kingsville does not carry out winter patrol on a 24/7 basis. Each operator is responsible for observing winter road conditions on his/her beat. The Public Works Manager coordinates the overall response for winter maintenance and is responsible for callout of the operators to a winter storm event.

1.1.3 Staffing and Hours of Work

The Corporation of the Town of Kingsville adheres to the hours of work as set out in the *Highway Traffic Act*, Reg.4/93. When the driver has completed his 13 hours driving time in his/her 15 hour on-duty time, he/she then is sent home for the 8 hour off-duty period before driving the next shift. If there is no ongoing winter event a regular 8 hour shift will remain in use.

1.1.4 Winter Materials Used Annually

Material	2004/2005	**5 Year Average
Solids		
Rock Salt (NaCl)	2,427 tonnes	2,200 tonnes
Sand (sand/salt mix)*	100 tonnes	80 tonnes
Liquids		
Salt Brine (NaCl)	48,640 litres	48,640 litres
Calcium Chloride (CaCl ₂)	N/A	N/A
Magnesium Chloride (MgCl ₂)	N/A	N/A
Proprietary Product 1	N/A	N/A
Proprietary Product 2	N/A	N/A
Pre-treated material***	N/A	N/A
Pre-treated sand	N/A	N/A
Pre-treated Salt	N/A	N/A

* Percentage of salt in sand/salt mix by weight 5% (industry standard 2 to 5 %).

*** Percentage pre-treat material use 63 litres/tonne or 138 kg/tonne. If you do not use a product, show N/A for Not Applicable.

1.1.5 Application Rates

Solids Highway Class	Spreading Rates per 2 lane km	
	Salt	Sand
Class 1		
Class 2		
Class 3	170	
Class 4	150 – 170	
Class 5	140 – 170	
Class 6	140 - 170	

Note: MTO Maintenance Manual MBP-703 suggests 130 to 170 kg salt for paved roads and 570 kg sand per 2 lane kilometer.

Liquids – Pre-wetting	Spreading Rates per 2 lane km		
	Temperature		
	0 to -5C	-5 to -10C	-10 to -18C
Frost	50		
Light Snow	70		
Heavy Snow	130		
Freezing Rain	130		

Note: MTO Maintenance Manual MBP-705 suggests a range of application rates in litres/2lane km.

1.1.6 Equipment - Winter Maintenance Fleet

An inventory of municipal equipment *and contract equipment* used for winter maintenance is found in **Appendix 1**.

1.1.7 Yard Facilities

The municipality has one patrol yard from which it operates its winter maintenance. A list of the facilities with storage and drainage used for winter maintenance is found in **Appendix 2**.

1.1.8 Snow Removal and Disposal

Currently, municipal staff removes and hauls snow to one site (see accompanying table) when the resultant accumulation of piled snow impedes traffic within the business districts or residential areas of The Corporation of the Town of Kingsville.

in the spring, litter and debris are collected for disposal from all snow disposal sites.

1.1.9 Weather Monitoring

The Corporation of the Town of Kingsville supplements road patrol information to determine an effective winter storm response and allocation of resources with observations from municipal staff, communication with staff of adjacent municipalities and MTO contractors. Staff monitors websites, such as Environment Canada's, for weather forecasting and radar. The local O.P.P. will also communicate to the Public Works Manager their observations while on patrol.

1.2.0 Communications

All winter maintenance vehicles are equipped with two way communications (radios, cell, etc.) and municipal staff are responsible for reporting changing winter weather and/or road conditions. The municipal Town Hall and Public Works Garage located at 2021 Division Road North, Kingsville, Ontario facility serves as the main hub for in/outgoing calls from staff, emergency services and the general public.

External communication with the general public ranges from media press releases to information posted on The Corporation of the Town of Kingsville the web site regarding winter maintenance services and salt management practices to response to individual inquiries.

Note: There are many ways for a municipality and its staff to receive notice that a winter storm event has commenced. In order to meet the requirements for Minimum Maintenance Standards, response is required (upon receipt by a member of staff, council or the public). After becoming aware of the fact, the person receiving notice shall inform the public works supervisor (and/or patroller) immediately.

1.2.1 Training

The Corporation of the Town of Kingsville currently provides some staff training for winter maintenance personnel; however, there is no formal on-going annual winter training program in place. Staff attends the local Road Supervisors' Association meetings to discuss such issues as new equipment, material trends in winter maintenance, regulatory changes and common issues relating to winter storm management.

Prior to the winter season, staff meet to discuss the strategy for winter maintenance, to go over the spreading/plough responsibilities and review the safety issues. In the spring following the winter season, staff typically meet to discuss the successes and failures of the past winter maintenance campaign and to provide input and suggestions for improvement.

The Public Works Manager attends the annual Snow and Ice Colloquium to share experiences and information on new technologies and materials.

1.2.2 Record Keeping

The municipality retains records for the purchase of salt and sand for use in winter maintenance. Each employee documents in his daily timesheet the Route covered and work done, i.e., salting, ploughing, sanding.

Looking to the Future

The current winter maintenance policies and practices form the baseline or benchmark upon which improvements can be made to manage the use of road salt more effectively and in turn its impact on the environment.

2.1.0 Continuous Improvement Practices and Strategies

The Corporation of the Town of Kingsville has prepared a multi-year work plan to improve the management of road salt and its' winter maintenance policies, practices and procedures.

2.1.1 Level of Services Policy

Revisit the current level of service policy, to ensure it meets or exceeds Ontario Regulation 239/02, and customer expectations and sets out the condition of the road surface at the end of the storm and the timeframe within which the specified condition will be achieved. Level of Service policy may also address timing of application to ensure that salt is applied when optimal benefit will be achieved.

2.1.2 Equipment Upgrading

It is intended that the winter maintenance fleet (both municipally owned and contract unit) be capable of delivering appropriate levels of de-icing materials within a full range of climatic conditions.

- As the spreader fleet is due for replacement within the municipality's vehicle replacement program, the new spreader units are to be equipped with pre-wetting equipment and GPS for vehicle location and data transfer, upgraded by 2010.

2.1.3 Equipment Calibration

- Property calibrated equipment is one of the keys to the effective placement of de-icer material on municipal roads.
- Prior to the 2010 winter season and each year thereafter, all spreaders will be calibrated and, during the winter season the equipment will be checked and recalibrated once mid season and each time there has been work on the vehicle hydraulics system.

- Comparisons for application rates will be developed during the winter season and will be compared across the industry.

2.1.4 Equipment Washing

It is intended to reduce the amount of chlorides, oil, grease and grit that is discharged back into the environment.

- Before the 2010 winter season oil/water separators will be installed at (all) patrol yard(s) in order that all vehicle washing can be accomplished inside to minimize discharge directly to the environment.
- During the 2010 winter season all vehicles are to be washed indoors.
- By 2010 a retention area will be constructed to collect all salt laden wash water for treatment before release to the receiving body of water.

2.1.7 Material Delivery and Handling

In the fall season, salt and sand is delivered and stockpiled on the loading pad. Within 24 hours, winter sand is mixed with salt and all material conveyed to indoor storage.

- For the 2005 winter season reduce the percentage salt in the sand salt mix to just enough to prevent the mixture from freezing (2 to 5%) dependent on the moisture content of the sand.
- Ensure all deliveries of sand and salt are covered while in transport, on the ground, and schedule deliveries in good weather.
- Ensure the loading pad is swept clean following the transfer of the material to indoor storage.
- For the material that is pre-treated with liquid, ensure that the liquid materials are transferred without spillage to the mixer or carefully mixed without seepage on the loading pad.
- In the interim – salt storage will consist of a paved storage pad and tarping of the salt pile until a salt storage facility is constructed in 2005.
- The outside summer storage of salt sweetened sand will be discontinued immediately.

2.1.8 Record of Material Usage

Good record keeping includes the retention of accurate records on the amount of material used on each route by each vehicle and for each storm event.

- Implement a material tracking system, which records usage on each route, by each truck for each storm event.
- Compare material usage to benchmarked usage.
- With accurate records and comparisons, adjust amount of materials used for varying weather and pavement conditions.
- The material tracking system should be able to be used to rationalize the amount of materials used with the amount ordered and the residual amount at the end of season.
- For equipment with electronic spreader controls, download the information regularly and analyse it to compare the amounts of materials used with those recorded in the material tracking system.
- Implement a record of patrols performed.
- Implement a record of responses made to the winter storm events.

2.1.9 Weather and Pavement Temperature Forecasting

In order to ensure that the right material in the right amount is applied to the road at the right time, timely and accurate weather and pavement temperature forecasting is essential. Accurate pavement temperature forecasting is a tool to reduce the amount of salt used during a storm event, for when to apply the first round, the frequency of each round and if the final round is really needed.

- Explore opportunities in your geographic area to get accurate weather forecasting that is reported to your patrol yard by email and/or fax with 4 or 6 hour updates 24/7 for the winter season.

2.1.8 Storm Response

To assist patrol staff in decision making for winter maintenance, develop a set of guidelines for response to winter storm events that includes but is not limited to combinations of precipitation, air and pavement temperatures, time of day and traffic volume.

- Type of storm event, i.e., Alberta Clipper, Colorado Low, etc.
- Air and/or pavement temperature during event.
- At end or after the storm event; temperature rising, temperature falling
- Time of day; effect of heat gain during daylight hours.
- Time of day; traffic volumes assist in breaking the bond of snow/ice with the Pavement.
- Wind direction.
- Drifting conditions; do nothing and let the wind blow the snow across the road.
- Frost penetration in the road base contributing to pavement temperature.

2.1.9 Winter Patrol

Winter Patrol is used to monitor road conditions and to react quickly to changing weather and road conditions. It is necessary to establish Council approved winter patrol policy that is developed in conjunction with the annual level of service policy review.

- Patrol coverage as Council directs for the winter season

2.2.0 Training

All staff involved in winter maintenance; operators, patrollers, and supervisors need ongoing training, and need to share their skills and experience with the other municipal staff. Training should be refreshed annually before the upcoming winter season.

- Operators should be trained on the equipment that they are assigned to operate and allowed sufficient time to reacquaint themselves with controls and how they operate.
- Operators need refresher training on basic weather forecasting and tools used to determine pavement temperature.
- Operators need training on the chemicals and the use of those chemicals for de-icing and anti-icing; and when to use what chemical and when it is most effective.
- Supervisors and Patrollers need training on basic weather and pavement temperature forecasting, RWIS, and all other tools available to them to mount a response to a winter storm event.

- Managers and Supervisors should attend workshops, such as the Snow and Ice Colloquium, to learn the latest information about new technologies and techniques being used in other jurisdictions, and their experiences with various products and materials.
- All workers need training in the health and safety requirements for use of equipment and materials.

2.2.2 Technological Review

Existing and new technology should be continuously monitored to determine their applicability in current policy and procedures with a view to altering them for continuous improvement in response to winter storm events.

- Pre-wetting.
- Direct liquid application or anti-icing.
- Impact of different liquids on the equipment used for application.
- GPS for vehicle locating and data transfer.
- Electronic spreader controls with capability for solids, liquids, and data transfer via GPS.
- New spreader equipment with liquid capabilities.
- Material storage with inside loading.
- Environment protection at snow dumps to prevent discharge of debris and chemicals directly into a watercourse with the melt water.
- Controlled run-off from loading pads at salt storage facilities.
- Use of RWIS for localized weather and pavement temperature forecasting.
- Use of infrared thermometers for measuring pavement temperature.
- Use of pavement temperature as a tool in determining when and what material is to be used.

2.2.3 Environmentally Sensitive Areas

It is necessary to understand the impacts of the municipal winter maintenance policies and practices on environmentally and agriculturally sensitive areas.

- Monitor ground water and recharge areas.
- Identify wetlands, streams and valleys, environmentally sensitive areas, pond, lakes, reservoirs, woodlands, fish, wild life, plant habitat, threatened and endangered species, flood plains and hazard lands, and areas of natural and scientific interest.
- Liaise with the local potable water supply agencies within your jurisdiction.
- Seek guidance from federal/provincial ministries and/or agencies.

2.2.3 Communication Strategy

The Corporation of the Town of Kingsville communication strategy is to effectively communicate its' winter maintenance program to the public, in addition to municipal staff.

- Before November 15th of each calendar year, prepare and distribute a winter maintenance guideline to the general public to ensure public awareness of the program that is being delivered.
- Remind the public that road salt is not toxic to humans, but is harmful to the environment.
- Prepare an internal handbook for employees that communicates the Council approved winter maintenance policies and procedures and other important information such as,

contact list, operator and patroller shift assignments, strategies for dealing with the media, school boards and the public, etc.

- Establish a municipal website or if one already exists, provide winter maintenance information on the municipal website, and update regularly.

3.1.0 Monitoring and Updating

An annual review of the salt management plan by management and staff will occur at the end of each winter season. As a result of this review, the plan will be updated to include any changes in department policy, strategies and new techniques or equipment to be used in the upcoming winter season.

4.1.0 Performance Measures

Performance measures should be used to determine whether the objectives of the salt management plan have been met. Achievement, year over year, will be measured against the benchmark year described as "Current Winter Maintenance Program" in this salt management plan. Some of the indicators should include:

Monitoring the severity of the winter season:

- Total annual cm of snow accumulation.
- Total number of days with measurable snowfall.
- Total number of days with freezing rain.
- Total number of continuous winter event responses.
- Total number of spot winter event response.
- Total number of winter event hours.

Monitoring the salt used:

- Tonnes of salt purchased annually.
- % of applications where discharge rates exceeded.
- % of total trucks loaded in the yard where a spill occurred.
- Total tonnes of salt applied annually per system km.

Ensuring customer satisfaction:

- % of winter event responses that meet or exceed the level of service policy.
- Total number of complaints received regarding winter operations.
- % of complaints that resulted in a response.

Measuring the success of the plan:

- % of the goals set out in the plan that were met.

Appendix- Definitions

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

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

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 the sand pile or salt pile as the sand or salt is loaded into the storage facility.

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 Roads 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, sleet, 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 plough/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 (ploughing, salting/sanding, winging back, etc.) to respond to winter events.

**APPENDIX 1
Equipment - Winter Maintenance Fleet**

Winter Maintenance Fleet -- Town of Kingsville																			
Equipment By Unit Number	Patrol	Truck					Winter Equipment					New Technologies							
	Winter Pick Up	Tandem	Tri-Axle	Single Axle	Plough	Wing	Combination Unit	Spreader	Spinner Single Dual	Electronic Controller	Calibration	Pre-wet Equip	Anti-icing Equip	Anti-icing unit capacity	Infrared Thermometers	Loader	Loader Weigh Bucket	Grader	Side walk Equip
Patrol Yard #1 - 2021 Division Road North																			
00-01		Y					Y		S	Y	Y	Y							
01-01				Y			Y		S	Y	Y	Y							
#3		Y					Y		S										
88-1				Y	Y				S										
88-2				Y	Y				S										
03				Y	Y				Y										
770					✓	✓													✓
720					✓	✓													✓
344																✓			
99-01	✓																		
03-01	✓																		

For each patrol yard, list all the equipment including hired or contracted units by unit number and indicate 'Y' for YES in the appropriate box for the equipment making up that unit. If not applicable, then leave box blank. *See Example in the table above.
Spinner: S = Single, D = Double Spinner. Anti-icing Unit Capacity: Indicate in litres.

APPENDIX 2
Yard Facilities

Winter Maintenance Facilities – Town of Kingsville, 2021 Division Road North

Location	Site Drainage				Material Storage										
	Washing On-site	Washing Inside	Oil/Grit Separator	Discharge Drainage	Sand	Salt	Liquids	Structure Type	Structure Floor Paved	Salt Sand Loading	Door Overhang	Lighting	Mechanical Ventilation	Paved Loading Area	Liquid Containment
Patrol Yard #1		Y	Y		Y	Y	Y		Y	Outside	N	Y		Y	

Snow Removal and Disposal

Snow Disposal Sites – Town of Kingsville, Jasperson Road Parking Lot

Location	Surface		Drainage/Run Off		Surrounding Land Use			
	Paved	Unpaved	Controlled	Uncontrolled	West	East	North	South
Site #1		Y		Y	Road	Rec.	Res.	Ag

Note: Provide information on pollution to any neighbourhood wells caused by road salts.

APPENDIX 3
Continuous Improvement Practices and Strategies

Salt Management Plan- The Corporation of the Town of Kingsville										
Continuous Improvement Options	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
<i>Level Of Service Policy</i>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Electronic Spreader Controls Purchase</i>			Y		Y		Y			
<i>New Dome</i>		Y								