



*Owen Sound*

**City of Owen Sound**  
**Road Salt Management Plan**  
**as required by**  
**Environment Canada**

**June 2007**

Original Plan Approved by Owen Sound City Council- January 31, 2005

Revision # 1- June 2007

Approved by Owen Sound City Council- n/a

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## **1.0 INTRODUCTION**

This Salt Management Plan has been prepared by the City of Owen Sound in order to comply with Environment Canada's Code of Practice for the Environmental Management of Road Salts. The Code of Practice applies to organizations that use more than 500 tonnes of road salt per year.

Road salt has long been considered the most effective and least costly de-icing agent in Ontario. Environment Canada's Code of Practice is intended to implement best management practices in order to reduce the use of road salt and its subsequent effect on the environment. These best management practices include; storage, training, alternative materials, the use of technology, updating equipment, and the creation of maintenance policies in order to reduce the impact of road salt on the environment.

The City of Owen Sound has approximately 160 kilometers of roadways. The City's topography is somewhat unique as there are many hills and steep grades in the City. The majority of the major traffic routes in the City are located on these hills. These major traffic routes combined with extreme winter weather can create the need for increased levels of winter maintenance in order to provide reasonable safety for vehicular and pedestrian travel. The City uses road salt as a primary de-icing agent.

There are approximately 105 kilometers of sidewalks in the City. Approximately 75 kilometers of these sidewalks are maintained by the City in the winter. City Policy O-3, Sidewalks Not Maintained in the Winter, lists sidewalks that are not maintained in the winter months.

The Public Works Division applies de-icing materials to City owned parking lots and facilities on an as needed basis. These include: Bayshore Community Centre, Coliseum, Tourism Office, and the following parking lots; Transit Terminal, Pharma Plus, Scotiabank, City Hall, 1<sup>st</sup> Avenue East (2), Police Parking Lot, and the Transit Terminal.

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## **1.1 Purpose of the Plan**

The Salt Management Plan is intended to provide a framework for the City of Owen Sound to continuously improve the management of road salt during its winter maintenance operations. The existing maintenance operations are based on historic practices that reflect the community expectations regarding snow clearing in Owen Sound.

This Salt Management Plan is considered to be a base plan that will be updated on a regular basis. The Plan will facilitate enhancement and efficiencies in a fiscally responsible manner, with new procedures and technologies as they become available.

## **1.2 Format of the Plan**

Section 2.0 of the Plan includes the Policy Direction as approved by City Council. The policies are summarized in this section.

Section 3.0 of the Plan includes the Winter Maintenance Policies that are relevant to salt management. It focuses on levels of service, equipment settings, plowing and salting operations, snow disposal, and general maintenance activities.

Section 4.0 of the Plan includes summaries of Operational Practices and Strategies for Snow and Ice Control as they relate to the management of road salt. The current sub-sections in this section include the following:

- Winter Maintenance Fleet
- Use of pre-wetting techniques
- Vehicle Washing
- Recording salt use
- Storage and handling of salt, salt blends, and liquids
- Information sources for making snow and ice control decisions. These include weather forecasts, temperatures, etc.
- Winter patrol procedures
- Storm event response procedures
- Relevant Training
- Snow Removal and disposal
- Monitoring environmental implications of winter road maintenance.

Key goals are summarized in Section 4.0 of the Plan.

Section 5.0 of the Plan includes the monitoring, maintenance, and updating of the Plan.

### **1.3 Responsibilities**

The responsibility for winter road maintenance is held by Operations, Public Works under the direction of City Council.

**City Council**- Approves the Plan and approves funding for the winter maintenance program.

**Director of Operations** - Design, implement and maintain the Plan.

**Roads Superintendent**- Update the Plan through new technologies, techniques, and training initiatives.

**Roads Superintendent \ Lead Hands**- Implement the Plan and identify improvements for the Plan.

**Lead Hands \ Equipment Operators**- Carry out their winter maintenance duties in accordance with the policies and procedures set out in the Plan and identify improvements for the plan.

## **2.0 SALT MANAGEMENT POLICY**

### **2.1 Mission and Mandate**

#### **Mission**

The Operations Department through the Public Works Division's Roads Section will continue to optimize the use of de-icers on the City of Owen Sound's roadways and sidewalks in order to minimize the impact of road salts on the environment.

#### **Mandate**

The Operations Department is to provide reasonably safe winter conditions for vehicle and pedestrian traffic as required by level of service policies, funding guidelines, and responsible operating practices as established by Owen Sound City Council.

### **2.2 Policy Statement**

The City of Owen Sound will provide effective winter maintenance to ensure the reasonable safety of the users of the City's road network in keeping with Provincial Legislation and accepted local standards while striving to minimize the adverse effects that the use of road salts can have on our environment. To meet this commitment the City of Owen Sound will:

- meet and adhere to the guidelines contained within the Salt Management Plan;
- strive to review and upgrade the standards contained in the Salt Management Plan on an annual basis to take into account new technologies and developments;
- work with Environment Canada, other transportation agencies, and environmental groups to upgrade best winter practices; and
- commit to ongoing staff training and education.

### **2.3 Application**

This policy is adopted by the Operations Department's Public Works Division and applies to all employees involved in Winter Maintenance Operations on the City's roadways and sidewalks.

### **2.4 Conditions**

The following principals will guide the ongoing process to upgrade the Salt Management Plan:

- The Plan is activity based and follows an Environment Management System framework with the principles of continual improvement. It includes the following:
  - Periodic Review of Industry Practices;
  - Implementation and documentation of the Plan;
  - Ongoing staff training and education;
  - Monitoring and analysis;
  - Management Review;
  - Environmental Review;
  - Practices and Policy Revision; and
  - Record Keeping and Reporting.
  
- The Plan is reviewed and updated on an ongoing basis.

### 3.0 WINTER MAINTENANCE POLICIES

#### 3.1 Introduction

The major activities related to winter maintenance are:

- Salt/sand spreading- roadways and sidewalks
- Roadway plowing
- Sidewalk plowing
- Salt and sand storage
- Snow removal and disposal from city streets

#### 3.2 Winter Operations- Roadway De-icing and Plowing

The level of service for roadways is based on historic operating practices and the demands of the general public. A policy reflecting these practices was created by staff and presented to the Operational Audit Committee in January 2006. The Policy was subsequently approved by Owen Sound City Council on February 13, 2006. The policy, City Policy O-57 Winter Roadway Maintenance- Level of Service is included for reference.

City Policy O-2 defines general roadway plowing operations.

The City's 4 plow\salter\sander combination units utilize automated spreading equipment. The controllers for the salt application equipment are set to the following application rates:

<b>Controller Position</b>	<b>kg / km feed rate 2006-2007 Season</b>
1	75
2	130
3	180
4	200
5	250
6	300
7	350
8	400
9	400
10	400



Blast	400
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Three of these units are retrofitted for pre-wetting operations. At present an organic de-icing solution is used for pre-wetting. The application rate for the organic de-icing solution is 32 litres per 1000 kilograms of salt. The organic solution is not used during mild snowfall conditions as its benefit is derived from use at lower temperatures.

De-icer application rates for hills and arterial routes are specific to the weather conditions at the time. De-icer application in the balance of the City has been directed to be applied at intersections only, thus limiting the amount of de-icer in lower traffic areas.

### **3.3 Snow Removal and Disposal**

As a result of snow plowing operations snow accumulates in the boulevard areas adjacent to the roadways. The City commences snow removal operations when the accumulations impair visibility, narrow higher traffic streets enough to limit two way traffic, and in the case of the Downtown Core when the windrows approach approximately 3 feet in height restricting access to sidewalks.

In many areas outside the downtown core the accumulated snow can be blown further into the boulevard. This procedure requires little manpower and can generally be done with existing shift resources. In other cases, especially the downtown core, extra staff, City equipment, and haulage contractors are required for snow removal. This is at significant cost.

Hauled snow is disposed of on City property located either at the Public Works yard or directly adjacent to the yard. These areas allow for natural attenuation of residues; salt and others in the snow prior to reaching a water course.

This work is scheduled around snow clearing activities as time permits.

#### **Snow Removal Policy**

The City commences snow removal operations when the accumulations impair visibility, narrow higher traffic streets enough to limit two way traffic, and in the case of the Downtown Core when the windrows approach approximately 3 feet in height. The scheduling of snow removal operations are affected by;

- Hours of Work Legislation;
- Availability of Extra Staff, when required;
- Impending weather conditions;
- Contractor availability; and

- Budget levels.

### **3.4 Sidewalk Snow Clearing**

The following City policies dictate the level of service for the City's sidewalks; City Policy O-51 exists for the level of service for sidewalks. City Policy O-3 identifies sidewalks that are excluded from winter maintenance.

A salt /sand mixture is used for sidewalk de-icing operations. The sand component is used to provide traction properties. The ratio is approximately 20% salt and 80% sand. The Trackless MT's apply the sand\salt mixture at a rate between 45 kg/kilometer and 125 kg/km depending upon conditions. The application rate is based on the operator's judgment depending on the local conditions that relate to grade and general sidewalk condition.

In addition to these City policies, By-Law- 1974-1 requires the adjacent property owners to provide sidewalk maintenance in specific areas in the downtown core. In extreme weather such as freezing rain or a fast freeze the City will apply de-icers to these sidewalks.

## 4.0 Operational Practices, Strategies, and Goals

### Level of Service Policy

City Policy O57- Winter Roadway Maintenance- Level of Service identifies the existing service levels within the City. This Policy was adopted February 13, 2006 and was a goal of the previous Plan.

#### Goals:

- Continue to refine service policies.
- Update the roadway traffic counts in order to classify the roadways within the City as per Regulation 239.

### Equipment

#### Electronic Spreader Controls

All four combination units currently have electronic controls. Current technology is available that will allow downloading of information from the controllers. Further to this GIS and the resulting mapping capabilities are available in order to facilitate record keeping. A system incorporating these features has been trial run by the Roads Superintendent.

#### Goals:

- As the existing electronic controller units are replaced units with downloading and GIS capabilities should be purchased.
- Pursue the purchase of an integrated GIS based vehicle tracking system in order to document winter control operations.

#### Pre-Wetting Equipment

Currently 3 units have been pre-wetting capabilities. This provides basic coverage for the City during low intensity snow fall events.

#### Goal:

- As the existing combination units are replaced consideration should be given for equipping the replacement units with integrated pre-wetting capabilities.
- NOTE: The tender specification for the replacement of the 1999 International Tandem includes pre-wetting capabilities.

#### Spreader Calibration

The spreaders and pre-wetting equipment are calibrated annually to pre set spread rates.

#### Goal:

- Calibration of spread rates be continued and optimized in order to reduce salt use.

### **Reversible One Way Plows**

In late 2002 one loader and three combination units were outfitted with these plows, as well as a 4<sup>th</sup> combination unit this year. The intention of purchasing these plows was to use them to plow low to moderate amounts of snow. This is intended to reduce salt use by removing the snow off the roadway surface and then applying a smaller quantity of de-icer. These plows are smaller than the original conventional one-way plows offering better visibility and safety for the plow operator thereby requiring one operator as opposed to two operators for a traditional plow \ wing unit.

#### **Goal:**

- Continue to use the one-way plows in order to reduce the use of de-icing materials and increase the efficient use of human resources.

### **Temperature Equipment**

Currently two patrol trucks have infrared temperature reading equipment. They monitor air and surface temperatures. This device assists in the decision making process regarding the application of de-icing materials. Consideration should be given to installing this equipment in the four combination units.

#### **Goal:**

- The installation of temperature reading equipment in the four combination units.

## **Housekeeping**

### **Equipment Washing**

Equipment washing for the winter fleet is done in the Works Maintenance Building. The drainage system is equipped with an oil\grit separator and is connected to the sanitary sewer. This ensures that washing debris, salt, grit, oil, etc. is not directed to the natural environment.

#### **Goal:**

- Continue this practice and investigate the potential for an isolated wash bay.

### **Yard Housekeeping**

#### **Sand**

Deliveries of winter sand occur when the sand is dry and can be loaded directly in the sand dome. This serves the purpose of not freezing and clumping prior to and during application. Salt is mixed with the sand on an as needed basis. Sand \ salt

mixtures returned to the yard are dumped directly into the sand dome. This prevents salt leaching from the mixture into the natural environment.

**Goal:**

- To maintain the practice of receiving dry winter sand.

**Salt**

Deliveries of salt are commenced in late fall in order to provide an initial stockpile for the winter season. As the winter season progresses salt is ordered on an as needed basis. The salt is delivered in covered trucks and is either dumped directly in the salt dome or moved in the salt dome ASAP. The fresh salt absorbs less moisture than stockpiled salt and as such is less susceptible to clumping. As the winter season tapers down less salt is kept on hand. This results in a low inventory over the summer months when the salt could degrade.

**Goal:**

- Continue the existing practice of salt inventory management.

**Record Keeping**

**De-icer Ordering and Delivery Information**

Electronic records are kept on each salt delivery received indicating date and amount received. This information provides total mass of salt used. These records are used for due diligence as well as to provide the basis for an integrated review of salt use as compared to weather, snow fall events, and snowfall quantity.

**Goal:**

- Use the new financial software program to eliminate duplicate keying of this information.

**De-icer Use by Route and Vehicle**

Currently measurements relating to truckloads of material, vehicle, and driver are the way application rates can be measured. Upgrading the electronic controls with downloading and GIS capabilities would assist in this area.

**Goals:**

- In the short term devise a means of monitoring salt use to vehicle and operator.
- Continue to fine tune salt use and routes within the City.
- In the longer term continue to review equipment and technology upgrades.

**Winter Weather Monitoring**

There is an Environmental Climate Monitoring Station located at the City's Sewage Treatment Plant. Observations regarding precipitation, snow on ground, temperatures, and general weather conditions are monitored at this location. The

monthly observation records are provided to Public Works in the winter months in order to link weather information; specifically precipitation and snow fall events, to de-icer use. An electronic spreadsheet is maintained that analyzes snow fall information, snow fall events, salt use, and the overall winter control budget. This information is used in an attempt to gauge and monitor the use of de-icing materials and compare to the winter weather received and compare to historic information.

**Goal:**

- To maintain this information gathering in order to compare and evaluate salt use as compared to weather.

**Storage**

There are two domes on site for sand and salt storage. The salt dome will store approximately 3,400 tonnes while the sand dome will store 1,400 tonnes. The sand dome provides adequate storage for the entire winter season unless a long, cold winter season is experienced. The salt dome provides effective storage based on the current operating mode as described previously.

**Goal:**

- Continue to utilize the existing domes to their maximum capabilities.

**Weather Observation and Forecasting**

Currently Winter Patrol personnel have Internet access to several weather forecasting sites. This provides some ability to plan staff availability and response to winter events. The pending ability to view MTO RWIS locations in the region will provide an additional tool for winter observation and response to storm events. Long term goals should include the installation of observation points within the City.

**Goals:**

- Continue refinement of the use of existing weather forecasting.
- Use of MTO RWIS Stations for local \ regional weather conditions.
- Consideration of the installation of weather observation points within the City.

**Training**

Training all winter control staff in the use of de-icers is currently and will continue to be a high priority. The training will be on an on-going basis and will be held prior to the commencement of winter shifts. Technology, materials of use, application techniques, case studies, legal implications, and regulations should compose the formal training. Further to this City supervisory staff should consider a basic information session regarding winter control. This can be based

on a cost breakdown of the prior Winter Control Season followed by an informal question and answer session for the purpose of information exchange with a view to improving the winter control program.

**Goals:**

- Continue formal staff training in regard to winter control issues.
- Supervisory staff initiates an information exchange session on a frequency of no less than on an annual basis.

**Snow Removal and Disposal**

Snow removed and hauled from City streets is hauled adjacent to the Public Works yard or to City owned lands in the industrial park. The general site layout allows for solid retention and some runoff attenuation prior to discharge to the natural environment. Due to cost considerations the only area in the City that regularly receives removal and haulage service is the downtown core.

**Goal:**

- To continue the practice of hauling snow to the Public Works yard.

**Technology Review**

On a continual basis Supervisory Staff will review available technology relating to winter control activities. This may consist of de-icing material, equipment, techniques, weather forecasting, and record keeping capabilities. Staff will make budget recommendations for suitable technological upgrades.

**Goals:**

- Continue to review available technology.
- Staff recommends suitable technology for budget purposes.

**Communications**

A diary of all reports to the Public Works Advisory Committee, the Operational Audit Committee, and City Council should be kept. Further to this if a formal level of service policy is to be considered consultations with Staff, various City Departments, Committees, Council, and the general public must be conducted.

**Goals:**

- Catalogue staff reports concerning Winter Control issues.
- Communicate any changes to the Winter Control level of service policy.

**Environmentally Sensitive Areas**

The City does not currently have areas that would be classified as being environmentally sensitive. Through the regular sampling program the Water

Treatment Plant staff sample the water in Owen Sound Bay. Part of this monitoring includes chloride levels in the Bay. These levels will be monitored.

**Goals:**

- Monitor chloride levels in Raw Water Samples taken at Water Treatment Plant.
- Continue to be diligent in identifying potential environmentally sensitive areas.



## **5.0 Closing**

The City of Owen Sound is committed to ensuring the City's roadways and sidewalks are maintained in order to ensure the reasonable safety of vehicle and pedestrian traffic. In doing so the City is committed to continue to reduce the impacts that de-icing materials have on the natural environment.

The City commits to review and continually improve this Salt Management Plan and implement appropriate technologies in order to improve levels of service, increase efficiencies, and reduce the impacts that de-icing materials have on the natural environment.