

## **COMMITTEE OF THE WHOLE - APRIL 4, 2005**

### **SALT MANAGEMENT PLAN**

#### **Recommendation**

The Commissioner of Engineering and Public Works recommends that the City of Vaughan Salt Management Plan dated March, 2005, as outlined in this report, be approved.

#### **Purpose**

To seek Council approval of the draft Salt Management Plan.

#### **Background - Analysis and Options**

The City of Vaughan currently has a road system that is comprised of approximately 790 kilometres (total of 1,600 lane kilometers) -of which 347 kilometers are considered primary roads and 440 kilometers secondary roads - a total of 783 kilometers of sidewalks (401 kilometer primary, 331 kilometers secondary), 40 kilometers of Park Walkways, and 12 kilometers of Walkways, and 514 cul-de-sacs and dead ends. This road system provides a safe, efficient, and affordable means of surface transportation for road users. People rely on the roadway network all year round for transport to workplaces, to recreational and leisure facilities, for transport of goods and services, and for emergency, and security services.

Snow and ice conditions on the road system have a dramatic impact on public safety, roadway capacity, travel time and economic costs. User safety is considered the most important priority for the winter maintenance operations, practices, and strategies expressed in this Salt Management Plan. The City of Vaughan, like other road authorities, must use road salt to properly and safely maintain roads and sidewalks during the winter.

In 2001, Environment Canada released an assessment report stating that road salts are entering the environment in large amounts and are posing a risk to plants, animals, birds, fish, lake and stream ecosystems and groundwater. The report recommended that salt be designated toxic under the Canadian Environment Protection Act (CEPA). It should be noted that Health Canada stated that road salts are not harmful to humans. Environment Canada has stated that it will not ban road salts, but rather encourage users in developing a salt management strategy.

In April 2004, Environment Canada published the Code of Practice for the Environmental Management of Road Salts. Its purpose is to guide road authorities in developing salt management plans to reduce environmental harm caused by road salt. The Code applies to organizations using more than 500 tonnes of road salt annually (based on a 5 year average) or those having vulnerable areas that could be potentially impacted by road salts. Municipalities using fewer than 500 tonnes of road salt annually are encouraged to follow best practices in the management of road salt.

While the development of salt management plans remains non-regulatory, Environment Canada strongly urged municipalities using 500 tonnes of road salt or more annually to submit a Letter of Intent by October 3, 2004. Vaughan did submit such a letter. Municipalities that did not submit a Letter of Intent will be contacted by Environment Canada's nearest Regional Office to discuss their intentions. Municipalities should prepare a Salt Management Plan by April 3, 2005 (i.e. one year after the publication date of the Code of Practice).

Each June 30th, following the implementation of the salt management plan within the municipality, a report is required to be sent to Environment Canada encompassing the following:

1. Salt Management Plan (initial approval date and/or latest date of revision)

2. Materials used (quantities of all products used in winter maintenance)
3. Material storage
4. Road salt application practices
5. Snow disposal
6. Winter maintenance training
7. Areas vulnerable to road salt
8. Environmental monitoring

Considering the environmental concerns regarding road salt, the City of Vaughan's Public Works Department has recently developed a Salt Management Plan (SMP). The plan addresses growing concerns regarding the effect road salt has on our natural environment and at the same time, takes into account the issue of road safety by better managing the City's use of salt. As well, the SMP sets out a policy and procedural framework for ensuring that the City of Vaughan continually 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. However, any modifications to municipal winter maintenance activities must ensure that roadway safety is not compromised. While ways to reduce salt use are being reviewed, users' safety - both pedestrians and drivers - remain the most important priority within winter maintenance operations, practices and strategies contained in the Salt Management Plan.

Although there is ongoing research into the use of alternatives to road salt (sodium chloride) in winter maintenance, salt continues to be the most cost-effective de-icer across Canada. Because of the adverse effects that salt may have on the environment, the Salt Management Plan tries to minimize the amount of salt entering the environment by including best salt handling practices and new technologies to ensure the most effective use over the road system.

The review strategy in the Salt Management Plan requires new technologies to be investigated and trials conducted on promising developments and discussed in annual assessments. A brief overview of the Salt Management Plan is as follows.

#### *Purpose*

The intent of the Salt Management Plan is to set out a policy and procedural framework for ensuring that the City of Vaughan continually improves the management of road salt used in winter maintenance operations. It is based on a comprehensive comparison of past practices against best management practices. The plan sets out specific goals for improving the City's salt management practices.

Any modifications to the City's winter maintenance activities must be done in a way that they provide safety to the roadway and mobility to the user during the snow and ice season.

This Plan is flexible and allows the City to try new approaches and technologies according to fiscal restraints and the need to ensure that roadway safety is not compromised.

#### *Key Objectives*

The following Table summarizes the key objectives of the Salt Management Plan:

<b>Activity</b>	<b>Objectives</b>
Level of Service	Update the Level of Service Policy as required. Define more detailed description of road classifications.
Alternative De-icing Materials	Continue the usage of ClearLane and other modified salt products or additives, and monitor the performance and effects of the products.
Electronic Controls for Spreaders	Continue to require ground speed regulated electronic controllers in all of the City-owned and contracted salt spreaders.
Spreader Calibration	Develop standardized salter calibration procedures. Continue to require calibration of all spreaders each fall. Check calibration on a regular basis and recalibrating as needed.
Equipment Washing	Ensure the equipment washing is done at the JOC yard where the wastewater will pass through the oil/water separators before discharging into the sewer system.
De-Icer (Salt Ordering & Stockpiling)	Adopt measures to reduce the loss of salt during stockpiling operation.
De-Icer Record Keeping	Develop record keeping for each vehicle and each storm event and comparing periodically to set benchmarked rates for the particular year to confirm the calibrations.
Housekeeping Practices	Develop a housekeeping code of practice to improve the salt management practices at storage facilities (yards).
Weather Forecasting	Provide additional training to staff on interpreting weather information for making snow and ice control decisions.
Road Weather Information System (RWIS)	Implement RWIS stations. Provide training to staff in using RWIS.
Winter Patrolling	Develop patrol guidelines to ensure that the Level of Service Policy is met.
Training	Provide continuing training to staff in the following areas: <ol style="list-style-type: none"> <li>1. Weather interpretation</li> <li>2. Pavement conditions to make snow and ice control decisions</li> <li>3. Infra-Red thermometers</li> <li>4. Record keeping and review</li> </ol>
Snow Removal & Disposal Guidelines	Develop snow removal & disposal guidelines.
Reviewing New Technology	Conduct pilot studies using new technology and products.

<b>Activity</b>	<b>Objectives</b>
Communications	Maintain and update the City's web site by providing information to the public on the City's approach to winter maintenance and salt management
Monitoring Program and Sensitive Areas	Identify environmentally sensitive areas in conjunction with TRCA for monitoring and using the results to upgrade the salt management plan
Monitoring of Salter Operations	Reinstate the use of GPS technology in all City-owned and contracted winter maintenance equipment.

As specified in the Code of Practice for the Environmental Management of Road Salts, the SMP needs the endorsement of Council.

### **Relationship to Vaughan Vision 2007**

By adopting the proposed Salt Management Plan, the City of Vaughan has voluntarily agreed to look at ways of reducing road salt usage, without compromising the safety of the public.

This report is consistent with the priorities previously set by Council in terms of safeguarding the environment (A-3), and pursuing excellence in the delivery of core services (A-1). The necessary resources have been allocated and approved.

### **Conclusion**

The City of Vaughan is committed to provide properly maintained roads in accordance with its level of service policy. At the same time, the City is committed to reducing the impacts that de-icing chemicals, such as salt, have on the environment. The comprehensive Salt Management Plan will allow the City to do so, and will allow for continuous improvement as newer and more innovative salt management techniques become available.

### **Attachments**

1. Salt Management Plan, City of Vaughan, dated March 2005.

### **Report prepared by:**

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Respectfully submitted,

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Commissioner of Engineering and Public Works

Brian T. Anthony, CRS-S, C. Tech  
Director of Public Works



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**CITY OF VAUGHAN**

**PUBLIC WORKS DEPARTMENT  
Road Maintenance Services**

**SALT  
MANAGEMENT  
PLAN**

March 2005

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## **1.0 INTRODUCTION**

### **1.1 Overview**

The City of Vaughan currently has a framework of road system that is composed of approximately 790 kilometres (total lane of 1,600 kilometers) -of which 347 kilometers are considered primary roads and 440 kilometers secondary roads - a total of 783 kilometers of sidewalks (401 kilometer primary, 331 kilometers secondary), 40 kilometers of Park Walkways, and 12 kilometers of Walkways, and 514 cul-de-sacs and dead ends. This road system provides safe, efficient, and affordable means of surface transportation for road users. People rely on the roadway network all year round for transport to workplaces, to recreational and leisure facilities, for transport of goods and services, and for emergency, and security services.

Snow and ice conditions on the road system have a dramatic impact on public safety, roadway capacity, travel time and economic costs. User safety is considered as the most important priority for the winter maintenance operations, practices, and strategies expressed in this Salt Management Plan. The City, like other road authorities, must use road salt to maintain safe roads and sidewalks for the people during the winter.

In 2001, Environment Canada released an assessment report stating that road salts are entering the environment in large amounts and are posing a risk to plants, animals, birds, fish, lake and stream ecosystems and groundwater. The report recommended that salt be designated toxic under the Canadian Environment Protection Act (CEPA). **It should be noted that Health Canada stated that road salts are not harmful to humans.** Environment Canada has stated that they will not ban road salts, but rather they will encourage users in developing a management strategy.

On April 3, 2004, Environment Canada published the Code of Practice for the Environmental Management of Road Salts. Its purpose is to guide road authorities in developing salt management plans to reduce environmental harm caused by road salt. The Code applies to organizations using more than 500 tonnes of road salt annually (based on a 5 year average) or those having vulnerable areas that could be potentially impacted by road salts. Municipalities using fewer than 500 tonnes of road salt annually are encouraged to follow best practices in the management of road salt. The Code of Practice can be accessed on [www.publicworks.ca](http://www.publicworks.ca) website.

While the development of salt management plans remains non-regulatory, Environment Canada strongly urges municipalities using 500 tonnes of road salt or more annually to submit a Letter of Intent by October 3, 2004. This letter will state the municipality's intention to develop a salt management plan. Municipalities that do not submit a Letter of Intent will be contacted by Environment Canada's nearest Regional Office to discuss their intentions. If the municipality has already developed a salt management plan, you should still send a Letter of Intent to Environment Canada indicating that the plan exists.

Municipalities should prepare a Salt Management Plan by April 3, 2005 (i.e. one year after the publication date of the Code of Practice).

"It is recommended that implementation of the salt management plan begin in the fiscal year following the preparation of the salt management plan."

Each June 30th, following the implementation of the salt management plan within the municipality, a report is required to be sent to Environment Canada encompassing the following:

1. Salt Management Plan (initial approval date and/or latest date of revision)
2. Materials used (quantities of all products used in winter maintenance)
3. Material storage
4. Road salt application practices
5. Snow disposal
6. Winter maintenance training
7. Areas vulnerable to road salt
8. Environmental monitoring

Considering the environmental concerns regarding road salt the City of Vaughan's Public Works Department has decided to develop Salt Management Plan in 2005. The plan will address growing concerns about the effect road salt is having on our natural environment and at the same time continue to provide for road safety by better managing the City's use of salt.

While we look for ways to reduce salt use, users' safety - both pedestrians and drivers - remain the most important priority within winter maintenance operations, practices and strategies contained in the Salt Management Plan.

Although there is ongoing research into the use of alternatives to road salt (sodium chloride) in winter maintenance, salt continues to be the most cost-effective de-icer across Canada. However, because of the adverse effects that salt has on the environment, the Salt Management Plan tries to minimize the amount of salt entering the environment by including best salt handling practices, and using new technologies to ensure its most effective use over the road system.

The review strategy in the Salt Management Plan requires new technologies to be investigated and trials conducted on promising developments and discussed in annual assessments. This document presents an overview of the Salt Management Plan.

## **1.2 Purpose of the Salt Management Plan**

The intent of the Salt Management Plan is to set out a policy and procedural framework for ensuring that the City of Vaughan continuously improves the management of road salt used in winter maintenance

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operations. It was based on a comprehensive comparison of past practices against best management practices. The plan sets out specific goals for improving the City's salt management practices.

Any modifications to the City's winter maintenance activities must be done in a way that they provide safety to the roadway and mobility to the user during the snow and ice season.

This Plan is flexible and allows the City to try new approaches and technologies according to fiscal restraints and the need to ensure that roadway safety is not compromised.

### **1.3 Format of the Plan**

The Salt Management Plan information has been organized into the following sections:

#### ***Section 2***

This section presents the policy direction approved by the City of Vaughan Council. These policies are summarized in Section 2.

#### ***Section 3.0***

This section presents the Winter Maintenance Policies relevant to Salt Management. It focuses on Levels of Service, Spreader Settings and Snow Removal and Disposal Policies.

#### ***Section 4.0***

This section shows the summaries of operational practices and strategies for snow and ice control related to the road salt management. This section contains a series of sub-sections that can be modified as new policies, procedures and practices are introduced and refined.

#### ***Chapter 5.0***

This section introduces the approach for monitoring the implementation of the plan and how to maintain & update it with the focus on continuous improvement.

### **1.4 Responsibilities**

Everyone in the City of Vaughan involved in winter road maintenance has some responsibility for developing, implementing and reviewing the success of the Salt Management Plan. It is through the cooperation and effort of these people that the City will achieve the goal of reducing the environmental effects of its road salt while maintaining safe roads.

## **2.0 SALT MANAGEMENT POLICY**

### **2.1 Vision and Goals**

In the City of Vaughan planning decisions, reflected in the official Plans, are made based on a balance among the following factors: protecting the natural environment, enhancing economic competitiveness,

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and fostering a healthy and equitable society. The ultimate goal is to enhance the quality of life for all residents of Vaughan.

This Salt Management Plan is in support of the Official plans, visions, and goals of the City of Vaughan.

The Public Works Department will be the lead in de-icer usage in an environmentally sensitive manner, while providing for safe road and sidewalk conditions during the winter. Optimizing the use of de-icers on the roads and sidewalks and minimizing the salt impacts to the environment will be the Public Works Department's responsibility. The Public Works Department will also provide safe winter conditions for vehicular and pedestrian movements as required by level of service policies.

## **2.2 Policy Statement**

The City of Vaughan will provide effective winter maintenance to ensure the safety of users of its road networks, in conjunction with Provincial Legislation and accepted standards. At the same time, the City will try to minimize the adverse effects of road salt on our environment. In order to achieve this commitment, the City will:

- meet and comply with the guidelines contained within the Salt Management Plan,
- try to review and upgrade (if needed) the standards in the Salt Management Plan annually to consider new technologies and approaches,
- work with Environment Canada, other transportation agencies, and environmental groups to upgrade best winter maintenance practices, and
- commit to continuous training and education for the staff.

## **2.3 Application**

This policy is adopted by the Public Works Department and is applicable to all Winter Maintenance Operations staff.

## **2.4 Conditions**

There are a number of activities that will guide the ongoing process of upgrading the Salt Management Plan. The plan is based on activities and continuous improvement on an on-going basis. It includes the following activity items:

- Review and Analysis of Industry Approaches and Practices
- Implementation and Documentation of the Plan
- Staff Education and Training

- Monitoring and Analysis
- Management Review
- Environmental Review and
- Practices and Policy Revision.

### 3.0 WINTER MAINTENANCE POLICIES

#### 3.1 Introduction

This section documents the snow and ice control standards of the City of Vaughan. The major activities related to winter maintenance can be identified as follows:

- Salt and sand storage
- Salt/sand spreading
- Snow ploughing (roads, sidewalks, laneways)
- Snow removal and disposal from City streets
- Snow removal at driveway entrances, bus stops, and municipality owned/operated parking lots

#### 3.2 Level of Service Policies – Road De-Icing and Ploughing

For the purpose of snow ploughing, salting, snow & ice control, and snow removal & disposal operations, the City's roads have been classified into three classes. The roads de-icing and ploughing is shown in Table 1 (Existing Level of Service). The Level of Service (LOS) for winter operation is shown in Table 2. The LOS standards are driven by the technical requirements of the winter operations.

*Table 1 – De-icing & Ploughing Chart*

<i>Road Classification</i>	<i>Type of Winter Service</i>	<i>De-Icer</i>	<i>Application Rates* (kg/lane km)</i>	<i>Duration to Complete the De-Icer Operation</i>
Primary Roads	Bare Pavement	100% Rock Salt	170 kg	5 cm of snow & within 4 hrs after snowfall stops
Primary Roads	Bare pavement	100% Rock Salt	130 kg	2-4 cm of snow and within 4 hrs after snowfall stops
<i>Road Classification</i>	<i>Type of Winter Service</i>	<i>De-Icer</i>	<i>Application Rates* (kg/lane km)</i>	<i>Duration to Complete the De-Icer Operation</i>

Primary Roads	Bare pavement	100% Rock Salt	85 kg	Less than 2 cm of snow and within 4 hrs after snowfall stops
Secondary Roads	Limited Bare Pavement	100% Rock Salt	170 kg	5 cm of snow & stopped 12 hrs after snowfall stops
Secondary Roads	Limited Bare Pavement	100% Rock Salt	130 kg	2-4 cm of snow & stopped 12 hrs after snowfall stops
Secondary Roads	Limited Bare Pavement	100% Rock Salt	85 kg	Less than 2 cm of snow & stopped 12 hrs after snowfall stops
Rear Laneways	Safe & Passable Pavement	100% Rock Salt	130 kg	2+ cm of snow & stopped 24 hrs

◆ This is the desired condition of the pavement surface. However, it is necessary to have sufficient traffic volumes to activate and improve the characteristics of the de-icer, the time to achieve this condition will vary with the time, duration and intensity of each storm event.

\* The City is also experimenting with a modified salt product called "ClearLane". This product is being used in the west portion of the City, and is applied at 80% of the rates indicated for rock salt.

**Special Cases**

If any one or more of the following cases present, the winter service level should be bumped-up according to the next highest road classification:

- Slope >4%
- Presence of emergency services (i.e. police, fire or ambulance station, hospital)
- Public Transit bus route including turnaround loops

In the worst case scenario, the highest application rate could be increased to 255 kg/lane km.

*Table 2 – (Level of Service Policy)*

Road Classifications	Pavement Condition after Salt/Sand Application	Ploughing Starts After Accumulation of (cm) of Snow	Ploughing Completion Time (hr) After the End of Snowfall			
			5 cm of Snow	5-15 cm of Snow	15-25 cm of Snow	25+ cm of Snow
Primary Roads	Bare Pavement	5 and continues	4 ◆◆	4 ◆◆	4 ◆◆	4 ◆◆

Road Classifications	Pavement Condition after Salt/Sand Application	Ploughing Starts After Accumulation of (cm) of Snow	Ploughing Completion Time (hr) After the End of Snowfall			
Primary Roads	Centre Bare	5	4	4	4	4+
Primary Roads (Gravel)	Limited Bare / Snow Covered	5	4	4	4	4+
Secondary Roads	Limited Bare	5	16	16	16	16+
Secondary Roads (Gravel)	Limited Bare / Snow Covered	5	16	16	16	16+
Laneways	De-Icer required to Maintain Passable Conditions	5 cm Removal based on the local condition and 15 cm	24	24	24	24+

Notes:

••• Ploughing on primary roads is continuous for bare pavement conditions

### 3.3 Equipment – Fleet Size

The City of Vaughan uses a variety of equipment including ploughs, spreaders, and combined units. The total size of the fleet is 113. The following chart shows the type of equipment, number of equipment, rental or owned. See Appendix “A” for detailed information on winter operation equipment.

*Equipment – Fleet Size Chart*

Equipment Type	Number	Rental / Owned	Remarks
Plowing Units	42	Rental	Dale Farren and Gazzola Paving
Plowing Units	3	Owned	
Salting Units	24	Rental	Dale Farren and Gazzola Paving
Salting Units	5	Owned	
F E Loader	3	Lensed	Caterpillar 950 G 4 yd bucket
F E Loader	1	Owned	Case

<i>Equipment Type</i>	<i>Number</i>	<i>Rental / Owned</i>	<i>Remarks</i>
Backhoe	1	Owned	Ford
Grader	1	Owned	Champion 740A
Mobile Conveyor Belt	1	Owned	McCloskey 85'
Backhoe for Windrow Clearing	35	Rental	Windrow Enterprises and Crupi Construction
Dump Trucks (Tandem and Tri-axle)	As required	Rental	Hired as needed for snow removal

### 3.4 Snow and Ice Control Material

#### 3.4.1 Salt / Sand Storage

The City of Vaughan no longer uses a sand/salt mixture in the urban areas. However, a sand / salt mixture is used by Parks Department staff on some sidewalks and parks trails. A sand/salt mixture is used in the rural areas on gravel roads only. Three years ago, the Public Works department started using a new product called "ClearLane Treated Salt" on a trial basis on road network located in Woodbridge area and West of Weston Road. The composition of the new product is Sodium Chloride (93.6%-96.3% concentration), Magnesium Chloride Hexahydrate (0.5% - 1.5% concentration), Magnesium Sulfate (0.02% - 0.12% concentration), Molasses Solids (0.45% - 2.40% concentration), and Water (2% - 3% concentration).

The City of Vaughan uses the provincial standard grade of road salt. All salt is stored in indoor facilities on impermeable floors. Currently, the City has three salt storage facilities. These facilities are located at No. 2800 Rutherford Road (known as the JOC), No. 4630 Langstaff Road (known as the Woodbridge yard), and No. 8000 Dufferin Street (known as the Dufferin yard).

The following chart shows the salt / sand storages in the City of Vaughan:

*Salt / Sand Storages Chart*

<i>No</i>	<i>Name</i>	<i>Dome Capacity (tonnes)</i>	<i>No. of Domes</i>
1	JOC Yard	6,000	2
2	Woodbridge Yard	4,000	1
3	Dufferin Yard	6,000	1

The current policy is to apply a solid de-icer once the snow starts to accumulate or “stick” on the road surface. This is a proactive strategy that reduces the amount of salt that would be lost if solid de-icer was applied to dry pavement prior to a storm, and ensures timely applications on major expressways and arterials (i.e. within the first hour of any significant snow or ice accumulations). Early application of chemical is critical in preventing ice forming and ice binding to the pavement surface. Without this chemical, the snow would bond to the road and would be very difficult to plough off. The chemical is allowed to work before ploughing occurs. As the snow accumulates, it is ploughed to maintain safe driving conditions.

### **3.5 Training**

The Public Works Department, through a combination of in-house and contracted services, provides winter maintenance related training to its Roads Division staff during fall of the year. The training includes Preseason preparation, weather basics, snow and ice control, equipment operations, and salt management.

### **3.6 Snow Removal and Disposal**

Snow ploughing operations causes snow accumulations at the roadside known as windrows or mounds. In addition, when ploughing the cul-de-sacs, snow is piled into the middle of the court. The snow removal operation starts when these windrows reach volumes that create a nuisance or hazard to pedestrians and motorists. Removal of snow from the cul-de-sacs commences when the height of the pile creates a potential for children to tunnel into or slide down the pile.

Experience over the years has shown that the City must have the capability and capacity to remove and dispose of this snow in a two-week period. Snow removal involves the use of front-end loaders and trucks in conjunction with contracted trucks and front-end loaders.

Over the years the City has used various different land disposal locations to disposal of snow. Many of the snow disposal sites had environmental and operational constraints. Currently, snow is dumped at the City-owned property on McLary Court, and at the Dufferin Street yard.

### **3.7 Sidewalk Snow Clearing**

Sidewalk snow ploughing is the removal of snow and ice on sidewalks on both City and Regional road allowances and on some predetermined park pathways using specialized equipment.

Primary sidewalks are usually defined as: sidewalks that front City owned facilities, parks and other properties; sidewalks that are located on a public transit route; and/or, sidewalks that have been identified as being Primary by staff due to exceptional circumstances.

Secondary sidewalks are usually defined as: all other sidewalks and walkways and are usually located in residential neighbourhoods where the abutting private property owner is responsible for snow clearing

responsibilities, as per By-law 300-93.

**Snow Ploughing** Operations will commence when approval has been given to commence a snow ploughing operation by the Manager of Parks Services or the designated representative in consultation with the Manager of Road Maintenance Services or designated representative.

When determining whether or not to clear snow from sidewalks when snow accumulation is less than 5 cm, the following other factors shall be taken into consideration:

1. Drifting snow, where it is likely to create hazardous conditions.
2. Windrows at intersections from road plowing operations that are likely to create an obstruction to the safe passage of pedestrians or may obstruct the view of drivers.

Circumstances permitting, one complete pass of primary sidewalk routes shall be done within 4 hours of commencing operations when snow accumulation has reached 5cm or more/that secondary routes will be done only after all primary routes are complete/ if circumstances permit all secondary routes will be completed within 16 hours after starting secondary sidewalk plowing/ that with snowfalls of less than 5cm action will be directed by the supervisor.

**Salting / Sanding** Operations will commence when approval has been given to commence a snow ploughing operation by the Manager of Parks Services or the designated representative in consultation with the Manager of Road Maintenance Services or designated representative.

When determining whether to apply de-icing and/or abrasive materials, the following factors shall be taken into account:

1. The temperature is forecasted to remain below 0 degrees Celsius
2. Sleet or freezing rain has fallen and the ambient temperature is not likely to exceed 0 degrees Celsius, or
3. The ambient temperature following a snowstorm will remain below 0 degrees Celsius.

Under normal circumstances, sand/salt shall be applied to Primary sidewalks only. However, should sleet or freezing rain as described in #2 above be a factor, materials shall be applied to all sidewalks.

## **4.0 OPERATIONAL PRACTICES AND STRATEGIES**

### **4.1 Overview**

This Section 4.0 discusses each of the key operational practices and strategies related to the effective management of road salt during winter maintenance activities.

Each subsection has a summary that presents a discussion of the objective, environmental considerations,

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current situation, plan goal, responsibilities, performance measures and references (documents or tables). The important character of the plan is that it is dynamic and obviously takes time to implement.

## 4.2 Key Objectives

Table 4 summarizes the key objectives of the Salt Management Plan.

**Table 4**

<i>Activity</i>	<i>Objectives</i>
Level of Service	Update the Level of Service Policy as required. Define more detailed description of road classifications.
Alternative De-icing Materials	Continuing the usage of ClearLane and other modified salt products or additives, and monitor the performance and effects of the products.
Electronic Controls for Spreaders	Continue to require ground speed regulated electronic controllers in all of the City-owned and contracted salt spreaders.
Spreader Calibration	Develop standardized salter calibration procedures. Continue to require calibration of all spreaders each fall. Check calibration on a regular basis and recalibrating as needed.
Equipment Washing	Ensure the equipment washing is done at the JOC yard where the wastewater will pass through the oil/water separators before discharging into the sewer system.
De-Icer (Salt Ordering & Stockpiling)	Adopt measures to reduce the loss of salt during stockpiling operation.
De-Icer Record Keeping	Develop record keeping for each vehicle and each storm event and comparing periodically to set benchmarked rates for the particular year to confirm the calibrations.
Housekeeping Practices	Develop a housekeeping code of practice to improve the salt management practices at storage facilities (yards).
Weather Forecasting	Provide additional training to staff on interpreting weather information for making snow and ice control decisions.

<i>Activity</i>	<i>Objectives</i>
Road Weather Information System (RWIS)	Implement RWIS stations. Provide training to staff in using RWIS.
Winter Patrolling	Develop patrol guidelines to ensure that the Level of Service Policy is met.
Training	Provide continuing training to staff in the following areas: <ul style="list-style-type: none"> <li>• Weather interpretation</li> <li>• Pavement conditions to make snow and ice control decisions</li> <li>• Infra-Red thermometers</li> <li>• Record keeping and review</li> </ul>
Snow Removal & Disposal Guidelines	Develop snow removal & disposal guidelines.
Reviewing New Technology	Conduct pilot studies using new technology and products.
Communications	Maintain and update the City's web site by providing information to the public on the City's approach to winter maintenance and salt management
Monitoring Program and Sensitive Areas	Identify environmentally sensitive areas in conjunction with TRCA for monitoring and using the results to upgrade the salt management plan
Monitoring of Salter Operations	Reinstate the use of GPS technology in all City-owned and contracted equipment.

## **5.0 CLOSING**

The City of Vaughan is committed to provide properly maintained roads in accordance with its level of service policy. At the same time the City is committed to reducing the impacts that de-icing chemicals, such as salt, have on the environment.

The City has developed a comprehensive Salt Management Plan that it is committed to implementing over the next 5 years. The City will also continue to improve the plan as more salt management techniques become available.