



**City of Fargo
Public Works**

Winter Operations Plan

City of Fargo Public Works

Approved by Council: (__ / __ / ____)

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Purpose

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

The plan is meant to be dynamic, to allow the 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 Winter Operations Plan for **City of Fargo Public Works** was endorsed by council on the _____ day of _____ 20__

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.

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

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

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

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

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

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

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

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

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

system.

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

1.0 Winter Operations Management - Objective

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

2.0 Policy Statement

City of Fargo Public Works will provide efficient and cost effective winter maintenance to ensure, insofar as reasonably practicable, 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 Winter Operations Plan;
- reviewing and upgrading the Winter Operations Plan on an annual basis to incorporate new technologies and new developments;
- committing to ongoing winter maintenance staff training and education; and
- monitoring on an annual basis, the present conditions of the winter maintenance program, as well as the effectiveness of the Winter Operations Plan.

3.0 Winter Maintenance Program

3.1.0 The System Maintained

The major activities related to winter maintenance are:

- anti-icing
- snow plowing
- salt /sand application
- salt and sand storage
- snow removal
- snow storage
- sidewalk plowing and de-icing

City of Fargo Public Works is responsible for winter maintenance on:

Paved roads	<u>0 lane km</u>
Surface treated roads	<u>0 lane km</u>
Unpaved roads	<u>0 lane km</u>
Sidewalks	<u>0 km</u>
Paths and Trails	<u>0 km</u>

For the purposes of this winter operations plan, the highways under the jurisdiction of **City of Fargo Public Works** have been classified (Class 1, 2, 3, 4, 5) as per the

following table which is based on the Classification of Highways table included in O.Reg. 239/02.

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

For the purposes of the table above to this section, the average daily traffic on a highway or part of a highway under the jurisdiction of **City of Fargo Public Works** shall be determined:

- a. by counting and averaging the daily two-way traffic on the highway or part of the highway; or
- b. by estimating the average daily two-way traffic on the highway or part of the highway.

The table below summarizes the road system in **City of Fargo Public Works** as follows:

Paved Lane / KM		Surface Treated / KM		Unpaved Lane / KM	
Rural	Urban	Rural	Urban	Rural	Urban

3.2.0 Level of Service

City of Fargo Public Works provides the following level of service during the winter maintenance season, as set out in 3.3.0, in response to a winter event.

Weather monitoring

3.1 (1) From November 1 to April 30, the minimum standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once every shift or two times per calendar day, whichever is more frequent, at intervals determined by the municipality.

(2) From May 1 to September 30, the minimum standard is to monitor the weather, both

current and forecast to occur in the next 24 hours, once per calendar day.

4. Section 4 of the Regulation is revoked and the following substituted:

Snow accumulation

4. (1) The minimum standard for addressing snow accumulation is,

(a) after becoming aware of the fact that the snow accumulation on a roadway is negatively impacting traffic flows, all efforts will be made to deploy resources as soon as practicable to address the snow accumulation; and

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

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

(ii) on a Class 4 or Class 5 highway with two lanes, to provide a total width of at least five metres.

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

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

1. Patrolling highways.
2. Performing highway maintenance activities.
3. Supervising staff who perform activities described in paragraph 1 or 2.

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

- (a) performing an actual measurement;
- (b) monitoring the weather; or
- (c) performing a visual estimate.

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

- (a) plowing the roadway;
- (b) salting the roadway;
- (c) applying abrasive materials to the roadway; or
- (d) any combination of the methods described in clauses (a), (b) and (c).

(6) This section does not apply to that portion of the roadway designated for parking.

TABLE SNOW ACCUMULATION
The minimum standard for treating snow w.r.t time on roadways is:

Class of Highway	Depth	Time
1	--	--

2	--	--
3	--	--
4	--	--
5	--	--
6	--	--

5. Section 5 of the Regulation is revoked and the following substituted:

Ice formation on roadways and icy roadways

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

1. Monitor the weather in accordance with section 3.1.
2. Patrol in accordance with section 3.

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

(2) If the municipality meets the minimum standard set out in subsection (1) and, despite such compliance, ice forms on a roadway, the roadway is deemed to be in a state of repair until the earlier of,

- (a) the time that the municipality becomes aware of the fact that the roadway is icy; or
- (b) the applicable time set out in the Table to this section for treating the roadway to prevent ice formation expires.

(3) The minimum standard for treating icy roadways after the municipality becomes aware of the fact that a roadway is icy is to treat the icy roadway within the time set out in the Table to this section, and an icy roadway is deemed to be in a state of repair until the applicable time set out in the Table for treating the icy roadway expires.

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

TABLE ICY ROADWAYS
The minimum standard for treating icy roadways is:

Class of Highway	Time
1	--
2	--
3	--
4	--
5	--
6	--

3.3.0 Winter Maintenance Season

The winter maintenance season within which **City of Fargo Public Works** will perform

winter highway maintenance commences on and is completed

3.4.0 Winter Preparations

In the months prior to the start of the winter maintenance season, as identified in 3.3.0, the **City of Fargo Public Works** undertakes the following tasks to prepare for the upcoming winter season.

3.4.1 Prior to the Winter Season

Prior to the winter season, if required, prepare and call tenders for the supply of materials (salt, sand, liquid), replacement parts (for plows, solid and liquid application equipment), value added meteorological services (VAMS) and contract equipment (plow trucks, spreader trucks, combination units).

Prior to the winter season **City of Fargo Public Works** will

1. Conduct a mandatory training session for staff and contract operators where all policies, procedures, schedules, reporting procedures for callout, route maps, equipment training and safety precautions will be discussed. Any issues resulting from the meeting with regard to the policies, procedures, schedules, reporting procedures for callout, route maps, equipment training and safety precautions shall be resolved either at the meeting or prior to the winter season.
2. Train winter patrollers (or staff whose duties also include patrolling) on the route of representative roads to be patrolled between winter events, their duties during a winter event, recording keeping requirements and callout procedures and the de-icing chemicals to be applied for the forecast weather conditions.
3. Inspect equipment to ensure proper working order. Schedule and complete any and all equipment repairs.
4. Arrange for the delivery of materials (salt, sand and liquid solution) and begin filling storage facilities. If liquid solution is mixed on site, begin mixing and filling storage tanks.
5. Confirm that all guiderail, catchbasin, hazard and fire hydrant markers, if any, are in place. Any missing markers will be replaced prior to the winter session.

3.4.2 One Month Prior to the Winter Season

One month prior to the winter season **City of Fargo Public Works** will

1. Post the winter shift schedule in accordance with the municipality's collective agreement, if any.
2. Assign equipment to staff.
3. Calibrate material application equipment.
4. Allow operators (staff and contract) time to familiarize themselves with any new equipment, material application rates, material application equipment and their route (driving the route and noting obstacles along the route).
5. Assign staff to monitor weather forecasts on a daily basis. Assign night patrol shift if forecast indicates an overnight winter event is probable. The patrol person will be authorized to initiate a winter event response if conditions warrant a response.
6. Have a % of the fleet ready to respond to a winter event.
7. Have sufficient staff available to operate the fleet if conditions warrant a winter event response.

3.4.3 Two Weeks Prior to the Winter Season

Two weeks prior to the winter season **City of Fargo Public Works** will

1. Begin regularly scheduled night patrol of representative roads that are maintenance class 1 and 2 roads.

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

3.4.4 At the Start of the Winter Season

At the start of the winter season:

1. Implement the winter shift schedule.
2. Begin patrolling representative roads in all maintenance classes.
3. Respond to winter events as per the winter operations plan.

3.5.0 Winter Patrol

During the winter maintenance season, 3.3.0, **City of Fargo Public Works** carries out a winter patrol on a route of representative roads twice daily, 7 days a week. Between winter events a patrol of representative roads will occur during daylight hours and a second night patrol will be also be scheduled. The purpose of the patrol is to monitor and record weather and road conditions and mobilize winter maintenance operators and equipment should a winter event be observed and a winter event response is required. On the approach of a winter event or during a winter event the route of representative roads may be modified, insofar as reasonably practicable, depending on the type and severity of winter event or the direction from which the storm approaches.

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

3.6.0 Operations

3.6.1 Staffing and Hours of Work

City of Fargo Public Works has a full time employee assigned to each vehicle used for winter operations. Each vehicle is assigned a route for sanding/salting and/or plowing.

City of Fargo Public Works adheres to the hours of service as set out in the Highway Traffic Act, Reg.555/06.

Employee ID or Name	Equipment	Comments	Plow Routes
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3.6.2 Winter Materials Used Annually

Material	2011/2012	5 Year Average**
Solids		
Rock salt (NaCl)	0 tonnes	0 tonnes
Sand	0 tonnes	0 tonnes
Sand and salt mix*	0 tonnes	0 tonnes
--	--	--
Liquids		
Salt brine (NaCl)	--	--
Calcium chloride(CaCl ₂)	--	--
Magnesium chloride(MgCl ₂)	--	--
--	--	--
Pre-treated material***		
PRE-TREATED SAND	--	--
PRE-TREATED SALT	--	--
PRE-TREATED SAND AND SALT MIX	--	--
--	--	--

* Percentage of salt in sand/salt mix by weight **25 %** (industry standard 2 to 5 %)

(** If you do not have 5 years experience, then provide the average for your number of years' experience.

*** Percentage pre-treat material use **0 %**

3.6.3 Application Rates

Solids	Spreading Rates per 2 lane km	
	Salt	Sand
Highway Class		
CLASS1	--	--
CLASS2	--	--
CLASS3	--	--
CLASS4	--	--
CLASS5	--	--
CLASS6	--	--

(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 -5 C	'-5 to -10oC'	'-10 to -18oC'
FROST	--	--	--
LIGHT SNOW	--	--	--
HEAVY SNOW	--	--	--
FREEZING RAIN	--	--	--

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

Liquids - Direct Application	Application Rates litres per lane km
FROST AND BLACK ICE PREVENTION	
Light Traffic/Low Volume	--
Heavy Traffic/High Volume	--
ANTI-ICING: PREVENTING OR REDUCING BOND TO ROAD SURFACE	
Light Traffic/Low Volume	--
Heavy Traffic/High Volume	--
DE-ICING	
Light Traffic/Low Volume	--
Heavy Traffic/High Volume	--

3.6.4 Equipment - Winter Maintenance Fleet

The municipality provides winter maintenance services on _____ routes with the equipment listed below:

Route	Equipment	Staff
-------	-----------	-------

For Equipment Details, See Appendix 3A

3.6.5 Yard Facilities

The municipality provides winter maintenance services from the patrol yards listed below. Each patrol yard has a front end loader capable of loading the winter maintenance fleet with sand or salt.

3.6.5.1 : Yard : Public Works Facility

Equipment Storage Details: 1 pre-engineered steel building, paved lot
Primary Equipment Storage Facility

Equipment Washing Details: 1 dedicated washing bay with oil and grit separator

Material Storage Details: Primary Salt, Sand, Liquid Material Storage Location

Site Drainage Details: MS4 Compliant

3.6.6 Snow Removal and Disposal

3.6.8 Vulnerable Areas

City of Fargo Public Works does not fall under a Source Water Protection Region.

3.6.9 Weather Monitoring

(1) From October 1 to April 30, the minimum standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once every shift or three times per calendar day, whichever is more frequent, at intervals determined by the municipality.

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

In order to determine an effective winter event response and allocate the appropriate resources **City of Fargo Public Works** supplements road patrol information with weather information from various sources which includes:

- Observations from municipal staff, communication with staff of adjacent municipalities and MTO contractors
- Customized weather forecasts which are updated 24 times/day from a Value Added Meteorological Service Schneider Electric
- Monitoring websites
- Staff also monitors pavement temperatures by means of on-board infra red thermometers which are mounted on the patrol and other trucks, and;

3.6.10 Communications

3.6.11 Call Out Procedures

3.6.12 Road Closure Procedures

In the event a road must be closed due to a severe winter storm, **Fargo Police Department** will request signs be placed to close the road. Rb-92 Road Closed Signs on portable stands, TC-54 flexible drums and barricades will be available at the patrol yard. Upon receiving a request from **Fargo Police Department** to close a road to traffic, the Patrol Supervisor or his/her designate will organize manpower and equipment to place the signs and barricades. The Patrol Supervisor or his/her designate will contact the call centre and request that a media release (Appendix 4) be sent to the local news and radio stations advising of the road closure. Roads will be deemed to be closed once the signs and barricades are placed. When it is physically impossible to place signs and barricades to close a road, the Patrol Supervisor or his/her designate will advise **Fargo Police Department** and request **Fargo Police Department** permission to send the media release (Appendix 5).

3.7.0 Decommissioning Winter Operations

After the winter season (identified in 3.3.0) expires **City of Fargo Public Works** undertakes the following tasks to decommission winter operations.

3.7.1 Two Weeks After the Winter Season Ends

Two weeks after the winter season ends:

1. Cease regularly scheduled winter night patrols;
2. Continue monitoring weather forecasts. Assign night patrol shift if forecast indicates an overnight winter event is probable.
3. Decommission % of the fleet

3.7.2 One Month After the Winter Season Ends

One month after the winter season ends cease all winter highway maintenance operations and decommission the remainder of the equipment providing weather forecasts warrant the decommissioning.

3.8.0 Training

3.9.0 Record Keeping

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

Staff is responsible for keeping the following records:

The date will be recorded as Day/Month/Year. It will be written in a numerical format (27/09/12). The time shall be documented using the 24 hour clock format.

Always retain the original copy of documents regardless of their appearance. Writing must legible for others to read and written in ink. Stains or dirt on the documents is not an issue. If a document requires correction then a line is to be placed through the incorrect information without making it illegible and continue writing on the original document. Initial corrections or change in the colour of ink in a case where you change writing pens.

Records will be completed daily and forwarded to the _____ weekly for retention.

4.0 Plan Improvements

The current winter maintenance policies, practices and procedures form the baseline or benchmark upon which improvements can be made to improve winter operations and/or the use and management of road salt.

Over the next ten years **City of Fargo Public Works** plans to undertake the improvements as listed in Table 1. This list will be reviewed and updated annually.

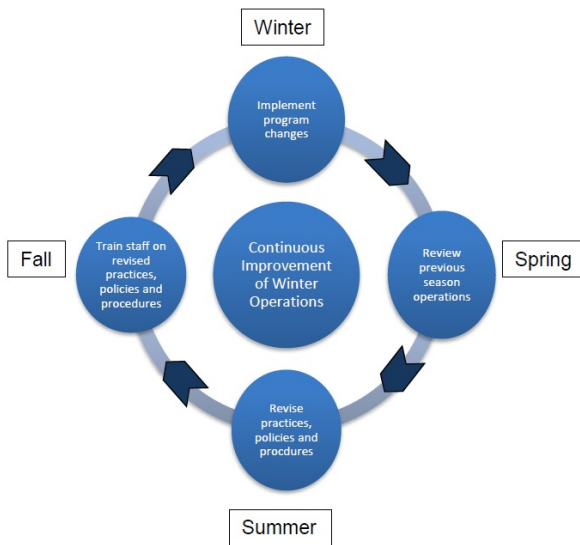
Table 1

Description	Implementation

5.0 Monitoring and Updating

The purpose of monitoring and updating is to provide a basis for continuous

improvement of the winter operations plan and the winter maintenance policies, practices and procedures of the **City of Fargo Public Works**.



At the end of the winter season, as identified in 3.3.0, a meeting to review winter operations will be held each year with all winter operations staff to itemize all issues that arose during the winter season and discuss how these issues may be resolved. Prior to the start of the next winter season and with sufficient lead time to implement any changes, the **City of Fargo Public Works** shall train staff on the changes to equipment and/or winter maintenance policies, practices, and procedures.

The winter season of **2011/12** will be the benchmark year. Year over year achievement using the performance measures listed below will be measured against said benchmark year. Performance measures will be used to determine whether or not the objectives of the Winter Operations Plan and/or winter maintenance policies, practices, and procedures have been met.

Appendix 1 - Route of Representative Roads

Appendix 2 - Plow Routes

Appendix 3 - Vulnerable Areas

Appendix 3A - Equipment

Equipment	Equipment Type	Electronic Controller	Calibration Date	Pre-wet Capability	Anti-icing capability	Liquid Capacity (L)	Infrared thermometers
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Appendix 4 - Media Release Road Closed



City of Fargo Public Works

Date _____

Time _____

Media Release

Due to a severe winter storm **Fargo Police Department** advise that the following roads in **City of Fargo Public Works** are impassable due to drifting and blowing snow and have been closed to traffic.

Street Name	From	To

Fargo Police Department advise that these roads will remain closed until the storm subsides and driving conditions improve.

Appendix 5 - Media Release Severe Weather



City of Fargo Public Works

Date _____

Time _____

Media Release

Due to a severe winter storm **Fargo Police Department** advise that many roads in **City of Fargo Public Works** are impassable due to drifting and blowing snow. **Fargo Police Department** advise that you do not drive until the storm subsides and driving conditions improve.

Appendix 6 - Record of Training



City of Fargo Public Works

This statement certifies that the below named individual has successfully completed the in-house Winter Operations Training program as required by **City of Fargo Public Works** Winter Operations Plan.

The Winter Operations Training program is comprised of the following modules:

- Equipment Circle Check
- Equipment Calibration

- Record Keeping
- Health and Safety
- Level of Service - policies, practices and procedures
- Identification of Plow Routes - including variations for year to year and issues identified along the route
- De-icing chemicals - application rates, storage and handling
- Identification of road salt vulnerable areas and the procedures to follow in those areas
- Yard and Equipment maintenance

Employee Name _____

Print Name

Employee Signature _____

Date _____

Trainer Signature _____

Supervisor Signature _____

Appendix 7 - Record of Training - Night Patroller



City of Fargo Public Works

This certifies that _____ (employee name) has successfully completed the in-house Winter Operations - Night Patroller Training as required by **City of Fargo Public Works** Winter Operations Plan.

The Winter Operations - Night Patroller Training workshop includes the following modules:

- Weather monitoring and forecasting results including: Road Weather Information System, Value Added Meteorological Service, eutectic temperature, pavement temperature, dew point
- Winter Schedules
- Record Keeping
- Health and Safety
- Level of Service - policies, practices and procedures
- Identification of Plow Routes - including variations for year to year and issues identified along the route
- De-icing chemicals - usage, application rates, storage and handling
- Identification of road salt vulnerable areas and the procedures to follow in those areas
- Call-out procedures
- Emergency contacts
- Yard and Equipment maintenance

Employee Name _____

Date of Training _____

Location of Training _____

Trainer Signature _____
Supervisor Signature _____

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