Winter Maintenance

on

Provincial Highways

October 2023



Overview

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Ministry of Transportation



Highway Maintenance Background

- Year-round, the Ministry of Transportation (MTO) is responsible for maintaining-approximately 17,000 kilometres (40,000 lane kilometres*) of provincial highways and 3,000 bridges representing \$82 billion of infrastructure assets through the highway maintenance program.
- Ontario has been using contractors to maintain provincial highways since the 1980s.
- MTO's maintenance contracts are multi-year and include both summer and winter maintenance work. Work includes incident response, pothole patching, drainage maintenance, shoulder and-guiderail repairs, vegetation management, electrical, bridge and sign maintenance, retracing pavement markings and winter maintenance.
- Ontario has some of the highest winter maintenance standards in North America and the ministry is always looking to improve our winter maintenance program.



* Lane kilometres: Length in kilometres of all lanes combined in both directions. For example, one kilometre of a four-lane highway (two lanes in each direction) is four lane-kilometres.

Winter Maintenance Overview

- MTO uses over 1,400 pieces of equipment and the latest technology to fight winter weather across the province.
- The province is divided into four geographical areas (central, west, east, north) with 31 maintenance areas.
- Winter maintenance service levels for provincial highways are based mainly on traffic volumes. Additionally, consideration is given to
 ensuring consistent driver expectations, mobility on the TransCanada highways and access to international gateways, hospitals, schools,
 winter tourism, etc.
- MTO prescribes the minimum effort required to respond to a storm and measures and reports the outcome through bare pavement reporting. MTO's winter service commitment is to achieve bare pavement standard (defined as when 95% of the driving surface is free of snow, slush and/or ice) after the storm 90% of the time. In the 2022-23 winter season, the province met the standard 97 per cent of the time.

Highway Type	Southern Ontario (vehicles per day)	Northern Ontario (vehicles per day)	Highway Condition
Freeway/Urban Highway	> 10,000	> 10,000	Bare pavement within 8 hrs following end of winter event
ON Trans-Canada Highway	(see Note below)	(see Note below) (see Note below) Bare pavement within 12 hours after the end of a winter	
Major Highway	2,001-10,000	1,501 - 10,000	Bare pavement within 16 hrs following end of winter event
Intermediate Highway	1,001-2,000	801 - 1,500	Bare pavement within 24 hrs following end of winter event
Minor Highway	501-1,000	401 - 800	Centre Bare pavement within 24 hrs following end of winter event and fully bare pavement when conditions permit
Local Highway	< 500	< 400	Snow packed driving surface within 24 hrs following end of winter event. Excess snow plowed off and sand applied where required

Note: ON Trans-Canada highway type is specifically for Trans-Canada Highways 11 and 17.

Ministry of Transportation - Winter Service Levels North Region (East) - Northern Portion Ministère des Transports – Niveaux de service pendant l'hiver Région du Nord (Est) – Partie Nord



Winter Maintenance Overview – Hwy 11 North

• New Liskeard / Cochrane area

- Winter Season = Oct 22 to Apr 22
- Transition Period = Sep 22 to Oct 21 and Apr 23 to May 22
- Lane kilometers = 4600
- Heavy Equipment (Snow Plows) = 74
- Maintenance Areas = 2
- Snow Clearing Routes = 50
- Patrol Yards = 17
- Sand (tonnes) = 100,000
- Salt (tonnes) = 50,000
- DLA (litres) = 1,100,000

Winter Maintenance Overview – Materials

- Winter Materials:
 - <u>Sand</u>: Provides traction on slippery surfaces, especially when it is too cold for salt to be effective (below -18°C). It may
 be used at higher temperatures to provide immediate traction on hills, curves, bridges and intersections, and on snowpacked highways.
 - <u>Salt</u>: Melts snow and ice but is less effective at temperatures below -12°C, especially if there is no sunlight, making-bare pavement difficult to achieve in extremely low temperatures.
 - <u>Anti-icing liquid</u>: Anti-icing liquid is sprayed on a highway before a storm to prevent snow and ice from forming and sticking to the highway. It can be placed along a section of highway or at specific locations prone to icing, such as bridge decks. Anti-icing liquid is only applied at specific temperatures and weather conditions.
 - <u>Pre-wetted salt</u>: Pre-wetted salt is regular road salt with anti-icing liquid applied before it is spread on the highway. This
 helps the salt stick to the highway, melt ice and snow more quickly to reduce the amount of salt needed.



Winter Maintenance Overview – Contract Models

Since 2017/2018, MTO has been transitioning to two new contract models that include more prescriptive requirements, optimized routes and equipment requirements and appropriate risk allocation between the maintenance contractor and MTO.

<u>Contractor Directed Maintenance Contracts (CDMC) (starting 2017)</u>:

- Contractor plans and delivers the work in accordance with contract specifications.
- MTO specifies the minimum equipment, operators and materials required for the maintenance area.
- Contractor provides resources (equipment, operators, spares, etc.), materials and services such as patrolling in accordance with contract requirements. Supply of materials (salt, sand, anti-icing liquid, etc.) is based on contract quantities with risk-sharing based on actual usage.
- Contractor is required to follow ministry best practices and method-based standards.

Ministry Directed Maintenance Contracts (MDMC) (after 2018 in select areas):

- MTO plans the work and the contractor delivers the work in accordance with contract specifications.
- MTO specifies the minimum equipment, operators and materials required for the maintenance area. Contractor is responsible for providing resources (equipment, operators, spares etc.) to undertake the work. MTO arranges supply of materials (i.e. salt, sand, anti-icing liquid, etc.) under separate supply contracts.
- MTO is responsible for patrolling and determining the equipment and materials needed to maintain the highway.
- MDMC model requires front-line ministry staff for road patrolling. The model is intended to provide opportunities to smaller/new contractors and to support MTO's goal to remain a knowledgeable owner in the delivery of highway maintenance services.

Planning and Preparedness

- Prior to fall transition period/ winter season:
 - Patroller training.
 - Complete winter equipment and operator list.
 - Complete winter readiness check for all winter vehicles includes spares
 - Calibration checks of salt/ sand spreaders.
 - Servicing/testing of all Road Weather Information System (RWIS) stations.
 - Material stockpiling: salt, sand, brine, proprietary mixes.
 - Pre-winter coordination meetings.

During winter season:

- Monitoring of weather and reports.
- Pre-storm meetings, review with contractors.
- In-storm audits and post-storm audits.
- Updating listing of winter equipment and operators.
- Servicing and repairs of equipment that has experienced break-down.
- Calibration checks of salt/ sand spreaders.
- Material stockpiles reconciliation and replenishment.
- Post-winter coordination meetings and materials reconciliation.





Winter Maintenance Services Delivery Approach

- <u>Pre-Storm Activities</u>: Maintenance staff maintain awareness of changing weather and road conditions through patrolling, highway cameras and MTO's state-of-the-art RWIS technology. MTO's pre-storm approach includes application of anti-icing liquids when conditions are appropriate, prior to a storm to provide the first defense against snow, frost and ice and prevent them from sticking to the pavement.
- **In-Storm Winter Operations**: During a winter storm, MTO requires maintenance contractors to deploy winter maintenance equipment to spread appropriate winter materials within 30 minutes of the start of the accumulation of snow and snow plowing to begin upon 2 centimetres accumulation of snow.
 - Winter maintenance is a continuous operation once a winter storm starts. Equipment usage and material placement are active 24 hours/7 days per week during and following a winter storm, until bare pavement is achieved.
 - This differs from many North American jurisdictions that use terms like best efforts, within allowable budgets, and during normal working hours in their performance commitments.
- **Post-Storm Winter Operations**: After a storm, winter maintenance equipment usage and material placement continue until bare pavement condition is restored. Thereafter, maintenance crews perform clean-up work on shoulders and other work within timelines prescribed in the contract.
 - A severe or long-term winter storm may delay restoration to normal driving conditions, despite best efforts of maintenance crews. Rapid drops to very cold temperatures or long periods of very cold temperatures can also delay the restoration of bare pavement.



Winter Maintenance Oversight

- Contractors must meet 30 contract requirements. MTO provides oversight using various tools and techniques:
 - Monitoring of equipment and activities using GPS and highway cameras
 - Receiving weather data through-Environment Canada and the Road Weather Information System (RWIS).
 - Selective in-storm monitoring and field reviews
 - Audit documents (contractor diaries, equipment reports, material usage, MTO & OPP reports).
- MTO has established a risk-based audit approach, and the contractor's operations are assessed against contract requirements that include the following:
 - Equipment readiness, driver/operator availability and materials for the winter season
 - Deployment of snow plows (upon accumulation of 2cm of snow)
 - Spreading sand/salt (within 30 minutes of start of storm)
 - Application rates for sanding and salting
 - Continuous operations until bare pavement is achieved
 - Addressing isolated slippery sections
 - Post storm clean-up (shoulders, banks, commuter parking lots)
 - Salt and sand management
 - Documentation
 - Circuit times for plowing, sanding and salting
- Non-conformances are issued if the contractor fails to meet contract requirements.







Bare Pavement Performance

Bare Pavement

- Ontario has some of the highest winter maintenance standards in North America.
- Bare Pavement regained is defined as when 95% of the driving surface (edge line to edge line) is free of snow, slush and/or ice.
- After a storm, the province's performance standard is to clear snow from highways to reach bare pavement 90 per cent of the time. The ministry has achieved or exceeded this goal since reporting started in 2003.
- In the 2022-23, the province met the standard 97% of the time.

Winter Severity Index

- Winter Severity Index (WSI) allows consistent year-over-year comparisons in all contract areas. The index is based on snowfall, temperature, freezing rain, rain, and amount of blowing snow.
- Winter Severity Index is calculated each winter season using information from the ministry's 153 RWIS stations and 64 Environment Canada weather stations.

Winter Season	Performance Target (%)	Provincial Achievement (%)
2022-2023	90	97
2021-2022	90	95
2020-2021	90	98
2019-2020	90	97
2018-2019	90	96
2017-2018	90	96
2016-2017	90	97
2015-2016	90	97
2014-2015	90	92
2013-2014	90	94
2012-2013	90	95
2011-2012	90	96

What's new for 2023/24

- <u>New ON Trans-Canada Standard</u>
 - During the 2022-23 winter season, the ministry introduced a new "ON Trans-Canada" standard which requires contractors to clear Highways 11 and 17 to bare pavement within 12 hours of the end of a winter storm, four hours faster than the previous standard.
 - The 12 hours bare pavement standard is intended to enhance winter maintenance services on Highways 11 and 17 while also making the best use of resources and protecting our environment.
 - Ontario Improving Road Safety in the North | Ontario Newsroom <u>https://www.ontario.ca/page/keeping-highways-11-and-17-safe-winter</u>
- Snow Plow Legislation
 - Amendment to the Highway Traffic Act (HTA) came into effect on September 15, 2023, that prohibits the overtaking of snow plows working in echelon formation, on provincial highways with a posted speed limit of 80 km/hr.
 - The amendment is expected to enhance safety by helping reduce unsafe passing manoeuvres around working snow plows.





What's new for 2023/24

- <u>Remote Weather Information System (RWIS)</u>
 - Twenty-four new RWIS stations (14 in Northern Ontario) have been added to the current 152 standard RWIS stations and 16 solar-powered mini-weather stations in our network, for better awareness and response to winter weather conditions.
- Winter Equipment and Materials Innovations
 - Trial use of winter maintenance materials that may be more suitable for extreme cold temperatures in Northern Ontario – potassium acetate and calcium chloride.
 - Further review of new equipment configurations including wide wing plows and medium duty combination units.



Medium Duty Combination Unit



Wide Wing Plow

Technology and Information Services

- Ontario 511 is our official source for information about traffic, highway and weather conditions to help drivers make safer driving choices and plan their journeys. Information is available in both official languages:
 - Website: <u>www.ontario.ca/511</u>
 - Twitter: <u>@511Ontario</u> (English) and <u>@Ontario511</u> (French)
 - Telephone: dial 5-1-1
 - Mobile app: Ontario 511 app
- Tools and features to help travellers plan their journeys include:
 - Updated road conditions
 - Over 600 cameras showing Ontario highways in real-time
 - Weather forecasts and radar (provided by Environment Canada)
 - Forecasted driving conditions based on weather forecasts and pavement temperatures
 - Track My Plow feature with current and past locations of snow plows
 - Incidents and road closures
 - Traffic speeds showing stopped and slow traffic
 - Text/ email notifications for registered users travel delays, reduced traffic speed, incidents and closures
- The Ontario 511 App is available for free at the <u>App Store</u> and <u>Google</u> and includes the ability to switch between "Trucker" and "Public Driver" modes.



Winter Maintenance - Other Considerations

Despite best efforts of winter maintenance crews, poor road conditions can occur during winter season. Impacts are typically more disruptive in Northern Ontario due to limited alternative routes and longer duration closures/ time to clear the highway due to extreme cold weather.

- <u>Highway Closures</u>: During a severe storm poor weather, road conditions or visibility may necessitate the closure of highways by the OPP to ensure the safety of the travelling public and maintenance equipment operators.
 - Decisions on highway closures are carefully considered by the Ontario Provincial Police and are implemented only when necessary.
 - MTO provides road and weather information through Ontario 511 and local media services, where feasible, to assist planning by travelers.
- <u>Lake-Effect and Local Weather Conditions</u>: Local severe weather such as snow squalls, lake-effect, blowing snow etc. can result in poor visibility or poor road conditions until weather conditions improve, and maintenance crews are able to clear the roadway.
 - The OPP and MTO endeavor to issue advisories when local severe weather and poor visibility is forecasted.
- Local Slippery and Poor Road Conditions: In some situations, local slippery conditions can result from snow/ice melting due to sun-exposure and refreezing as temperature drops in the evening/ night.
 - Maintenance contractors pay special attention to known areas of concern and address local slippery conditions on priority.
- High Rock Cuts and Steep Highway Grades: At places where high rock cuts prevent direct sunlight exposure of sections of the highway, very cold temperature snaps can limit the ability of salt to work effectively leading to slippery conditions. Similarly long and steep highway grades, typically in Northern Ontario, often reduce the travelling speed of tractor trailers or cause them to jackknife. On occasions when the OPP closes the highway, winter maintenance operations are interrupted.
 - MTO continues to program and implement infrastructure improvements such as rock removal, truck climbing/ passing lanes and other measures to address steep grades.
- <u>Snow-Pack/Ice-Pack Conditions</u>: Winter materials become less effective during extreme low temperature conditions and similarly static or slowmoving traffic may impact winter operations. Such conditions can lead to snow-pack/ice-pack conditions requiring more time and effort to clear roadways.

For More Information:

- For questions or concerns contact MTO:
 - MTOINFO@ontario.ca
- To inquire on behalf of or refer a constituent, please contact:
 - Hardeep Singh Grewal, Parliamentary Assistant, Ministry of Transportation
 - hardeep.grewal@ontario.ca
 - 416-327-9200
- To express a concern, contact our contractors directly on their toll-free numbers (please see attached appendices for list of telephone numbers in each region).
 - Contractors are required to answer calls or have voice message services available. Calls are to be returned within 24 hours.

For hazardous conditions reporting:

• Please contact the Ontario Provincial Police 24 hour toll-free line by dialing 1-888-310-1122

Appendices



Ministry of Transportation



Appendix A: Central Region Maintenance Areas

AMC: Area Maintenance Contract CDMC: Contractor Directed Maintenance Contract MDMC: Ministry Directed Maintenance Contract

Central Region has eight Maintenance Areas:

Map of Southern Ontario Maintenance Contract Areas

Maintenance Area	Contractor	Telephone	Fall Transition Period	Winter Season	Spring Transition Period
Durham	Integrated Maintenance & Operations Services (IMOS)	1-877-673-1551	October 16 - November 14	November 15 - March 31	April 1 - April 30
Hamilton	Integrated Maintenance & Operations Services (IMOS)	1-877-563-2344	October 16 - November 14	November 15 - March 31	April 1 - April 30
Niagara	Integrated Maintenance & Operations Services (IMOS)	1-888-275-6030	October 16 – November 14	November 15 – March 31	April 1 – April 30
Peel/Halton East	Webber Infrastructure Management	1-833-222-0023	October 16 – November 14	November 15 – March 31	April 1 – April 30
Peel/Halton West	Emcon Services Inc.	1-877-905-7770	October 16 - November 14	November 15 - March 31	April 1 - April 30
Simcoe	Fowler Construction Company Ltd.	1-800-375-2430	October 16 - November 14	November 15 - April 15	April 16 - May 15
Toronto	MTO/ Integrated Maintenance & Operations Services (IMOS)	1-888-444-0456	October 16 - November 14	November 15 - March 31	April 1 - April 30
York	Webber Infrastructure Management	1-833-222-0024	October 16 - November 14	November 15 - March 31	April 1 - April 30

- Transition Period (start of Winter, end of Winter): Contractors are required to have a minimum of 50% of the full winter equipment complement available for use during the transition period.
- MTO has constructed three new Road Weather Information System (RWIS) weather stations in Central Region to further enhance weather forecasting and to help contractors better respond to winter weather and clear highways as quickly as possible.





Appendix B: West Region Maintenance Areas

AMC: Area Maintenance Contract CDMC: Contractor Directed Maintenance Contract MDMC: Ministry Directed Maintenance Contract

Map of Southern Ontario Maintenance Contract Areas

•	West Region	has three	Maintenance Areas:	
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Maintenance Area	Contractor	Telephone	Fall Transition Period	Winter Season	Spring Transition Period
Chatham	Emcon Services Inc.	1-866-259-8932	November 1 - November 30	December 1 - March 31	April 1 - April 30
London	Emcon Services Inc.	1-855-557-8478	October 16 - November 14	November 15 - March 31	April 1 - April 30
Owen Sound	Integrated Maintenance and Operations Services (IMOS)	1-888-222-2640	October 15 – November 5	November 5 - April 1	April 1 - April 30

- Transition Period (start of Winter, end of Winter): Contractors are required to have a minimum of 50% of their total winter equipment available for use during the transition period.
- MTO has constructed four new Road Weather Information System (RWIS) weather stations in West Region for better weather forecasting and to help contractors better respond to winter weather as quickly as possible.



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West Region

Appendix C: North Region (West) Maintenance Areas

AMC: Area Maintenance Contract CDMC: Contractor Directed Maintenance Contract MDMC: Ministry Directed Maintenance Contract

• North Region (West) has five Maintenance Areas:

Map of Northern Ontario

Maintenance Area	Contractor	Telephone	Fall Transition Period	Winter Season	Spring Transition Period
Kenora	Emcon Services Inc.	1-844-362-6615	September 22 - October 21	October 22 - April 22	April 23 - May 22
Thunder Bay East	Emcon Services Inc.	1-888-636-8704	September 22 - October 21	October 22 - April 22	April 23 - May 22
Thunder Bay West	Integrated Maintenance and Operations (IMOS)	1-855-680-0861	September 22 - October 21	October 22 - April 22	April 23 - May 22
Marathon	MTO/ IMOS	1-833-768-0293	September 22 - October 21	October 22 - April 22	April 23 - May 22
Kakabeka	MTO/ IMOS	1-833-768-0293	September 22 - October 21	October 22 - April 22	April 23 - May 22

- Transition Period (start of Winter, end of Winter): Contractors are required to have a minimum of 50% of their total winter equipment available for use during the transition period.
- MTO has constructed three new Road Weather Information System (RWIS) weather stations in Northwestern for better weather forecasting and to help contractors respond to winter weather as quickly as possible.



Appendix C: North Region (East) Maintenance Areas

AMC: Area Maintenance Contract CDMC: Contractor Directed Maintenance Contract MDMC: Ministry Directed Maintenance Contract

• North Region (East) has six Maintenance Areas:

Map of Northern Ontario

Maintenance Area	Contractor	Telephone	Fall Transition Period	Winter Season	Spring Transition Period
Huntsville	Fowler Construction Company Ltd.	1-866-527-8216	October 8 – November 6	November 7 – April 15	April 16 – May 15
New Liskeard	Integrated Maintenance and Operations Services (IMOS)	1-877-236-4667	September 22 - October 21	October 22 - April 22	April 23 - May 22
Cochrane	Integrated Maintenance and Operations Services (IMOS)	1-877-236-4667	September 22 - October 21	October 22 - April 22	April 23 - May 22
North Bay	Fowler Construction Company Ltd.	1-888-353-0843	October 2 - October 31	November 1 - April 15	April 16 - May 15
Sault Ste. Marie	Ledcor	1-866-453-3267	September 22 - October 21	October 22 - April 22	April 23 - May 22
Sudbury	Emcon Services Inc.	1-844-362-6615	October 2 - October 31	November 1 - April 15	April 16 - May 15

- Transition Period (start of Winter, end of Winter): Contractors are required to have a minimum of 50% of their total winter equipment complement available for use during the transition period.
- A new CDMC contract in Sault Ste. Marie started on June 1, 2023
- MTO has constructed eleven new Road Weather Information System stations for better weather forecasting and to help contractors better respond to winter weather as quickly as possible.

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North Region -East - Northern

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Ministry of Transportation - Winter Service Levels North Region (East)- Southern Portion Ministère des Transports – Niveaux de service pendant l'hiver Région du Nord (Est) – Partie Sud

North Region -East - Southern

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Appendix E: Eastern Region Maintenance Areas

Eastern Region has five Maintenance Areas:

AMC: Area Maintenance Contract CDMC: Contractor Directed Maintenance Contract MDMC: Ministry Directed Maintenance Contract

Map of Southern Ontario Maintenance Contract Areas

Maintenance Area	Contractor	Telephone	Fall Transition Period	Winter Season	Spring Transition Period
Bancroft AMC	Emcon Services Ltd.	1-877-979-0998	October 2 – October 31	November 1 – April 1	April 2 – May 1
Carleton Place MDMC	MTO/ TG Caroll	1-888-362-1770	October 7 – November 6	November 7 – April 15	April 16 – May 15
Kingston East AMC	GIP Highway Maintenance	1-866-685-2770	October 16 – November 14	November 15 – March 31	April 1 – April 30
Kingston West AMC	Emcon Services Inc.	1-877-979-0998	October 16 – November 14	November 15 – March 31	April 1 – April 30
Ottawa CDMC	Webber Infrastructure Management	1-888-554-5344	October 7 – November 6	November 7 – April 15	April 16 – May 15

- Transition Period (start of Winter, end of Winter): Contractors are required to have a minimum of 50% of their total winter equipment available for use during the transition period.
- MTO has constructed three new Road Weather Information System stations in Eastern Ontario for better weather forecasting and to help contractors respond to winter weather as quickly as possible.

