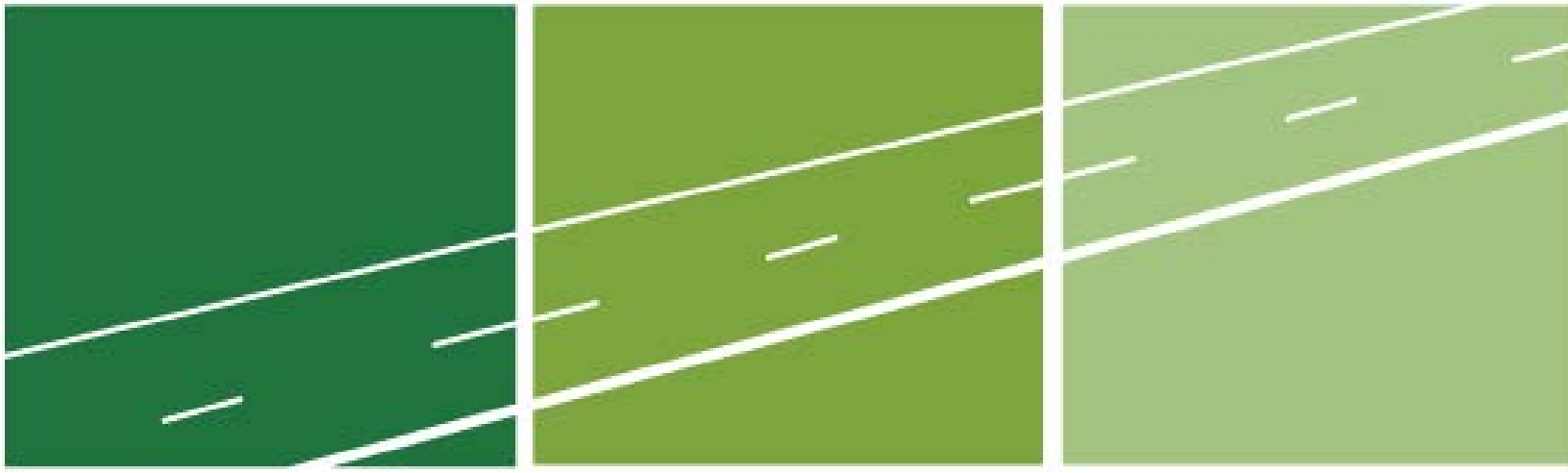
Manitoba Winter Levels of Service

A Guide to Winter Maintenance

Fall 2013



Manitoba
Infrastructure and Transportation

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* Note *

All words found in *Italic* within this document are defined on the second last page.

Program Objectives

Manitoba Infrastructure and Transportation provides winter operations necessary to ensure that roadways, interchanges, intersections and auxiliary structures are kept reasonably clear of ice and snow to allow for efficient, safe and timely travel throughout the province. This service will be provided within the guidelines and timeframes detailed in this document.

Purpose

To provide prioritized timely service in order to minimize the risk to the travelling public.

Priorities

For the purpose of snowplowing, snow removal and ice control, the entire network is assigned to one of three levels of service. Operations will normally be carried out in order of assigned levels.

Levels of Service

In support of the economy of Manitoba, Levels of Service are based on different components of the provincial road network: These components are Core and Local Trade Routes, Major Tourism Routes, and the Regional Highway Network (RHN). The criteria that were used to separate the roads into these components include traffic and truck counts, population and economic benefits to the province. All of these roadways are grouped into one of the following three levels for winter operations:

Level 1 Core and Local Trade, and Major Tourism routes.

Level 2 RHN - Surfaced

Level 3 RHN - Gravel Routes, Access Roads and Service Roads

The level of service provided to the travelling public will be in tune with public expectations, available funding and what is achievable based on resources and conditions.

Levels of Service Summary Statement

Level 1
All *travel lanes* shall be plowed within 4 hours of the event on surfaced roads and 8 hours on gravel roads in this Level. Once Level 1 roads are nearing completion, work may commence on Level 2 roads. All clean up of interchanges and intersections will be completed the day after the end of the storm. Clearing of snow adjacent to the lanes on bridges, structures, and guardrails will be completed within 72 hours of the end of a storm. This does not include the pushing back or loading and hauling of snow to make room for future accumulations.

Level 2
All *travel lanes* shall be plowed such that the surface is predominantly visible within 8 hours after plowing on Level 2 roads begin. . Shoulder clean up will be completed within 24 hours after the end of the storm. Roads in this level will have predominantly bare pavement before snowplowing will commence on Level 3.

Level 3
Roads will be cleared of any snow accumulation only after all other higher priority roads have received the level of service detailed above, typically within 48 hours after the end of the storm. Only those roads reported as 'impassable' to vehicles will be given priority in this category. It is acceptable to have a snow packed gravel surface.

There are four main components to the winter operations program where a service level will be defined. They are:

Road Patrol

Snowplowing

Snow Removal

Traction and Ice Control

Service levels for each of these components are described in the following sections.

Road Patrol

Routine patrol by Area Works Supervisors (ARS) or Designate will take place during scheduled shifts. This patrol is used to determine if intervention is required based on the service levels detailed in this document and to gather road condition information. Road conditions will be reported to the local dispatcher and must be updated as changes occur.

Weekend road patrol will occur on Level 1 roadways as directed by the Maintenance Superintendent. Typically the ARS and Assistant Works Supervisor (AWS) will alternate weekends when patrols are required.

Early morning sand/plow truck patrols will operate on select Level 1 roads as directed by the Maintenance Superintendent. This patrol will provide immediate action where traction control or light snowplowing is required to control drifting or light snowfall. The operator will call the Supervisor for additional resources once conditions exceed the capability of this unit. The operator will also report any changing road conditions. This service will be provided Monday to Friday.

This service will form the framework for the road information that is supplied to the public at the Regional level and through the Road Information Operations Center at the provincial level.

Snowplowing

Snowplowing operations involve the movement of snow from the traveled roadway to snow storage areas adjacent to the road. Truck-mounted plows and motor graders are typically used to carry out this work.

There are three general operating environments involved in snowplowing operations.

Storm Conditions
Snow Event Clean-Up Conditions
General Maintenance Conditions

The following outlines the Department's snow clearing strategy for each of these three environments.

Storm Conditions

During *storm conditions* like a heavy snowfall where accumulations are expected to be over 5cm or strong winds cause snow drifting, the objective is to keep roadways open for emergency travel in order of priority with Level 1 being the highest and Level 3 the lowest.

Level 1 - Snowplowing will commence as soon as there is sufficient snow to remove by mechanical means. This operation will continue through the storm or until visibility becomes a safety issue. If visibility is reduced to less than 100 meters and severe sight-distance restrictions exist that affect safety to both the operator and the motoring public then all snowplowing operations will cease until these conditions improve. Snowplowing will continue until end of storm or until the department determines that resources cannot keep up with *storm conditions*. At that point a decision may be made that resources will be pulled from the road until *storm conditions* improve. Reasonable extended hours may be required to achieve this level. A shift should not normally exceed 12 hours.

Level 2 - Snowplowing will commence once roads become *impassable for the average road user* and only if resources remain available to maintain Level 1 roadways. Priority will be given to single access and emergency routes

Level 3 - Snowplowing will commence only after roads become *impassable for the average road user* and only if resources remain available to maintain Level 1 and Level 2 roadways. Priority will be given to single access and emergency routes.

Snow Event Clean-Up Conditions

Snow event clean-up conditions commence once snow has reached a depth to which it can be removed by mechanical means. Each Level described below has its own intervention points. The following actions will be initiated in order of service level after a snow event:

Level 1 – Normally plowing will begin when an accumulation of 3 cm has built up on the *travel lanes*. All *travel lanes*, including shoulders, should be cleared within 4 hours of commencement of plowing paved roads and 8 hours on gravel roads. This may include a double round on shoulders where shoulder width and weather conditions are factors. Where ever possible, a corridor plowing strategy will be used to ensure continuity of service for the road users on all Level 1 roads. This may require working beyond the regular 8 hour shift. All clean up of shoulders, interchanges, and intersections will be completed the day after the end of the snow event. This does not include the pushing back or loading and hauling of snow to make room for future accumulations.

Level 2 – Normally plowing will begin when an accumulation of 5 cm has built up on the *travel lanes* or all Level 1 roads have been plowed. All *travel lanes*, including shoulders, should be cleared within 8 hours of commencement of plowing. This may require working beyond normal work hours. All clean up of shoulders, interchanges, and intersections will be completed the day after the end of the snow event. This does not include the pushing back or loading and hauling of snow to make room for future accumulations. Roads in this level will have predominantly bare pavement before snowplowing will commence on Level 3.

Level 3 – Normally plowing will begin when an accumulation of 10 cm has built up on the *travel lanes* or all Level 1 and Level 2 roads have been plowed. Roads will be cleared of any snow accumulation only after all other higher priority roads have received the level of service detailed above. This is typically accomplished within 48 hours after the end of the snow event. It is acceptable to have a snow packed gravel surface. These roads will be plowed during the regular 8 hour shift.

General Maintenance Conditions

General Maintenance including *winging back*, pushing with loaders etc., will commence once all roads have been cleared as described above. Snow removal activities will be carried out in order to prepare for subsequent events and to improve the safety for road users.

Snow levels will be reduced in areas such as interchanges, structures, median openings, curves and corners in order to improve driver lines-of-sight and to maintain the integrity of crash attenuation systems (i.e. guardrails, median barriers, crash drums, etc.). At an intersection an adequate site line is defined as a distance of 15 meters each way from point of entry and an accumulation of snow not in excess of 1.0 m in height.

In early spring, additional snow clearing operations may be performed to improve drainage conditions (i.e. areas around catch basins, shallow culverts, and frozen ditches). This work will be reviewed and authorized by the Maintenance Superintendent.

There are 4 general operating environments for *General Maintenance* Conditions including:

- *Snow Removal on Bridges and Structures*
- Snow Removal Within the *ROW*
- Snow Removal in Urban Areas
- *Ice and Traction Control*.

Snow Removal on Bridges and Structures

All bridge structures have some form of guardrail on and adjacent to them to protect an errant vehicle from crashing into a bridge abutment or going off a bridge into the water body/roadway below. It is important to clear snow that has piled up against the guardrail systems to minimize the risk of errant vehicles being launched over the guardrail.

The timelines for *snow removal on Bridges and Structures* are listed below by service level.

Level 1 - The clearing of snow adjacent to guardrails on bridges and structures will be carried out within 72 hours of the end of snow event.

Level 2 and 3 - The clearing of snow adjacent to the guardrails on bridges and structures will be carried out when snow stored along these structures reaches the edge of the travel lane.

Bridge Walkways

Snow shall be cleared from bridge walkways only after the Department has completed all Level 1 through 3 roadways. This operation will only be undertaken if the bridge is located on a *declared* roadway. Bridge walkways located on *designated* roadways are the responsibility of the local jurisdiction. The clearing of snow on bridge walkways will be completed during the regular 8 hour shift.

Snow clearing on Bridge walkways will only be done provided there are pedestrians using the walkway. Snow plowed onto the walkways has the potential to have sand and salt residue in it. This snow needs to be removed from the walkway and hauled to an acceptable snow dumpsite and not thrown into the waterbody/roadway below.

Snow Removal within ROW

Snow removal operations involve the removal of snow from the road right-of-way using trucks, industrial snow blowers, and front-end loaders. These operations will commence once other snowplowing operations have been completed. Snow is then transported to approved snow dumpsites, where the snow is stored until the spring melt. Snow removal ensures that there is snow storage capacity for future snow clearing operations and improves driver visibility within the right-of-way.

As with snow clearing operations, in early spring additional emphasis will be placed on snow removal operations in order to improve drainage conditions (i.e. areas around catch basins, shallow culverts, and frozen ditches). This work will be reviewed and authorized by the Maintenance Superintendent.

Level 1 – Snow removal is typically limited to interchanges, intersections, raised medians and railway crossings on Level 1 roadways. Snow removal on Level 1 roads may be scheduled any time of the day or night which ever best accommodates the motoring public and maximizes the use of department resources.

Level 2 – Snow removal is typically limited to interchanges, intersections, raised medians and railway crossings on Level 2 roadways. The removing of any snow will only take place after removal on Level 1 roads has been completed. Snow removal will generally be carried out on Level 2 roadways during the regular 8 hour shift.

Level 3 – Lower priority roadways may be treated if accumulation is causing significant risk with the ability of the road to stay open in the next snow event and/or concern with driver sightlines at intersections. Snow removal will be carried out on Level 3 roadways during the regular 8 hour shift.

Snow Removal Urban

Cities, Towns, & Villages / Local Urban Districts (LUD's)

The Department will provide and maintain an equitable level of service to Cities, Towns, Villages and LUD's as defined herein. Urban roadways will be opened in the *travel lanes* within 24 hours of the end of a storm but only after the department has met its objectives on Level 1 & 2 roads. This does not preclude the fact that in some instances urban roadways will have the lanes opened while the snowplow is in the area.

Urban roadways will have the snow cleared from the surface after each snow event that drops 8 cm or more. Any amount less will be allowed to accumulate until the next event.

In general, snow shall be plowed and stored in the most practical manner available to reduce the impact on local business and industry.

Business area – No Boulevard

On roadways that do not have a median sufficient for storing snow but have a parking area, snow shall be spread in the parking lanes and allowed to pack to curb height or to depths of approximately 20 cm. Snow not able to be stored in this manner shall be windrowed to the center of the street or to the edge of the roadway and stored if roadway width is sufficient to accommodate without impacting traffic. Snow removal should be scheduled for hauling away to approved snow dumpsites when the stored snow in the center of the street has accumulated to a height of 150 cm. When the stored snow at the edge of the roadway has accumulated to a height of 50 cm removal should be scheduled.

Business owners are expected to cut access through the windrow as required.

Business area – Boulevard

On roadways that have a sufficient median for storing snow that does not affect parking or pedestrians shall be plowed and windrowed into the storage area. Removal of this snow will not be undertaken unless driver sightlines are impeded at intersections as described previously or drainage improvements are required to handle the spring melt. Where there is no storage area the snow will be spread in the parking area and allowed to pack to a depth of approximately 20 cm.

Residential –
Snow shall be stored at locations as previously outlined. Snow removal in front of residential areas will not be undertaken. The department will not clean driveways filled during the snowplowing operation, as this is the responsibility of the crossing owner.

School Zones –
Snow hauling from boulevards adjacent to school drop off areas in Towns and Villages should be done only after snow accumulations in the windrow exceed 50 cm in height.

Ice and Traction Control

Ice and Traction Control is the application of a sand/chemical mixture or pure chemical to the road surface in order to increase the traction of vehicle tires in winter conditions.

As icy conditions develop or are about to develop due to either rain or snow, roadways are treated with sand and/or a chemical in order to ensure that safe winter driving conditions are achieved within a reasonable time frame.

Level 1 - Sand and/or chemicals should be applied when conditions are appropriate. Level 1 roads will be monitored for conditions that result in slippery road surfaces. These slippery road conditions will be treated as weather conditions permit. Sanding and the application of

chemical will be handled in a timely fashion without swinging into a 24-hour operation. Extended hours or unscheduled hours of operation may be required. Known problem areas in this level including certain hills and intersections should be given priority when treatment begins.

Generally it can be expected to have coverage on all Level 1 roads within 4 hours once operations commence.

Level 2 - Sand and/or chemical should be applied when conditions are appropriate. Level 2 roadways are patrolled during icy conditions and will be treated once the majority of Level 1 roads are completed and the prevailing weather conditions permit. Generally once the sanding or chemical application operation begins on Level 2 roads, they should receive coverage within 8 hours, without swinging into a 24-hour operation. Extended hours or unscheduled hours of operation may be required.

Level 3 – Level 3 roadways should be sanded once all Level 1 and 2 roadways have been treated and do not require continual inspection and treatment. Level 3 roadways are typically inspected and treated as required. Generally only sand should be applied at intersections and on hills and curves. Sanding will be carried out on Level 3 roadways during normal working hours.

Winter Operations Review

It is important for each Regional Maintenance Management Team to conduct a minimum of two Winter Operations Review meetings. One will be held during the fall in advance of winter operations and the other in the spring before the end of March. The purpose of the fall meeting is to develop and fine tune a snowplow and ice control strategy. The purpose of the spring meeting is to review how things went and what can be done to improve the plan while it is fresh in everyone's mind.

Snowplowing Operations

It is the responsibility of all Maintenance Operations Staff to optimize the use of resources in an effort to maximize their capacity in order to meet the time frames identified for each level of service. There are many things to consider when a winter storm is about to develop so the more that can be planned and organized in advance the better. One of the most important tasks in any snow event is the dispatching and routing of the snowplow equipment. For this reason, having a well thought out and documented snowplow strategy in place takes a lot of pressure off both supervisors and staff as both then know what is expected.

The use of corridor plowing on all Level 1 roads is important in order to provide a consistent driving condition for the road user. For purposes of this document, corridor plowing is defined as plowing from one community to the next without deviating from the most direct path. The corridor plowing strategy will be developed first during the fall Winter Operations Review meeting. Once all routing has been determined for Level 1 roads in the *Region*, a snowplow strategy for servicing Level 2 and 3 roads will be developed.

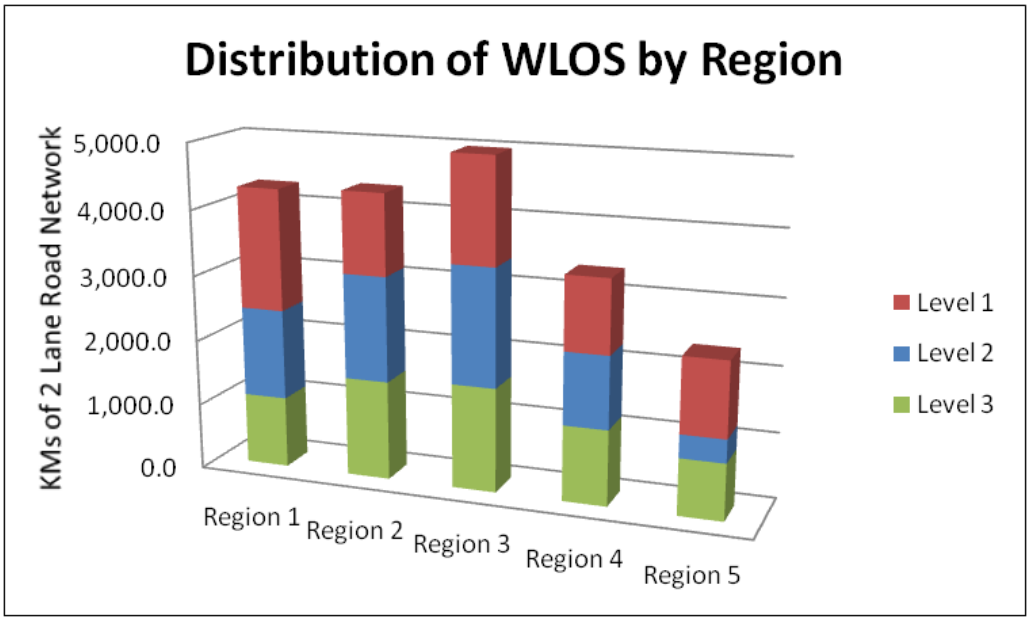
Ice Control Operations

While snowplowing operations and ice control operations appear similar, they are not the same. Many of the statements made in the previous section remain true for ice control, but because ice control units must cycle back to a maintenance yard to reload with product, the routes used for snowplowing may not work. For this reason, an ice control strategy for each *Region* will need to be developed and will include routing in order of priority.

Pre-planning snowplow and ice control operations will substantially improve communication, resource utilization and service delivery to our customers, the motoring public!

Network Distribution

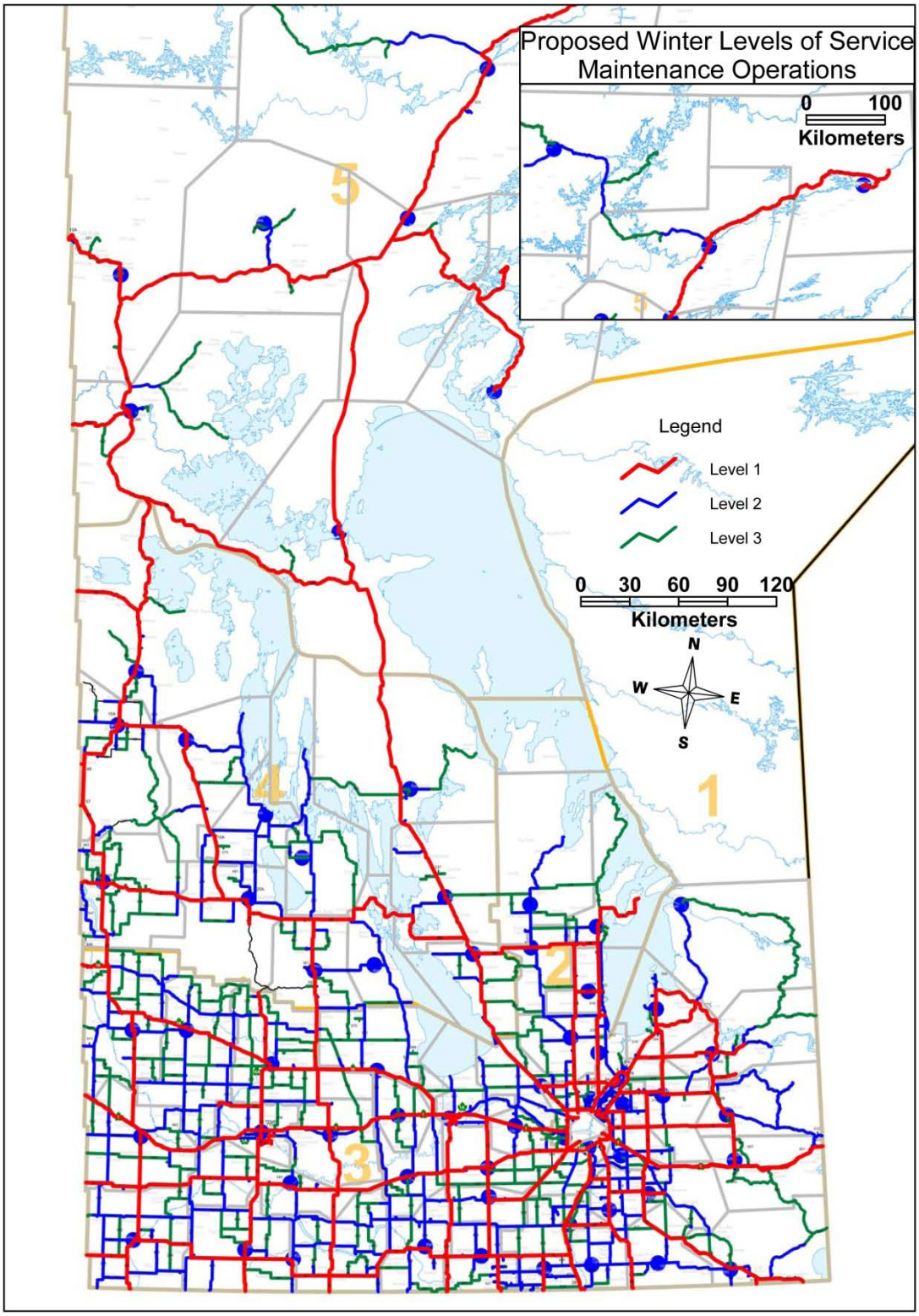
The following charts indicate the breakdown of the road network based on the Provincial Winter Levels of Service. It shows the Kilometers of 2 Lane road in each level of network per *Region* for the entire Province.



	Level 1	Level 2	Level 3	Regional Total
Region 1	1,850.7	1,368.4	1,083.3	4,302.4
Region 2	1,237.8	1,598.4	1,510.0	4,346.2
Region 3	1,605.5	1,793.6	1,587.8	4,987.0
Region 4	1,115.1	1,097.4	1,150.8	3,363.3
Region 5	1,137.1	351.5	860.1	2,348.7
Provincial Total	6,946.2	6,209.4	6,192.0	19,347.6

The following map provides a high level overview of the provincial network. Regional, Sub Regional and Resource Group Specific maps are available on the Operational Services intranet site.

Provincial Winter Levels of Service Map



Definitions

WLOS, Winter Level of Service.

Travel lanes, includes main lanes and all auxiliary/turning lanes, legs and loops.

Routine patrol, Area Works Supervisors or Designate will take place during normal working hours. This patrol is used to determine if intervention is required based on the service levels.

Storm Conditions, Conditions such as a heavy snowfall or strong winds causing snow drifting, the objective is to keep roadways open for emergency travel, in order of priority.

Impassable for the average road user – will be defined by the majority of type of traffic using the road (i.e. what is impassable for predominantly commuter traffic may not be for an industrial route which carries mostly truck traffic.

Snow Event Clean-Up Conditions, *(no more snow is accumulating)* Snow event Clean-Up Conditions commence once snow has reached a depth to which it can be removed by mechanical means.

General Maintenance, ***(after all roads are cleared).***General Maintenance, winging back, pushing with loaders, etc., will commence once all roads have been cleared.

Winging back, Pushing snow from shoulder to snow storage areas or ditches.

Snow Removal on Bridges and Structures, The clearing of snow adjacent to the lanes on bridges, structures, and guardrails.

Snow Removal within ROW, Snow removal operations involve the removal of snow from the road right-of-way using trucks, industrial snow blowers, and front-end loaders.

ROW, Right of Way, means an area of land acquired for a public thoroughfare.

Ice and Traction Control, Ice and Traction control is the application of a sand/chemical mixture or pure chemical to the road surface in order to increase the traction of vehicle tires in winter conditions.

Region, the province is split into these 5 geographical areas.

Declared Highway, The Department is the traffic authority.
Designated Highway, Highways within a community where the local jurisdiction is the traffic authority and is responsible for provision of municipal services such as cleaning sidewalks and bridge walkways.

Approval/Sign Off

Recommended

Original signed by Ron Weatherburn, P. Eng. — *April 16, 2013*

Ron Weatherburn, P. Eng.
Executive Director
Construction & Maintenance

Date

Original signed by Don McKibbin, P. Eng. — *April 15, 2013*

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Approved

Original signed by Lance Vigfusson, P. Eng, — *April 16, 2013*

Lance Vigfusson, P. Eng.
Assistant Deputy Minister
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Date