FINAL

Compass Report

Wisconsin State Highway

2017

Maintenance, Traffic, and Operations Conditions

Compass Advisory Team:

Lance Burger, WisDOT Northwest Region Roadway Maintenance Engineer
Scott Bush, WisDOT Compass Program Manager
Brandon Dammann, Wood County Patrol Superintendent
Jeff Gust, WisDOT State Highway Program Development & Analysis Section Chief
Bob Hanifl, WisDOT Southwest Region Maintenance Project Engineer
Jeff Hess, WisDOT North Central Region System Planning and Operations Manager
Todd Hogan, WisDOT Southwest Region Maintenance Coordinator
Jim Hughes, WisDOT Highway Maintenance & Roadside Management Section Chief
Bill McNary, WisDOT Traffic Engineering Section Chief
Mike Ostrenga, WisDOT Northwest Region Maintenance Supervisor
Doug Passineau, Wood County Highway Commissioner
Iver Peterson, WisDOT Southwest Region Signing and Marking Lead Worker
Bob Platteter, Buffalo County Highway Commissioner
Mark Woltmann, WisDOT Highway Maintenance Program Management Section Chief

Table of Contents

List of Tables

List of Figures

Executive Summary

The Compass Program is an annual assessment of the maintenance condition of Wisconsin's Interstates, U.S. highways, and state trunk highways. The program helps the Wisconsin Department of Transportation understand current infrastructure conditions, trends and needs on the state highway system. The data also helps WisDOT managers set reasonable maintenance targets that reflect department priorities and respond to limited resources. To ensure that maintenance targets are consistently reflected in work programs around the state, these priorities are shared with the WisDOT regions, to help structure the Routine Maintenance Agreements with counties. To evaluate the maintenance target setting process, existing conditions are also compared to their target levels, to see if the annual goals were met or exceeded.

The Compass Annual Report is based on a yearly field review process and current data from the WisDOT Sign Inventory Management System, WisDOT Annual Winter Maintenance Report and WisDOT Pavement Maintenance Management System. Below are the significant messages on the current condition of the state highway system and specific examples of how the WisDOT Bureau of Highway Maintenance uses the information to manage maintenance of the state highway system:

- *MAPSS performance data:* MAPSS is the performance management system for WisDOT and stands for the five WisDOT goals – **M**obility, **A**ccountability, **P**reservation, **S**afety and **S**ervice. Condition data obtained by the Compass field review process is used to develop the MAPSS highway maintenance performance measure. A maintenance grade point average is calculated from the individual condition grades for 29 highway features evaluated in the Compass program. The 2017 GPA for state highway maintenance is 2.55 (refer to the chart on next page). The department's maintenance goal is a 3.00 GPA.
- *Continued focus on reducing shoulder drop-off*: There has been continued emphasis on fixing drop-off along unpaved shoulders so drivers who veer off the traveled way can safety get back onto the paved surface. More aggressive maintenance targets have been set over the past several years to deal with this issue and more funding has been directed to gravel shoulder maintenance. The amount of drop-off on unpaved shoulders increased slightly from 34% in 2016 to 37% in 2017. There will be a continued focus on improving safety by reducing gravel shoulder drop-off.
- *Removing hazardous debris on shoulders*: For several years, the department has emphasized the safety benefits of quickly responding to and removing hazardous debris from roadways and shoulders. The 7% backlog for hazardous debris in 2017 was an increase over 2016 rates, but similar to prior levels.
- *More visible, longer lasting traffic signs*: More than 95% of the 286,267 signs on the state highway system have high-intensity face material, providing longer lasting signs and better illumination to drivers during low light conditions and evenings. To maximize installation efficiencies, WisDOT has recently designated each state highway corridor within a 12-year replacement cycle. All signs on a given corridor are replaced once during a 12-year cycle.

- *Replacement of regulatory, warning and school signs*: The amount of regulatory, warning and school signs older than their useful life was 10% in 2017; the same level as the previous two years. In 2017, approximately 20% of state engineer-grade signs were replaced with more visible high-intensity face material.
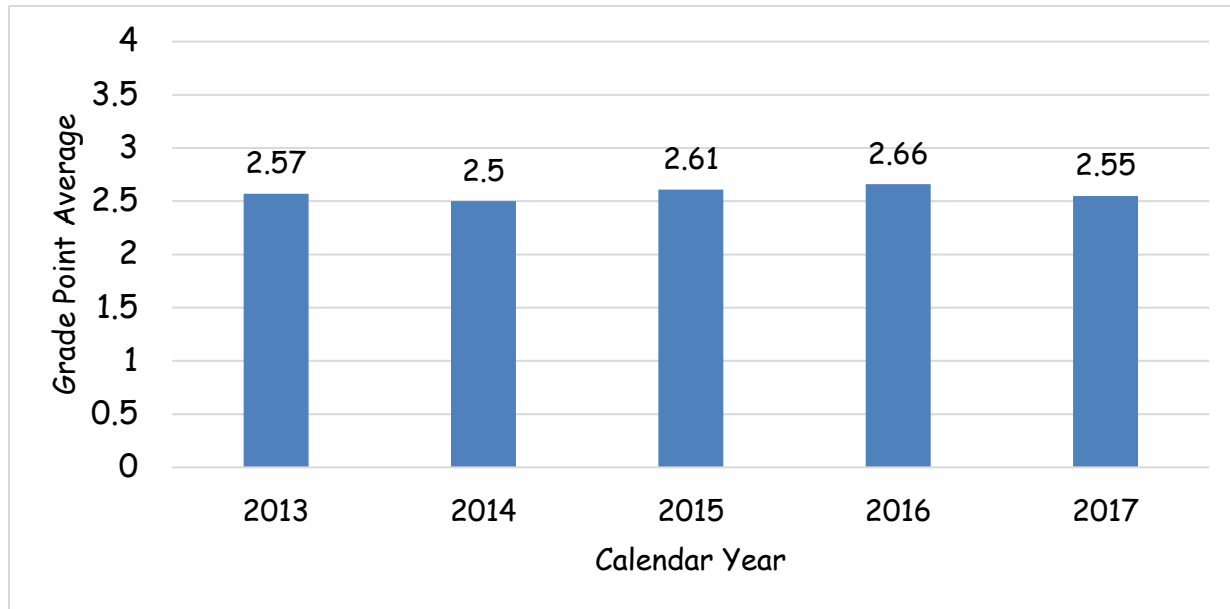
Figure 1. Wisconsin 2013-2017: Grade Point Average (GPA) for the Maintenance Condition of State Highways

Compass Annual Report

About this Report

The Compass Annual Report is issued each year to communicate the condition of Wisconsin's state highway network and to demonstrate accountability for maintenance expenditures. The primary audience for this report includes Operations Managers and Maintenance Supervisors at the Wisconsin Department of Transportation (WisDOT) and the partner organizations with the 72 county highway departments. The Compass Reports reveal trends and conditions, used to prioritize resources, and set future target condition levels for the state highway system. The condition data is also used to estimate costs to reduce maintenance backlogs to varying levels of service.

This report includes data on shoulders, drainage features, roadside elements, selected traffic control devices, pavement conditions, the routine replacement of signs, and specific aspects of winter maintenance activities. The report *does not include* measures for preventive maintenance, operational services (such as traveler information and incident management), or electrified traffic assets (e.g. signals and lighting). It is important to consider what is not in the report when using this information to discuss comprehensive investment choices and needs.

The first section of this report is the overall scorecard on the condition of Wisconsin's Highways and the relationship to agency priorities. Subsequent sections provide further details on the condition of specific roadway features. This report and previous annual Compass Reports can be obtained from http://wisconsindot.gov/Pages/doing-bus/local-gov/hwy-mnt/compass/reports/reports.aspx

Feedback on the format, content, and other aspects of the report is welcome and should be sent to Scott Bush, Compass Program Manager, at Scott.Bush@dot.wi.gov or (608) 266-8666.

Background

The Compass Program was implemented statewide in 2002 as WisDOT's maintenance quality assurance and asset management program for highway maintenance. The Compass Report is a comprehensive overview of highway maintenance and operations by integrating information from field reviews with inventory data and information from other sources.

Process

The Compass report is issued annually in cooperation with the research team from the Wisconsin Transportation Center (WisTrans) at University of Wisconsin – Madison. Starting in January of each year, WisTrans and the Compass Program Manager work on the analysis of each element. The project team presents the draft report each spring to the WisDOT Operations Managers, the WisDOT Maintenance Supervisors, and to the Compass Advisory Team. The report is revised based on feedback from these meetings. The report is then finalized and officially published in the summer.

The Field Review is a statistical analysis of a stratified random sample of maintenance conditions collected by a field survey conducted by maintenance personnel. Each year, 1,200 one-tenth mile segments are randomly selected in the five WisDOT regions. A WisDOT Maintenance Coordinator and a County Patrol Superintendent together collect the field data in each county

between August 15 and October 15 every year. The field survey includes a condition analysis of shoulders, drainage features, roadside elements, pavement markings and signs.

Pavement conditions are the data reported by WisDOT through the MAPSS performance data. The routine sign replacement information is stored in the WisDOT Sign Inventory Management System (SIMS). Winter maintenance data is gathered from the winter season 2016-17 and includes Time to Bare Wet, Winter Severity Index, Winter VMT, and crash data. Some figures and tables are taken directly from the 2016-17 *Annual Winter Maintenance Report* prepared by WisDOT's Winter Operations unit, including the "Winter by the Numbers" table and the statewide snowfalls and Winter Severity Index figures.

Compass identifies backlog percentages for each feature at the region and statewide level. Backlog percentages indicate the percent of the feature requiring maintenance, assuming available budget. Therefore, an increasing backlog percentage reflects fiscal constraints, rather than inadequate work in the field.

Appendix C identifies when assets are considered backlogged for highway maintenance features. Traffic signs are considered backlogged for maintenance if they are in use past their expected service life.

WisDOT Operations Managers and Maintenance Supervisors annually set the targets for backlog percentage levels for each feature. These targets are intended to reflect priorities and goals for the year given fiscal constraints. Appendix E provides the maintenance targets for 2017.

2017 Maintenance Report Card

Compass uses predefined backlog percentage thresholds to calculate maintenance conditions, expressed as an "A" through "F" letter grade. A grade declines as the backlog percentage increases. The grading scales vary to account for the importance of the feature to the motorist and roadway system. For example, a feature that contributes to critical safety would see its grade decline more rapidly than a feature that is primarily aesthetic in nature. There are five contribution categories: Critical Safety, Safety/Mobility, Stewardship, Ride/Comfort, and Aesthetics. Each contribution category has a unique grading curve. A feature grade of "A" means that all basic routine maintenance needs have been met within the maintenance season and there is no significant backlog. Appendix B identifies the grading curve for each Compass feature and Appendix C identifies the contribution category for each feature. The features are listed in the report card in order of priority within their contribution category.

System Overview

Below is a summary of the 2017 condition grades for the 29 features that are evaluated in the field each year by the Compass program. The individual grades for the 29 features translate to an overall average system condition grade point of 2.55 for the year 2017. The department goal is a 3.00 GPA.

Grade	Number
A	10
B	6
C	5
D	6
F	2
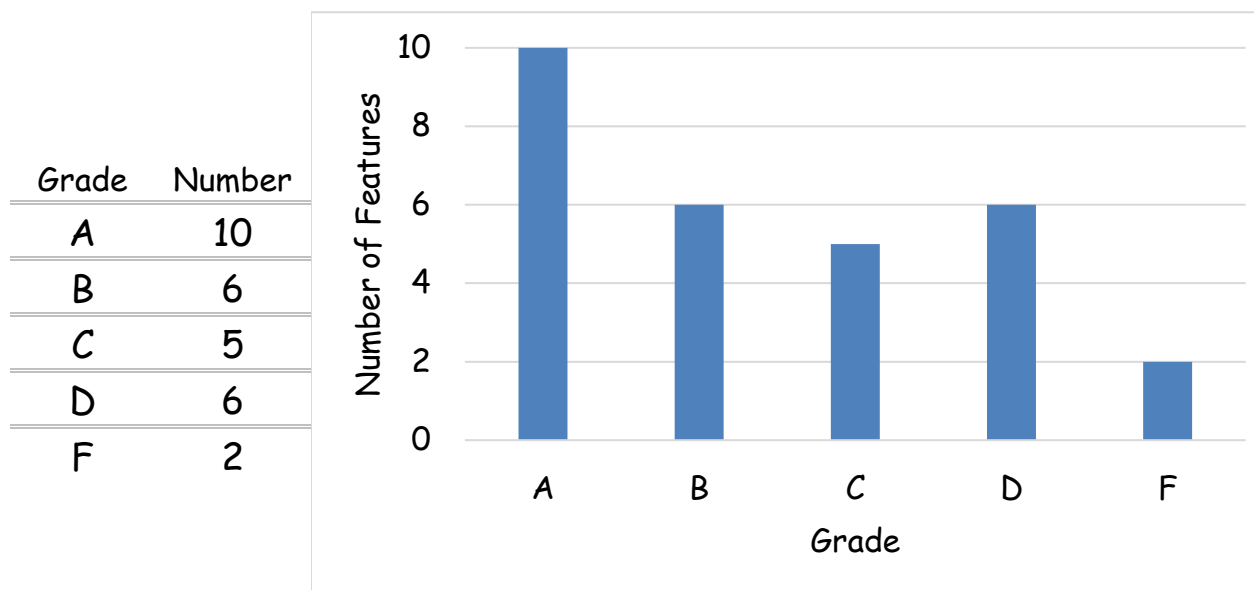
Figure 2. Wisconsin 2017: Summary of Feature Grades

Between 2016 and 2017, the condition grade for 24 features stayed constant, the grade declined for four features, and one feature improved one grade level. Hazardous Debris went from grade "B" (4% backlog) to "C" (7%). Curb and Gutter went from "A" (4%) to "B" (7%). Storm Sewer System dropped from "B" (9%) to "C" (17%). The grade for Protective Barriers dropped two letter grades, from "A" (2%) to "C" (8%). Flumes improved one grade level, from "F" (51%) to "D" (50%).

A highway feature is considered to have met its target condition if it is within five percentage points of the target level. Twenty-four features met the target condition in 2017. Three features

exceeded their targeted condition level (Urban Fences, Rural Fences, and Routine Replacement of Other Signs). Two features were below the targeted maintenance condition - Drop-off/Build-up on Unpaved Shoulders and Flumes.

The following tables identify the five-year trend in Compass feature grades by contribution category (priority). Key observations are also provided for each contribution category.

Critical Safety Features

The roadway features considered critical for safety are those that would require immediate remediation action if they are malfunctioning. The grades and grade changes are highlighted in Table 1.

- The agency's average grade on critical safety features dropped in 2017. As highlighted in the table, the grade for two features dropped and no Critical Safety grades improved in the last year.

- WisDOT met its targets for all Critical Safety features except Drop-off/Build-up on Unpaved Shoulders, which continues to receive an "F" grade. The backlog rate increased from 34% in 2016 to 37% in 2017, while the target was set at 28%.

- The backlog rate for Hazardous Debris on highways nearly doubled in 2017. Seven percent of Wisconsin's highways have debris that can be a critical safety hazard to motorists.

- The backlog rate for maintenance of protective barriers quadrupled from 2% to 8% in 2017, causing a grade drop from "A" to "C". Evaluating protective barriers was an emphasis area for Compass training in 2017, accounting for most of this increase. In addition to rating the height and deformation of protective barriers, raters were reminded to also evaluate the posts, blocks and bolts. The 8% deficiency level should be considered the new baseline when monitoring future trends.

- Drop-off/Build-up on Paved Shoulders continued to receive a "B" grade. The backlog rate remained at 3% in 2017.

- The emergency repair of Regulatory/Warning/School Signs has received an "A" grade every year since 2012. The backlog rate has remained constant at 1% since 2014.

Table 1. Wisconsin 2013-2017: Critical Safety Feature Grades

Feature	2017	2016	2015	2014	2013	Element
Reg./Warning Signs (emergency repair)	A	A	A	A	A	Traffic and Safety
Hazardous Debris	C	B	C	C	C	Shoulders
Protective Barriers	C	A	B	B	A	Traffic and Safety
Centerline Markings	B	B	C	C	C	Traffic and Safety
Edgeline Markings	B	B	C	C	C	Traffic and Safety
Drop-off/Build-up (unpaved shoulders)	F	F	F	F	F	Shoulders
Drop-off/Build-up (paved shoulders)	B	B	A	B	B	Shoulders

Safety/Mobility Features

Safety/Mobility features are highway features and characteristics that protect users against - and provide them with a clear sense of freedom from - danger, injury or damage.

- Storm Sewer System conditions fell from a "B" to a "C" in 2017, returning to its 2013 level. The grade decline was based on the backlog expanding from 7% to 17%.

- All Safety/Mobility features met or exceeded their maintenance target. Mowing for Vision, Special Pavement Markings, Woody Vegitation, Culverts, and Urban Fences were in better condition than their maintenance target.

- Woody Vegetation Control, Woody Vegetation Control for Vision, and Mowing for Vision have all maintained "A" grades since 2013.

Table 2. Wisconsin 2013-2017: Safety/Mobility Feature Grades

Feature	2017	2016	2015	2014	2013	Element
Woody Veg. Control for Vision	A	A	A	A	A	Roadside
Mowing for Vision	A	A	A	A	A	Roadside
Special Pavement Markings	B	B	B	B	B	Traffic and Safety
Woody Vegetation	A	A	A	A	A	Roadside
Culverts	D	D	D	D	D	Drainage
Storm Sewer Systems	C	B	C	C	C	Drainage
Cross-Slope (unpaved shoulders)	D	D	D	D	D	Shoulders
Delineators	D	D	C	D	D	Traffic and Safety
Regulatory/Warning Signs (routine replacement)	C	C	C	B	B	Traffic and Safety
Urban Fences[1]	A	A	N/A	N/A	N/A	Roadside

Stewardship Features

Stewardship captures performance on routine and preventive maintenance actions taken to help a highway asset obtain its full potential service life.

- WisDOT met or exceeded the target for all Stewardship features except Flumes, which was six percentage points worse than the targeted condition of 44%.

- The maintenance backlog for Flumes and Drains vary from year to year more than the backlog of the other Stewardship features. The backlog variations are due, in part, to a small sample size evaluated each year. Since 2007, the backlog rate for Flumes has ranged between 25% and 51%. The rate in 2017 is 50%, down slightly from 51% in 2016. Similarly, since 2007, the

---

[1]Urban Fences and Rural Fences were considered a single feature prior to 2016.

backlog rate for Under-drains/Edge-drains has ranged between 20% and 34%. The rate for 2017 is 31%, down from 34% in 2016.

- Maintenance workers have successfully prevented and treated erosion on Wisconsin's unpaved highway shoulders. The feature grade has been "A" since 2007, with a 2017 backlog level of 1%.

- Similarly, the ditches on Wisconsin's highways are well maintained. The feature grade has been rated in "A" condition since 2007.

- Cracking on Paved Shoulders continues to receive an "F" grade. Since 2007, the backlog has ranged from 53% to 69%. In 2017, the backlog dropped slightly, from 60% to 59%.

Table 3. Wisconsin 2013-2017: Stewardship Feature Grades

Feature	2017	2016	2015	2014	2013	Element
Ditches	A	A	A	A	A	Drainage
Curb & Gutter	B	A	A	A	A	Drainage
Flumes	D	F	C	D	D	Drainage
Cracking (paved shoulders)	F	F	F	F	F	Shoulders
Erosion (unpaved shoulders)	A	A	A	A	A	Shoulders
Under-drains/Edge-drains	D	D	C	C	C	Drainage

Driver Comfort Features

The Driver Comfort features provide a state of ease and quiet enjoyment for highway users. These features include proper fencing and signing, along with a lack of pavement obstructions.

- Three features, Rural Fences, Potholes/Raveling, and Other Signs (emergency repair) maintained an "A" grade.

- All Driver Comfort features met or exceeded their condition targets.

Table 4. Wisconsin 2013-2017: Driver Comfort Feature Grades

Feature	2017	2016	2015	2014	2013	Element
Rural Fences[1]	A	A	N/A	N/A	N/A	Roadside
Potholes/Raveling (paved shoulders)	A	A	A	B	A	Shoulders
Other Signs (emergency repair)	A	A	A	A	A	Traffic and Safety
Other Signs (routine replacement)	B	C	C	C	C	Traffic and Safety

[1]Urban Fences and Rural Fences were considered a single feature prior to 2016.

Aesthetics

Aesthetics concerns the display of natural beauty located along a highway corridor. It focuses on maintaining grass along roadway shoulders and removing litter, which detracts from the visual aesthetics of the roadway.

- Mowing and Litter conditions have remained constant over the recent five-year period, with Mowing receiving a "C" grade and Litter maintaining a "D" grade level.

- WisDOT met or exceeded its condition target for both Aestetics features.

Table 5. Wisconsin 2013-2017: Aesthetics Feature Grades

Feature	2017	2016	2015	2014	2013	Element
Mowing	C	C	C	C	C	Roadside
Litter	D	D	D	D	D	Roadside

Routine Replacement of Signs

- WisDOT launched a new sign database and reporting system in 2017. A major scrub of the sign data was also undertaken and reduced the number of records by 9%. Type H signs were also merged into the HP sign category, and the Type H category was retired.

- The backlog for the routine replacement of regulatory/warning/school signs remained at 10%, the same level in 2016. The Southwest Region has the highest number and percent of deficient signs among the five WisDOT regions.

- The backlog for the routine replacement of other signs (guide and recreational signs) decreased from 23% in 2016 to 17% in 2016, improving from a "C" to a "B" grade.

- Regulatory/warning/school signs due for replacement were in service for an average 3.4 years beyond their recommended service life, down from 4.5 years in 2016. Other signs were in service for an average 8 years beyond their useful life, down slightly from 9.2 years in 2016. There were 6,453 regulatory/warning/school signs and 18,952 other signs in service for five years or more beyond their recommended useful life.

- The percentage of high intensity signs on the state system increased from 94% in 2016 to 95% in 2017. As of 2017, 98% of regulatory/warning/school signs and 90% of other signs were made with high intensity face material.

Winter

- The statewide winter maintenance cost per lane mile increased by 22% in the 2016-17 winter season. The average cost rose from $2,087 in 2015-16 to $2,537 in 2016-17. When adjusted for seasonal weather variation, the relative cost per lane mile increased a similar 21% statewide. The cost per lane mile per Winter Severity Index (WSI) point increased from $23.09 in 2015-16 to $27.85 in 2016-17.

- The WisDOT target for "time to bare/wet pavement" on 24-hour coverage highways was met for 79% of the reported storm events. The standard was met for 70% of reported events on 18-hour coverage highways, and 74% of all reported events statewide.

- The 2016-17 season had the same or fewer crashes than other winters when the WSI was lower. The state average is 18 winter crashes per 100 million VMT; the same as for last year. By region, the number of winter crashes varied more than in previous years, but the trend is toward fewer crashes.

Table 6. Wisconsin 2017: Compass Report on Highway Maintenance Conditions

Element	What are we spending? Dollars spent (in millions)[2]					Feature	How much of the system still needs work at the end of the maintenance season? Condition change: 2016 to 2017[3]	% of system backlogged					How well is the system maintained? 2017 Feature grades				
	FY 13	FY 14	FY 15	FY 16	FY 17			2013	2014	2015	2016	2017	A	B	C	D	F
Shoulders	8.16 8.51 0.24 0.25	7.79 8.00 0.23 0.23	12.50 12.81 0.36 0.37	18.87 19.09 0.55 0.55	12.07 12.07 0.35 0.35	Hazardous Debris	↓	7	7	6	4	7			C		
						Drop-off/Build-up (paved)	—	4	4	2	3	3		B			
						Cracking (paved)	↑	54	69	67	60	59					F
						Potholes/Raveling (paved)	—	7	8	6	7	7	A				
						Drop-off/Build-up (unpaved)	↓	36	41	42	34	37					F
						Cross-Slope (unpaved)	↓	22	27	25	20	23				D	
						Erosion (unpaved)	—	1	3	2	1	1	A				
Drainage	7.10 7.40 0.21 0.22	7.04 7.22 0.21 0.21	7.58 7.77 0.22 0.23	9.35 9.46 0.27 0.27	10.23 10.23 0.30 0.30	Ditches	—	1	1	1	1	1	A				
						Culverts	↓	25	21	20	21	24				D	
						Under-drains/Edge-drains	↑	29	26	23	34	31				D	
						Flumes	↑	47	42	23	51	50				D	
						Curb & Gutter	↓	4	5	6	4	7		B			
						Storm Sewer System	↓↓	14	15	11	9	17			C		

[2] The four values in each column are nominal dollars, constant dollars (base year 2017), nominal dollars per thousand lane miles, and constant dollars per thousand lane miles, respectively.

[3] Arrows indicate a condition change from 2016 to 2017 (↑ = improved condition/lower backlog, ↓ = worse condition/higher backlog). Double arrows indicate the backlog changed eight or more percentage points.

Element	What are we spending? Dollars spent (in millions)[2]					Feature	How much of the system still needs work at the end of the maintenance season? Condition change: 2016 to 2017[3]	% of system backlogged					How well is the system maintained? 2017 Feature grades				
	FY 13	FY 14	FY 15	FY 16	FY 17			2013	2014	2015	2016	2017	A	B	C	D	F
Roadsides	18.65 19.44 0.55 0.57	15.03 15.42 0.44 0.45	19.27 19.75 0.56 0.58	21.32 21.57 0.62 0.63	20.31 20.31 0.59 0.59	Litter	↓	64	61	63	62	63				D	
						Mowing	↓	41	34	35	34	37			C		
						Mowing for Vision	↑	0.3	2	3	2	1	A				
						Woody Vegetation	—	3	2	2	2	2	A				
						Woody Veg. Control for Vision	—	1	1	1	1	1	A				
						Urban Fences	↓	N/A	N/A	N/A	0	1	A				
						Rural Fences	—	N/A	N/A	N/A	2	2	A				
Traffic & safety (selected)	17.89 18.65 0.53 0.55	17.22 17.67 0.50 0.52	16.33 16.73 0.48 0.49	19.36 19.59 0.56 0.57	17.24 17.24 0.50 0.50	Centerline Markings	—	6	8	6	4	4		B			
						Edgeline Markings	↑	7	9	6	5	4		B			
						Special Pavement Markings	↓	9	6	8	8	9		B			
						Reg./Warning Signs (emerg. repair)	—	2	1	1	1	1	A				
						Reg./Warning Signs (routine replacement)	—	9	9	10	10	10			C		
						Other Signs (emerg. repair)	↓	2	3	1	1	2	A				
						Other Signs (routine replacement)	↑	33	30	26	23	17		B			
						Delineators	↓	22	22	18	19	22				D	
						Protective Barriers	↓	1	3	5	2	8			C		

Table 7. Wisconsin 2017: Targets for Highway Maintenance Conditions

Category	Feature	Element	Statewide 2017 Backlog (%) Actual	Target	On target[4]	Gap if target missed — Worse 20	10	0	Better 0	10	20	Regions Worse condition	On Target	Better condition
Critical Safety	Reg./Warning Signs (emerg.)	Traffic and Safety Devices	1	0	◎								ALL	
	Hazardous Debris	Shoulders	7	5	◎							SE	NC, NE, NW, SW	
	Protective Barriers	Traffic and Safety Devices	8	3	◎							NC, NW	NE, SE, SW	
	Centerline Markings	Traffic and Safety Devices	4	5	◎								ALL	
	Edgeline Markings	Traffic and Safety Devices	4	8	◎								NC, NW, SE	NE, SW
	Drop-off/Build-up (unpaved)	Shoulders	37	28				9				NE, SE, SW	NC, NW	
	Drop-off/Build-up (paved)	Shoulders	3	4	◎								ALL	
Safety / Mobility	Woody Veg. Control for Vision	Roadsides	1	2	◎								ALL	
	Mowing for Vision	Roadsides	1	5	◎								ALL	
	Special Pavement Markings	Traffic and Safety Devices	9	10	◎							NE	NC, NW, SE, SW	
	Woody Vegetation	Roadsides	2	5	◎								ALL	
	Culverts	Drainage	24	25	◎							NC	NW, SW	NE, SE
	Storm Sewer System	Drainage	17	15	◎							NC, SW	NE, NW, SE	

---

[4] ◎ This symbol indicates the backlog level is on target - within five percentage points.

Category	Feature	Element	Statewide 2017 Backlog (%) Actual	Target	On target[4]	Gap if target missed Worse 20	Worse 10	Worse 0	Better 0	Better 10	Better 20	Regions Worse condition	On Target	Better condition
Category	Cross-Slope (unpaved)	Shoulders	23	18	◎							NC, NE, SE, SW		NW
	Delineators	Traffic and Safety Devices	22	20	◎							NW, SE	SW	NC, NE
	Reg./Warning Signs (routine)	Traffic and Safety Devices	10	9	◎							SW	NC, NE, NW, SE	
	Urban Fences	Roadsides	1	14						13				ALL
Stewardship	Ditches	Drainage	1	5	◎								ALL	
	Curb & Gutter	Drainage	7	10	◎							NW	NC, NE, SW	SE
	Flumes	Drainage	50	44				6				NC, NW, SW		NE, SE
	Cracking (paved)	Shoulders	59	58	◎							NE, SE	NC, NW, SW	
	Erosion (unpaved)	Shoulders	1	5	◎								ALL	
	Under-drains/Edge-drains	Drainage	31	30	◎							NC, SW	SE	NE, NW
Ride / Comfort	Potholes/ Raveling (paved)	Shoulders	7	10	◎								NE, NW, SE, SW	NC
	Other Signs (emerg. repair)	Traffic and Safety Devices	2	1	◎								ALL	
	Other Signs (routine replace)	Traffic and Safety Devices	17	33						16				ALL
	Rural Fences	Roadsides	2	14						12			NW	NC, NE, SE, SW
Aesthetics	Mowing	Roadsides	37	40	◎							NE	NC, SE, SW	NW
	Litter	Roadsides	63	63	◎							NE, SE	SW	NC, NW

2017 Highway Maintenance Conditions: Report on Shoulders, Drainage, Roadsides, and Traffic Control Devices

Information in this section is based on the field review of a stratified random sample of road segments. The data was collected by WisDOT region Maintenance Coordinators and county Patrol Superintendents. County level data is rolled up to estimate region level scores and region level scores are rolled up to estimate the state level grades. The results are statistically valid (within a 95% confidence interval) at the statewide levels, and for most features, at the region level. The county level scores are presented in Appendix G. Extreme caution should be used when analyzing or comparing the individual county scores. Due to sample size limitations, the statistical confidence for many county scores is not significant.

Below is a summary of backlog condition changes between 2016 and 2017. Refer to the "Maintenance Report Card" in the front part of the report for a complete summary of grade level changes between 2016 and 2017.

- The statewide backlog level declined for six features (i.e. in better condition).

- The statewide backlog level increased for 13 features (i.e. in worse condition).

- The statewide backlog level remained constant for 10 features.

Shoulders

- The individual grades for the seven Shoulder features correspond to an overall condition grade point average of 2.00, or a "C" grade.
- The backlog rate for one Shoulder feature, Cracking on Paved Shoulders, decreased in 2017 by one percentage point, from 60% to 59%.
- The backlog rate for three features increased by three percentage points. A three-percentage point increase for Hazardous Debris dropped the grade from "B" to "C". Cross-slope and Drop-off/Build-up on Unpaved Shoulders also experienced backlog increases of three percentage points, but their grade level was unchanged at "D" and "F", respectively.

Drainage

- The individual grades for the six Drainage features translate to an overall condition grade point average of 2.00, or a "C" grade.
- The condition of two Drainage features improved slightly between 2016 and 2017. Drains and Flumes had backlog reductions of three and one percentage points, respectively.
- The backlog for Curb and Gutter and Storm Sewer System increased in 2017. While the increases are well within historical ranges for these features, the increases were great enough to cause the letter grade for these features to drop from "A" to "B" and "B" to "C", respectively. The backlog rate for Culverts also increased slightly in 2017.

Roadsides

- The individual grades for the seven Roadside features translate to an overall condition grade point average of 3.29 or a "B" grade. Five of the seven features received a letter grade of "A".
- Two features increased their backlog by one percentage point: Litter and Urban Fences. The backlog for Mowing increased from 34% to 37%, with no resulting grade change.
- The backlog level dropped one percentage point for Mowing for Vision.

Traffic Control and Safety Devices

- The individual grades for the nine Traffic Control and Safety Devices translate to an overall condition grade point average of 2.78 or a "C" grade.
- The backlog for the Routine Replacement of Other Signs decreased from 23% to 17%, improving from a "C" to a "B" grade.
- Four features had an increased backlog level, with a deteriorated maintenance condition: Special Pavement Markings, Emergency Repair of Other Signs, Delineators, and Protective Barriers. The backlog rate for Protective Barriers increased from 2% to 8%, causing the letter grade to drop from "A" to "C".
- The backlog level did not change for three features: Centerline Markings, Emergency Repair of Regulatory/Warning/School Signs, and Routine Replacement of Regulatory/Warning/School Signs.

Regional Report on Shoulders, Drainage, Roadsides, and Traffic Control Devices

Shoulders
- Hazardous Debris: The hazardous debris rate dropped slightly in two regions, but increased in three regions. Hazardous debris on highways in the Southeast Region increased from 18% in 2016 to 23% in 2017. In the North Central and Southwest Regions, the backlog rates increased from 2% and 3%, to 8% and 7%, respectively. The rate of hazardous debris in the Northeast and Northwest Regions dropped 1% in 2017, to 6% and 1%, respectively.
- Paved Shoulders: Cracking continue to be a significant problem for all regions. In 2017, the rate of cracking ranged from 55% in the North Central Region to 68% in the Northeast Region. The rate of Drop-off/Build-up on paved shoulders continues to be low, ranging from 2% in the North Central Region and the Northwest Region, to 7% in the Southeast Region. The rate of Potholes/Raveling ranged from 1% in the North Central Region to 13% in the Southeast Region.
- Unpaved Shoulders: High backlog levels continue for Drop-off/Build-up on unpaved (gravel) shoulders. The Drop-off/Build-up rate varied from 26% in the North Central Region to 58% in the Southeast Region. The Cross-slope backlog varied across regions, but was consistent with previous years. The rates ranged from 9% in the Northwest Region to 36% in the Northeast Region. The Erosion backlog on unpaved shoulders remains very low, ranging from 0 to 1% across the five regions.

Drainage
- Ditches: Low backlog rates of 1% or less were found in all five WisDOT regions.
- Culverts: The rate of culvert backlog continues to vary widely across the state and from year to year. In 2017, the backlog ranged from 4% in the Southeast Region and a high of 37% in the North Central Region.
- Drains: The backlog rates are highly variable from year to year, because the typical sample size in each region is small. In 2017, the backlog rate ranged from 0% in the Northwest Region to 48% in the Southwest Region.
- Flumes: Flume conditions remained steady, except in the Northwest Region, where the backlog rate increased from 27% in 2016 to 58% in 2017. Region conditions varied from a 36% backlog in the Southeast Region to a 61% backlog in the Southwest Region.
- Curb and Gutter: The backlog rate for curb and gutter increased in four of the five regions. The backlog rates ranged from 4% in the Southeast Region to 21% in the Northwest Region.
- Storm Sewer System: During the last year, there was a large increase in the statewide backlog rate. Large backlog increases in the Southeast Region and the Southwest Region are likely due to few observations in those regions, and does not necessarily constitute a significant finding. The backlog rate for Storm Sewer Systems ranged from 12% in the Southeast Region to 22% in the North Central Region.

Roadsides

- Litter: High litter backlog rates continued to be recorded around the state. The litter rates in 2017 ranged from 52% in the North Central Region and the Northwest Region, to 85% in the Southeast Region.
- Mowing and Mowing for Vision: Mowing backlog rates were similar to previous years, with the lowest rate at 27% in the Northwest Region and the highest rate of 46% in the Northeast Region. The Mowing for Vision backlogs are 2% or less across the state, the lowest level recorded since 2013.
- Woody Vegetation and Woody Vegetation for Vision: Low backlog levels were recorded for both features. The Southeast Region experienced the highest backlogs of 6% and 4%, resepectively.
- Urban Fences and Rural Fences: Maintenance backlogs were 1% or less for Urban Fences, which prohibits pedestrian access to highways. Very low backlog levels were found for Rural Fences, which identify the public rights-of-way, with only the Northwest Region (9%) recording a backlog level above 1%.

Traffic Control and Safety Devices

- Pavement Markings: Centerline Marking and Edgeline Marking conditions were similar across the regions, ranging from 2% to 8% backlog rates. Special Pavement Markings had higher backlog levels, ranging from 6% in the Southwest Region to 20% in the Northeast Region.
- Emergency Repair of Signs: Low backlog levels were recorded around the state, varying from 0% to 4% across the five regions.
- Routine Replacement of Signs: Backlogs for Regulatory/Warning Signs were similar across regions, varying from 7% to 16%. Backlog levels for Other Signs were higher, ranging from 11% in the Southeast Region to 22% in the Northwest Region and Southwest Region.
- Delineators: The condition of delineators can change dramatically from year to year and vary widely across the regions. In 2017, the backlog rate ranged from 2% in the North Central Region to 40% in the Northwest Region.
- Protective Barriers: The backlog rates for Protective Barriers increased significantly in four of the five WisDOT regions. The backlog rates ranged from 0% in the Northeast Region to 16% in the Northwest Region. Part of the increase may be due to a focus on Protective Barriers during 2017 Compass training.

Table 8. Regions 2017: Compass Report on Highway Maintenance Conditions

Element	Feature	How much of the system needs work at the end of the season? *What did it cost to achieve this condition?*					
		Region — Percent of System Backlogged					
		NC	NE	NW	SE	SW	Statewide
Shoulders	Hazardous Debris	8	6	1	23	7	7
	Drop-off/Build-up (paved)	2	5	2	7	3	3
	Cracking (paved)	55	68	57	67	56	59
	Potholes/Raveling (paved)	1	6	8	13	9	7
	Drop-off/Build-up (unpaved)	26	45	29	58	43	37
	Cross-Slope (unpaved)	27	36	9	33	24	23
	Erosion (unpaved)	0	1	1	0	1	1
	Shoulder Expenditures (Millions)	$2.28M	$0.81M	$3.06M	$1.51M	$4.42M	$12.07M
Drainage	Ditches	1	1	1	0	0	1
	Culverts	37	8	25	4	22	24
	Under-drains/Edge-drains	37	19	0	26	48	31
	Flumes	53	37	58	36	61	50
	Curb & Gutter	9	9	21	4	6	7
	Storm Sewer Systems	22	18	18	12	21	17
	Drainage Expenditures (Millions)	$1.23M	$1.06M	$3.11M	$2.08M	$2.75M	$10.23M
Roadsides	Litter	52	78	52	85	68	63
	Mowing	42	46	27	40	35	37
	Mowing for Vision	n/a	2	2	n/a	2	1
	Woody Vegetation Control	2	2	3	6	3	2
	Woody Veg. Control for Vision	n/a	n/a	1	4	1	1
	Urban Fences	0	1	0	0	0	1
	Rural Fences	1	0	9	0	0	2
	Roadside Expenditures (Millions)	$2.90M	$2.70M	$4.61M	$4.93M	$5.17M	$20.31M
Traffic Control & Safety Devices	Centerline Markings	3	6	3	8	2	4
	Edgeline Markings	5	1	4	7	2	4
	Special Pavement Markings	8	20	8	8	6	9
	Reg./Warning Signs (emerg.)	1	1	2	2	1	1
	Reg./Warning Signs (routine)	10	7	8	7	16	10
	Other Signs (emerg. repair)	1	0	4	3	1	2
	Other Signs (routine)	16	12	22	11	22	17
	Delineators	2	9	40	29	24	22
	Protective Barriers	9	0	16	4	8	8
	Traffic Control & Safety Device Expenditures (Millions)	$3.22M	$2.07M	$3.62M	$3.95M	$4.38M	$17.24M

Condition Grade Color Key	A	B	C	D	F

19

Table 9. Regions 2013-2017: Highway Maintenance Conditions

Element	Feature	Region	2013	2014	2015	2016	2017
Shoulders	Hazardous Debris	NC	5%	2%	4%	2%	8%
		NE	9%	11%	6%	7%	6%
		NW	3%	3%	2%	2%	1%
		SE	12%	9%	16%	18%	23%
		SW	11%	13%	9%	3%	7%
Shoulders	Drop-off/Build-up (paved)	NC	1%	2%	2%	1%	2%
		NE	6%	6%	3%	4%	5%
		NW	3%	3%	1%	2%	2%
		SE	10%	11%	4%	4%	7%
		SW	3%	2%	2%	4%	3%
Shoulders	Cracking (paved)	NC	48%	62%	69%	63%	55%
		NE	65%	80%	74%	68%	68%
		NW	51%	66%	62%	52%	57%
		SE	67%	68%	51%	62%	67%
		SW	53%	71%	74%	60%	56%
Shoulders	Potholes/Raveling (paved)	NC	3%	1%	2%	0.4%	1%
		NE	5%	2%	1%	3%	6%
		NW	8%	9%	7%	6%	8%
		SE	10%	14%	8%	16%	13%
		SW	10%	12%	11%	11%	9%
Shoulders	Drop-off/Build-up (unpaved)	NC	29%	27%	30%	24%	26%
		NE	44%	49%	49%	48%	45%
		NW	28%	40%	33%	31%	29%
		SE	48%	48%	40%	37%	58%
		SW	44%	48%	58%	36%	43%
Shoulders	Cross-slope (unpaved)	NC	24%	23%	27%	24%	27%
		NE	28%	25%	22%	28%	36%
		NW	9%	15%	17%	15%	9%
		SE	29%	44%	31%	9%	33%
		SW	27%	39%	31%	19%	24%
Shoulders	Erosion (unpaved)	NC	0%	2%	1%	32%	0%
		NE	1%	1%	0%	1%	1%
		NW	0.3%	3%	2%	0.1%	1%
		SE	2%	5%	1%	5%	0%
		SW	2%	4%	4%	2%	1%
Drainage	Ditches	NC	1%	0.4%	0.2%	1%	1%
		NE	0.4%	1%	1%	1%	1%
		NW	0.4%	3%	2%	1%	1%
		SE	3%	5%	3%	2%	0%
		SW	0.4%	1%	1%	1%	0%

Element	Feature	Region	2013	2014	2015	2016	2017
Drainage	Culverts	NC	17%	12%	14%	31%	37%
		NE	19%	32%	24%	43%	8%
		NW	23%	23%	24%	28%	25%
		SE	29%	18%	12%	14%	4%
		SW	33%	20%	19%	7%	22%
Drainage	Under-drains/Edge-drains	NC	21%	20%	13%	8%	37%
		NE	25%	14%	41%	82%	19%
		NW	53%	57%	29%	29%	0%
		SE	11%	20%	24%	19%	26%
		SW	39%	31%	35%	17%	48%
Drainage	Flumes	NC	29%	29%	32%	56%	53%
		NE	26%	46%	2%	43%	37%
		NW	36%	56%	46%	27%	58%
		SE	56%	36%	8%	47%	36%
		SW	73%	44%	35%	66%	61%
Drainage	Curb & Gutter	NC	2%	3%	5%	4%	9%
		NE	3%	4%	2%	5%	9%
		NW	16%	13%	12%	14%	21%
		SE	0.3%	3%	1%	0.5%	4%
		SW	5%	9%	10%	8%	6%
Drainage	Storm Sewer System	NC	3%	8%	10%	18%	22%
		NE	10%	11%	16%	19%	18%
		NW	24%	12%	0%	16%	18%
		SE	12%	14%	7%	5%	12%
		SW	21%	26%	24%	4%	21%
Roadsides	Litter	NC	54%	38%	44%	47%	52%
		NE	75%	74%	80%	82%	78%
		NW	60%	54%	61%	56%	52%
		SE	74%	78%	78%	81%	85%
		SW	67%	72%	67%	62%	68%
Roadsides	Mowing	NC	35%	29%	34%	33%	42%
		NE	54%	41%	46%	49%	46%
		NW	29%	22%	29%	23%	27%
		SE	55%	54%	39%	35%	40%
		SW	46%	39%	35%	39%	35%
Roadsides	Mowing for Vision	NC	0%	0%	4%	0%	0%
		NE	0%	4%	4%	2%	2%
		NW	0%	2%	2%	4%	2%
		SE	0%	0%	5%	0.1%	0%
		SW	1%	2%	1%	2%	2%
Roadsides	Woody Vegetation Control	NC	3%	2%	2%	2%	2%

Element	Feature	Region	2013	2014	2015	2016	2017
		NE	2%	1%	1%	1%	2%
		NW	3%	2%	5%	4%	3%
		SE	1%	5%	1%	4%	6%
		SW	4%	3%	2%	2%	3%
Roadsides	Woody vegetation control for vision	NC	1%	1%	0%	1%	0%
		NE	2%	1%	0%	1%	0%
		NW	0%	0.3%	0.3%	1%	1%
		SE	0%	3%	1%	1%	4%
		SW	2%	1%	1%	0%	1%
Roadsides	Fences[6]	NC	0%	0%	2%	N/A	N/A
		NE	0%	0%	1%	N/A	N/A
		NW	12%	6%	6%	N/A	N/A
		SE	0%	0%	0%	N/A	N/A
		SW	0%	0%	1%	N/A	N/A
Roadsides	Urban Fences[6]	NC	N/A	N/A	N/A	0%	0%
		NE	N/A	N/A	N/A	0%	1%
		NW	N/A	N/A	N/A	0%	0%
		SE	N/A	N/A	N/A	0%	0%
		SW	N/A	N/A	N/A	0%	0%
Roadsides	Rural Fences[6]	NC	N/A	N/A	N/A	6%	1%
		NE	N/A	N/A	N/A	0%	0%
		NW	N/A	N/A	N/A	9%	9%
		SE	N/A	N/A	N/A	0%	0%
		SW	N/A	N/A	N/A	1%	0%
Traffic and safety (selected devices)	Centerline Markings	NC	5%	9%	4%	5%	3%
		NE	7%	8%	2%	5%	6%
		NW	8%	6%	6%	5%	3%
		SE	4%	7%	1%	1%	8%
		SW	4%	8%	10%	3%	2%
Traffic and safety (selected devices)	Edgeline Markings	NC	4%	7%	5%	4%	5%
		NE	6%	3%	2%	5%	1%
		NW	5%	2%	5%	5%	4%
		SE	4%	8%	1%	2%	7%
		SW	12%	20%	10%	6%	2%

[6]Urban Fences and Rural Fences were considered a single feature prior to 2016.

Element	Feature	Region	2013	2014	2015	2016	2017
Traffic and safety (selected devices)	Special Pavement Markings	NC	16%	2%	2%	10%	8%
		NE	0%	0%	3%	11%	20%
		NW	6%	3%	18%	4%	8%
		SE	4%	5%	5%	5%	8%
		SW	18%	11%	15%	12%	6%
Traffic and safety (selected devices)	Regulatory/warning signs (emergency repair)	NC	1%	1%	1%	1%	1%
		NE	0%	1%	1%	1%	1%
		NW	4%	1%	2%	1%	2%
		SE	1%	1%	1%	2%	2%
		SW	2%	2%	1%	0%	1%
Traffic and safety (selected devices)	Regulatory/Warning Signs (routine replacement)	NC	6%	4%	8.7%	9%	10%
		NE	13%	11%	11%	8%	7%
		NW	8%	8%	7.7%	8%	8%
		SE	14%	12%	12%	11%	6%
		SW	6%	7%	10%	14%	16%
Traffic and safety (selected devices)	Detour/Object Marker/Recreation/Guide Signs (emergency repair)	NC	1%	1%	1%	0%	1%
		NE	1%	4%	1%	3%	0%
		NW	3%	6%	4%	1%	4%
		SE	2%	2%	2%	1%	3%
		SW	2%	2%	0.3%	0.3	1%
Traffic and safety (selected devices)	Detour/Object Marker/Recreation/Guide Signs (routine replacement)	NC	20%	14%	17%	17%	16%
		NE	28%	26%	20%	14%	12%
		NW	38%	33%	30%	25%	22%
		SE	44%	40%	31%	29%	11%
		SW	30%	29%	25%	24%	22%
Traffic and safety (selected devices)	Delineators	NC	19%	6%	8%	10%	2%
		NE	6%	11%	13%	26%	9%
		NW	25%	22%	22%	17%	40%
		SE	40%	26%	12%	20%	29%
		SW	23%	32%	25%	21%	24%
Traffic and safety (selected devices)	Protective Barriers	NC	2%	0%	0%	0%	9%
		NE	1%	7%	0%	2%	0%
		NW	2%	4%	10%	2%	16%
		SE	1%	1%	2%	0.1%	4%
		SW	2%	4%	6%	4%	8%

Mowing

The table below summarizes the Compass assessment of mowing backlog statewide. The table indicates the number and percentage of rated road segments that were found to be deficient. Columns identify *how* the segment was deficient and rows indicate *why* the segment was deficient. Each question has two answers: the number of deficient segments and the percentage of segments over the row total. Note that multiple reasons are allowed for how and why segments are deficient; therefore, the sum of percentages for each deficiency type (e.g. Safety/Equipment) can be more than 100%.

How roadway segments are backlogged for Mowing is based on WisDOT policy for grass height and width. The following are the general components of the WisDOT mowing policy:

- Height: Grass should be between six inches and 12 inches.

- Outside shoulder width: Grass should be cut a maximum of 15 feet in width or to the bottom of the ditch, whichever is less.

- Inside shoulder width (medians): Grass should be cut a maximum of five feet in width or one pass with a single unit mower. If the remaining vegetation width is 10 feet or less, the entire median should be mowed.

- No-Mow Zones: Grass should not be cut in areas that have been designated and signed as "No-Mow" zones.

Table 10. Wisconsin 2017: Scope and Scale of Mowing Deficiencies

		How is it deficient?			
		# of segments with observed deficiency			
		% of segments			
		Too Wide	Too Short	Too Tall	In No-Mow Zone
Why is it deficient?	Safety/Equipment	0	0	0	0
		0%	0%	0%	0%
	Mowed by Property Owner	163	407	145	0
		63%	71%	20%	0%
	Woody Vegetation Control	0	0	0	0
		0%	0%	0%	0%
	Maintenance Decision	94	168	585	1
		37%	29%	80%	0%
	Total	257	575	730	1

2017 Traveled Way: Compass Report on Maintenance Conditions

Data for this section comes from the WisDOT MAPSS performance management initiative. The MAPSS pavement data is collected by a pavement inspection van, which measures the severity and extent of pavement distresses on state highways.

The map in Figure 3 shows the pavement evaluation schedule in Wisconsin. Pavement inventory data is collected every two years. State highways in the yellow-colored counties - the Northwest Region and Southwest Region - get evaluated in the odd-numbered years (e.g. 2017). State highways in the green-colored counties - the North Central Region, Northeast Region, and Southeast Region - get evaluated in the even-numbered years (e.g. 2016).

Figure 3. Pavement Inspection Schedule Map

25

Table 11. Wisconsin 2017: Statewide Pavement Conditions - Backbone Routes

Pavement Condition	Centerline Miles	Percentage
Excellent	707.02	25%
Good	1,721.18	61%
Fair	212.47	8%
Poor	177.47	6%
Total	2,818.14	100%

Table 12. Wisconsin 2017: Statewide Pavement Conditions 3R Routes

Pavement Condition	Centerline Miles	Percentage
Excellent	1,851.78	16%
Good	5,686.73	50%
Fair	1,921.99	17%
Poor	1,912.15	17%
Total	11,372.65	100%

Table 13. Regions 2017: Backbone Routes – Percentage of Highway Mileage

Pavement Condition	Percentage of Asphalt Paved Miles				
	NC	NE	NW	SE	SW
Excellent	20%	36%	30%	11%	20%
Good	69%	59%	47%	79%	62%
Fair	7%	4%	10%	6%	10%
Poor	5%	1%	13%	3%	8%

Table 14. Regions 2017: 3R Routes – Percentage of Highway Mileage

Pavement Condition	Percentaage of Concrete Paved Miles				
	NC	NE	NW	SE	SW
Excellent	16%	21%	15%	15%	16%
Good	51%	61%	50%	62%	40%
Fair	20%	13%	21%	13%	15%
Poor	14%	5%	14%	10%	29%

2017 Signs: Compass Report on Routine Replacement and Remaining Service Life of Highway Signs

This section assesses performance on routine replacement of highway signs according to the agency's useful life standards. The scope of this report is limited to replacement of Type II Signs, sign replacement primarily paid for by WisDOT's maintenance program. Replacement of Type I Signs and Type III Signs, on the other hand, are exclusively paid for by WisDOT's improvement program and are outside the scope of this report. The standard is to replace signs before the end of their useful life. Counties, under contract with WisDOT, also provide the emergency repair of damaged and knocked-down signs. The Compass assessment of performance on the emergency repair of signs can be found in the Compass Field Review section of this report.

Compass groups signs into two categories:
- Regulatory/Warning/School Signs (also referred to as "regulatory/warning signs")
- Detour/Object Marker/Recreation/Guide Signs (also referred to as "other signs")

Regulatory and warning signs on Wisconsin highways are critically important for the safety of Wisconsin's motorists. WisDOT prioritizes routine replacement of signs on corridor segments when most of the existing signs qualify for replacement. To maximize installation efficiencies, all signs on a given segment are replaced.

The Compass performance measures for routine replacement of signs are backlog, remaining service life and years beyond useful life for both categories of signs. Signs in service beyond their useful life are considered backlogged for routine replacement. The useful life begins on the date signs are manufactured and not the date they are installed. The useful life standard for signs with high intensity face material is 12 years and seven years for engineer-grade face material. The analysis also looks at the distribution of remaining service life across all signs in the inventory. The remaining service life is the number years a sign can remain in service before the useful life expires. Finally, years beyond useful life is the number of years a sign has been in service past the end of it useful life.

In addition, WisDOT is transitioning from the use of Engineer-Grade face material (grade 1) to more visible and longer lasting High Intensity face material (grade 2). Compass analyzes the progress for retiring the inventory of engineer-grade signs. The Compass measure is percent of engineer-grade signs replaced.

Data for this section comes from the WisDOT Sign Inventory Management System (SIMS) managed by the Bureau of Traffic Operations (BTO). In 2017, BTO completed a major scrub of the sign data in tandem with developing a new sign database. The data scrub reduced the number of signs in each category, compared to previous years, except for Type HP signs. The number of Type HP signs increased, because Type H signs were merged into the HP category and the Type H classification was phased out. The data scrub also eliminated most of the SH signs that were erroneously included in previous data sets, because after additional analysis most of these SH signs were found to be Type I signs.

The 2017 Compass conditions for routine replacement of signs are based on a thorough review and update of records in the sign database. Given the discontinuity in the database assumptions, time trend analysis for 2017 and prior years for the high intensity signs Types HP and SH would be inappropriate. Going forward, the 2017 Compass sign conditions will be used as the newly established baseline for assessing the routine replacement of Type II signs.

Key Observations

- The number of signs backlogged for routine replacement is lower in 2017 than in 2016.
- The backlog rate for routine replacement of regulatory/warning signs was 10% in 2017; about the same level as past years.
- The backlog for routine replacement of other signs (i.e. detour/object marker/recreation/guide signs) is 17% in 2017, compared to 23% in 2016; continuing a steady decreasing trend. The 2017 backlog rate sets a new benchmark for maintenance performance in coming years.
- Of signs that are backlogged for replacement, the average number of years these signs remain in service beyond their useful life is lower in 2017 than in 2016. Ten percent of the state's regulatory/warning signs are in service for an average of 3.4 years beyond their useful life standard. Similarly, 17% of the other signs are in service an average of 8 years beyond the recommended useful life. The average years of service beyond the useful life are down from 4.5 and 9.2, respectively in 2016.
- There are 6,453 regulatory/warning signs and 18,952 other signs in service five years or more beyond their recommended service life. This represents 3% and 16% respectively of the state highway signs in each category.
- The state's inventory of high intensity signs has many new signs. Of the Type F - Fluorescent signs, 88% (40,158 signs) have six or more years of remaining service life. Of the Type HP - Prismatic High Intensity signs, 50% (114,011 signs) have six or more years of remaining service life. Of the 81 Super High Intensity signs in the state's inventory, 74% have six or more years of remaining service life.
- The regions have made significant progress is phasing out signs with Engineer-grade face material. In 2017, the Engineer-grade signs made up only 5% of the state's inventory (13,277 signs).

Condition of Signs by Category

Table 15. Wisconsin 2013-2017: Condition of Signs by Category

Year[6]	Regulatory/Warning/School				Detour/Object Marker/ Recreation/Guide			
	Total Signs	Backlog	Deficient Signs	Average Years Beyond Useful Life	Total Signs	Backlog	Deficient Signs	Average Years Beyond Useful Life
2013	181,763	9%	17,237	6.8	117,655	33%	39,041	9.1
2014	188,872	9%	16,169	6.1	117,346	30%	35,053	9.2
2015	194,356	10%	18,992	4.9	118,981	26%	30,451	9.3
2016	197,815	10%	20,696	4.5	117,959	23%	27,373	9.2
2017	190,101	10%	18,646	3.4	96,165	17%	16,662	8.0
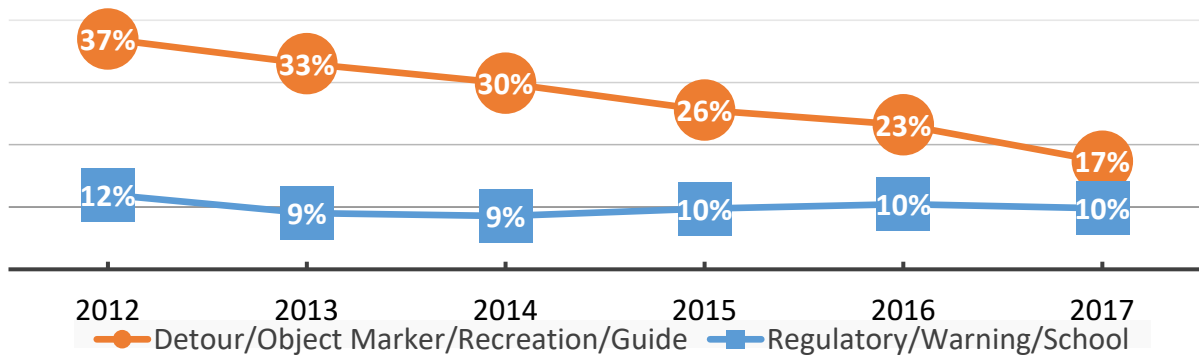
Figure 4. Wisconsin 2012-2017: Signs due for Replacement by Category[1]
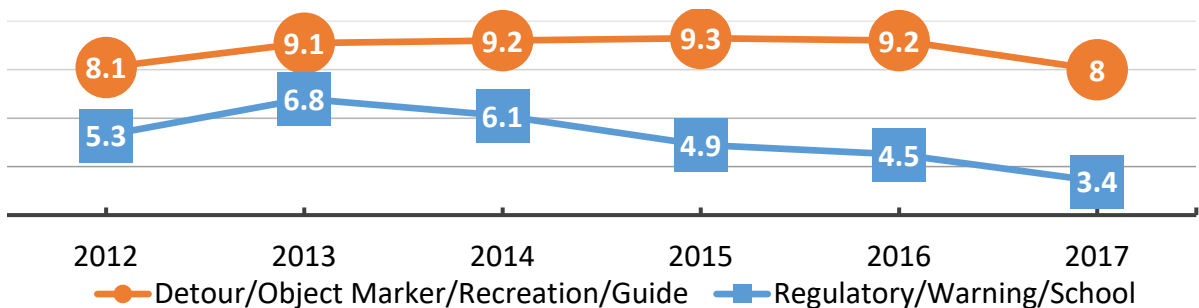
Figure 5. Wisconsin 2012-2017: Years Beyond Service of Signs backlogged for Replacement[1]

---

[6] WisDOT Bureau of Traffic Operations completed a major scrub of the sign data in 2017. Estimates of backlog prior to 2017 are based on the "un-scrubbed" data from that year.

Table 16. Regions 2017: Condition of Signs by Category

Region	Regulatory/Warning/School				Detour/Object Marker/Recreation/Guide			
	Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life	Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life
NC	30,347	10%	3,035	2.8	15,635	16%	2,532	5.3
NE	27,704	7%	1,876	4.7	13,500	12%	1,556	8.1
NW	37,031	8%	2,862	3.7	20,002	22%	4,365	8.5
SE	47,708	6%	3,094	4.1	19,346	11%	2,060	6.8
SW	47,311	16%	7,779	2.9	27,682	22%	6,149	9.1
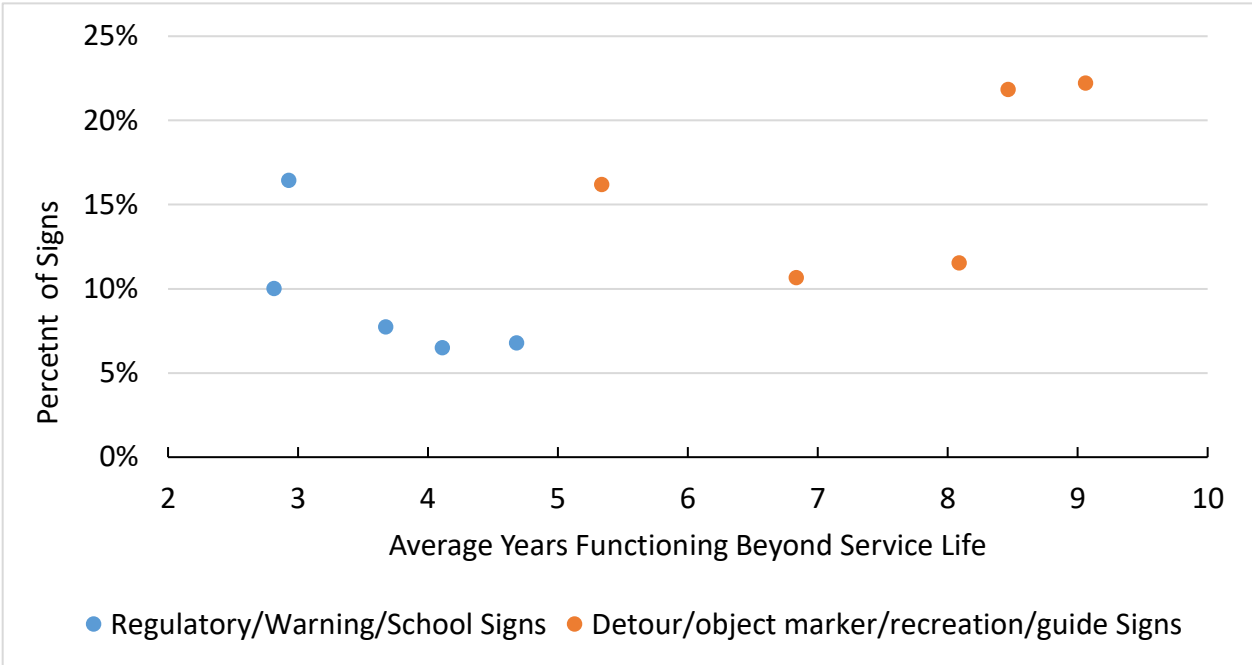
Figure 6. Regions 2017: Condition of Signs by Category

Table 17. Regions 2013-2017: Condition of Signs by Category

Region	Year	Regulatory/Warning/School				Detour/Object Marker/Recreation/Guide			
		Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life	Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life
NC	2013	29,353	6%	1,678	4.7	17,197	20%	3,469	6.9
	2014	29,941	4%	1,203	4.5	17,264	14%	2,464	6.7
	2015	30,109	9%	2,628	2.5	17,244	17%	2,992	5.5
	2016	30,246	9%	2,658	2.7	17,120	17%	2,963	5.6
	2017	30,347	10%	3,035	2.8	15,635	16%	2,532	5.3
NE	2013	26,597	13%	3,548	7.2	15,816	28%	4,424	9.1
	2014	27,181	11%	3,050	6.3	15,800	26%	4,049	8.7
	2015	27,668	11%	2,918	4.9	15,529	20%	3,051	8.7
	2016	27,972	8%	2,123	4.9	15,426	14%	2,083	8.3
	2017	27,704	7%	1,876	4.7	13,500	12%	1,556	8.1
NW	2013	34,492	8%	2,683	5.4	25,649	38%	9,711	8.4
	2014	36,264	8%	2,722	4.7	24,372	33%	8,133	8.6
	2015	37,156	8%	2,853	4.2	24,072	30%	7,136	8.9
	2016	37,342	8%	2,946	3.8	22,678	25%	5,619	8.7
	2017	37,031	8%	2,862	3.7	20,002	22%	4,365	8.5
SE	2013	45,174	14%	6,390	8.0	28,260	44%	12,327	8.7
	2014	49,019	12%	5,976	7.5	29,212	40%	11,549	9.0
	2015	51,893	11%	5,949	6.9	30,524	31%	9,454	10.0
	2016	54,566	11%	6,184	6.6	31,533	29%	9,209	10.2
	2017	47,708	6%	3,094	4.1	19,346	11%	2,060	6.8
SW	2013	46,147	6%	2,938	6.6	30,733	30%	9,110	11.3
	2014	46,467	7%	3,218	5.1	30,698	29%	8,858	10.9
	2015	47,530	10%	4,644	4.1	31,612	25%	7,818	10.3
	2016	47,689	14%	6,785	3.5	31,202	24%	7,499	10.0
	2017	47,311	16%	7,779	2.9	27,682	22%	6,149	9.1
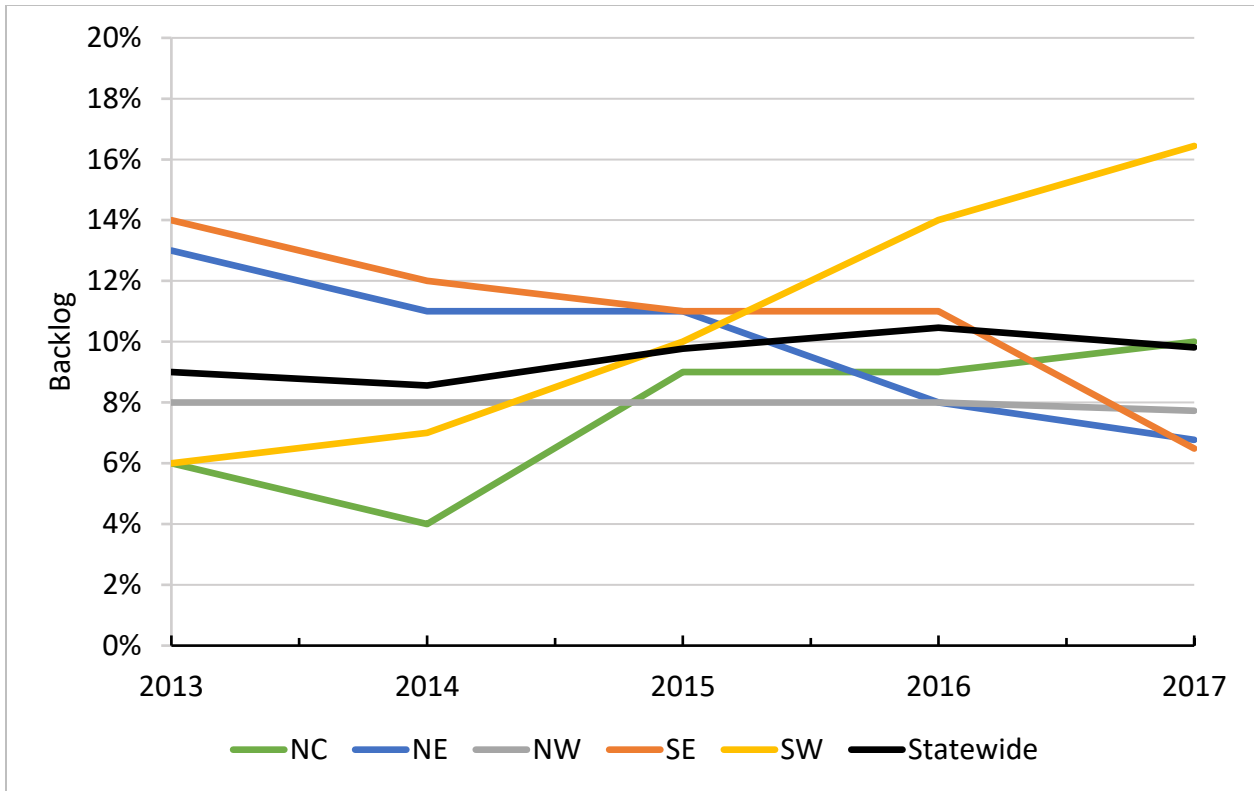
Figure 7. Regions: Annual Condition of Regulatory/Warning/School Signs
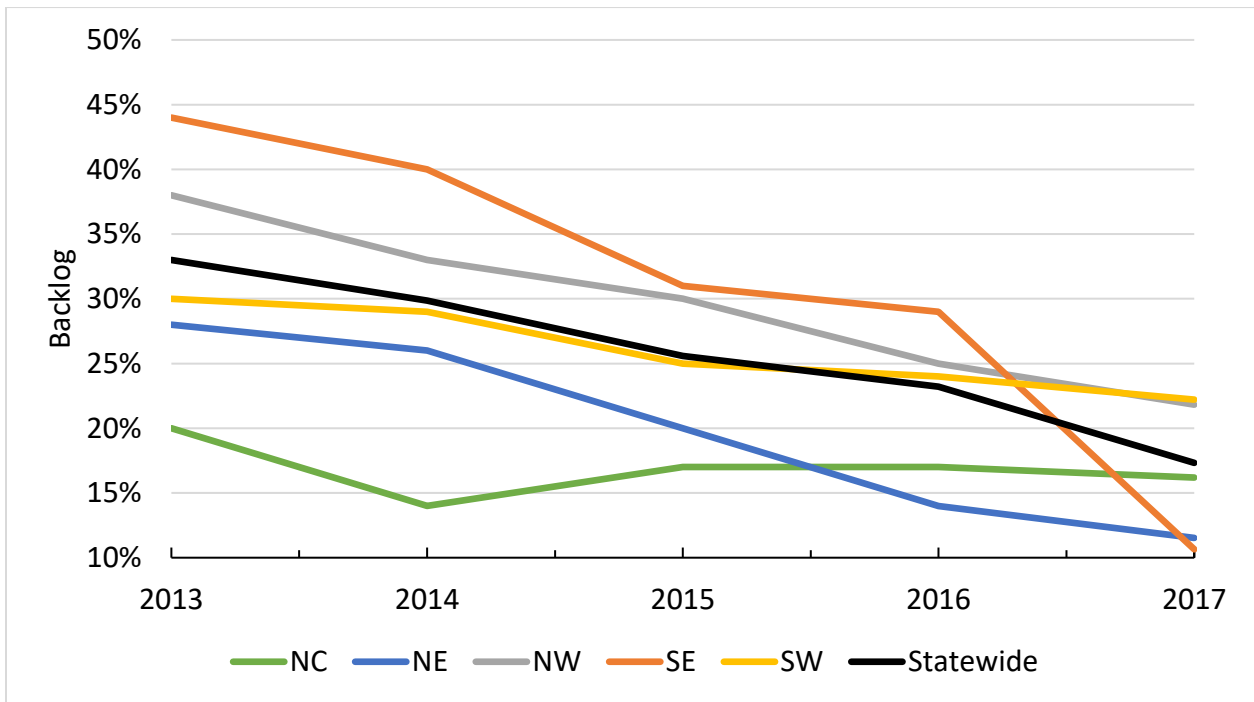
Figure 8. Regions: Annual Condition of Detour/Marker/Recreation/Guide Signs

Table 18. Counties 2017: Condition of Signs by Category

Region	County	Regulatory/Warning/School				Detour/Object Marker/Recreation/Guide			
		Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life	Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life
NC	ADAMS	1,029	2%	23	2.9	547	10%	53	6.4
	FLORENCE	483	2%	8	3.1	316	13%	40	5.0
	FOREST	1,287	11%	147	2.8	783	29%	229	4.8
	GREEN LAKE	978	6%	57	2.3	583	9%	53	6.9
	IRON	1,143	6%	63	2.5	532	14%	77	3.8
	LANGLADE	1,274	6%	71	2.3	682	11%	72	2.8
	LINCOLN	1,473	8%	115	1.9	832	11%	94	7.2
	MARATHON	4,427	13%	557	2.5	2,209	18%	392	5.5
	MARQUETTE	994	22%	217	2.5	522	13%	67	9.5
	MENOMINEE	664	8%	55	6.5	119	23%	27	5.2
	ONEIDA	2,111	13%	280	2.8	897	19%	172	3.8
	PORTAGE	2,327	15%	356	2.7	1,346	18%	245	6.5
	PRICE	1,192	4%	46	4.3	768	21%	161	4.9
	SHAWANO	1,954	9%	175	4.5	1,271	21%	263	4.2
	VILAS	1,593	7%	104	3.1	751	14%	106	3.5
	WAUPACA	3,142	10%	318	2.8	1,400	19%	263	5.3
	WAUSHARA	1,949	14%	275	2.7	874	11%	97	8.7
	WOOD	2,327	7%	168	2.8	1,203	10%	121	6.5
NE	BROWN	4,242	7%	299	5.9	2,055	8%	155	11.1
	CALUMET	1,447	3%	40	4.3	655	7%	46	9.5
	DOOR	2,032	7%	145	8.1	708	12%	82	11.1
	FOND DU LAC	2,785	14%	398	3.2	1,450	21%	311	5.5
	KEWAUNEE	664	0%	0	NA	346	2%	6	12.8
	MANITOWOC	2,195	5%	102	2.6	1,268	11%	137	7.8
	MARINETTE	1,962	0%	3	4.0	973	5%	48	6.2
	OCONTO	2,388	6%	145	3.2	1,023	14%	144	5.7
	OUTAGAMIE	3,534	8%	288	4.6	1,629	10%	156	7.6

Region	County	Regulatory/Warning/School				Detour/Object Marker/Recreation/Guide			
		Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life	Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life
	SHEBOYGAN	3,363	3%	112	4.1	1,816	15%	270	10.9
	WINNEBAGO	3,092	11%	344	5.5	1,577	13%	201	7.0
NW	ASHLAND	1,322	2%	23	6.2	646	12%	80	10.4
	BARRON	1,890	5%	87	3.0	1,039	24%	246	8.2
	BAYFIELD	1,516	11%	172	3.7	882	27%	237	8.6
	BUFFALO	1,859	1%	18	4.9	817	9%	74	12.2
	BURNETT	1,250	4%	45	4.1	513	20%	103	11.4
	CHIPPEWA	2,634	11%	281	3.0	1,518	25%	375	7.0
	CLARK	1,611	7%	112	3.3	844	18%	149	8.7
	DOUGLAS	2,113	7%	138	3.9	1,106	21%	235	9.1
	DUNN	2,339	8%	177	4.7	1,472	21%	303	10.9
	EAU CLAIRE	2,719	8%	210	3.1	1,496	22%	333	5.9
	JACKSON	1,720	6%	109	2.8	1,050	14%	149	9.0
	PEPIN	589	15%	91	2.4	387	19%	72	7.6
	PIERCE	1,868	5%	85	4.7	1,172	17%	195	10.3
	POLK	2,308	12%	279	4.0	1,172	36%	422	8.7
	RUSK	1,049	23%	243	2.3	641	37%	236	7.2
	SAWYER	1,440	3%	47	3.9	759	23%	176	7.6
	ST. CROIX	3,335	13%	435	4.5	1,704	24%	411	7.7
	TAYLOR	1,191	5%	56	3.9	656	16%	102	7.2
	TREMPEALEAU	2,263	8%	184	3.7	1,206	27%	322	9.0
	WASHBURN	2,015	3%	70	4.5	922	16%	145	8.4
SE	KENOSHA	5,681	9%	517	4.9	2,134	14%	302	6.0
	MILWAUKEE	14,900	3%	413	3.7	5,743	3%	170	5.5
	OZAUKEE	2,375	3%	65	1.6	1,058	4%	40	7.2
	RACINE	5,866	7%	384	4.9	2,333	21%	498	6.9
	WALWORTH	4,409	6%	284	4.2	1,933	7%	132	6.3
	WASHINGTON	4,334	11%	474	4.3	2,285	10%	234	7.6
	WAUKESHA	10,143	9%	957	3.6	3,860	18%	684	7.3
	COLUMBIA	3,512	14%	509	2.5	1,888	18%	345	6.5

Region	County	Regulatory/Warning/School				Detour/Object Marker/Recreation/Guide			
		Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life	Total Signs	Backlog	Deficient Signs	Average Years Beyond Service Life
SW	CRAWFORD	2,366	17%	411	2.2	1,301	22%	284	11.4
	DANE	8,381	20%	1,673	4.7	4,022	27%	1,087	6.9
	DODGE	3,373	18%	592	3.2	1,846	33%	613	12.0
	GRANT	3,113	24%	737	2.0	2,001	25%	508	11.6
	GREEN	1,428	16%	227	2.0	748	15%	110	10.4
	IOWA	2,143	14%	299	2.7	1,167	17%	203	6.3
	JEFFERSON	2,357	13%	313	3.0	1,547	22%	341	8.3
	JUNEAU	1,855	13%	236	2.3	1,396	21%	299	8.4
	LA CROSSE	3,054	13%	401	2.4	2,260	19%	440	9.6
	LAFAYETTE	1,415	19%	272	2.4	738	21%	158	11.4
	MONROE	2,584	17%	449	2.0	1,877	25%	468	10.1
	RICHLAND	1,862	12%	228	1.6	1,378	15%	207	4.6
	ROCK	3,174	13%	421	2.7	1,946	24%	471	10.8
	SAUK	3,682	20%	730	2.9	1,865	22%	411	6.8
	VERNON	3,012	9%	281	1.9	1,702	12%	204	9.6

Distribution of Signs by Grade and Face Material Type

Table 19. Wisconsin and Regions 2017: Signs by Grade and Face Material Type

Face		Region					Statewide	
Grade	Type	NC	NE	NW	SE	SW	Total	Percentage
1	Non-Reflective	10	0	101	21	8	140	0.05%
	Reflective – Engineer Grade	1748	1344	3834	2158	4003	13,087	4.6%
2	F - Fluorescent	7137	7642	11056	8285	11345	45,465	15.9%
	HP - Prismatic High Intensity	37058	32216	42023	56571	59626	227,494	79.5%
	SH - Super High Intensity	29	2	19	20	11	81	0.03%
Total		45,982	41,204	57,033	67,055	74,993	286,267	100%

Table 20. Wisconsin and Regions 2014-2017: Engineer Grade Signs

Region	Number of Engineer- Grade Signs in Service			
	2014	2015	2016	2017
NC	3,496	2,548	1,619	1,758
NE	3,465	2,324	1,296	1,344
NW	7,623	5,923	4,112	3,935
SE	11,077	8,957	7,350	2,179
SW	8,883	6,587	5,744	4,011
Statewide	34,544	26,339	20,121	13,227
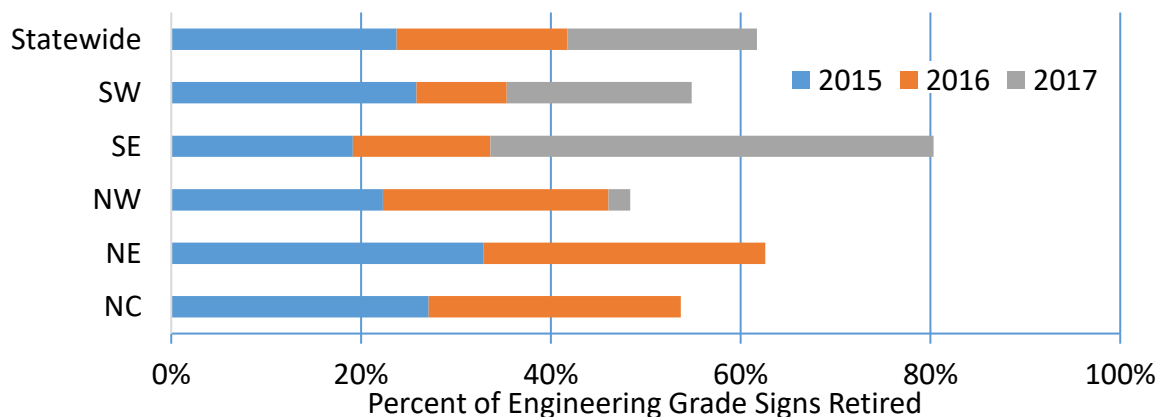
Figure 9. Wisconsin and Regions: Engineer-Grade Signs Retired or Replaced since 2014

Table 21. Wisconsin and Regions 2017: Signs by Face Material Grade and Category

Region	Regulatory/Warning/School Signs			Other Signs		
	Engineer Grade	High Intensity	Total	Engineer Grade	High Intensity	Total
NC	637	29,710	30,347	1,121	14,514	15,635
NE	410	27,294	27,704	934	12,566	13,500
NW	720	36,311	37,031	3,215	16,787	20,002
SE	900	46,808	47,708	1,279	18,067	19,346
SW	507	46,804	47,311	3,504	24,178	27,682
Statewide	3,174 (2%)	186,927 (98%)	190,101	10,053 (10%)	86,112 (90%)	96,165

Remaining Service Life

Table 22. Wisconsin and Regions 2017: Remaining Service Life of Regulatory/Warning/School Signs

	Years prior to the end of service life							Years beyond service life						
	6-10	5	4	3	2	1	0	1	2	3	4	5-10	>10	Total
NC	17,404	1,843	950	2,230	2,087	2,069	999	835	1,160	95	62	302	204	30,246
	58%	6%	3%	7%	7%	7%	3%	3%	4%	0%	0%	1%	1%	100%
NE	17,128	2,074	2,079	896	1,517	1,533	622	168	822	256	182	405	290	27,972
	61%	7%	7%	3%	5%	5%	2%	1%	3%	1%	1%	1%	1%	100%
NW	25,025	1,902	1,283	1,441	1,310	2,299	1,132	966	704	380	140	522	234	37,342
	67%	5%	3%	4%	4%	6%	3%	3%	2%	1%	0%	1%	1%	100%
SE	27,715	4,194	4,534	4,957	2,519	2,552	1,768	1,075	998	663	318	1,716	1,414	54,566
	51%	8%	8%	9%	5%	5%	3%	2%	2%	1%	1%	3%	3%	100%
SW	23,064	3,042	2,514	2,254	2,770	4,234	2,911	3,122	1,401	630	266	798	568	47,689
	48%	6%	5%	5%	6%	9%	6%	7%	3%	1%	1%	2%	1%	100%
State	110,336	13,055	11,360	11,778	10,203	12,687	7,432	6,166	5,085	2,024	968	3,743	2,710	197,815
	56%	7%	6%	6%	5%	6%	4%	3%	3%	1%	0%	2%	1%	100%

Table 23. Wisconsin and Regions 2017: Remaining Service Life of Detour/Marker/Recreation/Guide Signs

	Years prior to the end of service life							Years beyond service life						
	6-10	5	4	3	2	1	0	1	2	3	4	5-10	>10	Total
NC	7,720	956	807	2,345	1,193	486	603	388	617	87	84	959	828	17,120
	45%	6%	5%	14%	7%	3%	4%	2%	4%	1%	0%	6%	5%	100%
NE	7,936	1,533	1,502	561	970	548	289	130	290	167	107	703	686	15,426
	51%	10%	10%	4%	6%	4%	2%	1%	2%	1%	1%	5%	4%	100%
NW	9,411	1,911	1,433	1,217	936	1,075	1,071	586	410	368	145	2,057	2,053	22,678
	41%	8%	6%	5%	4%	5%	5%	3%	2%	2%	1%	9%	9%	100%
SE	13,505	1,758	1,573	2,255	1,289	905	969	543	727	466	712	2,584	4,177	31,533
	43%	6%	5%	7%	4%	3%	3%	2%	2%	1%	2%	8%	13%	100%
SW	12,657	2,547	1,475	2,180	1,474	1,097	960	797	719	815	263	1,611	3,294	31,202
	41%	8%	5%	7%	5%	4%	3%	3%	2%	3%	1%	5%	11%	100%
State	51,229	8,705	6,790	8,558	5,862	4,111	3,892	2,444	2,763	1,903	1,311	7,914	11,038	117,959
	43%	7%	6%	7%	5%	3%	3%	2%	2%	2%	1%	7%	9%	100%
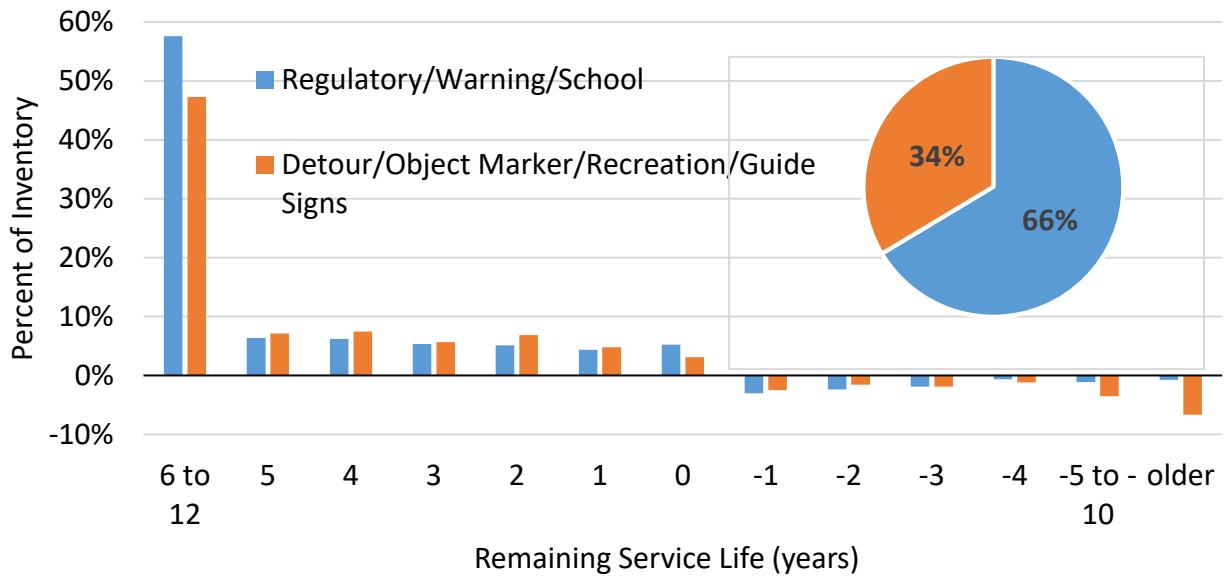
Figure 11. Wisconsin 2017: Remaining Service Life of Signs by Category
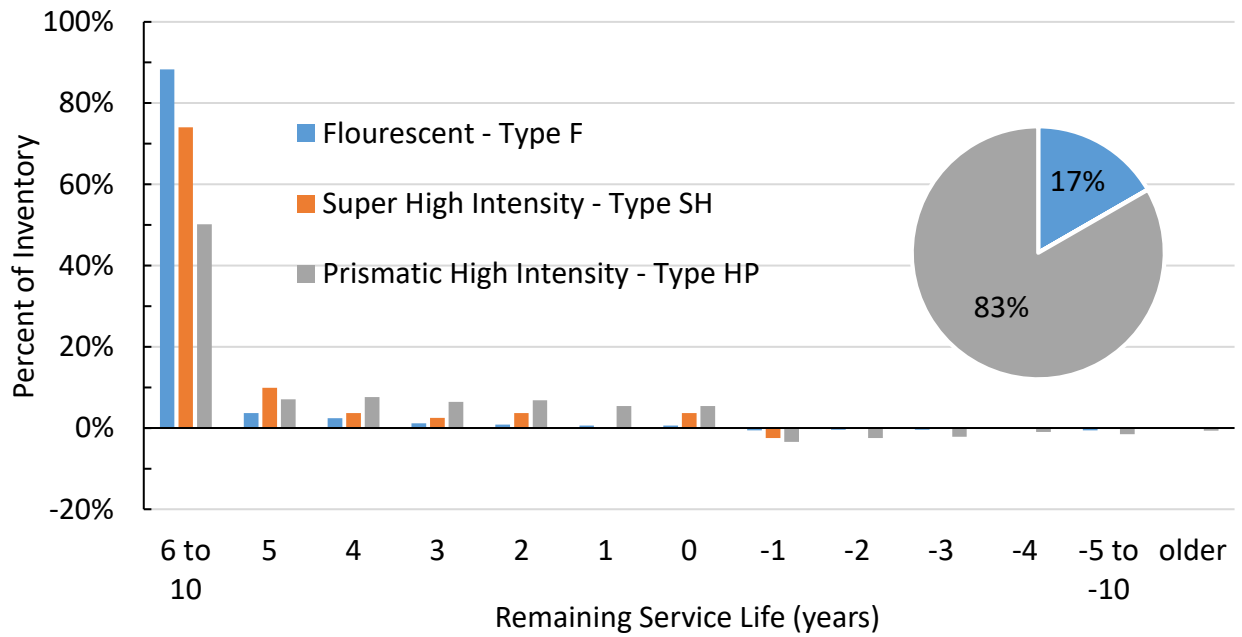
Figure 10. Wisconsin 2017: Remaining Service Life of High Intensity Signs

Table 24. Wisconsin and Regions 2017: Remaining Service Life of Fluorescent High Intensity Signs

	Years prior to the end of service life							Years beyond service life						
	6-10	5	4	3	2	1	0	1	2	3	4	5-10	>10	Total
NC	6,469	127	139	20	82	60	71	26	34	57	2	21	29	7,137
	91%	2%	2%	0%	1%	1%	1%	0%	0%	1%	0%	0%	0%	100%
NE	7,182	183	122	70	10	33	6	6	0	4	9	11	6	7,642
	94%	2%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
NW	10,391	363	105	19	33	26	34	30	15	18	8	13	0	11,055
	94%	3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
SE	6,513	544	459	184	176	86	41	84	17	41	22	89	29	8,285
	79%	7%	6%	2%	2%	1%	0%	1%	0%	0%	0%	1%	0%	100%
SW	9,603	470	292	219	80	88	111	102	120	71	33	124	31	11,344
	85%	4%	3%	2%	1%	1%	1%	1%	1%	1%	0%	1%	0%	100%
State	40,158	1,687	1,117	512	381	293	263	248	186	191	74	258	95	45,463
	88%	4%	2%	1%	1%	1%	1%	1%	0%	0%	0%	1%	0%	100%

Table 25. Wisconsin and Regions 2017: Remaining Service Life of Prismatic High Intensity Signs

	Years prior to the end of service life							Years beyond service life						
	6-10	5	4	3	2	1	0	1	2	3	4	5-10	>10	Total
NC	18,685	1,701	2,376	1,464	3,872	2,657	2,088	1,080	975	1,067	88	507	493	37,053
	50%	5%	6%	4%	10%	7%	6%	3%	3%	3%	0%	1%	1%	100%
NE	16,926	2,079	3,138	2,924	1,307	1,918	1,399	633	157	776	252	491	215	32,215
	53%	6%	10%	9%	4%	6%	4%	2%	0%	2%	1%	2%	1%	100%
NW	24,691	2,657	2,558	2,082	1,987	1,444	2,136	1,343	987	756	451	778	151	42,021
	59%	6%	6%	5%	5%	3%	5%	3%	2%	2%	1%	2%	0%	100%
SE	30,442	3,493	4,511	4,672	4,635	2,705	2,401	1,457	465	615	328	706	134	56,564
	54%	6%	8%	8%	8%	5%	4%	3%	1%	1%	1%	1%	0%	100%
SW	23,267	6,086	4,681	3,449	3,759	3,551	4,354	3,226	2,988	1,630	1,039	911	449	59,390
	39%	10%	8%	6%	6%	6%	7%	5%	5%	3%	2%	2%	1%	100%
State	114,011	16,016	17,264	14,591	15,560	12,275	12,378	7,739	5,572	4,844	2,158	3,393	1,442	227,243
	50%	7%	8%	6%	7%	5%	5%	3%	2%	2%	1%	1%	1%	100%

Table 26. Wisconsin and Regions 2017: Remaining Service Life of Super High Intensity Signs

	Years prior to the end of service life							Years beyond service life						
	6-10	5	4	3	2	1	0	1	2	3	4	5-10	>10	Total
NC	24	0	2	1	1	0	0	1	0	0	0	0	0	29
	83%	0%	7%	3%	3%	0%	0%	3%	0%	0%	0%	0%	0%	100%
NE	1	0	0	0	1	0	0	0	0	0	0	0	0	2
	50%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	100%
NW	16	1	0	1	0	0	1	0	0	0	0	0	0	19
	84%	5%	0%	5%	0%	0%	5%	0%	0%	0%	0%	0%	0%	100%
SE	16	3	0	0	0	0	1	0	0	0	0	0	0	20
	80%	15%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	100%
SW	3	4	1	0	1	0	1	1	0	0	0	0	0	11
	27%	36%	9%	0%	9%	0%	9%	9%	0%	0%	0%	0%	0%	100%
State	60	8	3	2	3	0	3	2	0	0	0	0	0	81
	74%	10%	4%	2%	4%	0%	4%	2%	0%	0%	0%	0%	0%	100%

Winter 2016-17: Compass Report on Winter Maintenance

This section presents winter maintenance outcomes critical to drivers and taxpayers; it is directed toward a general audience. The report looks at winter maintenance on state highways from November 1, 2016 to April 30, 2017. The *Annual Winter Maintenance Report* is a more comprehensive summary and is directed toward front-line maintenance managers. Both reports are prepared by the WisDOT Bureau of Highway Maintenance.

County highway departments determine the best combination of snow and ice control strategies according to storm conditions. The number of storm events drive up costs faster than total inches of snowfall, since staff and equipment may be mobilized for as little as 0.1 inches of snow or freezing rain events. Weekend and evening storms may also be costlier because of overtime pay. Extreme low temperatures can be difficult for crews because deicing agents become less effective. Storms with high winds are challenging because of blowing snow.

The 2016-2017 winter was milder than the previous year's moderate winter. Above average temperatures were common, and snowfall was lighter statewide. On average, about 35 to 40 winter weather events hit Wisconsin each winter and the state experiences numerous freezing drizzle and freezing fog events that cause roads to ice over.

WisDOT uses a Winter Severity Index (WSI) to compare maintenance performance from one winter to the next. The WSI is a normalizing factor based on a weighted formula that considers the number of snow and freezing rain events, snow amounts, storm durations, and number of incidents. The Winter Severity Index was scaled to 100 so that WSI greater than 100 indicates higher-than-average severity and WSI below 100 indicates lower-than-average severity. The recent annual trend for WSI and the Compass Winter measures are summarized in Table 27.

Table 27. Annual Trend of Compass Winter Operations Measures.

Compass Measure	Winter Maintenance Season				
	2012-13	2013-14	2014-15	2015-16	2016-17
Winter Severity Index (WSI)	115.2	133.6	99.28	90.35	91.14
Percent of winter events when crews achieved time to bare/wet pavement standards	73%	63%	70%	74%	70%
Actual Cost per lane mile	$2,778	$3,304	$2,155	$2,087	$2,537
Cost per lane mile per WSI point	$24.11	$24.73	$21.71	$23.09	$27.85
Weather-related crashes per 100 million vehicle miles traveled	29	44	25	18	18

Key Observations

- Actual statewide winter maintenance cost per lane mile increased by 22 percent in 2016-17. When adjusting for seasonal weather variation, the *relative* cost per lane mile increased by 20 to 27 percent, statewide and in all regions except the Northeast Region. For the Northeast Region, relative maintenance cost jumped 29 percent in 2015-16, one year earlier than at the other regions.

- For the 2016-17 target for "time to bare/wet pavement", standards achievement was met or exceeded. The target of 70 percent was exceeded on 24-hour coverage highways where the standard was met for 79 percent of the reported storm events. The standard was met for 70 percent of reported events on 18-hour coverage highways, and 74 percent of all reported events statewide.

- The 2016-17 season had the same or fewer crashes than other winters with lower WSI values. The state average is 18 winter crashes per 100 million VMT; the same as the previous year. By region, the number of winter crashes varied more than in previous years, but the trend is toward fewer crashes.

2016-2017 Winter Season Snowfall for Wisconsin

Figure 12 shows the snowfall from July 1, 2016 to June 30, 2017 as reported by counties in their *Winter Storm Reports*. The average snowfall of 60 inches was slightly below the 10-year average of 64 inches. Counties in the northern half of the state tend to face colder temperatures and heavier snowfall than those in the southern half of Wisconsin. Wisconsin's average annual snowfall ranges from about 40 inches in the south to as much as 160 inches along the shores of Lake Superior.
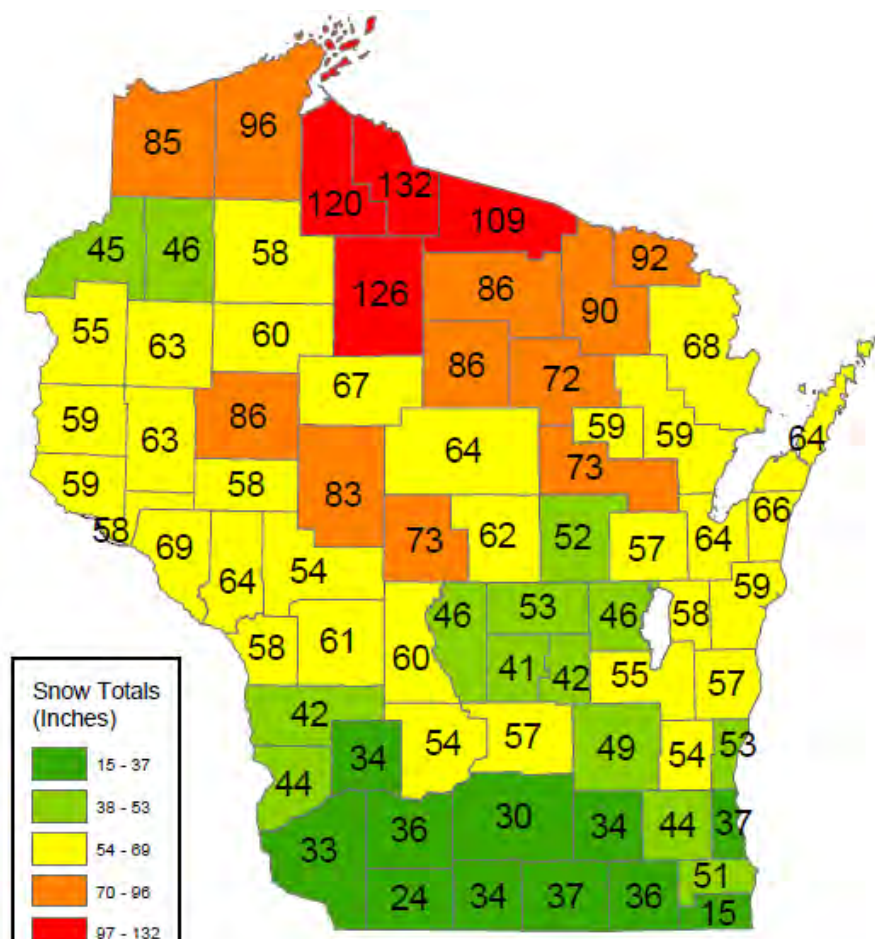
Figure 12. 2016-17 Winter Season Snowfall in Wisconsin

2016-2017 Wisconsin Winter Severity Index (WSI)

WisDOT uses the region and county-level WSI to assess cross-state differences each year. Table 27 lists the WSI by region for 2016-17 and fpir previous winter maintenance seasons. In 2016-17, the region-level WSI ranged more widely than in past years, from 65.7 in the Southeast region to 109.9 in the North Central region. Figure 13 shows the 2016-17 WSI for each county in Wisconsin[7]. By county, the WSI ranged from 54.7 in Waukesha to 168.9 in Douglas.

Table 28. Annual Winter Severity Index (WSI) by Region

Region	Annual Relative Cost per Lane Mile				
	2012-13	2013-14	2014-15	2015-16	2016-17
NC	131.5	148.9	114.2	102.2	106.9
NE	99.8	120.8	80.9	79.5	81.7
NW	128.2	139.7	110.0	102.2	104.3
SE	85.6	119.3	78.0	69.5	65.7
SW	104.0	124.0	91.0	72.6	74.6
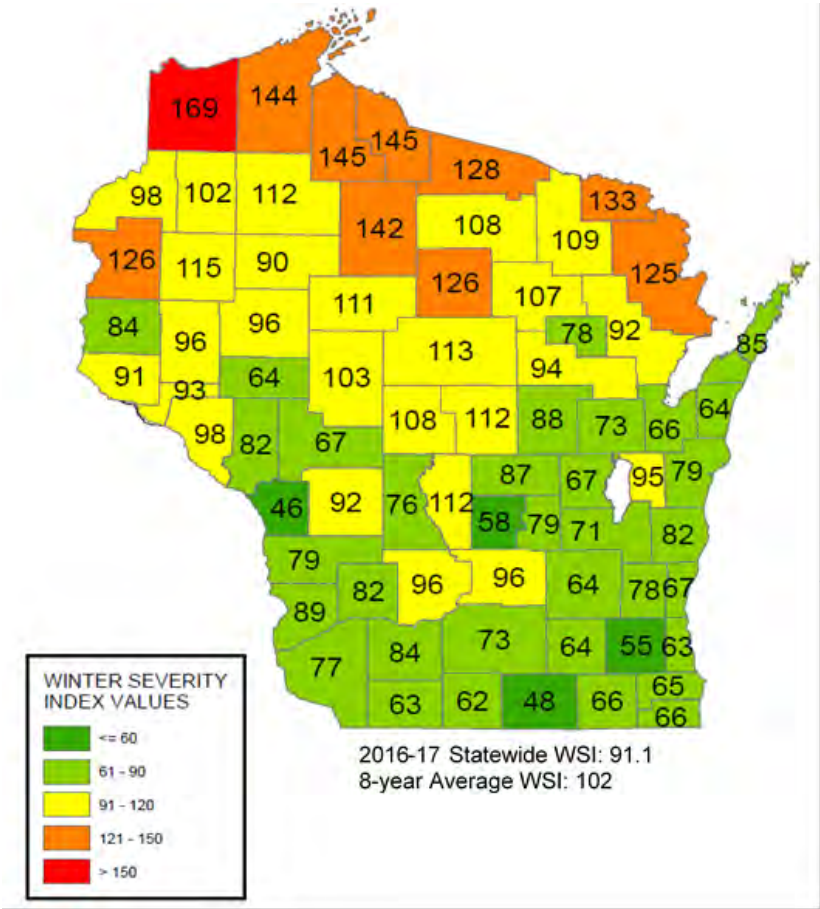
Figure 13. 2016-17 Winter Severity Index (WSI) by County

---

[7] If not in color, a color version can be obtained from the Compass Program Manager at the WisDOT Bureau of Highway Maintenance

Table 29. Winter Maintenance Statewide Summary, by the Numbers

Measure		2012-13	2013-14	2014-15	2015-16	2016-17
		Winter Maintenance Season				
Infrastructur	Lane miles	34,192	34,339	34,435	34,486	34,620
	RWIS stations	60	58	65	65	68
Material usage[4]	Tons Salt (tons per lane mile)	621,207 (18.1)	669,807 (19.5)	388,797 (11.3)	399,046 (11.6)	526,199 (15.2)
	Salt average cost per ton	$58.34	$60.40	$69.01	$71.35	$68.74
	Gallons pre-wetting liquid	2,124,834	2,970,166	2,009,139	2,116,648	3,018,207
	Gallons anti-icing agent	1,110,886	887,415	1,531,787	1,909,207	1,918,324
	Cubic yards Sand	18,589	58,870	22,301	9,255	14,036
Services	Labor hours[8]	212,090	244,602	160,453	142,983	147,395
	Overtime labor hours	137,225	182,311	91,691	82,630	122,220
	Public service announcements aired	7,154 total 5,919 radio 1,235 TV	3,184 total 2,704 radio 480 TV	6,080 total 5,085 radio 995 TV	4,971 total 4,311 radio 660 TV	13,936 total 12,269 radio 1667 TV
	Cost of public service announcements (market value)	$36,000 ($241,380)	$36,000 ($109,140)	$36,000 ($235,659)	$36,000 ($195,381)	$36,000 ($498,411)
Management and Technology	Patrol sections	769	753.5	755	754	755
	Average miles per patrol section	44.46	45.57	45.61	45.73	45.85
	Counties with on-board pre-wetting units	58 of 72 (80%)	58 of 72 (80%)	68 of 72 (94%)	68 of 72 (94%)	68 of 72 (94%)
	Counties with ground-speed controller units	67 of 72 (93%)	69 of 72 (96%)	68 of 72 (94%)	68 of 72 (94%)	68 of 72 (94%)
	Underbody plows	658	658	355	355	355
	Counties with underbody plows	55 of 72 (76%)	56 of 72 (78%)	54 of 72 (75%)	54 of 72 (75%)	54 of 72 (75%)

---

[8] Costs and hours come from county Winter Storm Reports, and reflect sanding, salting, plowing and anti-icing efforts.

Measure	Winter Maintenance Season				
	2012-13	2013-14	2014-15	2015-16	2016-17
Counties equipped to use anti-icing agents	66 of 72 (92%)	66 of 72 (92%)	66 of 72 (92%)	66 of 72 (92%)	66 of 72 (92%)
Counties using anti-icing agents	65 of 72 (90%)	63 of 72 (88%)	63 of 72 (88%)	63 of 72 (88%)	63 of 72 (88%)

Compass Winter Maintenance Measures

Time to Bare/Wet Pavement Standards Achievement

This Compass measure reports how well the agency is meeting its own set standards for "Time to Bare/wet Pavement" during a winter storm event. The counties perform winter maintenance according to the guidelines. The standard is four hours for roads that receive 24-hour coverage, while the standard is six hours for roads with 18-hour coverage. High-volume roads receive 24-hour coverage, while lower-volume roads receive 18-hour coverage. For each storm, the counties report the "Time to Bare/wet Pavement" for its 24-hour coverage roads, or for its 18-hour coverage roads, depending on which is predominant in the county.

For the 2016-17 winter maintenance season, the target for "time to bare/wet pavement" standards achievement was 70 percent. Table 30. Annual Time to Bare/Wet Pavement shows the percent of reported events for which the counties met the "time to bare/wet pavement" standard. The standard was met for 79 percent of the reported storm events on 24-hour coverage highways, 70 percent of reported events on 18-hour coverage highways, and 74 percent of all reported events statewide. "Never Bare/Wet" is reported for a storm if bare/wet conditions are not achieved within 24 hours, or if a new storm begins before the bare/wet condition is achieved. A county will report "Always Bare/Wet" if roadways were bare/wet during the duration of the storm event. Figure 14 shows the yearly trend for achieving the bare/wet pavement standard.

Table 30. Annual Time to Bare/Wet Pavement Standards Achievement

Service Category	Annual Target and Performance				
	2012-13	2013-14	2014-15	2015-16	2016-17
Target	70%	70%	70%	70%	70%
24-Hour	75%	66%	75%	78%	79%
18-Hour	70%	59%	67%	71%	70%
Statewide	73%	63%	70%	74%	74%
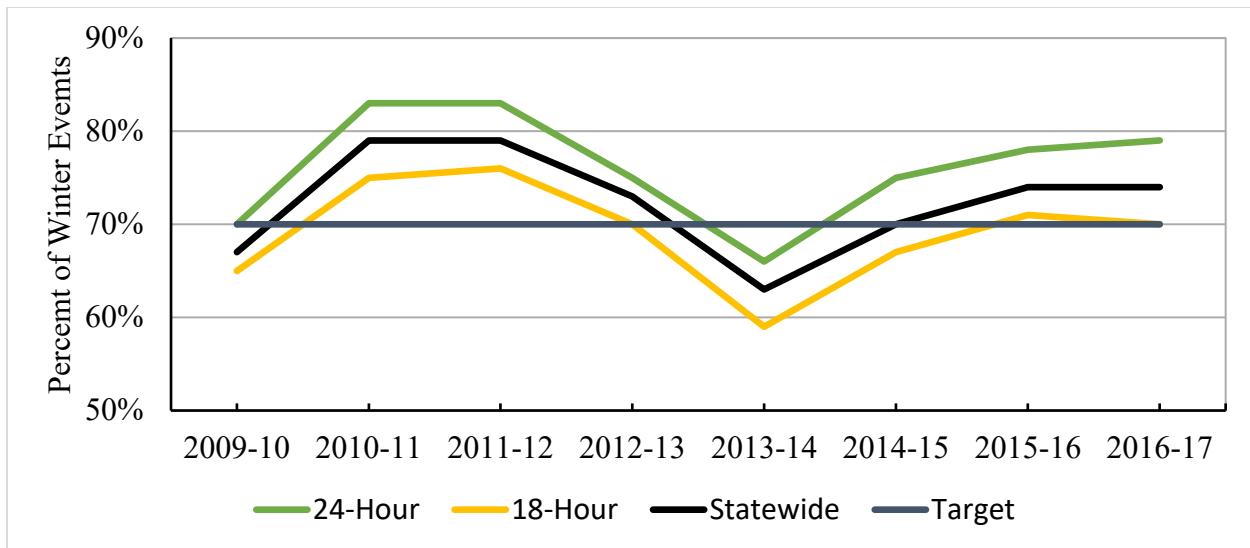
Figure 14. Annual Time to Bare/wet Pavement Standards Achievement

Winter Cost per lane mile relative to Winter Severity Index

This measure tracks expenditures normalized by the average WSI. The total cost per lane mile includes material, labor, equipment, and administrative costs. The costs were obtained from the WisDOT Financial Operating System.

$$\text{Relative cost per lane mile} = \frac{\text{Actual cost per lane mile}}{\text{WSI}}$$

For 2016-17, the statewide actual cost per lane mile was $2,533 and the average WSI was 91.14, thus the statewide relative cost per lane mile is $27.79.

$$\text{Statewide relative cost per lane mile} = \frac{\$2,533}{91.14} = \$27.79 \text{ per lane mile}$$

Table 31 contains the 5-year history of this relative cost per lane mile for the regions and statewide. The relative costs increased significantly, by 20 to 27 percent, in 2016-17 statewide and in all regions except the Northeast region. For the Northeast region, relative maintenance cost jumped significantly in 2015-16, one year earlier than at the other regions. As seen in Figure 15, the North Central and Northwest regions spend about the same relative cost as do the Northeast and Southwest regions. Relative cost per lane mile is much higher in the Southeast region.

Table 31. Annual Relative Cost per lane mile.

Coverage Area	Relative Cost per Lane Mile (base year 2017)				
	2012-13	2013-14	2014-15	2015-16	2016-17
NC	$21.42	$21.33	$20.15	$19.99	$23.76
NE	$29.34	$26.15	$22.85	$29.06	$28.80
NW	$22.31	$23.27	$19.19	$19.57	$24.30
SE	$34.45	$35.01	$35.32	$34.97	$41.30
SW	$28.99	$27.34	$23.79	$27.80	$33.87
Statewide	$25.42	$25.61	$22.44	$23.59	$27.79
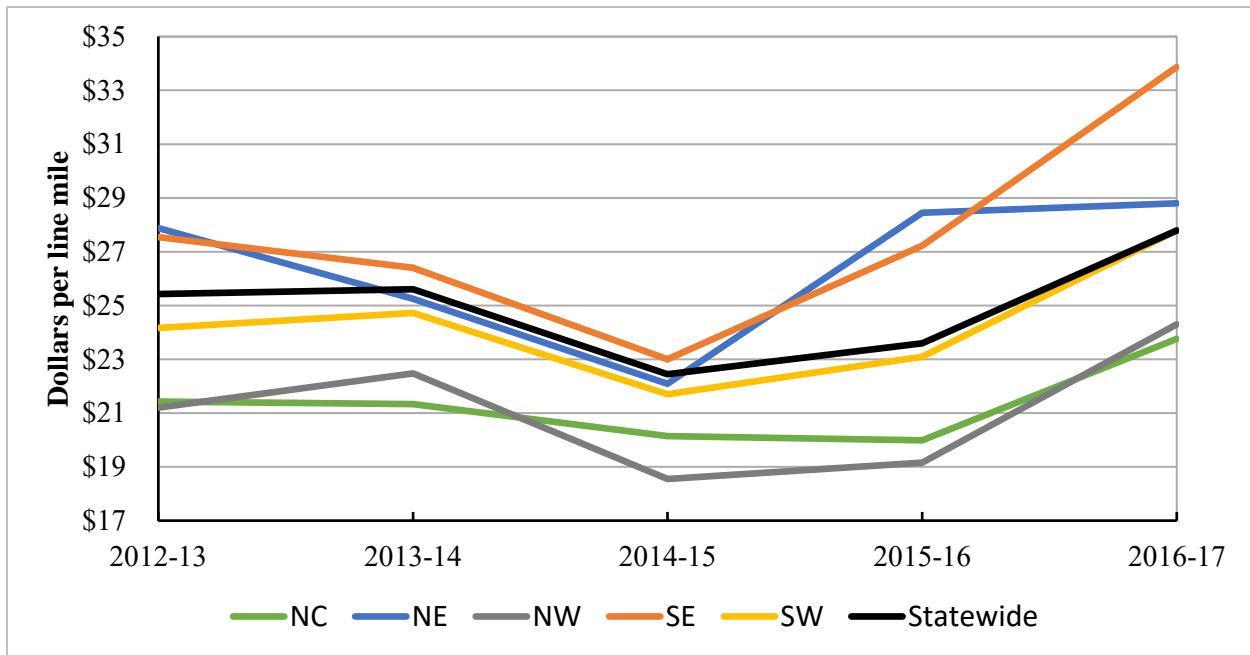
Figure 15. Relative Winter Maintenance Cost per lane mile by Region (base year 2017)

Winter Weather Crashes per Vehicle Miles Traveled (VMT)

Table 32 shows the five-year trend of crashes per 100 million VMT statewide and in each WisDOT region. The state average is 18 winter crashes per 100 million VMT; the same as for last year. By region, the number of winter crashes varies more than in previous years, but the trend is toward fewer crashes.

Table 32. Winter Weather Crashes per Vehicle Mile Traveled

Coverage Area	VMT[9] (100 million)	Crashes (2016-17)	Crashes per 100 million VMT					
			2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
NC	35.24	623	23	34	53	27	18	23
NW	51.70	819	22	37	44	20	16	20
NE	48.57	974	23	34	55	25	20	20
SE	75.79	1,252	16	19	36	26	17	12
SW	70.89	1,421	22	32	44	25	20	19
Statewide	282.18	5,089	20	29	44	25	18	18

---

[9] 100 million vehicle miles traveled (VMT) for November 1, 2016 through April 30, 2017 determined from annual average daily traffic (AADT) counts, gallons of gas sold, fuel tax collected, and average vehicle miles per gallon.

Figure 16 shows the relationship between the statewide severity of the winter and the number of crashes per VMT with the data point for 2016-17 highlighted. When the severity index is high, more crashes are likely. The 2016-17 season had the same or fewer crashes than other winters when the WSI was lower.
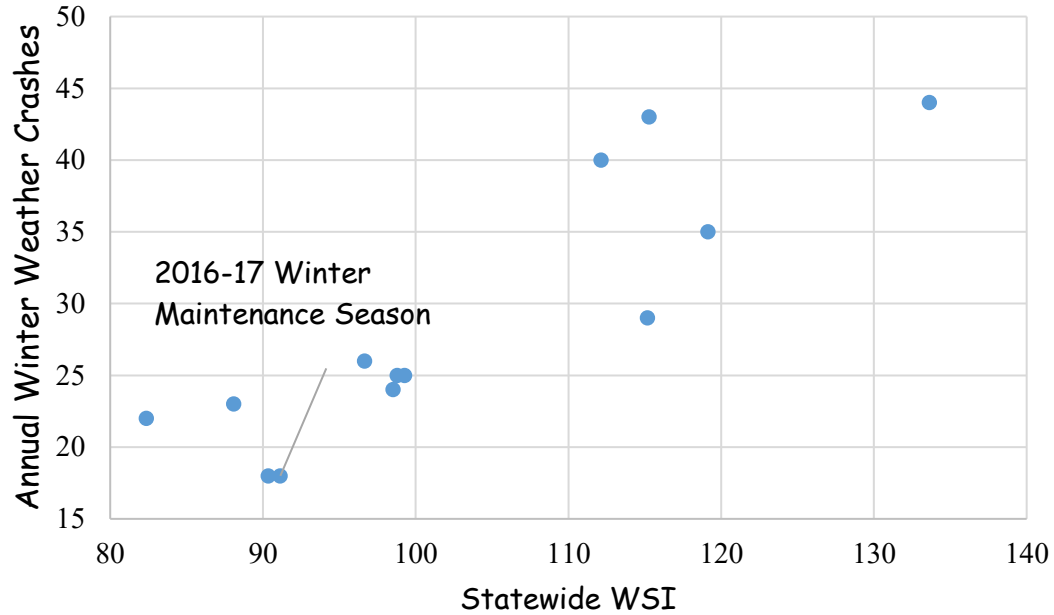
Figure 16. Winter Weather Crashes per 100 million Vehicle Miles Traveled

Appendices

A. Program Contributors

B. Feature Contribution Categories

C. Thresholds and Grade Ranges

D. 2017 Target Service Levels Memo

E. 2017 Highway Maintenance Targets

F: 2017 Region Scorecards

G. 2017 Highway Maintenance Condition Visualizations

H. 2017 County Level Field Data

   Counties 2017: Shoulders and Drainage

   Counties 2017: Roadsides and Traffic

I. 2017 Compass Rating Sheet

J. Winter Data Quality, Definitions, and Categories

A. Program Contributors

The Wisconsin Department of Transportation appreciates the significant contributions to the Compass program that were made by the following people:

2017 Compass Advisory Team

Lance Burger, WisDOT Northwest Region Roadway Maintenance Engineer

Scott Bush, WisDOT Compass Program Manager

Brandon Dammann, Wood County Patrol Superintendent

Jeff Gust, WisDOT State Highway Program Development & Analysis Section Chief

Bob Hanifl, WisDOT Southwest Region Maintenance Project Engineer

Jeff Hess, NC Region System Planning and Operations Manager

Todd Hogan, WisDOT Southwest Region Maintenance Coordinator

Jim Hughes, WisDOT Highway Maintenance & Roadside Management Section Chief

Bill McNary, WisDOT Traffic Engineering Section Chief

Mike Ostrenga, WisDOT Northwest Region Maintenance Supervisor

Doug Passineau, Wood County Highway Commissioner

Iver Peterson, WisDOT Southwest Region Signing and Marking Lead Worker

Bob Platteter, Buffalo County Highway Commissioner

Mark Woltmann, WisDOT Highway Maintenance Program Management Section Chief

2017 Compass Training Team

John Bangart, Marathon County Patrol Superintendent

Scott Bush, WisDOT Compass Program Manager

Brandon Dammann, Wood County Patrol Superintendent

Leif Hubbard, WisDOT Central Office

Dennis Newton, WisDOT Southeast Region

2017 Compass Quality Assurance Team

John Bangart, Marathon County

Scott Bush, WisDOT

Brandon Dammann, Wood County

Bob Hanifl, WisDOT

Dennis Newton, WisDOT

2017 Certified Compass Raters

Joel Allen, St. Croix County

Derek Anderson, Jefferson County

Thad Ash, Door County

Dawonn Averhart, Milwaukee County

John Bangart, Marathon County

Brent Bauer, Pepin County

Josh Blum, WisDOT SW Region

Todd Boivin, Shawano County

Robert Bonham, Sauk County

Jay Borek, Jackson County

Dennis Buchholz, Clark County

Michael Burke, WisDOT NW Region

Nick Carroll, Eau Claire County

William Condon, Richland County

Brandon Dammann, Wood County

Dan Davis, WisDOT NE Region

John Delaney, WisDOT SW Region

Jeff DeMuri, Florence County

Bill Elias, Oconto County

Matt Erickson, Ashland County

Greg Flohr, Waupaca County

Dave Fredrickson, Vernon County

Jason Freitag, Kenosha County

Randy Frisch, WisDOT NC Region

Jon Giese, Brown County

Rollin Gjestvang, Trempealeau County

Susan Greeno-Eichinger, WisDOT NC Region

Gary Gretzinger, Taylor County

Adam Gronning, Washburn County

Bill Groskopf, WisDOT NC Region
Jon Groth, Winnebago County
Chad Gudis, Rusk County
Tim Hammes, La Crosse County
Bob Hanifl, WisDOT SW Region
David Heil, Waukesha County
Nick Heintz, Green Lake County
Byron Henke, Marquette County
Todd Hogan, WisDOT SW Region
Brandon Hytinen, WisDOT NE Region
Jesse Jefferson, WisDOT NC Region
Jason Jilling, WisDOT SE Region
Ben Jiskra, Rusk County
Paul Johanik, Bayfield County
Kelly Johnston, Buffalo County
Doug Judd, Iowa County
Mike Keichinger, Juneau County
Joshua Kelch, Polk County
Jon Knautz, Grant County
Ross Krause, WisDOT NW Region
Terry Lammert, WisDOT SW Region
Tyson Langrehr, Monroe County
Gail Lantz, WisDOT SE Region
Randy Larson, Racine County
Joe Lechner, Dodge County
Todd Makuski, Portage County
Todd Marohl, WisDOT NE Region
Christina Martin, WisDOT NW Region
Jeff McLaughlin, Waukesha County
Brenda McNallan, WisDOT NW Region
Brent Miller, Dunn County
Ryan Murray, WisDOT SW Region
Todd Myers, Crawford County
Dan Nejedlo, Outagamie County
Leif Nelson, La Crosse County
Gordy Nesseth, Barron County
Dan Neuser, Manitowoc County
Dennis Newton, WisDOT SE Region
Don Nichols, Columbia County
Todd Nieman, WisDOT NC Region
George Nigh, Waushara County
Bryan Olson, Sheboygan County
Shaun Olson, Dane County

Joel Ortman, WisDOT NC County
Patrick Pare, Adams County
Kevin Peiffer, WisDOT SE Region
Neil Pierce, Rock County
Dale Poggensee, Walworth County
Vance Pollitt, Price County
Patty Pollock, WisDOT NW Region
Larry Rhea, Monroe County
Ben Rich, Oneida County
Richard Ricksecker, WisDOT NW Region
Dan Rielly, Lafayette County
Randy Roloff, Outagamie County
Mike Sabel, Calumet County
Jeff Scanlon, Burnett County
Troy Schalinske, Vilas County
Paul Schilling, Marathon County
Jesse Schley, Kewaunee County
Todd Schmeltzer, Lincoln County
Kevin Schmid, Douglas County
Tom Schmidt, Washington County
Howard Schmock, WisDOT NW Region
Dennis Schmunck, WisDOT SE Region
Joe Simon, Chippewa County
Dan Sinniger, La Crosse County
Jamie Smetana, Jackson County
Charles Smith, WisDOT NW Region
Brian Spilde, Eau Claire County
Fay Statezny, Forest County
Bruce Stefonek, Oneida County
Pete Strachan, WisDOT SW Region
Bud Strunz, Green County
John Suennen, Marinette County
Mike Swartz, Iron County
William Tackes, Ozaukee County
Jason Thom, Langlade County
Alan Thoner, Pierce County
Jeff Trentadue, Racine County
Jarrod Turk, WisDOT SW Region
Aaron Wagner, Green Lake County
Jim Weiglein, WisDOT SE Region
Jeremy Weso, Menominee County
Steve Wilke, Menominee County
Gary Wolf, WisDOT SE Region

David Woodhouse, Walworth County

John Zettler, Fond du Lac County

Additional Compass Resources

Mike Adams, WisDOT Central Office (Winter)

Dr. Teresa Adams, University of Wisconsin – Madison (Data analysis, report development)

Karl Buck, WisDOT Central Office (Segment data)

Martin Hansberry, WisDOT (Segment data)

Gretta Luedeke, WisDOT Bureau of Information Technology (Mapping)

Mary Kirkpatrick, WisDOT Central Office (Desktop publishing)

Tim Nachreiner, WisDOT Central Office (Database, Rating Sheets)

Matt Rauch, WisDOT Central Office (Signs)

Mike Sproul, WisDOT Central Office (Winter)

B. Feature Contribution Categories

Element	Feature	This Feature Contributes Primarily To:				
		Critical Safety	Safety/ Mobility	Stewardship	Driver Comfort	Aesthetics
Shoulders	Hazardous Debris	✓				
	Cracking (paved)			✓		
	Drop-off/Build-up (paved)	✓				
	Potholes/Raveling (paved)				✓	
	Cross-Slope (unpaved)		✓			
	Drop-off/Build-up (unpaved)	✓				
	Erosion (unpaved)			✓		
Drainage	Culverts		✓			
	Curb & Gutter			✓		
	Ditches			✓		
	Flumes			✓		
	Storm Sewer System		✓			
	Under-drains/Edge-drains			✓		
Roadside	Urban Fence		✓			
	Rural Fence				✓	
	Litter					✓
	Mowing					✓
	Mowing for Vision		✓			
	Woody Vegetation		✓			
	Woody Veg. Control for Vision		✓			
Traffic and Safety	Centerline Markings	✓				
	Delineators		✓			
	Edgeline Markings	✓				
	Detour/object marker/recreation/guide signs (emerg. repair)				✓	
	Detour/object marker/recreation/guide signs (routine repair)				✓	
	Protective Barriers	✓				
	Reg./Warning Signs (emerg.)	✓				
	Reg./Warning Signs (routine)		✓			
	Special Pavement Markings		✓			

Category Definitions:

Critical Safety: Critical safety features would necessitate immediate action to remedy if not properly functioning.

Safety/Mobility: Highway features and characteristics that protect users against – and provide them with a clear sense of freedom from – danger, injury or damage.

Stewardship: Actions taken to help a highway asset obtain its full potential service life.

Driver Comfort: Provide a state of ease and quiet enjoyment for highway users. These features include proper fencing and signing, along with a lack of pavement obstructions.

Aesthetics: The display of natural beauty located along a highway corridor. It focuses on maintaining grass along the roadway shoulders and removing litter, which detracts from the visual aesthetics of the roadway.

C. Thresholds and Grade Ranges

Element	Feature	Threshold	Ranges for System Grades Grade determined by percent backlogged shown: top of range				
			A	B	C	D	F
Shoulders	Hazardous debris	Any items large enough to cause a safety hazard (by mile)	2%	5%	9%	15%	>15%
	Cracking on paved shoulder	200 linear feet or more of unsealed cracks > ¼ inch (by mile)	6%	15%	29%	50%	>50%
	Drop-off/build-up on paved shoulder	200 linear feet or more with drop-off or build-up > 1.5 inches (by mile)	2%	5%	9%	15%	>15%
	Potholes/raveling on paved shoulder	Any potholes OR raveling > 1 square foot by 1 inch deep (by mile)	7%	18%	35%	60%	>60%
	Cross-slope on unpaved shoulder	200 linear feet or more of cross-slope at least 2x planned slope with the maximum cross slope of 8% (by mile)	4%	9%	18%	30%	>30%
	Drop-off/build-up on unpaved shoulder	200 linear feet or more with drop-off or build-up > 1.5 inches (by mile)	2%	5%	9%	15%	>15%
	Erosion on unpaved shoulder	200 linear feet or more with erosion >2 inches deep (by mile)	6%	15%	29%	50%	>50%
Drainage	Culverts	Culverts that are >25% obstructed OR where a sharp object - e.g., a shovel-can be pushed through the bottom of the pipe OR pipe is collapsed or separated (by culvert)	4%	9%	18%	30%	>30%
	Curb & gutter	Curb & gutter with severe structural distress OR >1-inch structural misalignment OR >1 inch of debris build-up in the curb line (by linear feet of curb & gutter)	6%	15%	29%	50%	>50%
	Ditches	Ditch with greater than minimal erosion of ditch line OR obstructions to flow of water requiring action (by linear feet of ditch)	6%	15%	29%	50%	>50%
	Flumes	Not functioning as intended OR deteriorated to the point that they are causing erosion (by flume)	6%	15%	29%	50%	>50%
	Storm sewer systems	Inlets catch basins, and outlet pipes with >=50% capacity obstructed OR <80% structurally	4%	9%	18%	30%	>30%

Element	Feature	Threshold	Ranges for System Grades				
			Grade determined by percent backlogged				
			shown: top of range				
			A	B	C	D	F
		sound OR >1 inch vertical displacement or heaving OR not functioning as intended (by inlet, catch basin & outlet pipes)					
	Under-drains/edge-drains	Under- and edge-drains with outlets, endwalls or end protection closed or crushed, OR water flow or end protection is obstructed (by drain)	6%	15%	29%	50%	>50%
Roadsides	Urban Fence	Fence missing OR not functioning as intended (by LF of fence)	4%	9%	18%	30%	>30%
	Rural Fence	Fence missing OR not functioning as intended (by LF of fence)	7%	18%	35%	60%	>60%
	Litter	Any pieces of litter on shoulders and roadside visible at posted speed, but not causing a safety threat. (by mile)	10%	25%	47%	80%	>80%
	Mowing	Any roadside has mowed grass that is too short, too wide or is mowed in a no-mow zone (by mile)	10%	25%	47%	80%	>80%
	Mowing for vision	Any instances in which grass is too high or blocks a vision triangle (by mile)	4%	9%	18%	30%	>30%
	Woody vegetation control	Any instances in which a tree is present in the clear zone OR trees and/or branches overhang the roadway or shoulder creating a clearance problem (by mile)	4%	9%	18%	30%	>30%
	Woody vegetation control for vision	Any instances in which woody vegetation blocks a vision triangle (by mile)	4%	9%	18%	30%	>30%
Traffic control & safety devices (selected)	Centerline markings	Line with > 20% paint missing (by mile)	2%	5%	9%	15%	>15%
	Edgeline markings	Line with > 20% paint missing (by mile)	2%	5%	9%	15%	>15%
	Delineators	Missing OR not visible at posted speed OR damaged (by delineator)	4%	9%	18%	30%	>30%
	Detour/object marker/recreation/guide signs (emergency repair)	Missing OR not visible at posted speed (by sign)	7%	18%	35%	60%	>60%

Element	Feature	Threshold	Ranges for System Grades				
			Grade determined by percent backlogged				
			shown: top of range				
			A	B	C	D	F
	Detour/object marker/recreation/guide signs (routine)	Beyond recommended service life (by sign)	7%	18%	35%	60%	>60%
	Protective barriers	Not functioning as intended (linear feet of barrier)	2%	5%	9%	15%	>15%
	Regulatory/warning signs (emergency repair)	Missing OR not visible at posted speed (by sign)	2%	5%	9%	15%	>15%
	Regulatory/warning signs (routine)	Beyond recommended service life (by sign)	4%	9%	18%	30%	>30%
	Special pavement markings	Missing OR not functioning as intended (by marking)	4%	9%	18%	30%	>30%

D. 2017 Target Service Levels Memo

WisDOT Highway Maintenance
2017 Target Service Levels

Issued by *Rose Phetteplace, Director, Bureau of Highway Maintenance*

August 17, 2016

Attached are the 2017 target service levels for highway maintenance and operations. Highway maintenance managers set these targets to provide guidance to central office and regional highway maintenance staff in prioritizing activities and expending resources. The 2017 maintenance targets are critical for structuring the 2017 Routine Maintenance Agreements (RMA). **The targets are consistent with the 2017 RMA guidance that Tom Goodwyn sent to regions on August 5, 2016.**

Targets are the conditions expected on state highways at the end of the summer maintenance season. They were selected by highway maintenance managers in the regions and BHM to set priorities within the budget and to increase consistency across region and county lines. The condition measure used is the percent of inventory with backlogged maintenance work. A measure greater than 0% backlogged reflects work left undone at the end of the summer season. Under full funding of maintenance needs, we would expect to see features at or close to 0%. The following chart provides historical service levels statewide and by region for 2015. Targets aren't set for a portion of highway maintenance expenditures including winter operations, certain traffic control devices, and electrical operations.

Targets do not reflect an optimal maintenance condition for the highways, but instead reflect a continued commitment to fully fund winter operations, other organizational priorities, existing highway conditions, and most importantly, dollars available. Given constrained resources, priorities include:
- ❑ Focusing our resources on keeping the system safe and operating from day to day. Highway maintenance priorities will:
  - Decrease drop-off on unpaved shoulders.
  - Decrease the amount of hazardous debris on shoulders.
  - Repair damaged safety appurtenances and signs.
  - Repair damaged regulatory and warning signs and continue to routinely replace old regulatory and warning signs.
- ❑ Expending far fewer resources, directing more funding to asset preservation activities:
  - Mowing is limited to one shoulder cut per season. The exception is for spot locations where vision is a safety issue for that specific area.
  - No maintenance of lane-line raised pavement markers and other wet reflective markings. Special pavement markings will only be addressed for the most critical safety needs.
  - Litter control is limited to once in the spring and Adopt-A-Highway efforts continue to be encouraged.
- ❑ Leveraging improvement funding and better coordinating improvement work to decrease maintenance workload and funding demands.
  - Now and going forward, maintenance supervisors and engineers will put greater emphasis on working with the improvement program to reduce the amount of drop-off/build-up on unpaved shoulders, decrease pavement rutting, reduce cracking on paved shoulders, and improve the condition of culverts.

Thank you to the Compass program for coordinating this effort and preparing this report.

E. 2017 Highway Maintenance Targets

Circles identify if targets were not met or exceeded. Arrows identify changes to target backlog percentages.

Contribution Category and Element	Feature	2012 Target Percent Backlogged and Feature Grade - Statewide	2013 Target Percent Backlogged and Feature Grade - Statewide	2014 Target Percent Backlogged and Feature Grade - Statewide	2015 Target Percent Backlogged and Feature Grade - Statewide	2016 Target Percent Backlogged and Feature Grade - Statewide	**2017 Target Percent Backlogged and Feature Grade - Statewide**
Critical Safety:							
Traffic and Safety	Reg./Warning Signs - Emergency Repair	0=A	0=A	0=A	0=A	0=A	**0=A**
Shoulders	Hazardous Debris	6=C	5=B	5=B	5=B	5=B	**5=B**
Traffic and Safety	Protective Barriers	3=B	3=B	3=B	3=B	3=B	**3=B**
Traffic and Safety	Centerline Markings	5=B	5=B	5=B	5=B	5=B	**5=B**
Traffic and Safety	Edgeline Markings	8=C	8=C	8=C	8=C	8=C	**8=C**
Shoulders (unpaved)	Drop-off/Build-up	30=F	30=F	30=F	28=F	28=F	**28=F**
Shoulders (paved)	Drop-off/Build-up	4=B	4=B	4=B	4=B	4=B	**4=B**
Safety/Mobility:							
Roadside	Woody Veg. Control for Vision	2=A	2=A	2=A	2=A	2=A	**2=A**
Roadside	Mowing for Vision	5=B	5=B	5=B	5=B	5=B	**5=B**
Traffic and Safety	Special Pavement Markings	23=D	10=C	10=C	10=C	10=C	**10=C**
Roadside	Woody Vegetation	5=B	5=B	5=B	5=B	5=B	**5=B**
Drainage	Culverts	30=D	30=D	30=D	30=D	30=D	**25=D**
Drainage	Storm Sewer System	15=C	15=C	15=C	15=C	15=C	**15=C**

Contribution Category and Element	Feature	2012 Target Percent Backlogged and Feature Grade - Statewide	2013 Target Percent Backlogged and Feature Grade - Statewide	2014 Target Percent Backlogged and Feature Grade - Statewide	2015 Target Percent Backlogged and Feature Grade - Statewide	2016 Target Percent Backlogged and Feature Grade - Statewide	**2017 Target Percent Backlogged and Feature Grade - Statewide**
Shoulders (unpaved)	Cross-Slope	20=D	20=D	20=D	18=C	18=C	**18=C**
Traffic and Safety	Delineators	25=D	25=D	25=D	25=D	25=D	**20=D**
Traffic and Safety	Reg./Warning Signs -Routine Replacement	25=D	15=C	15=C	9=B	9=B	**9=B**
Roadside	Fences	14=C	14=C	14=C	14=C	14=C	**14=C**
Stewardship:							
Drainage	Ditches	5=A	5=A	5=A	5=A	5=A	**5=A**
Drainage	Curb & Gutter	10=B	10=B	10=B	10=B	10=B	**10=B**
Drainage	Flumes	35=D	35=D	35=D	44=D	44=D	**44=D**
Shoulders (paved)	Cracking	60=F	60=F	60=F	58=F	58=F	**58=F**
Shoulders (unpaved)	Erosion	5=A	5=A	5=A	5=A	5=A	**5=A**
Drainage	Under-drains/Edge-drains	30=D	30=D	30=D	30=D	30=D	**30=D**
Ride/Comfort:							
Shoulders (paved)	Potholes/Raveling	10=B	10=B	10=B	10=B	10=B	**10=B**
Traffic and Safety	Other Signs - Emergency Repair	1=A	1=A	1=A	1=A	1=A	**1=A**
Traffic and Safety	Other Signs - Routine Replacement	59=D	39=D	39=D	33=C	33=C	**33=C**
Aesthetics:							
Roadside	Mowing	40=C	40=C	40=C	40=C	40=C	**40=C**
Roadside	Litter	81=F	63=D	63=D	63=D	63=D	**63=D**

F. 2017 Region Scorecards

2017 Maintenance Scorecard:
North Central Region

Region Grade Point Average (GPA):   2.59 *(statewide = 2.55)*
- Region with Highest GPA = 2.72 in Northeast Region
- Region with Lowest GPA = 2.48 in Southeast Region

Region GPA by Contribution Category:
- *Critical Safety*   2.57 *(statewide = 2.43)*
- *Safety/Mobility*   2.70 *(statewide = 2.60)*
- *Stewardship*   2.00 *(statewide = 2.17)*
- *Ride/Comfort*   3.75 *(statewide = 3.75)*
- *Aesthetics*   1.50 *(statewide = 1.50)*

Region GPA by Element:
- *Shoulders*   2.14 *(statewide = 2.00)*
- *Drainage*   1.50 *(statewide = 2.00)*
- *Roadsides*   3.29 *(statewide = 3.29)*
- *Traffic Control & Safety*   3.11 *(statewide = 2.78)*

Region Notes:
- <u>*Highest* Region Backlog Percentage</u>
  - *Ditches (tied with Northeast Region and Northwest Region)*
  - *Culverts*
  - *Storm Sewer Systems*

- *Lowest* Region Backlog Percentage
    - Drop-off/Build-up on Paved Shoulders *(tied with Northwest Region)*
    - Cracking on Paved Shoulders
    - Potholes/Raveling on Paved Shoulders
    - Drop-off/Build-up on Unpaved Shoulders
    - Litter (tied with Northwest Region)
    - Mowing for Vision (*tied with Southeast Region*)
    - Woody Vegetation Control (tied with Northeast Region)
    - Woody Vegetation Control for Vision (tied with Northeast Region)
    - Urban Fences *(tied with Northwest Region, Southeast Region, and Southwest Region)*
    - Emergency Repair of Regulatory/Warning/School Signs *(tied with Northeast Region and Southwest Region)*
    - Delineators

Region Conditions and Maintenance Targets:
- Conditions *Worse* Than Targeted
    - Protective Barriers
    - Culverts
    - Storm Sewer System
    - Cross Slope on Unpaved Shoulders
    - Flumes
    - Drains

- Conditions *Better* Than Targeted
    - Delineators
    - Urban Fences
    - Potholes/Raveling on Paved Shoulders
    - Routine Replacement of Other Signs
    - Rural Fences
    - Litter

2017 Maintenance Scorecard:
Northeast Region

Region Grade Point Average (GPA):   2.72 *(statewide = 2.55)*
- Region with Highest GPA = 2.72 in Northeast Region
- Region with Lowest GPA = 2.48 in Southeast Region

Region GPA by Contribution Category:
- Critical Safety   2.71 *(statewide = 2.43)*
- Safety/Mobility   2.80 *(statewide = 2.60)*
- Stewardship   2.33 *(statewide = 2.17)*
- Ride/Comfort   3.75 *(statewide = 3.75)*
- Aesthetics   1.50 *(statewide = 1.50)*

Region GPA by Element:
- Shoulders   1.86 *(statewide = 2.00)*
- Drainage   2.50 *(statewide = 2.00)*
- Roadsides   3.29 *(statewide = 3.29)*
- Traffic Control & Safety   3.11 *(statewide = 2.78)*

Region Notes:
- *Highest* Region Backlog Percentage
  - Cracking on Paved Shoulders
  - Cross Slope on Unpaved Shoulders
  - Erosion (tied with Northwest Region and Southwest Region)
  - Ditches
  - Mowing
  - Mowing for Vision (tied with Northwest Region and Southwest Region)
  - Urban Fences
  - Special Pavement Markings

- *Lowest* Region Backlog Percentage
  - Woody Vegetation (tied with North Central Region)
  - Rural Fences *(tied with Southeast Region and Southwest Region)*
  - Edgeline Markings
  - Emergency Repair of Regulatory/Warning/School Signs *(tied with North Central Region and Southwest Region)*
  - Routine Replacement of Regulatory/Warning/School Signs *(tied with Southeast Region)*
  - Emergency Repair of Other Signs
  - Protective Barriers

Region Conditions and Maintenance Targets:
- Conditions *Worse* Than Targeted
  - Drop-off/Build-up on Unpaved Shoulders
  - Special Pavement Markings
  - Cross Slope on Unpaved Shoulders
  - Cracking on Paved Shoulders
  - Mowing
  - Litter

- Conditions *Better* Than Targeted
  - Edgeline Markings
  - Culverts
  - Delineators
  - Urban Fences
  - Flumes
  - Drains
  - Routine Replacement of Other Signs
  - Rural Fences

2017 Maintenance Scorecard:
Northwest Region

Region Grade Point Average (GPA):   2.59 *(statewide = 2.55)*
- Region with Highest GPA = 2.72 in Northeast Region
- Region with Lowest GPA = 2.48 in Southeast Region

Region GPA by Contribution Category:
- Critical Safety   2.57 *(statewide = 2.43)*
- Safety/Mobility   2.80 *(statewide = 2.60)*
- Stewardship   2.33 *(statewide = 2.17)*
- Ride/Comfort   3.00 *(statewide = 3.75)*
- Aesthetics   1.50 *(statewide = 1.50)*

Region GPA by Element:
- Shoulders   2.57 *(statewide = 2.00)*
- Drainage   2.17 *(statewide = 2.00)*
- Roadsides   3.14 *(statewide = 3.29)*
- Traffic Control & Safety   2.44 *(statewide = 2.78)*

Region Notes:
- *Highest* Region Backlog Percentage
    - Erosion (tied with Northeast Region and Southwest Region)
    - Ditches (tied with North Central Region and Northeast Region)
    - *Curb and Gutter*
    - Mowing for Vision (tied with Northeast Region and Southwest Region)
    - *Rural Fences*

- o Emergency Repair of Regulatory/Warning/School Signs (tied with Southeast Region)
- o Emergency Repair of Other Signs
- o Routine Replacement of Regulatory/Warning/School Signs (tied with Southwest Region)
- o Delineators
- o Protective Barriers

- *Lowest* Region Backlog Percentage
  - o Hazardous Debris
  - o Drop-off/Build-up on Paved Shoulders (tied with North Central Region)
  - o Cross Slope on Unpaved Shoulders
  - o Drains
  - o Litter (tied with North Central Region)
  - o Mowing
  - o Urban Fences (tied with North Central Region, Southeast Region, and Southwest Region)

Region Conditions and Maintenance Targets:
- Conditions *Worse* Than Targeted
  - o Protective Barriers
  - o Delineators
  - o Curb and Gutter
  - o Flumes

- Conditions *Better* Than Targeted
  - o Cross Slope on Unpaved Shoulders
  - o Urban Fences
  - o Drains
  - o Routine Replacement of Other Signs
  - o Mowing
  - o Litter

2017 Maintenance Scorecard:
Southeast Region

Region Grade Point Average (GPA):   2.48 *(statewide = 2.55)*
- Region with Highest GPA = 2.72 in Northeast Region
- Region with Lowest GPA = 2.48 in Southeast Region

Region GPA by Contribution Category:
- Critical Safety   1.86 *(statewide = 2.43)*
- Safety/Mobility   2.80 *(statewide = 2.60)*
- Stewardship   2.50 *(statewide = 2.17)*
- Ride/Comfort   3.50 *(statewide = 3.75)*
- Aesthetics   1.00 *(statewide = 1.50)*

Region GPA by Element:
- Shoulders   1.29 *(statewide = 2.00)*
- Drainage   2.83 *(statewide = 2.00)*
- Roadsides   3.00 *(statewide = 3.29)*
- Traffic Control & Safety   2.78 *(statewide = 2.78)*

Region Notes:
- *Highest* Region Backlog Percentage
  - Hazardous Debris
  - Drop-off/Build-up on Paved Shoulders
  - Potholes/Raveling on Paved Shoulders
  - Drop-off/Build-up on Unpaved Shoulders
  - Litter
  - Woody Vegetation Control
  - Woody Vegetation Control for Vision
  - Centerline Markings
  - Edgeline Markings

- Emergency Repair of Regulatory/Warning/School Signs (tied with Northwest Region)

- *Lowest* Region Backlog Percentage
  - Erosion on Unpaved Shoulders (tied with North Central Region)
  - Ditches (tied with Southwest Region)
  - Culverts
  - Flumes
  - Curb and Gutter
  - Storm Sewer Systems
  - Mowing for Vision *(tied with North Central Region)*
  - Urban Fences *(tied with North Central Region, Northwest Region, and Southwest Region)*
  - Rural Fences *(tied with Northeast Region and Southwest Region)*
  - Routine Replacement of Regulatory/Warning/School Signs (tied with Northeast Region)
  - Routine Replacement of Other Signs

Region Conditions and Maintenance Targets:
- Conditions *Worse* Than Targeted
  - Hazardous Debris
  - Drop-off/Build-up on Unpaved Shoulders
  - Cross Slope on Unpaved Shoulders
  - Delineators
  - Cracking on Paved Shoulders
  - Litter

- Conditions *Better* Than Targeted
  - Culverts
  - Urban Fences
  - Curb and Gutter
  - Flumes
  - Rural Fences

2017 Maintenance Scorecard:
Southwest Region

Region Grade Point Average (GPA):　　　2.52 *(statewide = 2.55)*
- Region with Highest GPA = 2.72 in Northeast Region
- Region with Lowest GPA = 2.48 in Southeast Region

Region GPA by Contribution Category:
- Critical Safety　　　　　　　2.71 *(statewide = 2.43)*
- Safety/Mobility　　　　　　2.50 *(statewide = 2.60)*
- Stewardship　　　　　　　2.17 *(statewide = 2.17)*
- Ride/Comfort　　　　　　3.25 *(statewide = 3.75)*
- Aesthetics　　　　　　　1.50 *(statewide = 1.50)*

Region GPA by Element:
- Shoulders　　　　　　　1.86 *(statewide = 2.00)*
- Drainage　　　　　　　1.83 *(statewide = 2.00)*
- Roadsides　　　　　　3.29 *(statewide = 3.29)*
- Traffic Control & Safety　　2.89 *(statewide = 2.78)*

Region Notes:
- *Highest Region Backlog Percentage*
    - Erosion (tied with Northeast Region and Northwest Region)
    - Drains
    - Flumes
    - Mowing for Vision (tied with Northeast Region and Northwest Region)
    - Routine Replacement of Regulatory/Warning/School Signs
    - Routine Replacement of Other Signs (tied with Northwest Region)

- *Lowest* Region Backlog Percentage
  - Ditches *(tied with Southeast Region)*
  - Urban Fences *(tied with North Central Region, Northwest Region, and Southeast Region)*
  - Rural Fences *(tied with Northeast Region, and Southeast Region)*
  - *Centerline Markings*
  - *Special Pavement Markings*
  - Emergency Repair of Regulatory/Warning/School Signs *(tied with North Central Region and Northeast Region)*

Region Conditions and Maintenance Targets:
- Conditions *Worse* Than Targeted
  - Drop-off/Build-up on Unpaved Shoulders
  - Storm Sewer Systems
  - Cross Slope on Unpaved Shoulders
  - Flumes
  - Drains

- Conditions *Better* Than Targeted
  - Edgeline Markings
  - Urban Fences
  - Routine Replacement of Other Signs
  - Rural Fences

G. 2017 Highway Maintenance Condition Visualizations

2017 Shoulder Conditions (% backlog and grade)				
Feature	***Better←--→Worse***			
Hazardous Debris	NW: 1% (A)		◉5% (B) NE: 6% (C)	*WI: 7% (C)* SW: 7% (C) NC: 8% (C)	SE: 23% (F)
Drop-off/Build-up(paved)	NC: 2% (A) SW: 3% (B) NW: 2% (A) *WI: 3% (B)*		◉4% (B)	NE: 5% (B)	SE: 7% (C)
Cracking (paved)			NC: 55% (F) SW: 56% (F) NW: 57% (F)	◉58% (F) *WI: 59% (F)*	SE: 67% (F) NE: 68% (F)
Potholes/Raveling (paved)	NC: 1% (A)		NE: 6% (A) *WI: 7% (A)* NW: 8% (B)	SW: 9% (B) ◉10% (B)	SE: 13% (B)
Drop-off/Build-up (unpaved)			NC: 26% (F) ◉28% (F) NW: 29% (F)	*WI: 37% (F)* SW: 43% (F) NE: 45% (F)	SE: 58% (F)
Cross-slope (unpaved)			NW: 9% (B)	◉18% (C)	*WI: 23% (D)* SE: 33% (F) SW: 24% (D) NE: 36% (F) NC: 27% (D)

Erosion (unpaved)	NC: 0% (A) NE: 1% (A)
	SE: 0% (A) NW: 1% (A)
	            SW: 1% (A)
	            WI: 1% (A)
			◉5% (A)		

2017 Drainage Conditions (% backlog and grade)					
Feature	**Better**←--→**Worse**				
Ditches	SE: 0% (A) SW: 0% (A)	NC: 1% (A) NE: 1% (A) NW: 1% (A) ***WI: 1% (A)***		◎5% (A)	
Culverts	SE: 4% (A)	NE: 8% (B)	SW: 22% (D) ***WI: 24% (D)*** NW: 25% (D) ◎25% (D)		NC: 37% (F)
Drains	NW: 0% (A)	NE: 19% (C) SE: 26% (C)	◎30% (D) ***WI: 31% (D)*** NC: 37% (D)	SW: 48% (D)	
Flumes		SE: 36% (D) NE: 37% (D)	◎44% (D)	***WI: 50% (D)*** NC: 53% (F) NW: 58% (F)	SW: 61% (F)
Curb & Gutter	SE: 4% (A) ***WI: 7% (B)***	SW: 6% (A)	NC: 9% (B) NE: 9% (B) ◎10% (B)		NW: 21% (C)
Storm Sewer Systems		SE: 12% (C) ◎15% (C)	***WI: 17% (C)*** NE: 18% (C) NW: 18% (C)	SW: 21% (D) NC: 22% (D)	

2017 Roadside Conditions (% backlog and grade)					
Feature	*Better←---→Worse*				
Litter		NC: 52% (D) NW: 52% (D)	*WI: 63% (D)* ◎63% (D) SW: 68% (D)	NE: 78% (D)	SE: 85% (F)
Mowing	NW: 27% (C)	SW: 35% (C) *WI: 37% (C)*	◎40% (C) SE: 40% (C) NC: 42% (C)	NE: 46% (C)	
Mowing for Vision	NC: 0% (A) SE: 0% (A)	*WI: 1% (A)*	NE: 2% (A) NW: 2% (A) SW: 2% (A)		◎5% (B)
Woody Vegetation Control	NC: 2% (A) NE: 2% (A) *WI: 2% (A)*	NW: 3% (A) SW: 3% (A)	◎5% (B)	SE: 6% (B)	
Woody Vegetation Control for Vision	NC: 0% (A) NE: 0% (A)	NW: 1% (A) SW: 1% (A) *WI: 1% (A)*	◎2% (A)	SE: 4% (A)	
Urban Fences	NC: 0% (A) NW: 0% (A) SE: 0% (A) SW: 0% (A)	NE: 1% (A) *WI: 1% (A)*			◎14% (C)
Rural Fences	NE: 0% (A) SE: 0% (A) SW: 0% (A)	NC: 1% (A) *WI: 2% (A)*		NW: 9% (B)	◎14% (B)

2017 Traffic Control & Safety Conditions (% backlog and grade)						
Feature	*Better*←					---→*Worse*
Centerline	SW: 2% (A)	NC: 3% (B) NW: 3% (B)	*WI: 4% (B)*	◎5% (B)	NE: 6% (C)	SE: 8% (C)
Edgeline	NE: 1% (A) SW: 2% (A)		NW: 4% (B) *WI: 4% (B)*	NC: 5% (B)	SE: 7% (C)	◎8% (C)
Special Pavement Markings	SW: 6% (B)	NC: 8% (B) NW: 8% (B) SE: 8% (B)	*WI: 9% (B)*	◎10% (C)		NE: 20% (D)
Regulatory/Warning Signs – Emergency Repair	◎0% (A)	NC: 1% (A) NE: 1% (A) SW: 1% (A) *WI: 1% (A)*	NW: 2% (A) SE: 2% (A)			
Regulatory/Warning Signs – Routine Replacement	NE: 7% (B) SE: 7% (B)	NW: 8% (B) ◎9% (B)	*WI: 10% (C)* NC: 10% (C)			SW: 16% (C)
Other Signs – Emergency Repair	NE: 0% (A)	NC: 1% (A) SW: 1% (A) ◎1% (A)	*WI: 2% (A)*	SE: 3% (A)	NW: 4% (A)	
Other Signs – Routine Replacement	SE: 11% (B) NE: 12% (B)	NC: 16% (B) *WI: 17% (B)*	NW: 22% (C) SW: 22% (C)		◎33% (C)	
Delineators	NC: 2% (A)	NE: 9% (B)		◎20% (D) *WI: 22% (D)* SW: 24% (D)	SE: 29% (D)	NW: 40% (F)
Protective Barriers	NE: 0% (A)	◎3% (B) SE: 4% (B)		SW: 8% (C) *WI: 8% (C)*	NC: 9% (C)	NW: 16% (F)

H. 2017 County Level Field Data

Counties 2017: Shoulders and Drainage

| | | Condition % backlogged # of samples that contains the feature | | | | | | | | | | | |
| | | Shoulders | | | | | | | Drainage | | | | | |
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
NC	ADAMS	0%	50%	0%	0%	0%	20%	0%	50%	11%	0%	0%	0%	0%
		10	10	10	10	10	10	10	4	1	10	0	0	0
NC	FLORENCE	14%	80%	0%	0%	33%	33%	0%	0%	3%	0%	0%	0%	0%
		7	5	5	5	6	6	6	0	1	6	0	1	0
NC	FOREST	0%	69%	23%	0%	65%	47%	0%	100%	76%	0%	75%	0%	0%
		17	13	13	13	17	17	17	4	4	17	3	0	0
NC	GREEN LAKE	14%	29%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
		7	7	7	7	7	7	7	2	1	7	1	0	1
NC	IRON	0%	18%	0%	9%	0%	8%	0%	33%	0%	0%	0%	0%	0%
		13	11	11	11	12	12	12	3	1	12	0	1	0
NC	LANGLADE	0%	27%	0%	0%	27%	20%	0%	75%	0%	0%	0%	0%	0%
		15	15	15	15	15	15	15	4	0	15	0	0	0
NC	LINCOLN	25%	77%	0%	0%	38%	38%	0%	0%	21%	16%	0%	0%	0%
		16	13	13	13	16	16	16	7	1	15	1	0	0
NC	MARATHON	14%	65%	8%	4%	69%	54%	0%	0%	2%	0%	0%	0%	0%
		28	26	26	26	26	26	26	8	3	26	0	2	5
NC	MARQUETTE	0%	40%	0%	0%	0%	20%	0%	33%	0%	0%	0%	0%	0%
		10	10	10	10	10	10	10	3	0	10	0	0	0

| | | Condition % backlogged # of samples that contains the feature | | | | | | | | | | | | |
| | | Shoulders | | | | | | | Drainage | | | | | |
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
NC	MENOMINEE	0%	100%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%
		4	1	1	1	4	4	4	2	0	4	0	0	0
NC	ONEIDA	0%	47%	0%	0%	0%	21%	0%	50%	7%	1%	0%	0%	0%
		17	15	15	15	14	14	14	5	3	14	3	2	0
NC	PORTAGE	19%	80%	0%	0%	13%	13%	0%	60%	2%	0%	100%	75%	36%
		16	15	15	15	15	15	15	6	5	15	3	2	3
NC	PRICE	0%	13%	0%	0%	24%	12%	0%	60%	0%	0%	0%	0%	0%
		17	16	16	16	17	17	17	5	0	17	0	0	0
NC	SHAWANO	11%	63%	0%	0%	39%	28%	0%	0%	51%	1%	100%	0%	43%
		18	16	16	16	18	18	18	5	5	18	2	0	4
NC	VILAS	0%	47%	0%	7%	40%	33%	7%	80%	44%	0%	0%	100%	0%
		15	15	15	15	15	15	15	5	1	13	0	1	0
NC	WAUPACA	5%	75%	0%	0%	20%	15%	0%	33%	0%	0%	33%	12%	0%
		21	16	16	16	20	20	20	6	3	20	2	4	0
NC	WAUSHARA	0%	69%	0%	0%	0%	8%	0%	14%	0%	0%	0%	0%	0%
		14	13	13	13	13	13	13	6	2	13	0	1	2
NC	WOOD	28%	73%	0%	0%	13%	31%	0%	67%	3%	0%	0%	47%	77%
		18	15	15	15	16	16	16	3	3	15	1	3	3
NE	BROWN	0%	56%	6%	13%	29%	29%	0%	25%	0%	0%	0%	5%	50%
		16	16	16	16	14	14	14	3	1	14	0	5	3
NE	CALUMET	10%	60%	0%	0%	50%	20%	0%	14%	0%	4%	100%	0%	57%
		10	10	10	10	10	10	10	5	2	10	1	0	1

| | | Condition
% backlogged
# of samples that contains the feature | | | | | | | | | | | |
| | | Shoulders | | | | | | | Drainage | | | | | |
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
NE	DOOR	0%	82%	9%	9%	45%	73%	0%	0%	0%	0%	0%	0%	0%
		11	11	11	11	11	11	11	0	0	10	0	0	0
NE	FOND DU LAC	5%	55%	5%	5%	35%	25%	5%	0%	5%	1%	0%	25%	33%
		20	20	20	20	20	20	20	3	2	20	0	2	4
NE	KEWAUNEE	0%	67%	0%	17%	67%	17%	0%	0%	2%	0%	50%	0%	0%
		6	6	6	6	6	6	6	3	1	6	1	0	0
NE	MANITOWOC	7%	79%	0%	7%	14%	50%	0%	0%	10%	2%	0%	0%	0%
		14	14	14	14	14	14	14	4	4	14	2	3	0
NE	MARINETTE	0%	38%	6%	0%	6%	19%	6%	0%	39%	2%	100%	50%	0%
		17	16	16	16	16	16	16	5	1	17	1	1	0
NE	OCONTO	13%	81%	6%	0%	69%	69%	0%	0%	1%	2%	0%	22%	0%
		16	16	16	16	16	16	16	3	3	16	1	3	0
NE	OUTAGAMIE	0%	64%	0%	0%	11%	39%	0%	25%	2%	1%	75%	0%	0%
		19	14	14	14	18	18	18	3	4	19	2	1	0
NE	SHEBOYGAN	24%	88%	0%	0%	71%	50%	0%	0%	8%	0%	0%	0%	0%
		17	17	17	17	14	14	14	2	3	17	2	2	0
NE	WINNEBAGO	0%	80%	13%	20%	31%	94%	0%	0%	4%	3%	0%	25%	3%
		16	15	15	15	16	16	16	2	1	16	0	6	5
NW	ASHLAND	0%	20%	0%	10%	25%	17%	0%	33%	0%	24%	0%	0%	0%
		12	10	10	10	12	12	12	3	0	10	0	0	0
NW	BARRON	0%	67%	0%	0%	0%	13%	0%	67%	58%	0%	100%	0%	0%
		15	15	15	15	15	15	15	5	1	13	1	0	0

| | | Condition
% backlogged
# of samples that contains the feature | | | | | | | | | | | |
| | | Shoulders | | | | | | | Drainage | | | | | |
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
NW	BAYFIELD	0%	19%	0%	19%	0%	6%	6%	44%	53%	0%	100%	0%	0%
		17	16	16	16	17	17	17	7	1	16	1	0	0
NW	BUFFALO	0%	67%	17%	8%	8%	15%	0%	0%	0%	1%	0%	0%	0%
		16	12	12	12	13	13	13	6	0	13	0	0	0
NW	BURNETT	0%	55%	0%	9%	0%	8%	17%	67%	0%	3%	0%	0%	0%
		12	11	11	11	12	12	12	3	0	12	0	0	0
NW	CHIPPEWA	0%	81%	19%	0%	14%	23%	0%	22%	25%	0%	0%	33%	0%
		22	21	21	21	22	22	22	12	4	21	1	2	1
NW	CLARK	0%	65%	0%	6%	31%	69%	0%	50%	44%	1%	100%	0%	0%
		17	17	17	17	16	16	16	7	3	17	1	0	0
NW	DOUGLAS	0%	50%	6%	25%	0%	40%	0%	0%	15%	0%	0%	50%	0%
		16	16	16	16	15	15	15	3	1	14	0	1	0
NW	DUNN	0%	35%	0%	0%	0%	14%	0%	0%	7%	0%	0%	50%	0%
		21	20	20	20	21	21	21	2	1	21	1	1	0
NW	EAU CLAIRE	0%	81%	0%	6%	0%	6%	0%	0%	0%	0%	0%	0%	0%
		16	16	16	16	16	16	16	5	2	15	0	1	0
NW	JACKSON	0%	95%	0%	26%	60%	80%	0%	100%	0%	0%	100%	67%	0%
		20	19	19	19	20	20	20	4	0	19	1	1	0
NW	PEPIN	0%	0%	0%	0%	0%	20%	0%	0%	0%	1%	0%	0%	0%
		5	5	5	5	5	5	5	1	0	5	0	0	0
NW	PIERCE	6%	59%	0%	6%	7%	47%	0%	0%	0%	0%	0%	0%	0%
		17	17	17	17	15	15	15	8	1	15	1	0	0

80

| | | Condition % backlogged # of samples that contains the feature | | | | | | | | | | | | |
| | | Shoulders | | | | | | | Drainage | | | | | |
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
NW	POLK	0%	93%	0%	0%	0%	24%	6%	25%	42%	2%	75%	25%	0%
		17	15	15	15	17	17	17	4	5	16	2	1	0
NW	RUSK	0%	29%	0%	0%	0%	9%	0%	0%	0%	0%	0%	0%	0%
		11	7	7	7	11	11	11	2	1	10	0	0	0
NW	SAWYER	0%	29%	0%	0%	0%	18%	0%	0%	10%	0%	50%	0%	0%
		17	17	17	17	17	17	17	3	2	17	2	0	0
NW	ST. CROIX	0%	60%	0%	10%	5%	52%	0%	11%	8%	0%	50%	0%	0%
		21	20	20	20	21	21	21	6	6	21	4	5	0
NW	TAYLOR	0%	58%	0%	0%	8%	33%	0%	67%	100%	2%	0%	0%	0%
		12	12	12	12	12	12	12	3	1	12	0	0	0
NW	TREMPEALEAU	5%	67%	0%	22%	12%	12%	0%	11%	0%	0%	0%	0%	0%
		19	18	18	18	17	17	17	6	0	17	0	0	0
NW	WASHBURN	7%	27%	0%	7%	0%	40%	0%	0%	51%	0%	100%	0%	0%
		15	15	15	15	15	15	15	3	1	14	1	1	0
SE	KENOSHA	27%	78%	0%	22%	63%	50%	0%	0%	1%	1%	0%	19%	0%
		11	9	9	9	8	8	8	2	4	10	0	5	1
SE	MILWAUKEE	13%	54%	0%	15%	33%	100%	0%	100%	0%	0%	0%	13%	0%
		16	13	13	13	3	3	3	1	12	10	0	13	0
SE	OZAUKEE	17%	100%	33%	17%	17%	50%	0%	0%	0%	0%	0%	25%	50%
		6	6	6	6	6	6	6	3	0	6	0	3	1
SE	RACINE	0%	54%	8%	0%	46%	69%	0%	0%	3%	0%	45%	4%	43%
		15	13	13	13	13	13	13	1	8	13	5	5	2

| | | Condition
% backlogged
# of samples that contains the feature | | | | | | | | | | | |
| | | Shoulders | | | | | | | Drainage | | | | | |
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
SE	WALWORTH	62%	85%	0%	20%	42%	58%	0%	0%	51%	0%	33%	31%	0%
		21	20	20	20	19	19	19	6	4	19	2	5	4
SE	WASHINGTON	6%	59%	12%	6%	29%	53%	0%	0%	9%	0%	100%	18%	100%
		18	17	17	17	17	17	17	3	5	16	1	4	1
SE	WAUKESHA	23%	60%	10%	15%	6%	53%	0%	0%	1%	0%	0%	2%	0%
		22	20	20	20	17	17	17	2	9	18	3	9	1
SW	COLUMBIA	3%	79%	0%	33%	59%	97%	7%	38%	17%	0%	100%	0%	0%
		29	24	24	24	29	29	29	11	2	28	1	2	0
SW	CRAWFORD	10%	54%	0%	23%	14%	57%	0%	30%	1%	0%	0%	0%	0%
		20	13	13	13	7	7	7	10	4	18	1	2	0
SW	DANE	27%	39%	0%	0%	15%	50%	0%	11%	15%	0%	100%	57%	86%
		41	31	31	31	40	40	40	9	4	38	2	10	5
SW	DODGE	0%	50%	0%	12%	38%	50%	4%	64%	5%	0%	88%	7%	0%
		26	26	26	26	26	26	26	10	7	20	7	3	1
SW	GRANT	15%	70%	4%	7%	53%	59%	0%	25%	15%	2%	33%	8%	0%
		27	27	27	27	17	17	17	10	7	27	2	4	0
SW	GREEN	0%	33%	0%	0%	0%	15%	0%	0%	1%	0%	100%	0%	0%
		13	12	12	12	13	13	13	2	3	12	1	0	0
SW	IOWA	6%	33%	0%	0%	28%	22%	0%	14%	1%	0%	100%	0%	0%
		18	15	15	15	18	18	18	7	4	17	1	0	0
SW	JEFFERSON	0%	59%	0%	0%	6%	47%	0%	17%	1%	0%	0%	0%	0%
		18	17	17	17	17	17	17	5	3	17	1	1	0

82

		Condition % backlogged # of samples that contains the feature												
		Shoulders							Drainage					
Region	County	Hazardous Debris	Cracking (paved)	Drop-off/Build-up (paved)	Potholes/Raveling (paved)	Cross-Slope (unpaved)	Drop-off/Build-up (unpaved)	Erosion (unpaved)	Culverts	Curb & Gutter	Ditches	Flumes	Storm Sewer System	Under-drains/Edge-drains
SW	JUNEAU	15%	78%	28%	17%	25%	25%	0%	50%	0%	0%	0%	0%	0%
		20	18	18	18	16	16	16	5	0	19	0	0	1
SW	LA CROSSE	0%	33%	8%	0%	0%	58%	0%	0%	3%	0%	0%	0%	0%
		14	12	12	12	12	12	12	4	6	12	3	5	0
SW	LAFAYETTE	0%	27%	0%	0%	25%	17%	0%	0%	25%	0%	0%	0%	0%
		13	11	11	11	12	12	12	4	1	13	1	1	0
SW	MONROE	4%	46%	0%	0%	5%	14%	0%	0%	0%	0%	50%	0%	0%
		25	24	24	24	21	21	21	9	6	21	2	3	0
SW	RICHLAND	7%	60%	0%	10%	33%	42%	0%	0%	2%	0%	0%	33%	0%
		15	10	10	10	12	12	12	3	2	14	0	1	0
SW	ROCK	4%	60%	10%	10%	23%	41%	0%	0%	0%	0%	0%	5%	0%
		23	20	20	20	22	22	22	4	3	22	0	5	1
SW	SAUK	4%	71%	5%	5%	30%	9%	0%	33%	7%	0%	0%	0%	0%
		23	21	21	21	23	23	23	6	2	23	0	0	0
SW	VERNON	0%	68%	0%	21%	0%	47%	0%	0%	21%	0%	0%	0%	0%
		22	19	19	19	19	19	19	7	6	21	1	0	0

Counties 2017: Roadsides and Traffic

| Region | County | Condition % backlogged # of samples that contains the feature | | | | | | | | | | | | |
| | | Roadsides | | | | | | | Traffic | | | | | | |
		Rural Fences	Urban Fences	Litter	Mowing	Mowing for Vision	Woody Vegetation	Woody Veg. Control for Vision	Centerline Markings	Delineators	Edgeline Markings	Other Signs (emerg. repair)	Protective Barriers	Reg./Warning Signs (emerg.)	Special Pavement Markings
NC	ADAMS	0%	0%	10%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		0	0	10	10	1	10	10	10	0	10	2	0	3	0
NC	FLORENCE	0%	0%	14%	29%	0%	0%	0%	0%	0%	14%	0%	0%	0%	0%
		0	0	7	7	0	7	7	7	1	7	3	0	3	1
NC	FOREST	0%	0%	76%	47%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%
		0	0	17	17	4	17	17	17	0	17	8	0	7	1
NC	GREEN LAKE	0%	0%	29%	57%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		0	0	7	7	0	7	7	7	0	7	2	0	4	0
NC	IRON	0%	0%	38%	0%	0%	0%	0%	8%	0%	15%	0%	0%	0%	0%
		0	0	13	13	12	13	13	13	1	13	2	1	4	0
NC	LANGLADE	0%	0%	53%	53%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		0	0	15	15	9	15	15	14	1	14	4	1	3	0
NC	LINCOLN	0%	0%	56%	13%	0%	13%	0%	0%	4%	13%	0%	0%	6%	0%
		3	0	16	16	7	16	16	16	3	16	8	1	9	0
NC	MARATHON	3%	0%	86%	29%	0%	0%	0%	0%	0%	0%	6%	20%	0%	6%
		5	1	28	28	17	28	28	28	10	27	9	1	15	2
NC	MARQUETTE	0%	0%	10%	40%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%
		2	0	10	10	2	10	10	10	2	10	4	0	3	0
NC	MENOMINEE	0%	0%	50%	25%	0%	25%	0%	25%	0%	0%	0%	0%	0%	0%
		0	0	4	4	2	4	4	4	0	4	2	0	1	1
NC	ONEIDA	0%	0%	47%	0%	0%	0%	0%	12%	0%	13%	10%	0%	0%	15%
		2	0	17	17	14	17	17	17	1	15	9	2	3	2
NC	PORTAGE	0%	0%	94%	100%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%
		5	0	16	16	5	16	16	16	8	15	4	3	12	5
NC	PRICE	0%	0%	47%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

		Condition % backlogged # of samples that contains the feature													
		Roadsides						Traffic							
Region	County	Rural Fences	Urban Fences	Litter	Mowing	Mowing for Vision	Woody Vegetation	Woody Veg. Control for Vision	Centerline Markings	Delineators	Edgeline Markings	Other Signs (emerg. repair)	Protective Barriers	Reg./Warning Signs (emerg.)	Special Pavement Markings
		0	0	17	17	17	17	17	17	0	17	3	0	2	0
NC	SHAWANO	0%	0%	22%	72%	0%	0%	0%	0%	0%	6%	0%	0%	0%	11%
		0	0	18	18	7	18	18	18	5	18	10	1	10	5
NC	VILAS	0%	0%	87%	47%	0%	0%	0%	7%	20%	7%	0%	0%	0%	0%
		0	0	15	15	8	15	15	15	3	15	8	0	5	0
NC	WAUPACA	0%	0%	24%	33%	0%	0%	0%	19%	5%	10%	0%	100%	0%	14%
		0	0	21	21	4	21	21	21	5	20	7	1	8	4
NC	WAUSHARA	1%	0%	14%	21%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%
		3	0	14	14	0	14	14	14	3	14	4	0	2	1
NC	WOOD	0%	0%	94%	100%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%
		2	0	18	18	7	18	18	18	2	18	5	0	9	5
NE	BROWN	0%	0%	94%	38%	0%	0%	0%	6%	5%	0%	0%	0%	0%	0%
		2	1	16	16	3	16	16	16	9	16	9	6	7	3
NE	CALUMET	0%	0%	90%	80%	0%	0%	0%	0%	33%	0%	0%	0%	0%	67%
		0	1	10	10	1	10	10	10	1	10	0	0	5	2
NE	DOOR	0%	0%	91%	45%	25%	18%	0%	18%	11%	0%	0%	0%	0%	0%
		2	0	11	11	4	11	11	11	2	11	4	1	3	0
NE	FOND DU LAC	0%	0%	80%	65%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
		4	0	20	20	2	20	20	20	6	20	5	4	9	2
NE	KEWAUNEE	0%	0%	33%	33%	0%	0%	0%	0%	75%	0%	0%	10%	0%	0%
		0	0	6	6	1	6	6	6	1	6	2	1	1	0
NE	MANITOWOC	0%	0%	57%	57%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		5	1	14	14	7	14	14	14	5	14	7	1	8	2
NE	MARINETTE	0%	0%	53%	29%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		0	0	17	17	9	17	17	17	1	17	8	1	8	0
NE	OCONTO	0%	0%	94%	50%	0%	0%	0%	0%	3%	0%	0%	0%	7%	0%

Region	County		Rural Fences	Urban Fences	Litter	Mowing	Mowing for Vision	Woody Vegetation	Woody Veg. Control for Vision	Centerline Markings	Delineators	Edgeline Markings	Other Signs (emerg. repair)	Protective Barriers	Reg./Warning Signs (emerg.)	Special Pavement Markings
																Condition % backlogged # of samples that contains the feature
			Roadsides							**Traffic**						
NE	OUTAGAMIE	#	5	0	16	16	6	16	16	16	7	16	7	2	9	3
		%	0%	2%	68%	58%	0%	5%	0%	11%	11%	0%	0%	0%	0%	20%
NE	SHEBOYGAN	#	0	1	19	19	7	19	19	19	1	19	2	1	9	3
		%	0%	0%	100%	24%	0%	0%	0%	6%	8%	0%	0%	0%	0%	0%
NE	WINNEBAGO	#	3	0	17	17	5	17	17	17	5	17	10	1	7	2
		%	0%	1%	75%	31%	0%	0%	0%	19%	9%	13%	0%	0%	0%	0%
NW	ASHLAND	#	4	4	16	16	6	16	16	16	8	16	5	3	5	1
		%	0%	0%	58%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NW	BARRON	#	0	0	12	12	9	12	12	12	0	12	2	0	1	0
		%	0%	0%	40%	40%	7%	0%	0%	0%	53%	0%	0%	34%	0%	0%
NW	BAYFIELD	#	1	0	15	15	15	15	15	15	5	15	5	3	8	2
		%	0%	0%	47%	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%
NW	BUFFALO	#	0	0	17	17	1	17	17	17	0	17	5	0	2	1
		%	0%	0%	31%	44%	0%	13%	0%	7%	81%	29%	0%	0%	0%	0%
NW	BURNETT	#	0	0	16	16	7	16	16	14	4	14	1	2	5	0
		%	0%	0%	50%	17%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%
NW	CHIPPEWA	#	0	0	12	12	12	12	12	12	2	12	2	1	9	0
		%	0%	0%	5%	32%	0%	5%	0%	0%	15%	0%	0%	56%	0%	0%
NW	CLARK	#	7	1	22	22	10	22	22	22	10	22	7	3	11	2
		%	0%	0%	94%	0%	6%	0%	0%	6%	10%	6%	0%	7%	20%	67%
NW	DOUGLAS	#	0	0	17	17	17	17	17	17	3	17	3	2	6	2
		%	0%	0%	81%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NW	DUNN	#	0	0	16	16	16	16	16	16	1	16	1	0	2	1
		%	35%	0%	48%	48%	0%	0%	0%	0%	60%	0%	0%	2%	0%	0%
NW	EAU CLAIRE	#	1	0	21	21	5	21	21	21	2	21	4	2	10	1
		%	0%	0%	0%	25%	0%	13%	0%	20%	22%	20%	0%	0%	0%	0%

| | | Condition % backlogged # of samples that contains the feature | | | | | | | | | | | | |
| | | Roadsides | | | | | | Traffic | | | | | | |
Region	County	Rural Fences	Urban Fences	Litter	Mowing	Mowing for Vision	Woody Vegetation	Woody Veg. Control for Vision	Centerline Markings	Delineators	Edgeline Markings	Other Signs (emerg. repair)	Protective Barriers	Reg./Warning Signs (emerg.)	Special Pavement Markings
		4	0	16	16	5	16	16	15	5	15	2	3	5	2
NW	JACKSON	28%	0%	95%	0%	0%	10%	0%	0%	21%	0%	19%	3%	0%	0%
		5	0	20	20	20	20	20	20	6	20	10	4	4	0
NW	PEPIN	0%	0%	0%	40%	0%	0%	0%	0%	60%	0%	0%	100%	13%	0%
		0	0	5	5	3	5	5	5	1	5	1	1	5	0
NW	PIERCE	0%	0%	47%	35%	0%	0%	0%	0%	80%	0%	0%	5%	0%	0%
		0	0	17	17	2	17	17	17	6	17	4	6	6	1
NW	POLK	0%	0%	53%	59%	0%	0%	0%	0%	15%	0%	0%	13%	3%	22%
		0	0	17	17	17	17	17	17	4	17	4	4	11	2
NW	RUSK	0%	0%	45%	36%	0%	0%	0%	9%	50%	9%	0%	0%	0%	0%
		0	0	11	11	2	11	11	11	1	11	1	1	7	1
NW	SAWYER	0%	0%	76%	29%	0%	0%	6%	0%	50%	6%	0%	0%	0%	0%
		0	0	17	17	7	17	17	17	1	17	4	1	10	0
NW	ST. CROIX	0%	0%	62%	43%	0%	0%	0%	0%	26%	0%	0%	20%	0%	6%
		2	0	21	21	6	21	21	21	5	21	9	2	12	6
NW	TAYLOR	0%	0%	100%	0%	8%	17%	8%	0%	33%	0%	0%	0%	3%	0%
		0	0	12	12	12	12	12	12	3	12	5	3	7	0
NW	TREMPEALEAU	0%	0%	16%	47%	0%	0%	5%	0%	100%	0%	60%	100%	17%	0%
		0	0	19	19	8	19	19	19	2	19	5	2	9	1
NW	WASHBURN	0%	0%	73%	27%	0%	0%	0%	13%	7%	13%	0%	0%	0%	0%
		1	0	15	15	6	15	15	15	5	15	8	1	7	1
SE	KENOSHA	0%	0%	91%	55%	0%	0%	0%	9%	35%	0%	0%	0%	14%	0%
		0	0	11	11	0	11	11	11	1	11	7	1	9	5
SE	MILWAUKEE	0%	0%	94%	50%	0%	13%	6%	6%	50%	6%	4%	0%	4%	31%

Condition
% backlogged
# of samples that contains the feature

Region	County	Roadsides							Traffic						
		Rural Fences	Urban Fences	Litter	Mowing	Mowing for Vision	Woody Vegetation	Woody Veg. Control for Vision	Centerline Markings	Delineators	Edgeline Markings	Other Signs (emerg. repair)	Protective Barriers	Reg./Warning Signs (emerg.)	Special Pavement Markings
		1	3	16	16	14	16	16	16	1	16	13	5	12	12
SE	OZAUKEE	0%	0%	33%	33%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%
		2	0	6	6	1	6	6	6	1	6	1	0	1	0
SE	RACINE	0%	0%	93%	60%	0%	7%	7%	40%	43%	43%	5%	0%	1%	0%
		2	0	15	15	4	15	15	15	2	14	6	2	11	7
SE	WALWORTH	0%	0%	100%	29%	0%	5%	0%	0%	34%	0%	11%	21%	0%	10%
		7	0	21	21	3	21	21	21	10	21	10	6	12	7
SE	WASHINGTON	0%	0%	78%	61%	0%	0%	0%	0%	26%	0%	0%	0%	0%	0%
		3	1	18	18	11	18	18	18	4	18	7	3	14	5
SE	WAUKESHA	0%	0%	77%	9%	0%	9%	9%	5%	0%	5%	0%	0%	0%	0%
		5	1	22	22	18	22	22	22	6	22	12	5	16	10
SW	COLUMBIA	0%	0%	72%	38%	0%	3%	3%	3%	44%	0%	0%	19%	0%	100%
		4	0	29	29	8	29	29	29	6	29	4	3	13	1
SW	CRAWFORD	0%	0%	35%	35%	0%	0%	0%	0%	29%	0%	0%	14%	7%	0%
		0	0	20	20	13	20	20	20	8	20	4	8	4	1
SW	DANE	0%	0%	100%	32%	0%	2%	0%	0%	11%	0%	0%	1%	0%	7%
		14	0	41	41	14	41	41	41	12	41	23	11	17	10
SW	DODGE	0%	0%	65%	35%	0%	0%	0%	0%	45%	0%	0%	23%	0%	0%
		3	0	26	26	13	26	26	26	8	26	9	9	12	5
SW	GRANT	4%	0%	33%	44%	0%	4%	0%	0%	8%	0%	12%	3%	0%	25%
		2	0	27	27	13	27	27	27	4	27	8	3	13	3
SW	GREEN	0%	0%	100%	54%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%
		2	0	13	13	6	13	13	13	2	13	5	1	7	2

| | | Condition
% backlogged
# of samples that contains the feature | | | | | | | | | | | | | |
| | | Roadsides | | | | | | | Traffic | | | | | | |
Region	County	Rural Fences	Urban Fences	Litter	Mowing	Mowing for Vision	Woody Vegetation	Woody Veg. Control for Vision	Centerline Markings	Delineators	Edgeline Markings	Other Signs (emerg. repair)	Protective Barriers	Reg./Warning Signs (emerg.)	Special Pavement Markings
SW	IOWA	0%	0%	94%	50%	17%	0%	0%	6%	71%	17%	0%	0%	0%	0%
		3	0	18	18	6	18	18	18	3	18	7	1	8	2
SW	JEFFERSON	1%	0%	94%	44%	0%	0%	0%	0%	17%	0%	0%	2%	0%	25%
		3	0	18	18	3	18	18	18	6	18	9	4	10	3
SW	JUNEAU	0%	0%	50%	15%	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%
		4	0	20	20	3	20	20	19	4	19	9	0	10	1
SW	LA CROSSE	0%	0%	57%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		1	0	14	14	10	14	14	14	8	14	8	4	11	4
SW	LAFAYETTE	0%	0%	100%	46%	0%	8%	8%	8%	93%	8%	0%	0%	11%	0%
		1	0	13	13	2	13	13	13	3	13	3	2	5	0
SW	MONROE	0%	0%	32%	24%	0%	0%	0%	0%	0%	8%	0%	0%	0%	0%
		4	0	25	25	1	25	25	25	10	24	6	5	10	3
SW	RICHLAND	0%	0%	53%	27%	0%	7%	0%	0%	0%	0%	0%	17%	0%	0%
		0	0	15	15	7	15	15	15	3	15	4	3	4	0
SW	ROCK	0%	0%	65%	57%	0%	0%	0%	9%	0%	4%	0%	0%	0%	0%
		3	1	23	23	3	23	23	23	3	23	5	1	9	5
SW	SAUK	0%	0%	100%	26%	0%	0%	0%	0%	5%	0%	3%	0%	0%	0%
		1	0	23	23	3	23	23	23	4	23	11	5	2	0
SW	VERNON	0%	0%	41%	14%	5%	0%	0%	0%	47%	5%	0%	2%	0%	0%
		0	0	22	22	22	22	22	22	10	22	6	8	7	0

I. 2017 Compass Rating Sheet

2017 Compass Rating Sheet
Wisconsin Department of Transportation

Date Survey Taken:	
Start Time:	
Stop Time:	
Reviewed by:	

«MySegment», **«MyRoute»**, «RegionAbbr», «MyCounty», «MyRegion», «DS»
Directions: «PrimaryDir»
«PrimaryPost»
Alternate Directions: «AltDir»
«AltPost»

If a segment is discarded for one of the reasons below, please check the appropriate box and add the next highest numbered "spare" segment for a similar roadway (divided or undivided) to your list of segments to be rated. Please enter the reject reason in the database.
☐ A piece or the entire segment falls on a bridge.   ☐ A piece or the entire segment is currently under construction.
☐ We believe it would be unsafe to rate this segment.   ☐ We cannot locate this segment.
☐ An organization other than WisDOT is responsible for the maintenance of ANY of the four elements within this section.

Shoulders	Standard	Value	Comments
Hazardous Debris (S-1)	Number of items large enough to cause a safety hazard…………………………		
Paved Shoulder ☐ None (If none, skip to Unpaved Shoulder) ☐ Safety Edge			
	Paved shoulder width (typical width in whole feet)………………………………		
	Paved shoulder length (total linear feet)……………………………………………		
Drop off/ build-up (S-2)	Linear feet of <u>paved-to-paved</u> drop-off/build-up greater than 1.5"………..…		
Cracking (S-3)	Linear feet of unsealed cracks greater than ¼" (up to 150' on undivided highways or 300' on divided highways)…………………………………………		
Potholes/ Raveling (S-4)	Total sq. ft. of BOTH potholes AND raveling greater than 1 ft² x 1" deep……....		
Unpaved Shoulder ☐ None (If none, skip to Drainage)			
	Unpaved shoulder width (typical width in whole feet)……………….……………		
	Unpaved shoulder length (total linear feet)………………………………………		
Drop off/ build-up (S-5)	Linear feet of <u>paved-to-unpaved</u> drop-off/build-up greater than 1.5" (up to 150' on undivided highways or 300' on divided highways)………………..……		
Cross Slope (S-6)	Linear feet with unpaved cross slope greater than twice the designed slope (up to 150' on undivided highways or 300' on divided highways)……………		
Erosion (S-7)	Square feet with ruts deeper than 2 inches…………………..……………..		

Drainage			Value & Repair/Clean	Comments
Ditches (D-1)	☐ None	Total linear feet of ditch……………………………………… Linear ft. with more than minimal erosion of ditch line OR obstructions to the flow of water requiring action	☐ Repair ☐ Clean	
Culverts (D-2)	☐ None	Total number of culverts…………………………………… Number with more than 25% obstructed OR where a sharp object (a shovel) can be pushed thru bottom of pipe OR pipe is collapsing……………………………… Size and type of deficient culvert (*select check box in "Comments" column*)……………………………………	☐ Repair ☐ Clean	-------------------------------- Deficient Culvert: Size:_____ Type: ☐ Concrete ☐ Steel ☐ Lined ☐ Unknown --------------------------------
Under/ Edge Drain (D-3)	☐ None	Total number of drains……………………………………… Number with outlets, endwalls or end protection closed or crushed OR where water flow or end protection is obstructed………………………………………	☐ Repair ☐ Clean	
Flumes (D-4)	☐ None	Total number of flumes……………………………………… Number not functioning as intended OR deteriorated to the point that they are causing erosion……………	☐ Repair ☐ Clean	

Curb & Gutter (D-5)	☐ None	Total linear feet of curb and gutter............................ Linear feet with severe structural distress OR more than 1" structural misalignment OR more than 1" of debris build up in the curb line.		☐ Repair ☐ Clean
Storm Sewer (D-6)	☐ None	Total number of inlets, catch basins and outlet pipes... Number more than 50% capacity obstructed OR less than 80% structurally sound OR more than 1" vertical displacement OR not functioning as intended..........		☐ Repair ☐ Clean

Roadsides			Value	Comments
🚗 Litter (R-1)		Number of pieces (up to 15) of litter and non-natural encroachments on shoulders and roadside visible at posted speed, but not causing a safety threat..		
Mowing (R-2)	☐ Urban Mowing Section	Mowing meets standard.. If NO, grass is mowed: ☐ too wide ☐ too short ☐ too tall ☐ in a no mow zone If NO, why: ☐ safety/equipment ☐ mowed by property owner ☐ woody vegetation control ☐ maintenance decision	☐yes ☐no	
🚗 Mowing Vision (R-2)	☐ None	Grass blocks a vision triangle or sightlines...................................	☐yes ☐no	
Woody Vegetation (R-3)		Number of instances in which a tree > 4" in diameter is present in the clear zone OR trees and/or branches overhang the roadway or shoulder creating a clearance problem...		
🚗 Woody Vegetation Vision (R-3)		Woody vegetation causes a vision problem..	☐yes ☐no	
Fences (R-4)	☐ None	☐ Urban ☐ Rural	Total linear feet of right-of-way fence....................... Linear feet missing OR not functioning as intended...	

Traffic Control and Safety ☐ Round-A-Bout			Value	Comments
Centerline Markings (T-1)	☐ None	Over total segment, more than 20% of centerline material is missing...	☐yes ☐no	
Edgeline Markings (T-1)	☐ None	Over total segment, more than 20% of edgeline material is missing...	☐yes ☐no	
Special Pavement Markings (T-2)	☐ None	Total number of special pavement markings....... Number missing OR not functioning as intended.		
Regulatory/ Warning Signs (T-3)	☐ None	Total number of regulatory/warning signs.......... Number missing OR damaged...........................		
Other Signs (T-4)	☐ None	Total number of other signs............................. Number missing OR damaged...........................		
Delineators (T-5)	☐ None	Total number of delineators............................... Number missing OR damaged		
Protective Barriers (T-6)	☐ None	Total linear feet of beam guard, concrete barrier, and cable guard..................................... Linear feet of protective barriers not functioning as intended and type(s) of deficient protective barrier...		☐ Beam Guard ☐ Concrete Barrier ☐ Cable Guard ☐ Damaged Terminal ☐ Needs Herbicide or Build-up Removed

🚗 Rating the feature must be completed in vehicle driving at posted speed.

1/10-mile	X2	X3	X4
528 feet	1,056 feet	1,584 feet	2,112 feet

Ratings should be entered into the database **by October 15, 2017.** Hardcopy Rating Sheets should be sent to Scott Bush at 4802 Sheboygan Avenue, Room 501**.** Questions? Please call Scott at 608-266-8666 or email to Scott.Bush@dot.wi.gov

J. Winter Data Quality, Definitions, and Categories

Data Quality

Unless otherwise noted, all material and labor figures come from the Winter Storm Reports that are submitted by each county for every event or anti-icing procedure throughout the winter season. The data quality is unknown. Weather, road conditions and materials usages are based either upon the observations of county patrol superintendents or on their expert judgement. In the second case, there is more variability than direct measurements.

Definitions

Dollars: Cost data are from the fiscal year, July 1, 2016 to June 30, 2017.

Roads: The roads referred to in this report are state maintained highways, including Interstates, U.S. highways and state trunk highways. See the following tables for groupings.

Winter: November 1 through April 30, unless otherwise noted.

Winter Activities: Actual cost data incorporates all winter activities, including putting up snow fence, transporting salt, filling salt sheds, thawing out frozen culverts, calibrating salt spreaders, producing and storing salt brine, and anti-icing applications, as well as plowing and salting. Costs from storm reports, however, cover only plowing, sanding, salting, and anti-icing.

Categories & Groupings

Winter Highway Classification Table

Typical Types of Highways	Winter Highway Class	Coverage Type
• Major Urban Freeways • Most 6 Lanes and Greater	High Volume	24-hr service as conditions require
• Some 6-Lanes • High Volume 4 Lanes with AADT >25,000 and Some 4- Lanes with AADT <25,000 • Most 2-lane with AADT >5000 and Some 2-Lanes with AADT <5000 • Includes Interstates	High Volume	24-hr service as conditions require
• Some 4 Lanes with ADT <25,000 • Most 2-Lanes with AADT <5000 and Some 2-Lanes with AADT >5000	All Other	18-hr coverage as conditions require Service hours are adjusted based on timing of the storms. Some minimal ability to respond to emergencies should be provided during hours that full coverage is not provided

*The above highway classifications and coverage times are intended as a guide in winter maintenance operations and changes may be deemed appropriate based on local conditions.