Michigan Department of Transportation

2018 Freeway Congestion & Reliability Report

Chapter 1

FREEWAY PERFORMANCE MEASURES AND STATEWIDE METRICS

PROLOGUE

Since 2014, the Michigan Department of Transportation (MDOT) has used probe vehicle data to create an annual Freeway Congestion and Reliability Report. The probe vehicle data is collected anonymously from GPS enabled devices and in-vehicle telematics to provide real time speeds on roadways nationwide. Probe vehicles provide an enormous amount of data which can be difficult to manage, maintain, and analyze. The University of Maryland Center for Advanced Transportation Technology (CATT) Lab developed a visual analytics platform called the Regional Integrated Transportation Information System, or RITIS. This tool allows MDOT to monitor speeds, incidents, weather, special events, and many other data sources. Using the RITIS platform, data was downloaded, processed, and compiled into a report summarizing all freeway routes in Michigan.

This report is composed of eight chapters. The first chapter summarizes performance measures and statewide metrics. The remaining seven chapters use those performance metrics to characterize congestion in each of MDOT's seven regions. This document is for internal use to help MDOT regions, Transportation Service Centers (TSC), and planners understand how Michigan freeways are operating over time, as well as where potential improvement projects may be necessary. This report is typically used as a starting point for more detailed analysis incorporating additional probe data, as well as other MDOT resources. If your area has plans to share this information externally, please contact the Congestion and Reliability Unit to ensure the correct measures are being used.

The report was prepared by the Wayne State University Transportation Research Group under the guidance of the Congestion and Reliability Unit at MDOT. Please contact the Congestion and Reliability Unit if you have any questions/comments or would like to have the actual data for further analysis.

ACKNOWLEDGEMENTS

MDOT

Jason Firman – Congestion and Reliability Manager

Lee Nederveld – Operations Engineer

John Engle – Operations Engineer

Kayla Smith – Student Assistant

Peggy Johnson – Departmental Analyst

WAYNE STATE UNIVERSITY

Jenna Kirsch – Graduate Research Assistant

Steve Remias – Assistant Professor

TABLE OF CONTENTS

INTRODUCTION Page 4
PROBE DATA Page 7
PERFORMANCE MEASURES DEFINITIONS Page 9
PERFORMANCE MEASURES VISUALIZATIONS Page 12
Delay Index Page 12
Average Speed Page 13
Congestion Severity Page 15
Travel Time Reliability Page 16
Level of Travel Time Reliability Page 17
STATEWIDE: OVERVIEW Page 20
CASE STUDIES Page 43
CONCLUSION Page 56
CONTACT INFORMATION Page 56

INTRODUCTION

The purpose of this document is to provide a performance overview of Michigan freeways. Using probe vehicle data and systematic performance measures, a series of visualizations were created for each region in the state. Chapter 1 of this report provides an overview of the performance measures and visualizations used, as well as high level statewide performance summaries. The State of Michigan has a total of 120,256 miles of paved roadway in over 83 counties, which are separated into seven MDOT regions. The focus of this report is the mobility of limited access freeways in the state. These roadways typically serve the most vehicular volume throughout the year. The annual average daily traffic (AADT) per lane for these roads can be seen in Figures 1 and 2 below.

This chapter serves as an introduction to probe data and the performance measures that will be included in the regional summaries (Chapters 2-8). The performance measures description will be repeated in each of the chapters to allow them to be standalone documents for regional engineers.

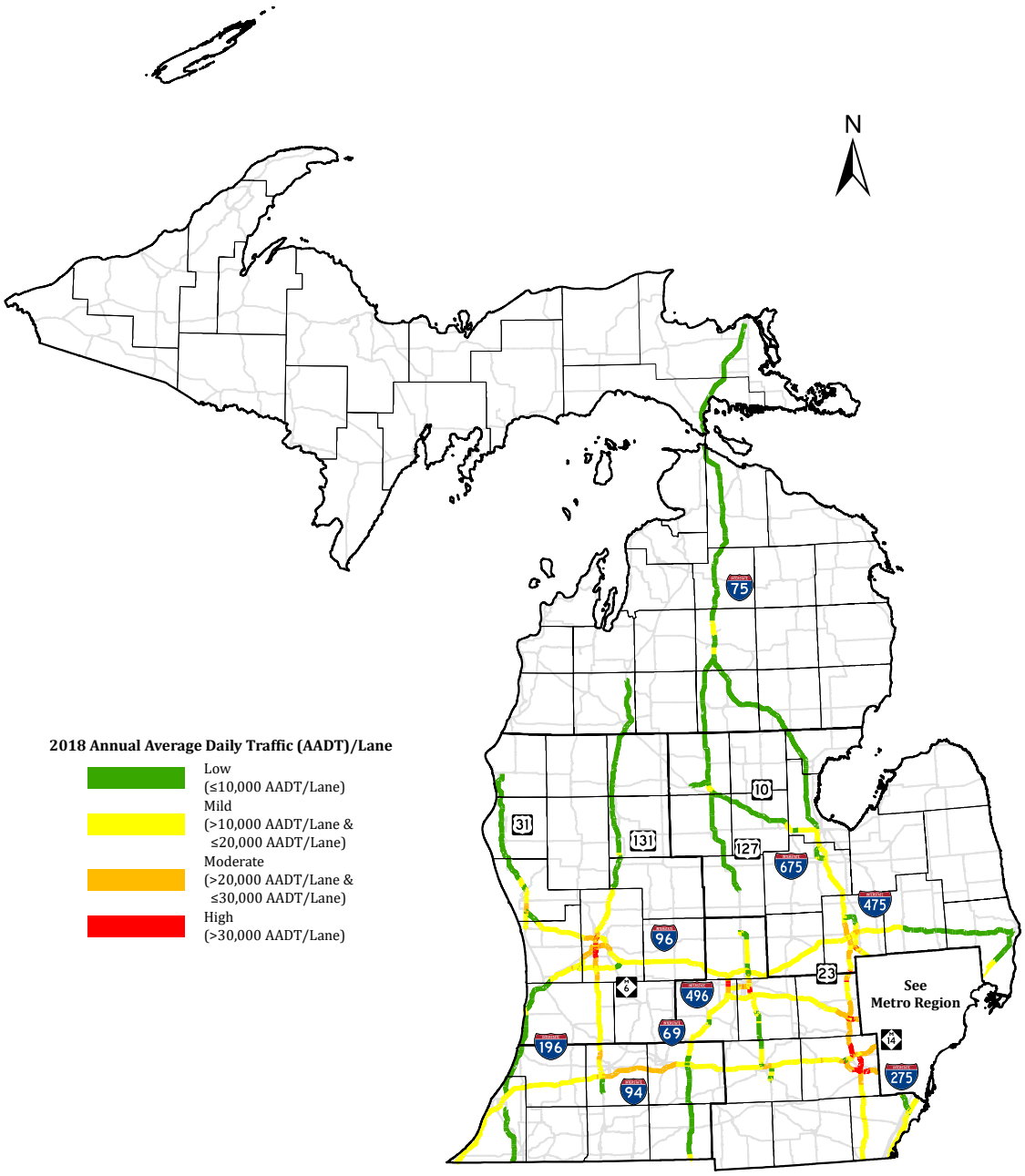


FIGURE 1. 2018 Statewide Annual Average Daily Traffic (AADT) per Lane

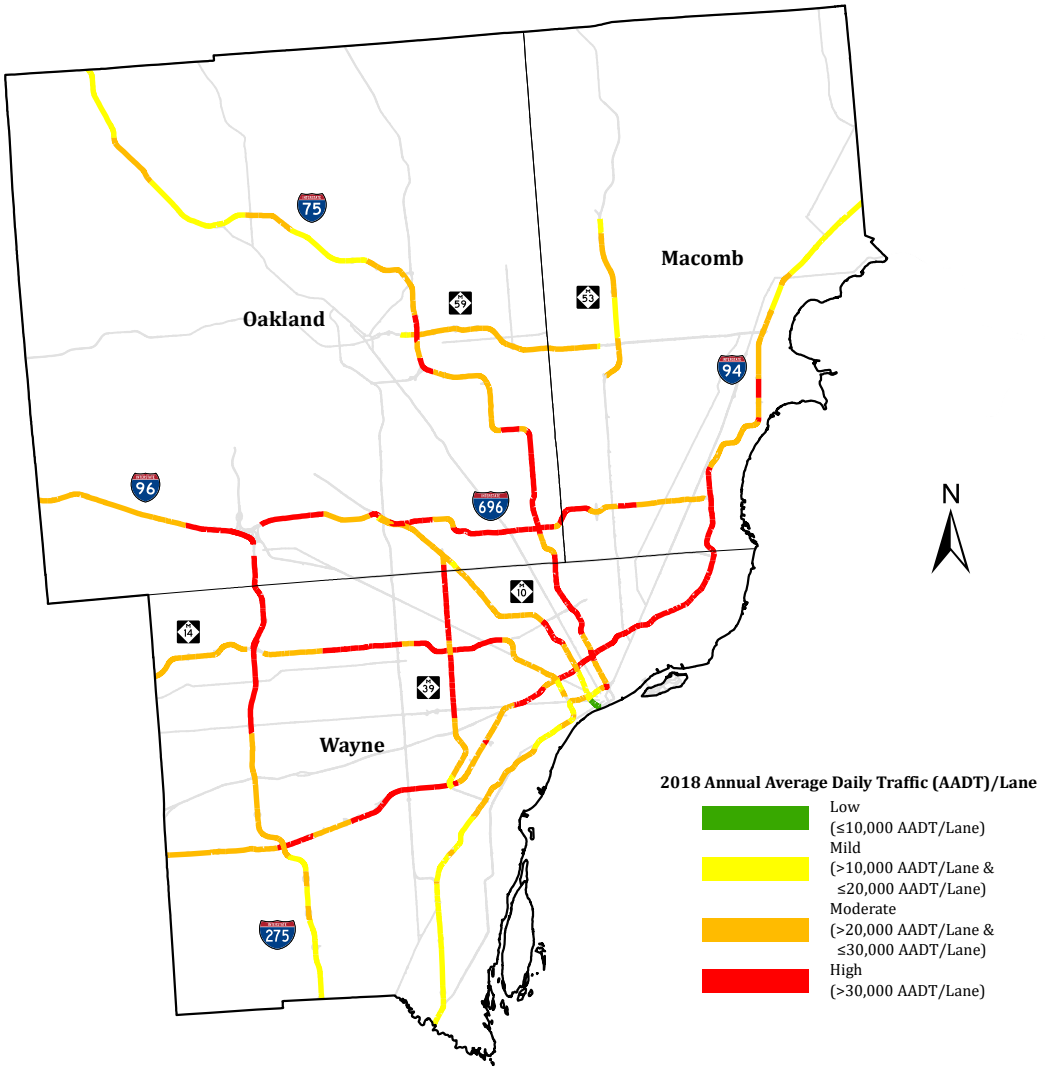


FIGURE 2. 2018 Metro Region Annual Average Daily Traffic (AADT) per Lane

PROBE DATA

In past reports, MDOT has utilized probe vehicle data from HERE to calculate freeway performance measures across the State of Michigan. However, MDOT has transitioned to a new commercial data provider named INRIX. In contrast to detector-based data which relies on fixed roadside sensors to collect vehicle speed information, probe data uses location information generated by GPS-equipped fleet vehicles, cell phones, and connected navigation devices. Companies such as INRIX process location data from their connected vehicle partners to compute real-time speed and travel time information, which is then provided to agencies on a subscription basis.

This data has many advantages with respect to statewide coverage and limited infrastructure costs. The roadway coverage provided by probe data can be seen in Figure 3. Probe data provides a consistent view of how MDOT freeways operate across the state, but the data does have some limitations. Some freeway segments, particularly those in rural areas, can have a minimal number of probe data collections during low volume periods or overnight hours. During these periods, the speeds reported by the system are more heavily weighted toward the historical average speed, which may occasionally miss speed reductions caused by minor incidents on those segments of freeway. These data limitations should be reduced over time as the penetration of probe vehicles on the roadway increase.

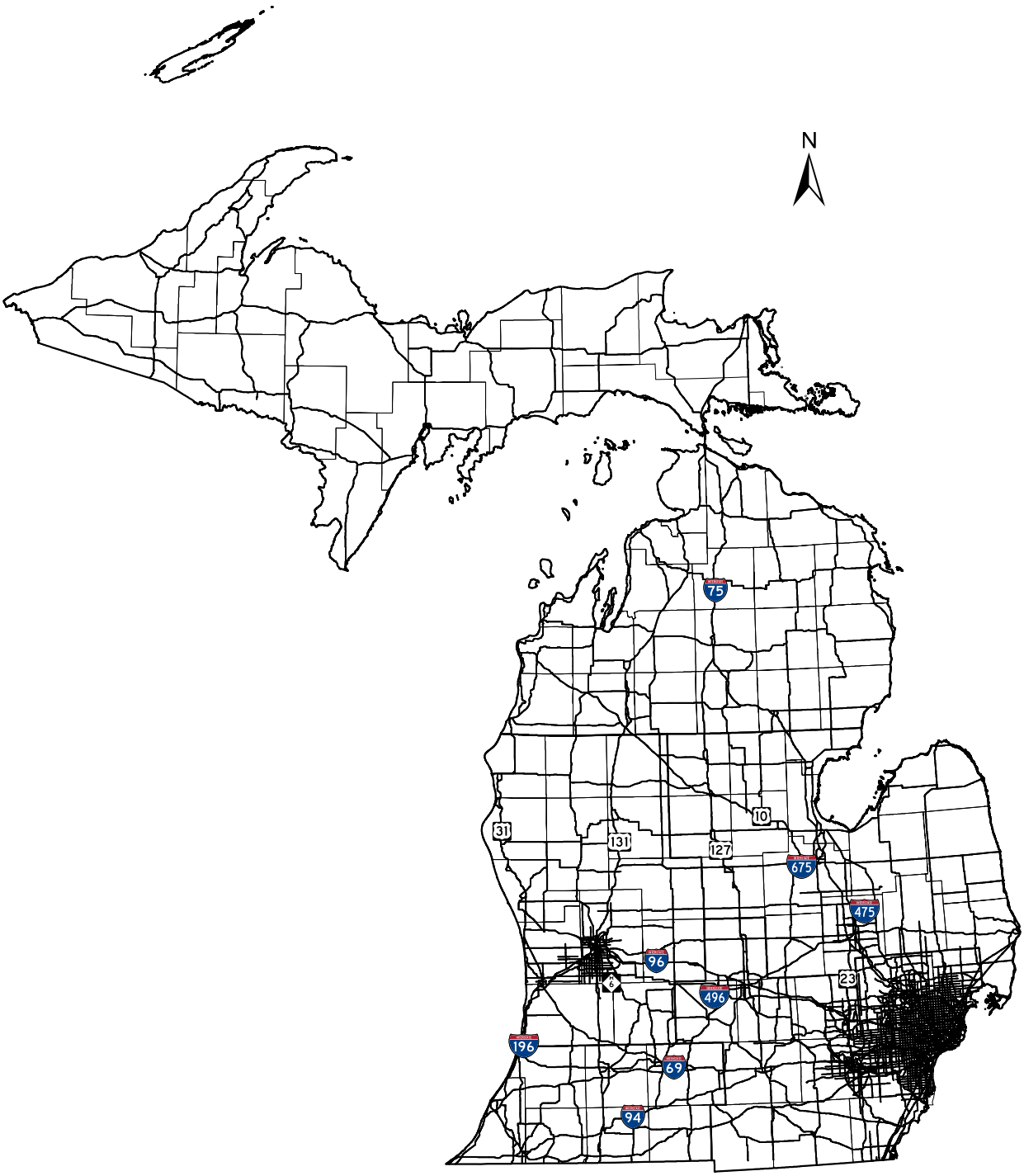


FIGURE 3. State of Michigan Probe Data Coverage

PERFORMANCE MEASURES DEFINITIONS

The probe data alone provides representative speeds on predefined segments of roadway every minute. Although this data is rich, it provides limited use to engineers and practitioners without well-defined aggregation techniques. Performance measures are growing in the transportation arena to better monitor traffic conditions, improve traveler information, and identify congested areas with the aim of improving operations on roadways. A summary of the performance measures used in this report can be seen in Table 1.

The goal of these performance measures is to quantify the congestion, delay, and reliability of the freeway network in Michigan. Numerous metrics were used in this report to quantify the performance of the road network, including a new delay index. Delay is quantified when the speed drops below 60 MPH, which is at least 10 MPH lower than the posted speed limit for the freeways (Figure 4). On segments with a speed limit of 55 MPH, delay is calculated when speed falls below that threshold. The delay index presented in this report represents the total delay on each segment if one vehicle were to drive that segment every ten minutes. The lower the value, the better the freeway segment is operating. The other element of interest is reliability. Reliability is a measure of the consistency of a travel time on a roadway. A roadway that has the same travel time every day is said to be reliable, whereas a roadway that has varying travel times is said to be unreliable. MDOT's goal is to provide reliable travel times with minimal delay. This is done through roadway improvement projects which can include additional lanes, pavement improvements, and intelligent transportation systems. These projects can reduce the travel time and also improve the travel time reliability. An example of this is shown in Figure 5.

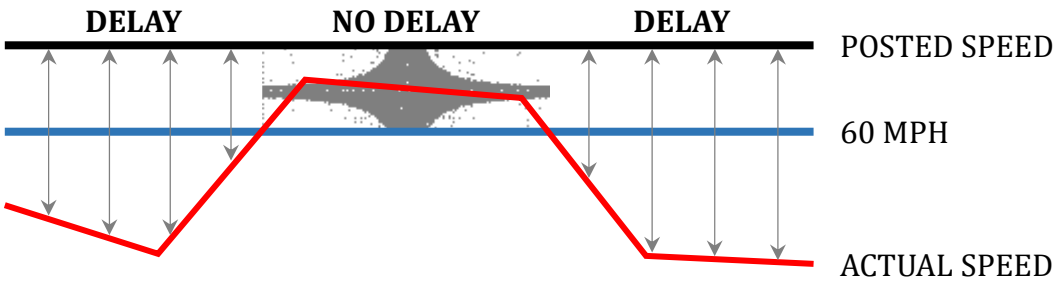


FIGURE 4. Delay Calculation

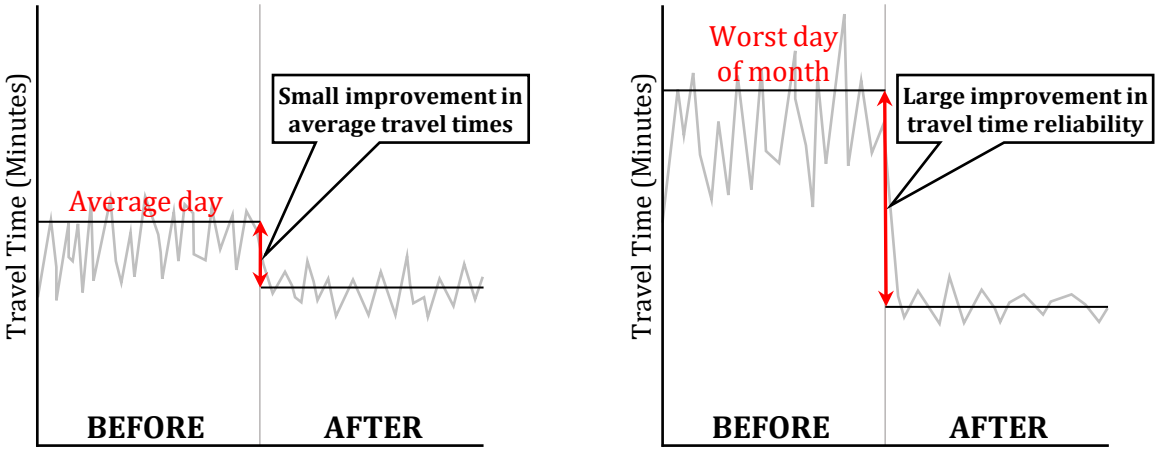


FIGURE 5. Travel Time Average and Reliability Improvements

TABLE 1. Performance Measures of Interest

PERFORMANCE MEASURE	Description
DELAY	Delay is calculated by taking the difference between actual speeds when they fall below 60 MPH and the posted speed limit. This is to take out the delay caused by the lower average speeds from commercial vehicles.
DELAY INDEX	Delay index is calculated by adding the delay if a probe vehicle drove every segment of roadway once every ten minutes. This value is then divided by the length of the roadway segment. This allows users to make comparisons between varying corridors and locate areas that cause the most delay.
MAXIMUM DELAY	Maximum delay is the maximum calculated delay per segment throughout a year.
AVERAGE SPEED	Average speed is determined by calculating the space mean speed of the worst ranked hour in the weekday AM peak (6:00 AM - 9:00 AM) and weekday PM peak (3:00 PM - 7:00 PM) periods for each segment of roadway. This is compared to the space mean speed of the previous five year period for the same hour.
CONGESTION SEVERITY	Congestion severity is calculated based on the worst hourly average speed experienced during the AM or PM peak period per traffic message channel (TMC) segment. A TMC segment is a standard for delivering real-time traffic information. They vary from tenths of a mile long to several miles long.
TRAVEL TIME RELIABILITY	Travel time reliability is a measure of travel time consistency over a period of time. When travel times are unreliable, customers are more likely to experience unexpected delays. Travel times are shown to be reliable when the 95th percentile travel time remains close to the average travel time.
AVERAGE TRAVEL TIME	The amount of time a customer should budget to be on-time on average.
95TH PERCENTILE TRAVEL TIME	The amount of time a customer should budget to be on-time 19 out of 20 days (95% of the time). The 95th percentile travel time is also known as the planning time.
LEVEL OF TRAVEL TIME RELIABILITY	Level of travel time reliability (LOTTR) is calculated as the ratio of the 80th percentile travel time to a "normal" travel time (50th percentile). LOTTR measures the consistency and dependability of road segments. The Federal Highway Administration (FHWA) deemed a road segment to be unreliable if its LOTTR value exceeds 1.50.

Note: May 1st through September 30th were used for the summer reliability calculations.

PERFORMANCE MEASURES VISUALIZATIONS

Performance measures visualizations provide an easy way to graphically represent the performance metrics listed above. In this report, five main visualizations are used. These five visualizations are explained in detail below.

DELAY INDEX

Figure 3 is an example of the delay index graph. This figure represents I-96 through Muskegon County in the Grand Region. The delay index visualization displays which months are incurring the most delay, while comparing how delay patterns change from year-to-year. Figure 3 shows the following:

a) Yearly delay index per mile totals (in minutes).
b) Delay index per mile (in minutes).
c) Month of year.
d) Higher than normal delay index per mile values in December 2017.
e) A delay index per mile value of over 140 minutes in January 2014.

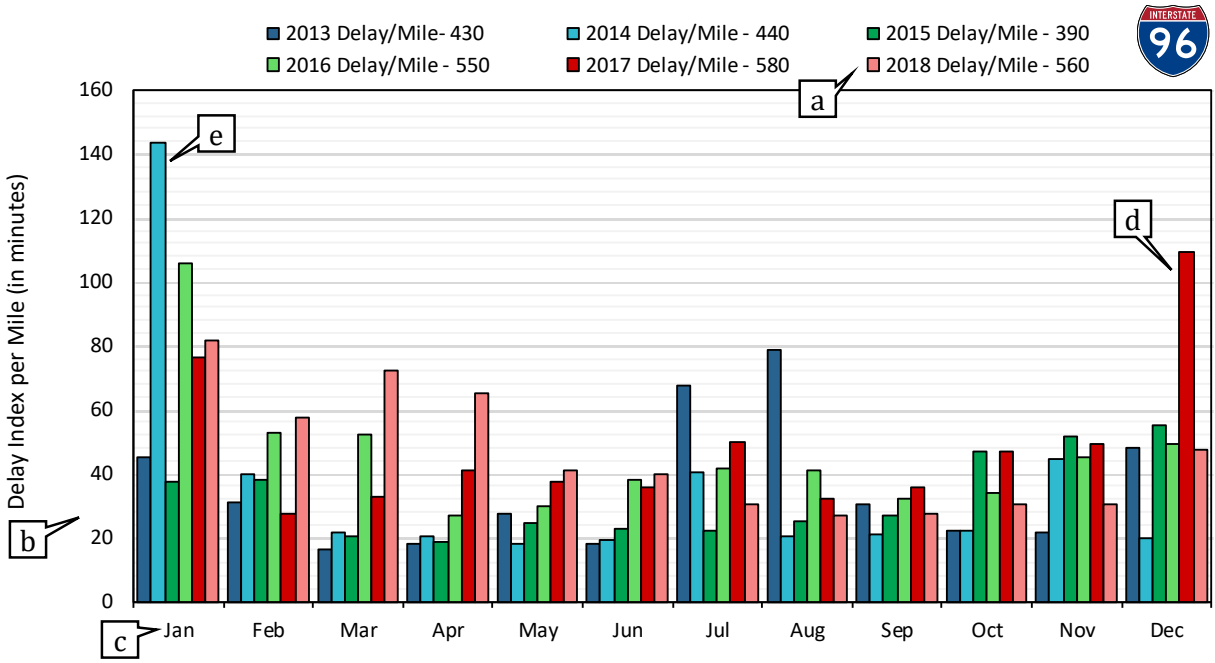


FIGURE 6. Example Delay Index Graph

AVERAGE SPEED

Figure 7 is an example of the average speed graph. This figure represents westbound I-94 through the University Region. This performance metric visualizes the speeds on a given corridor during the AM and PM peak periods, along with a 5-year historical average of those speeds. Average speed graphs can display how morning and evening peak speeds can vary by time and magnitude. The following criteria was used in the making of these graphs:

- Only weekdays (Monday – Friday) are included in the calculations.
- The AM peak hour is the worst ranked hour between 6:00 AM – 9:00 AM.
- The PM peak hour is the worst ranked hour between 3:00 PM – 7:00 PM.
- The worst ranked hour is based on the lowest average speed and minimum speed experienced during the peak hours.

Figure 7 shows the following:

a) Legend.
b) Location of interchanges by exit/mile marker number.
c) Specific significant interchanges.
d) Direction of travel.
e) Average speed in MPH.
f) Example of low speed area during the AM peak while near US-12 interchange.
g) Example of location where PM peak speeds are lower than AM peak speeds.
h) Example of limited change in speed from year to year.
i) 2018 PM peak average speed is approximately 54 MPH at Exit 142.
j) Example of improvement in the current year as compared to the 5-year historical average.

AVERAGE SPEED

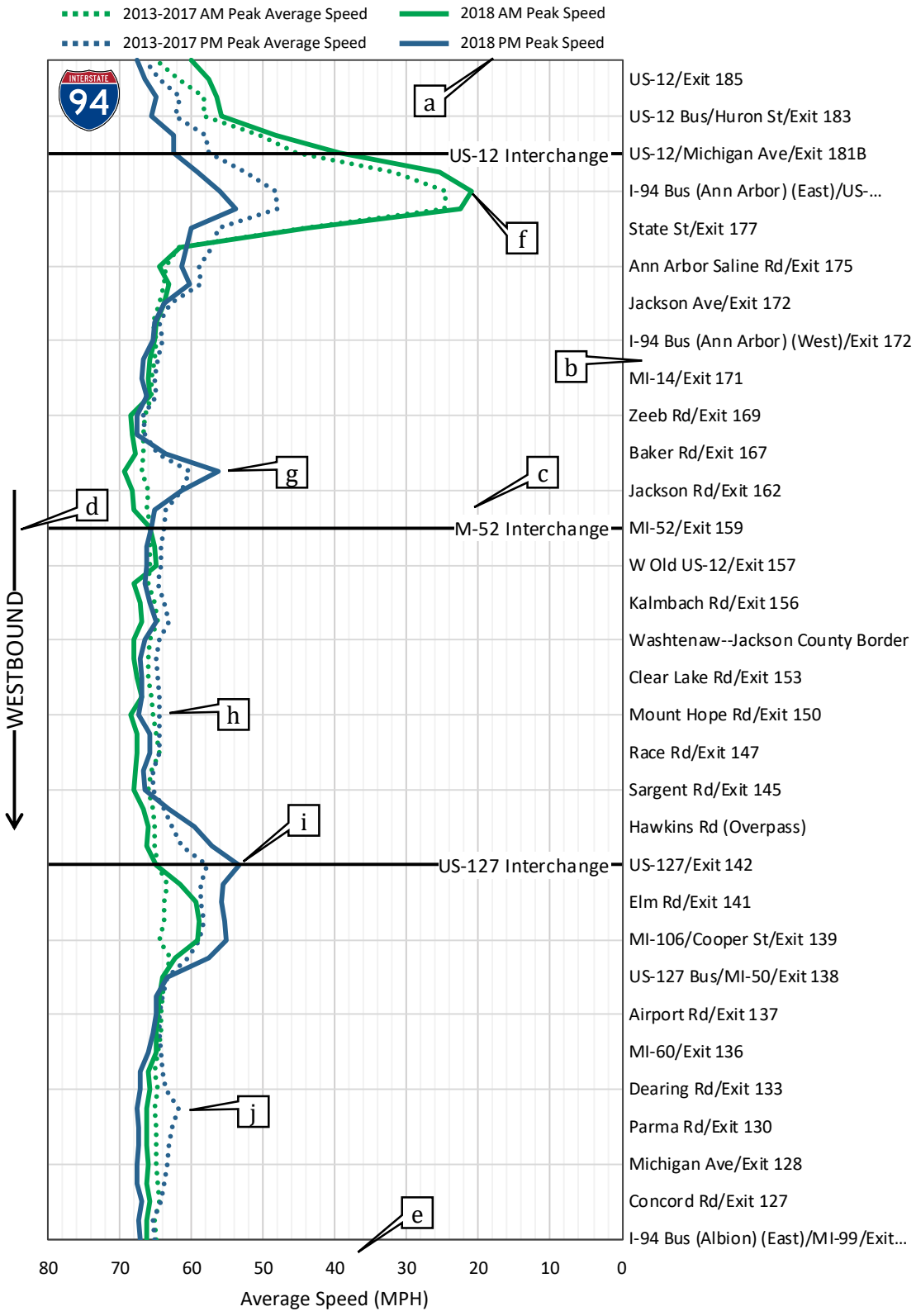


FIGURE 7. Example Average Speed Graph

CONGESTION SEVERITY

Figure 8 shows an example of the congestion severity figure. This figure represents Metro Region during the PM peak hour. This performance metric displays the amount of congestion on corridors during AM and PM peak periods by representing speeds in a color gradient. The color gradient consists of three different categories to distinguish severity levels:

- Low (≥55 MPH).
- Moderate (≥35 MPH & <55 MPH).
- Severe (<35 MPH).

Figure 8 shows the following:

a) Location of no congestion in either direction during the PM peak hour.
b) Congestion exists only in the eastbound direction of travel from people commuting from work to home during evening hours.
c) Location of severe congestion in both directions of travel along I-94.

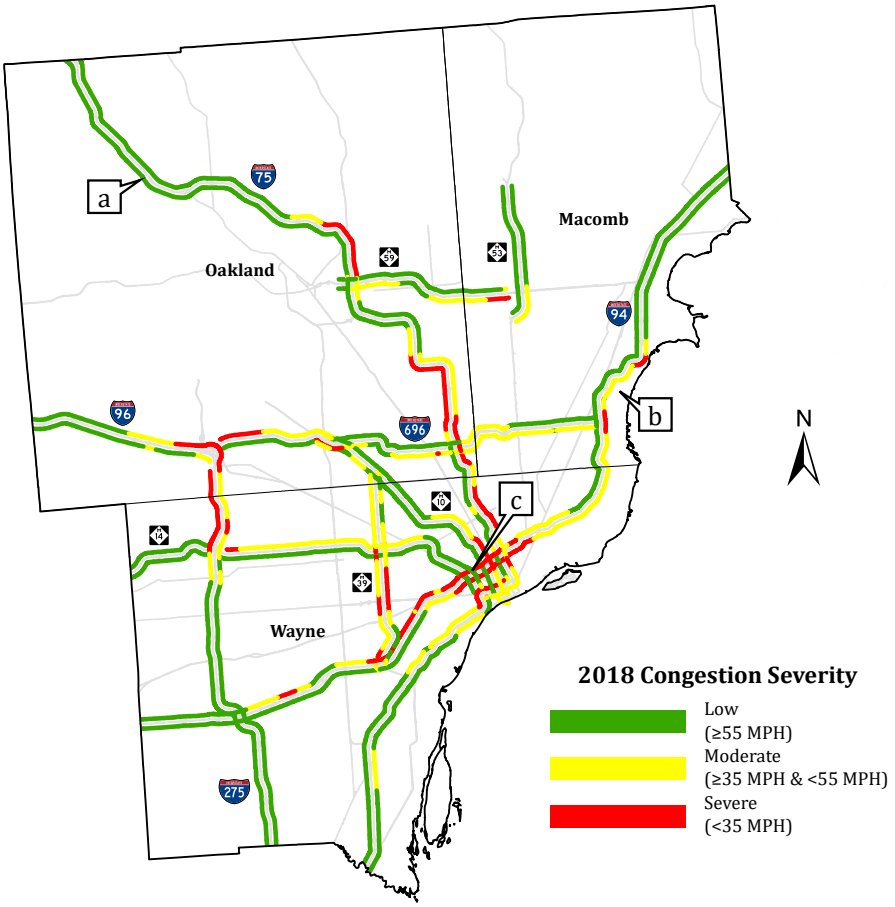


FIGURE 8. Example Congestion Severity Figure

TRAVEL TIME RELIABILITY

Figure 9 is an example of the travel time reliability graph. This figure represents a portion of westbound I-96 through the Metro Region. This performance metric displays the reliability of a given corridor over time. A segment is deemed "reliable" when the average and 95th percentile travel times are constant. A segment is deemed "unreliable" when the average and 95th percentile travel times differ by a large amount of time. Figure 9 shows the following:

a) The 95th percentile travel time reliability and the average (50th percentile) travel time reliability.
b) Amount of time it will take a vehicle to drive the entire corridor in minutes.
c) Time of day.
d) Small difference between average and 95th percentile travel times (reliable).
e) Large difference between average and 95th percentile travel times (unreliable).

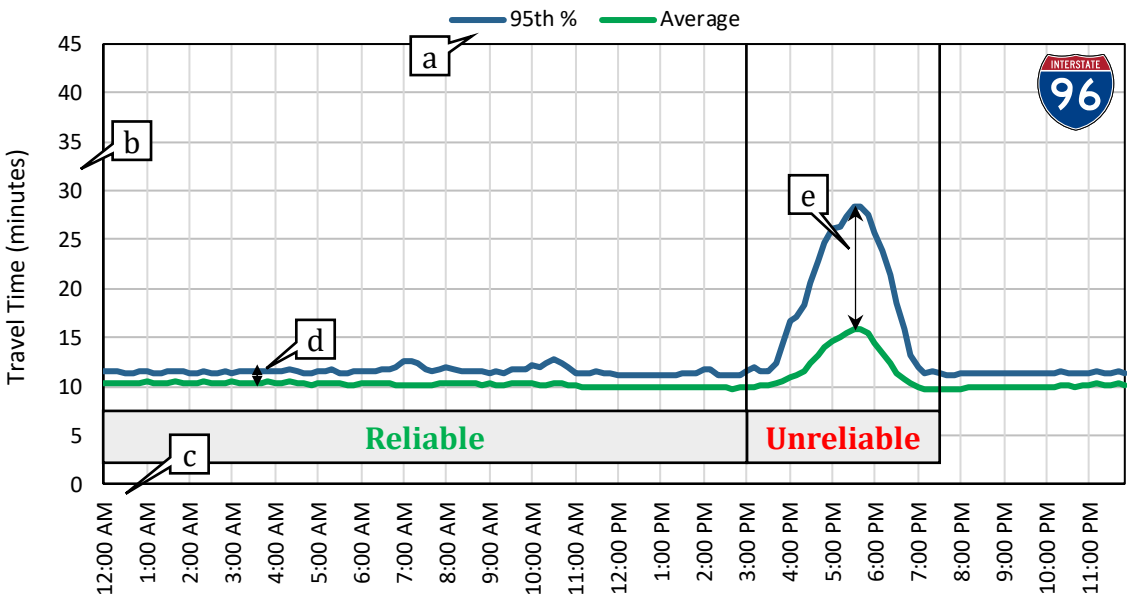


FIGURE 9. Example Travel Time Reliability Graph

LEVEL OF TRAVEL TIME RELIABILITY

Figure 10 shows an example of the level of travel time reliability (LOTTR) figure. This figure represents westbound I-94 through the University Region. This performance metric displays the consistency and dependability of road segments by analyzing vehicular travel times from day-to-day or across different times of the day. LOTTR is defined as the ratio between the 80th-percentile travel time to the 50th-percentile travel time. In order to determine if a road segment has reliable travel times, LOTTR utilizes a threshold value of 1.50. Therefore, a segment providing a calculated LOTTR value less than 1.50 would claim to have reliable travel times. As delegated by FHWA, the following time periods were used in the making of these graphs:

- Weekdays between 6:00 AM – 10:00 AM.
- Weekdays between 10:00 AM – 4:00 PM.
- Weekdays between 4:00 PM – 8:00 PM.
- Weekends between 6:00 AM – 8:00 PM.

Figure 10 shows the following:

a) Legend.
b) Location of interchanges by exit/mile marker number.
c) Specific significant interchanges.
d) Direction of travel.
e) Level of travel time reliability.
f) Threshold value of 1.50.
g) Area of unreliable travel times during weekdays between 6:00 AM – 10:00 AM (AM peak).

LEVEL OF TRAVEL TIME RELIABILITY

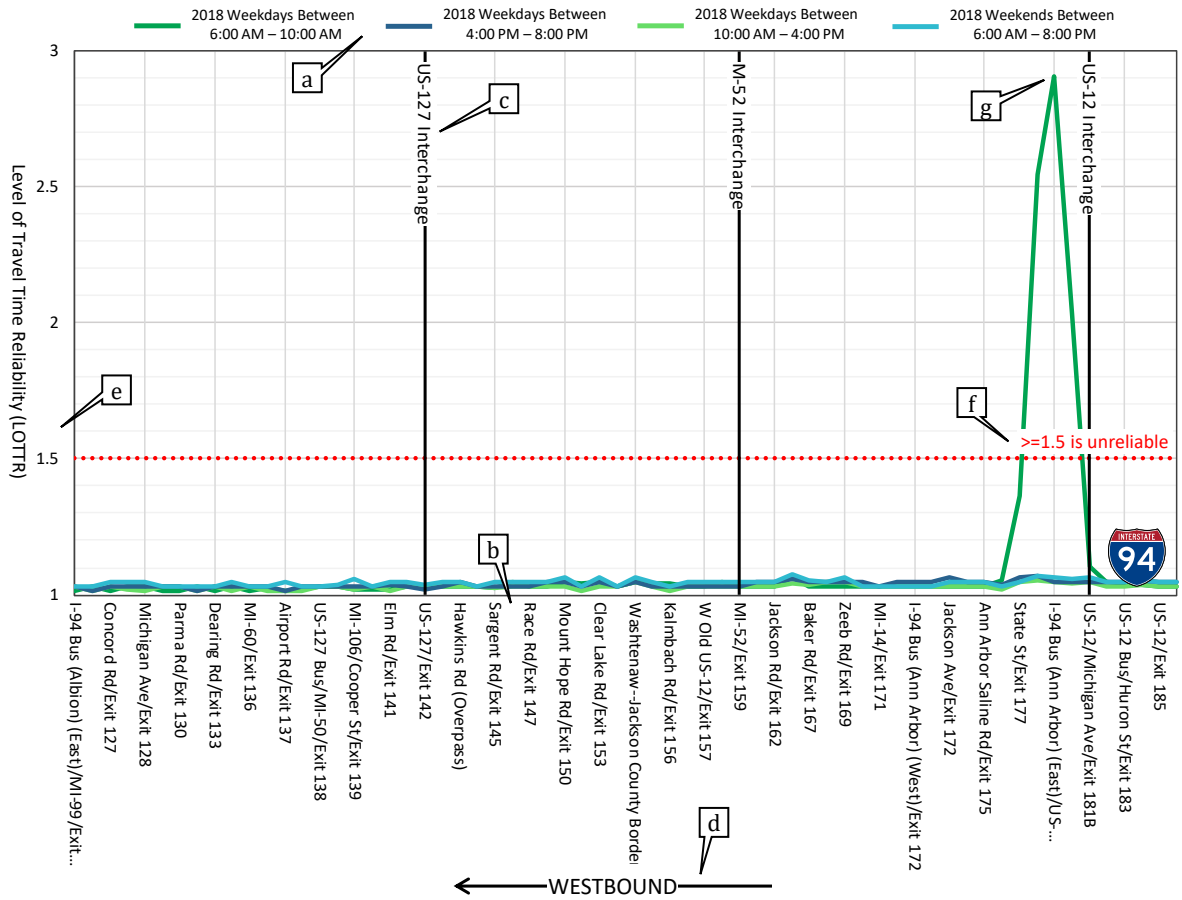


FIGURE 10. Example Level of Travel Time Reliability Figure

Figure 11 shows an example of the level of travel time reliability map. This figure represents University Region during weekdays between 4:00 PM – 8:00 PM. This performance metric displays the level of travel time reliability on corridors during each of the four time periods mentioned above. LOTTR is represented in a color gradient that consists of three different categories to distinguish severity levels:

- Low (<1.25 LOTTR).
- Moderate (≥1.25 LOTTR & <1.50 LOTTR).
- Severe (≥1.50 LOTTR).

Figure 11 shows the following:

a) Most roads have very reliable travel times because the LOTTR values are below 1.25.
b) Unreliable travel times occur southbound US-23 near Ann Arbor.
c) Unreliable travel times occur near the I-96 and US-23 interchange.

LEVEL OF TRAVEL TIME RELIABILITY

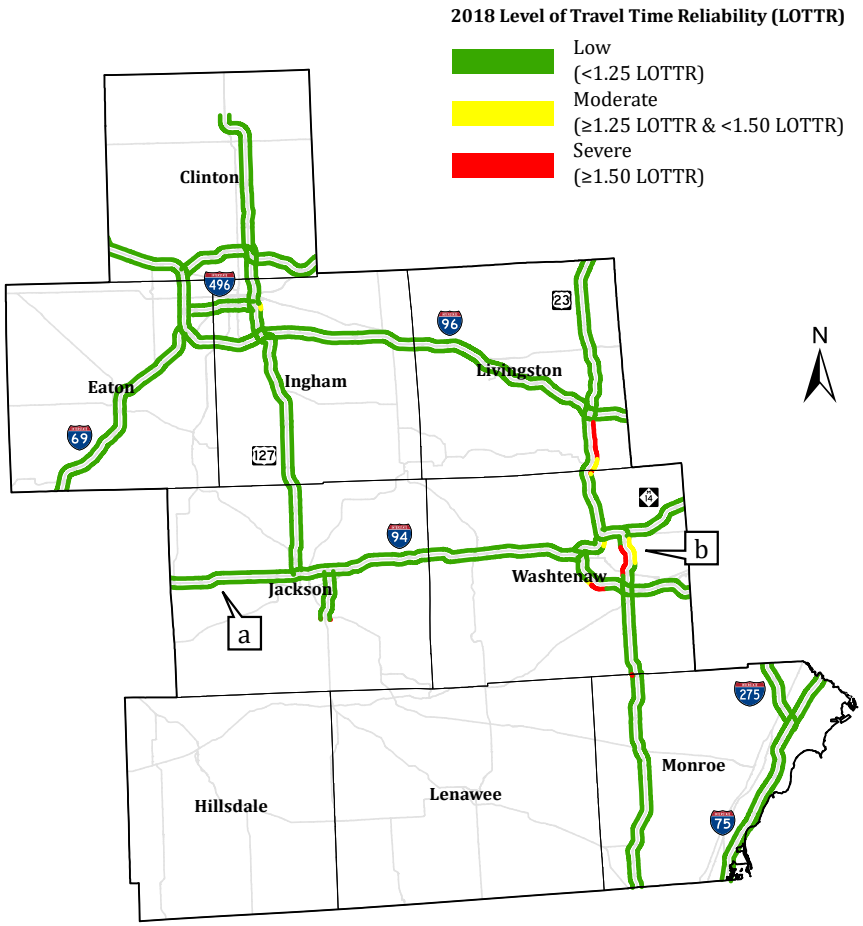


FIGURE 11. Example Level of Travel Time Reliability Map

STATEWIDE: OVERVIEW

STATEWIDE: DELAY INDEX

The following table ranks the top 30 freeways based on the delay index. Each freeway segment is presented on a countywide or TSC basis, as appropriate. Figures 12-13 supplement this information with a statewide perspective. Figure 12 shows the delay index per mile and Figure 13 shows the maximum delay drivers encountered over the year. Figures 14 and 15 display the delay index per mile and the maximum delay in the Metro Region, respectively.

STATEWIDE: DELAY INDEX

TABLE 2. 2018 Statewide Delay Index Data

Rank	Location (Route, County)	2018 Delay Index per Mile (in minutes)
1	I-94 – Detroit TSC (55 MPH)	5,149
2	M-39 – Detroit TSC and Oakland County (55 MPH)	2,707
3	I-75 – Detroit TSC	2,325
4	M-59 – Oakland and Macomb County	2,298
5	I-696 – Oakland County	1,948
6	I-75 – Detroit TSC (55 MPH)	1,878
7	I-96 – Oakland County	1,680
8	I-196 – Kent County	1,662
9	I-75 – Oakland County	1,659
10	M-10 – Detroit TSC (55 MPH)	1,550
11	I-96 – Taylor TSC	1,436
12	I-696 – Macomb County	1,413
13	I-75 – Taylor TSC	1,250
14	US-131 – Kent County	1,220
15	I-96 LOCAL – Detroit TSC (55 MPH)	1,189
16	I-94 – Taylor TSC	1,138
17	I-96 – Detroit TSC	1,116
18	M-14 – Washtenaw County	928
19	M-53 – Macomb County	839
20	I-94 – Washtenaw County	798
21	US-23 – Washtenaw County	787
22	M-10 – Oakland County	668
23	I-275 – Taylor TSC	655
24	I-94 – Macomb County	652
25	US-23 – Livingston County	607
26	I-496 – Eaton and Ingham County	602
27	I-196 – Ottawa County	602
28	I-96 – Livingston County	601
29	I-96 – Kent County	551
30	I-96 – Muskegon County	550

STATEWIDE: DELAY INDEX

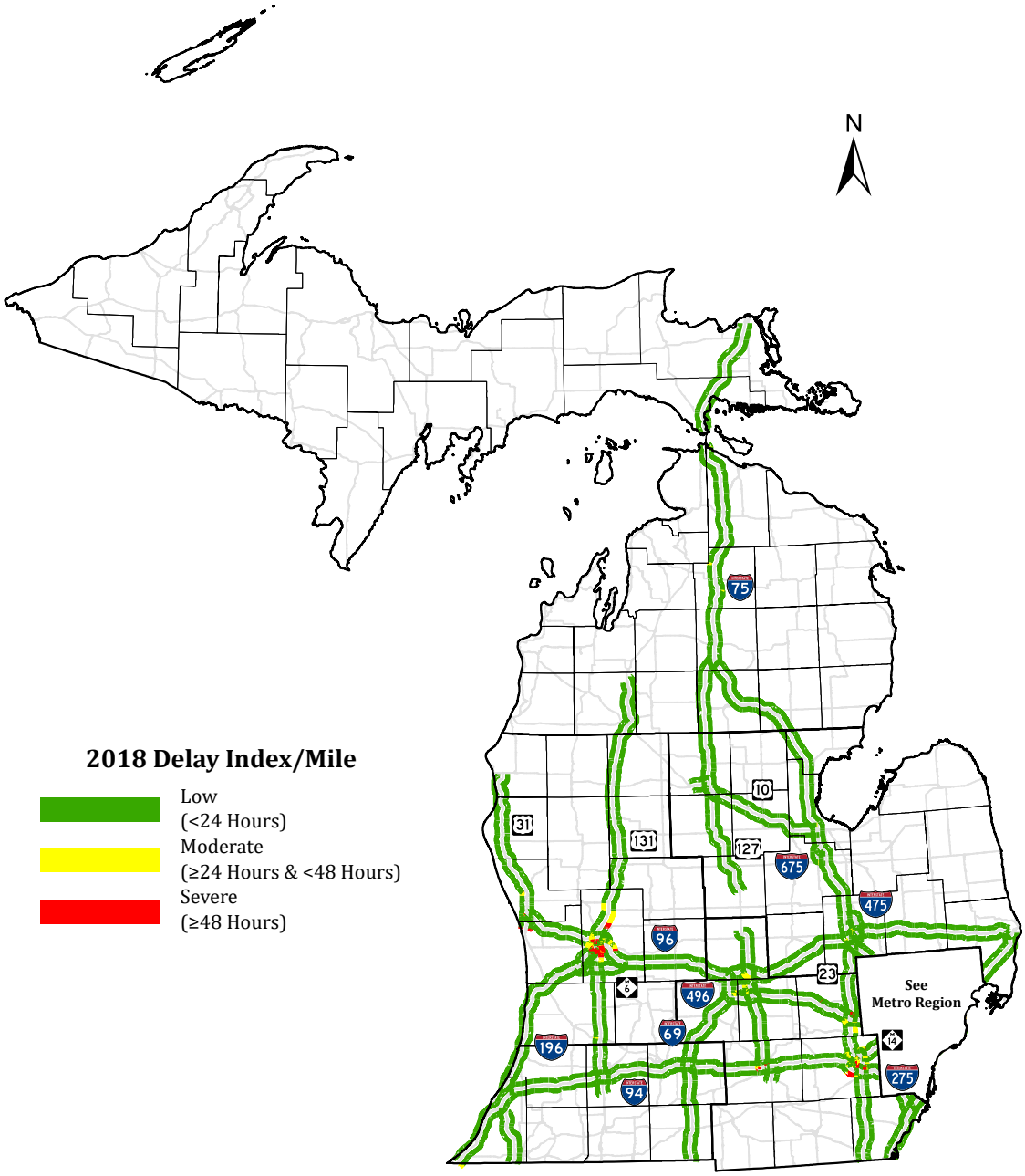


FIGURE 12. 2018 Statewide Delay Index per Mile

STATEWIDE: DELAY INDEX

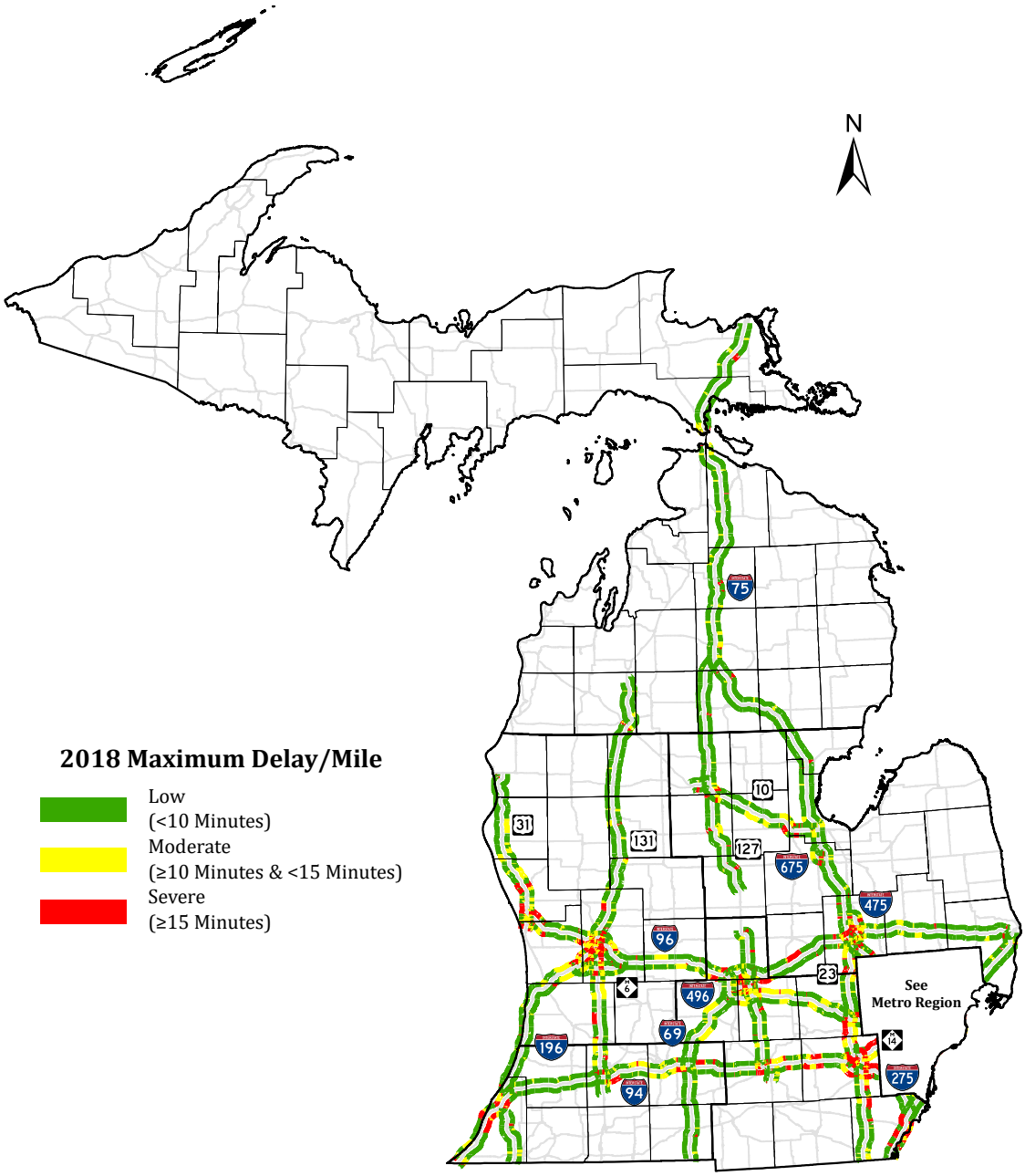


FIGURE 13. 2018 Statewide Maximum Delay per Mile

STATEWIDE: DELAY INDEX

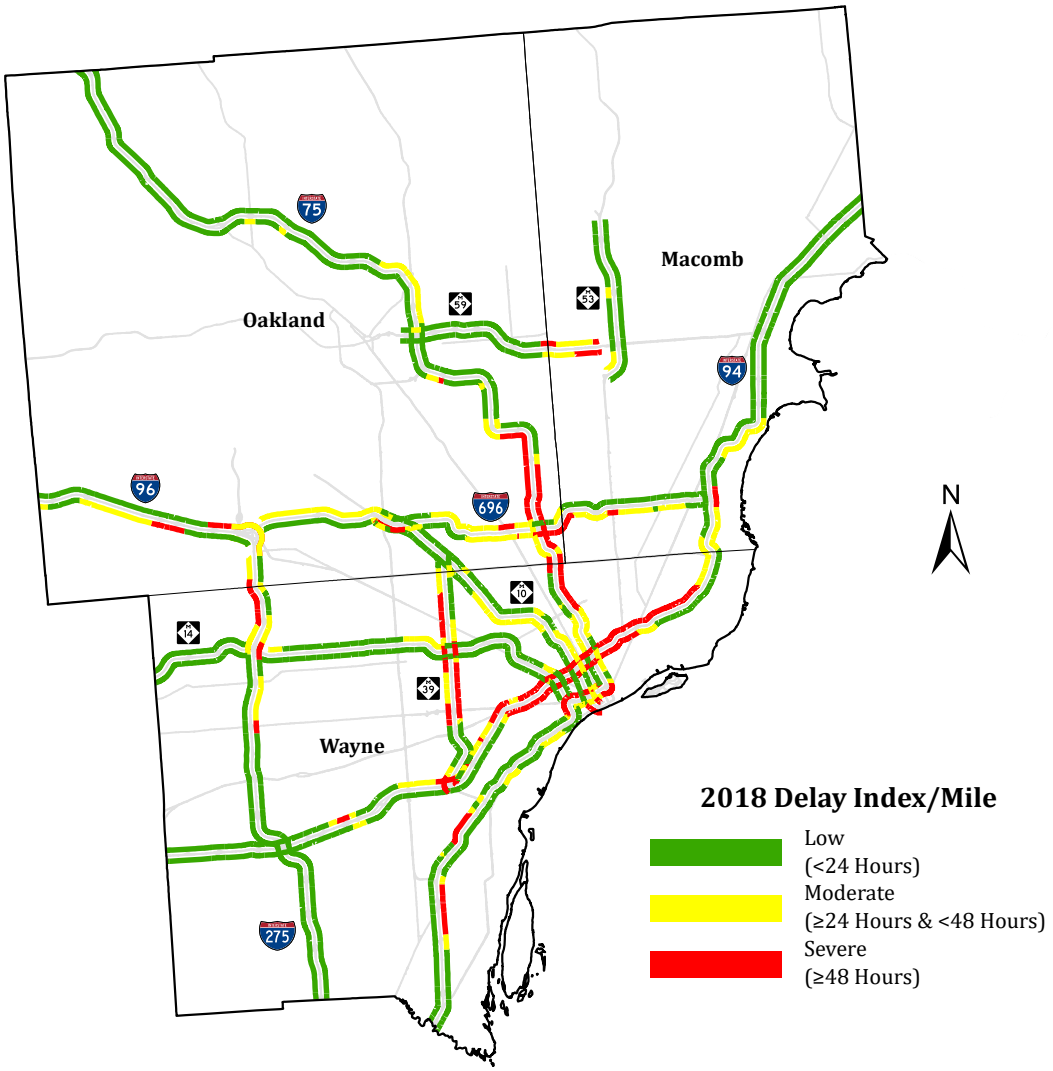


FIGURE 14. 2018 Metro Region Delay Index per Mile

STATEWIDE: DELAY INDEX

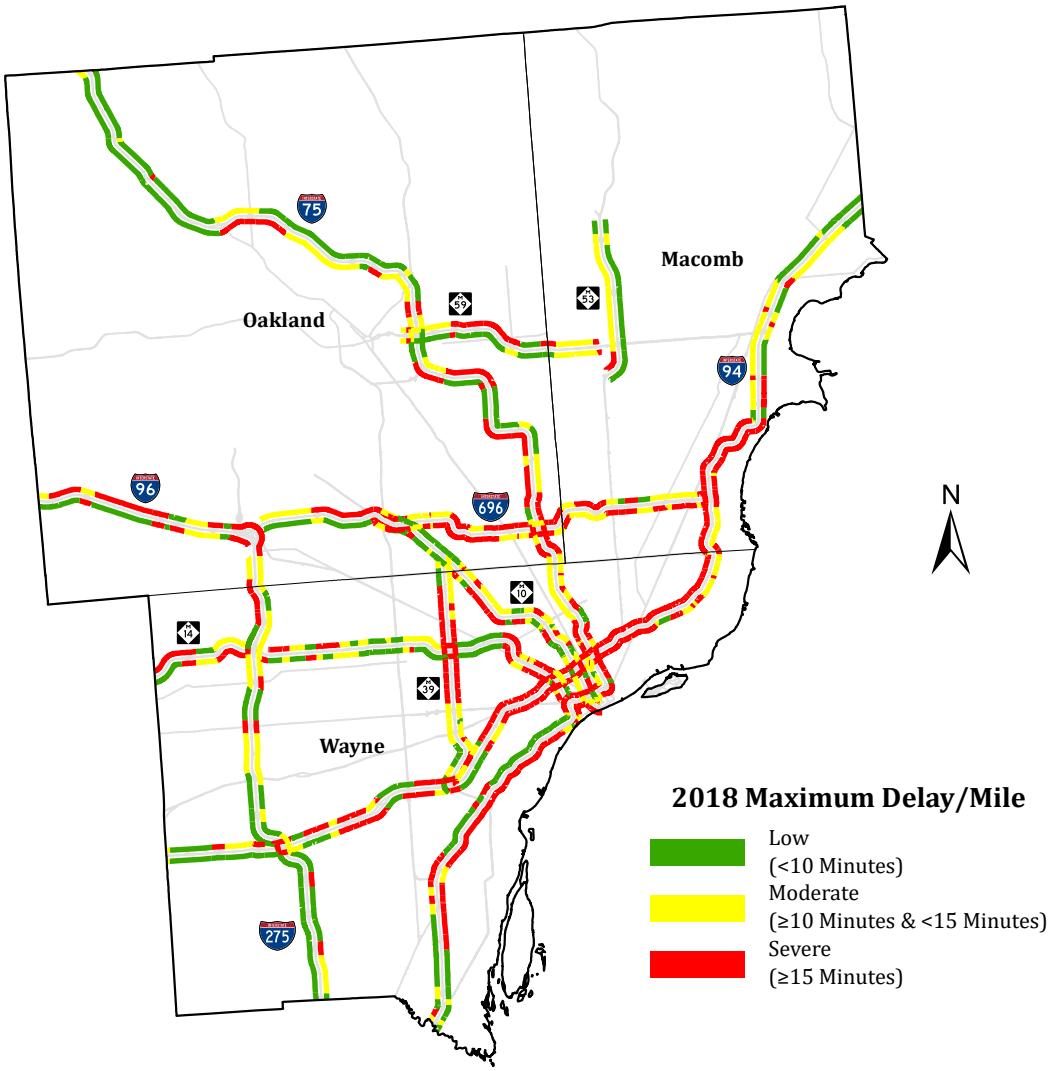


FIGURE 15. 2018 Metro Region Maximum Delay per Mile

STATEWIDE: CONGESTION SEVERITY

The following tables display the amount of congestion miles per region that fall into each severity level. Table 3 shows this data during the AM peak and Table 4 shows this data during the PM peak. These tables can be utilized to compare the amount and severity of congestion across all regions. Figures 16-17 supplement this information with a statewide perspective. Figure 16 shows the congestion severity during the AM peak and Figure 17 shows the congestion severity during the PM peak. Figures 18 and 19 give a detailed look into the Metro Region during the AM and PM peak hours, respectively.

TABLE 3. 2018 Congestion Miles by Severity – AM Peak

Region	Low	Moderate	Severe
Bay	772.9	0.0	0.0
Grand	668.9	36.8	0.0
Metro	405.1	139.9	32.4
North	358.2	0.3	0.0
Southwest	471.0	0.0	0.0
Superior	95.2	0.0	0.0
University	715.8	37.0	3.6
Total	**3487.1**	**214.1**	**36.1**

TABLE 4. 2018 Congestion Miles by Severity – PM Peak

Region	Low	Moderate	Severe
Bay	770.3	2.5	0.0
Grand	658.6	37.6	9.4
Metro	348.7	151.7	77.1
North	358.2	0.3	0.0
Southwest	471.0	0.0	0.0
Superior	95.2	0.0	0.0
University	719.9	24.7	11.8
Total	**3422.0**	**216.9**	**98.3**

STATEWIDE: CONGESTION SEVERITY

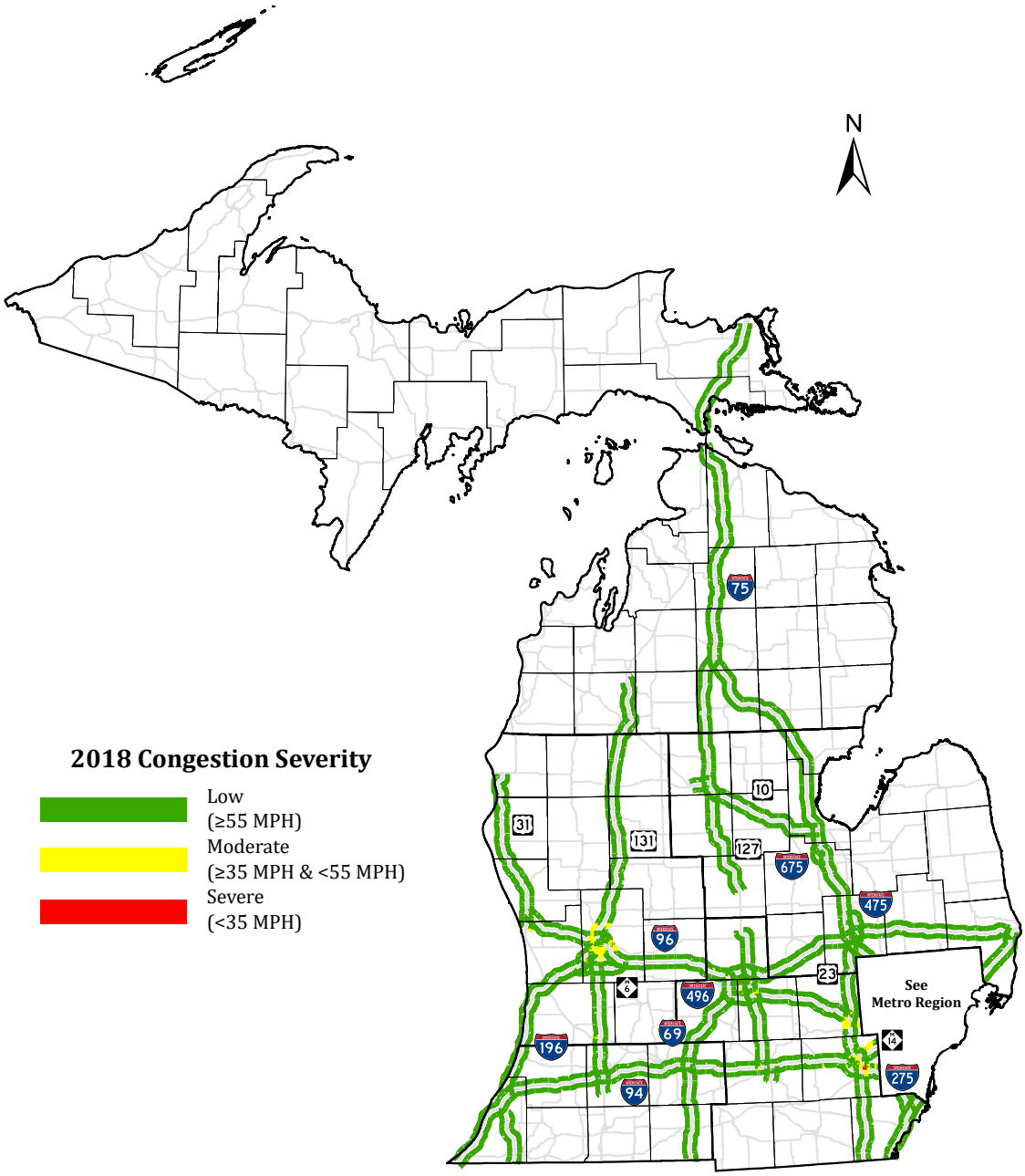


FIGURE 16. 2018 Statewide AM Peak Congestion Severity

STATEWIDE: CONGESTION SEVERITY

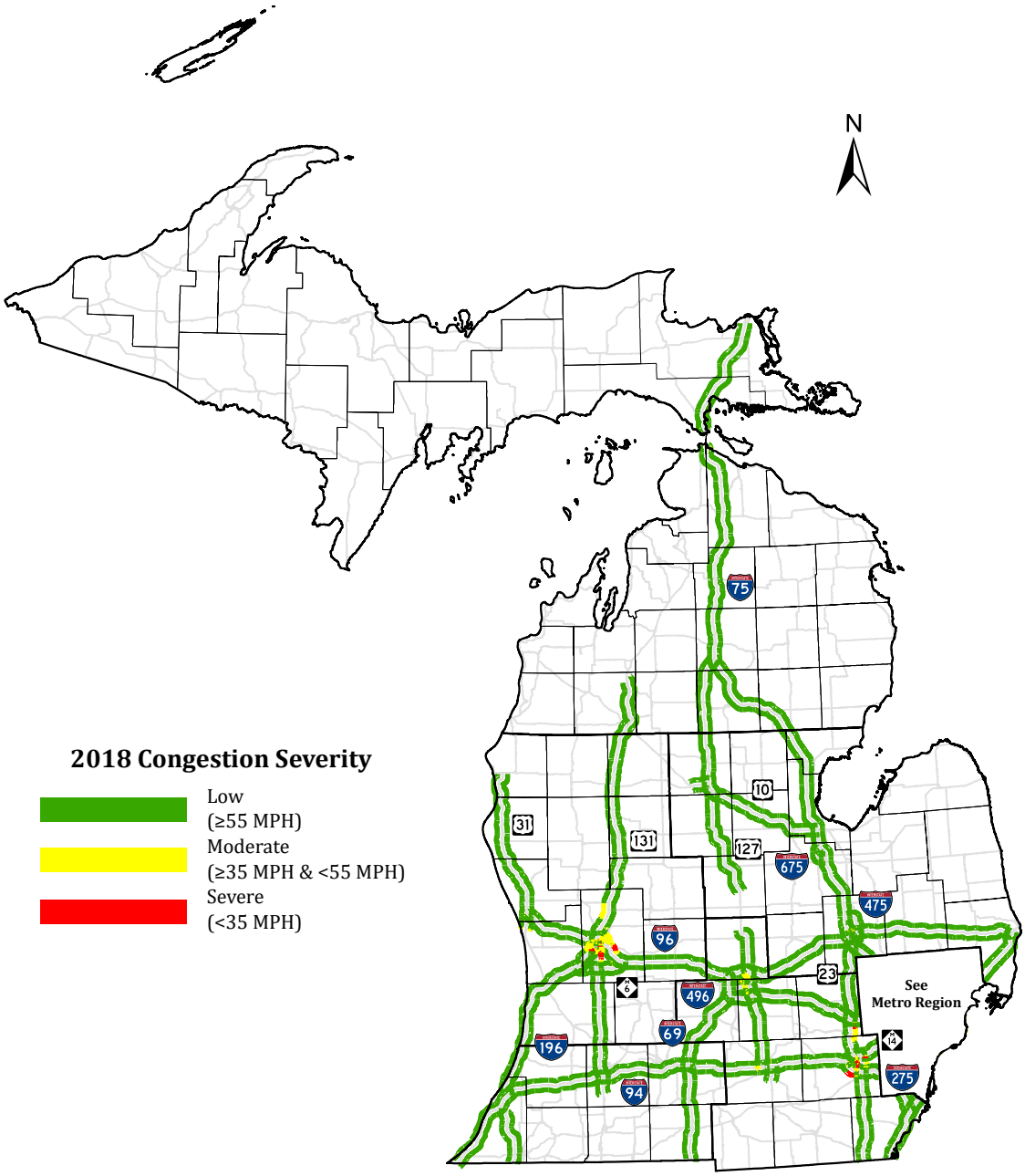


FIGURE 17. 2018 Statewide PM Peak Congestion Severity

STATEWIDE: CONGESTION SEVERITY

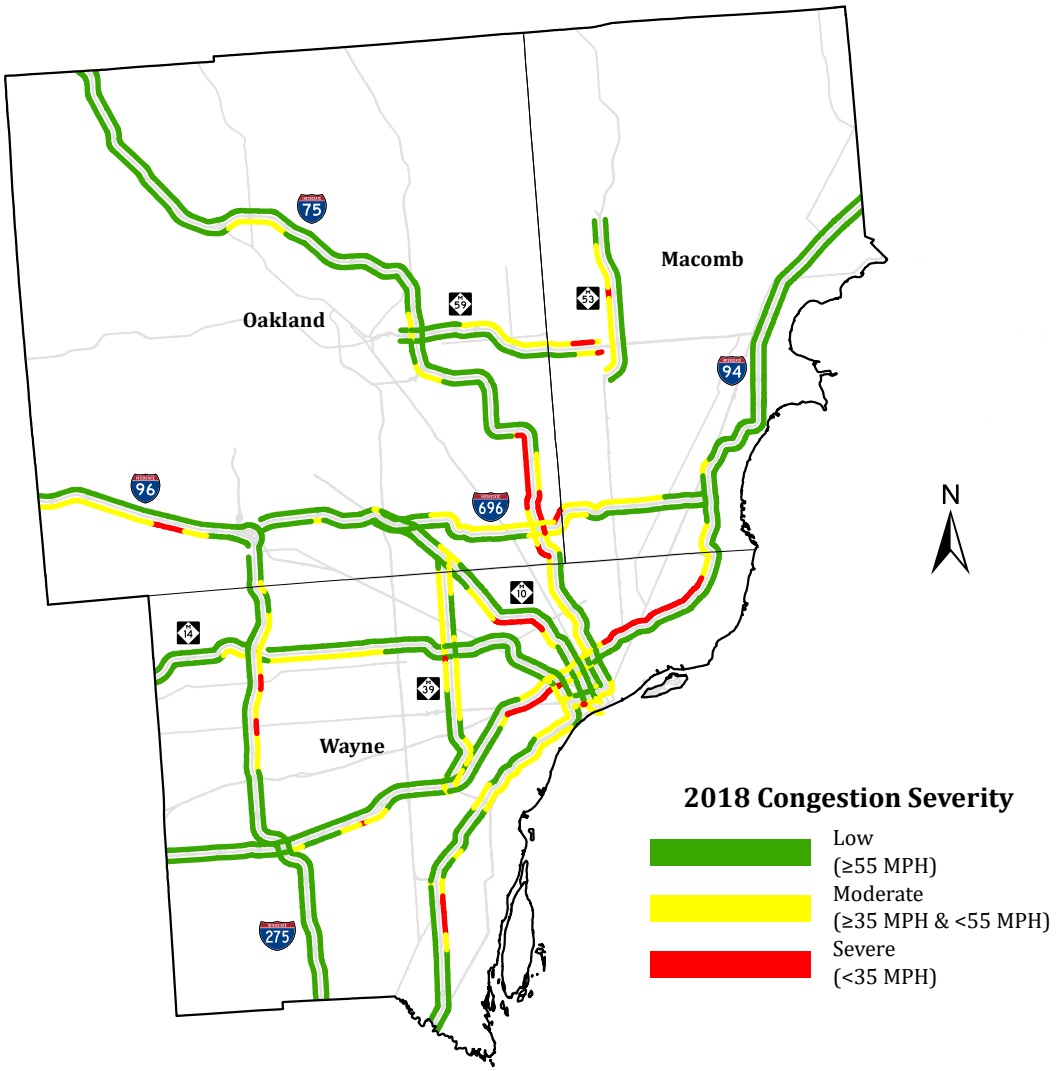


FIGURE 18. 2018 Metro Region AM Peak Congestion Severity

STATEWIDE: CONGESTION SEVERITY

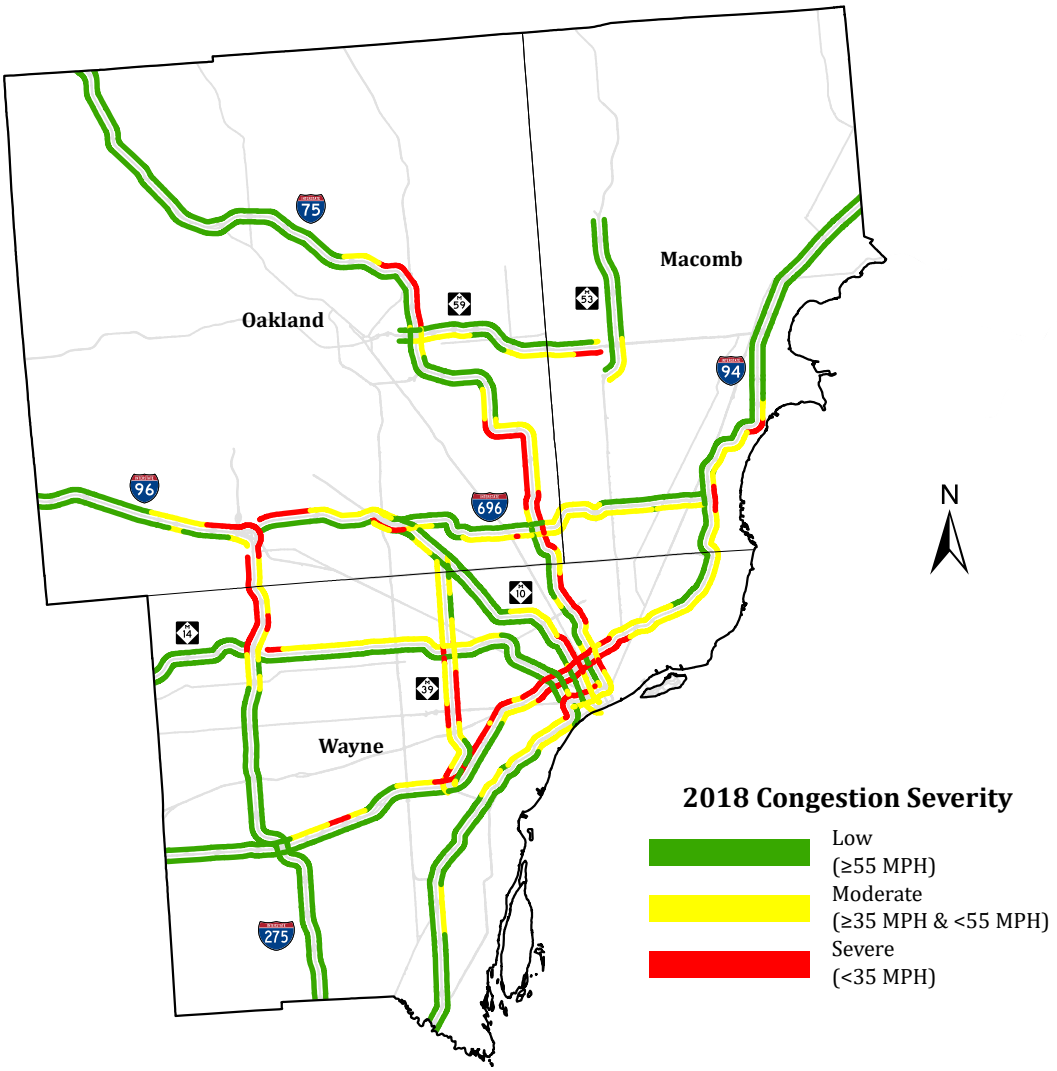


FIGURE 19. 2018 Metro Region PM Peak Congestion Severity

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

The following figures display the level of travel time reliability (LOTTR) based on severity level statewide. Figures 20-22 display the LOTTR during weekdays between 6:00 – 10:00 AM, 10:00 AM – 4:00 PM, and 4:00 PM – 8:00 PM, respectively. Figure 23 displays the LOTTR during weekends between 6:00 AM – 8:00 PM. Figures 24-27 give a detailed look into the Metro Region during these four time periods.

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

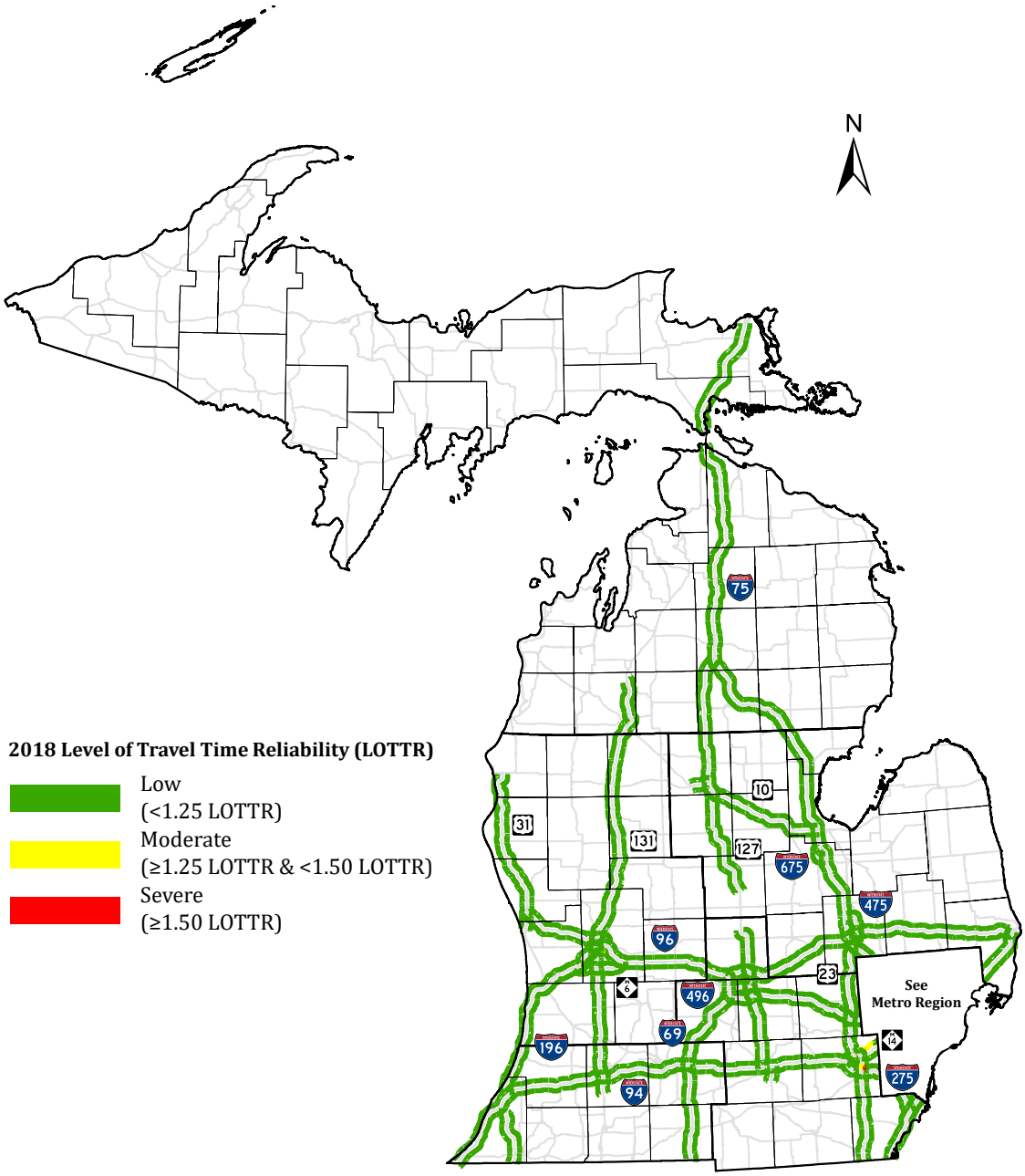


FIGURE 20. 2018 Statewide Level of Travel Time Reliability (Weekdays between 6:00 AM – 10:00 AM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

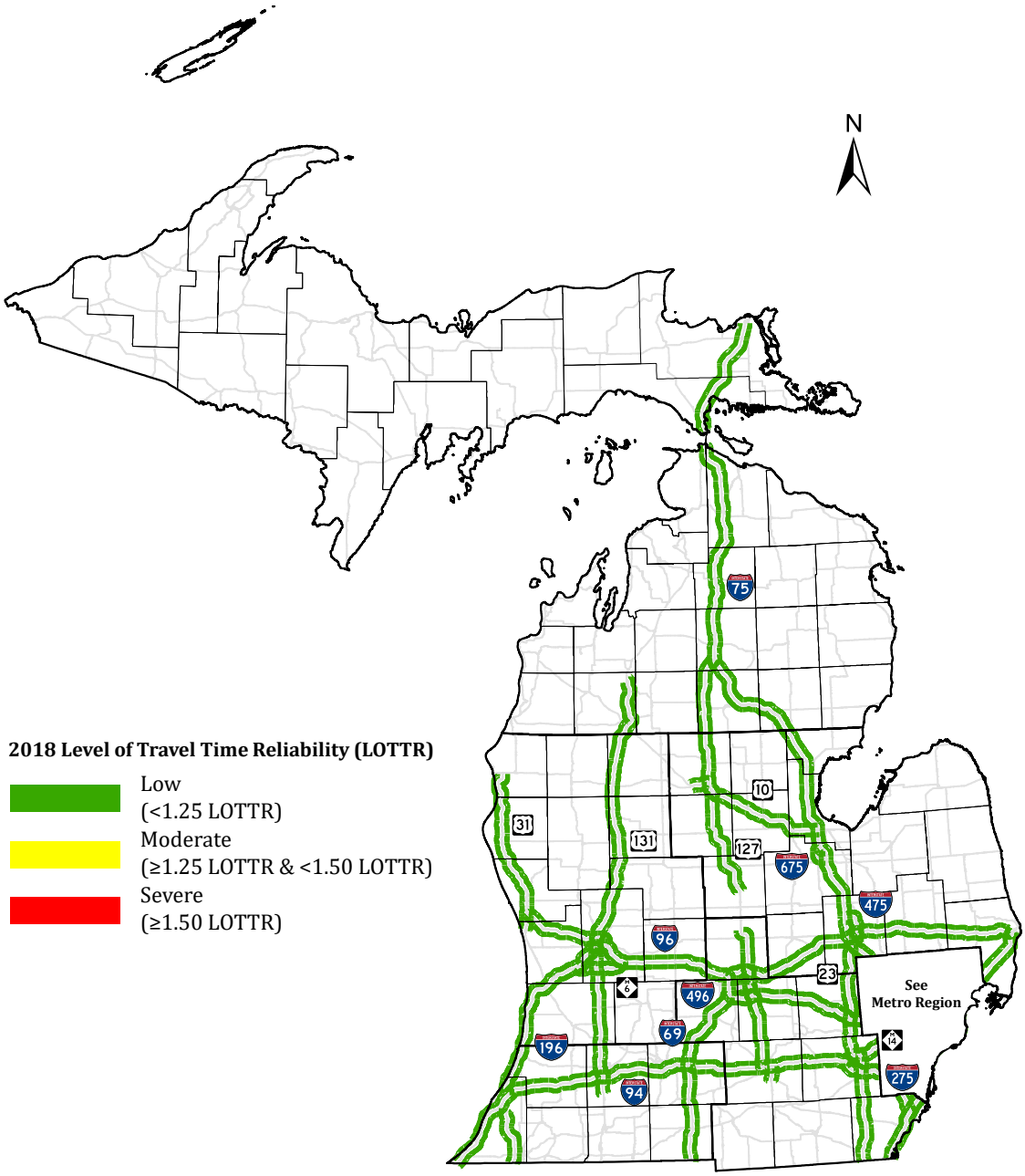


FIGURE 21. 2018 Statewide Level of Travel Time Reliability (Weekdays between 10:00 AM – 4:00 PM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

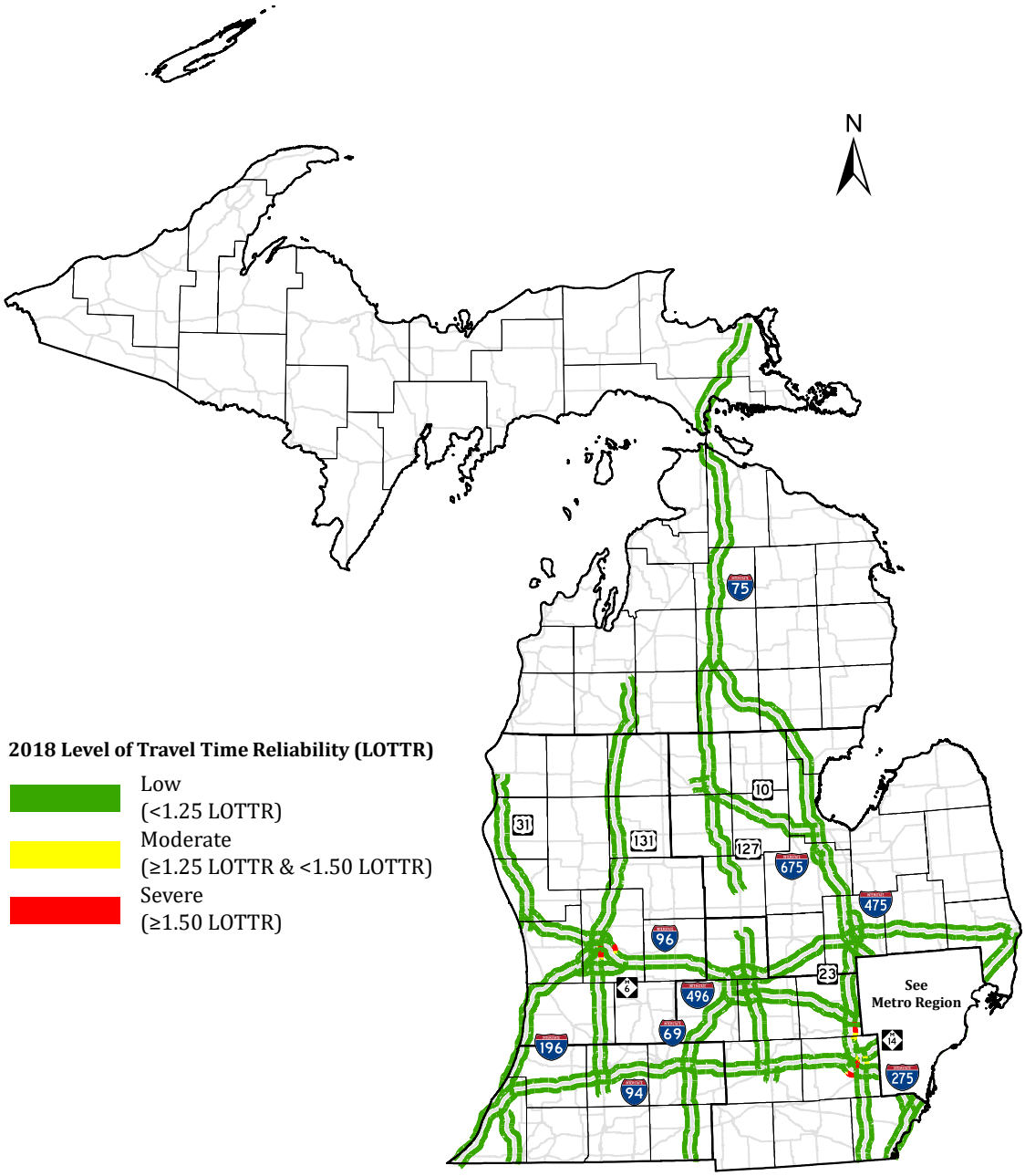


FIGURE 22. 2018 Statewide Level of Travel Time Reliability (Weekdays between 4:00 PM – 8:00 PM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

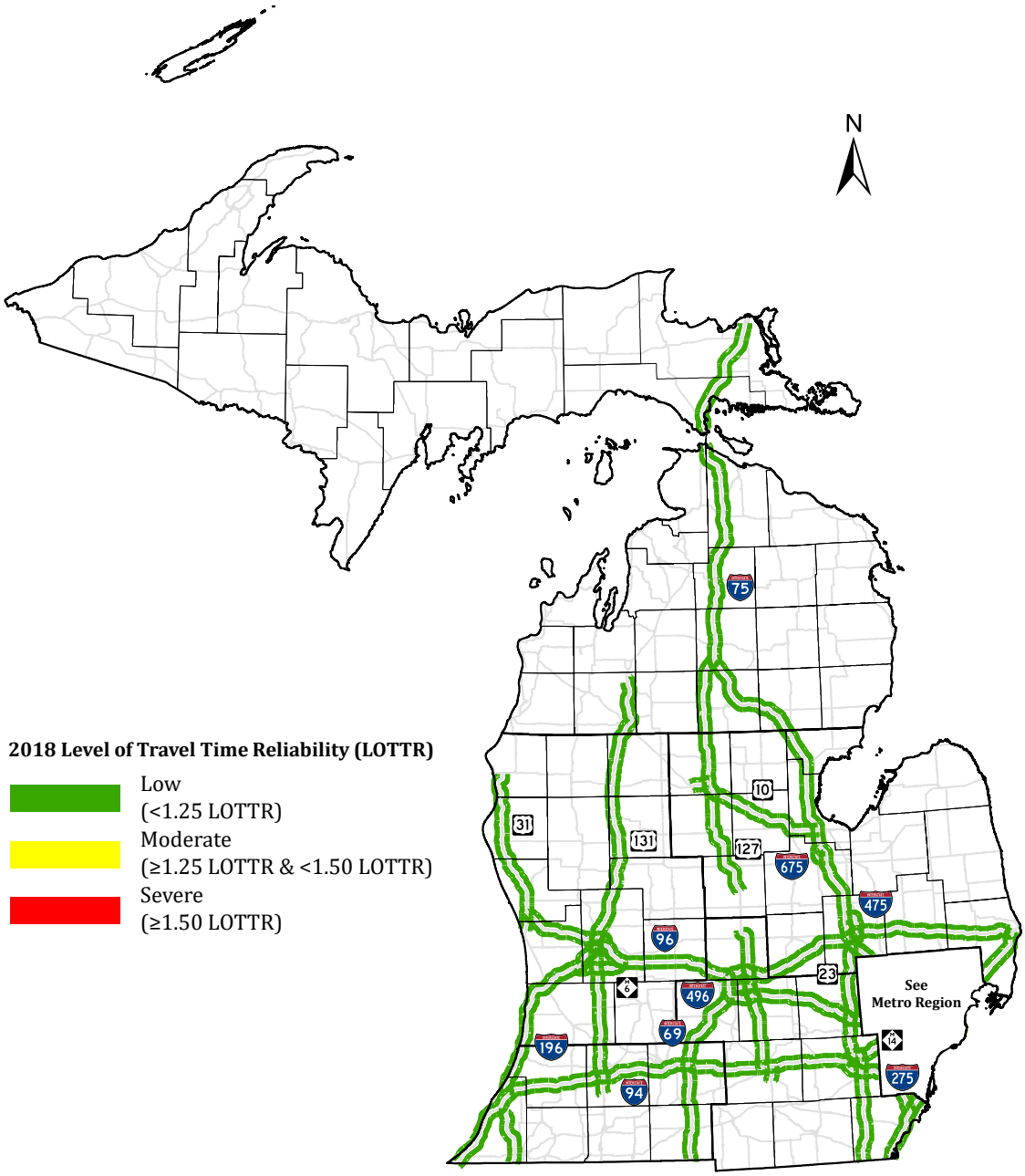


FIGURE 23. 2018 Statewide Level of Travel Time Reliability (Weekends between 6:00 AM – 8:00 PM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

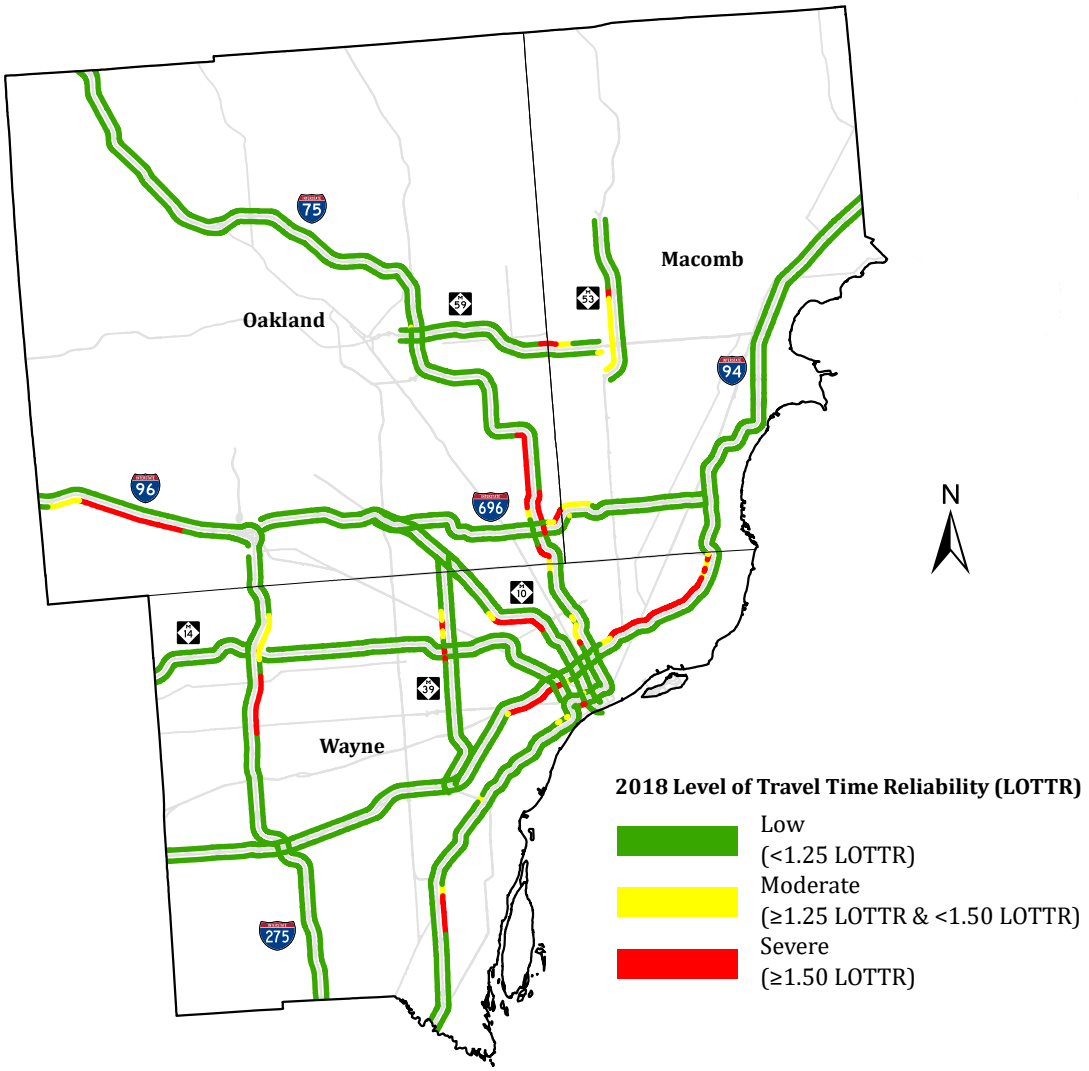


FIGURE 24. 2018 Metro Region Level of Travel Time Reliability (Weekdays between 6:00 AM – 10:00 AM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

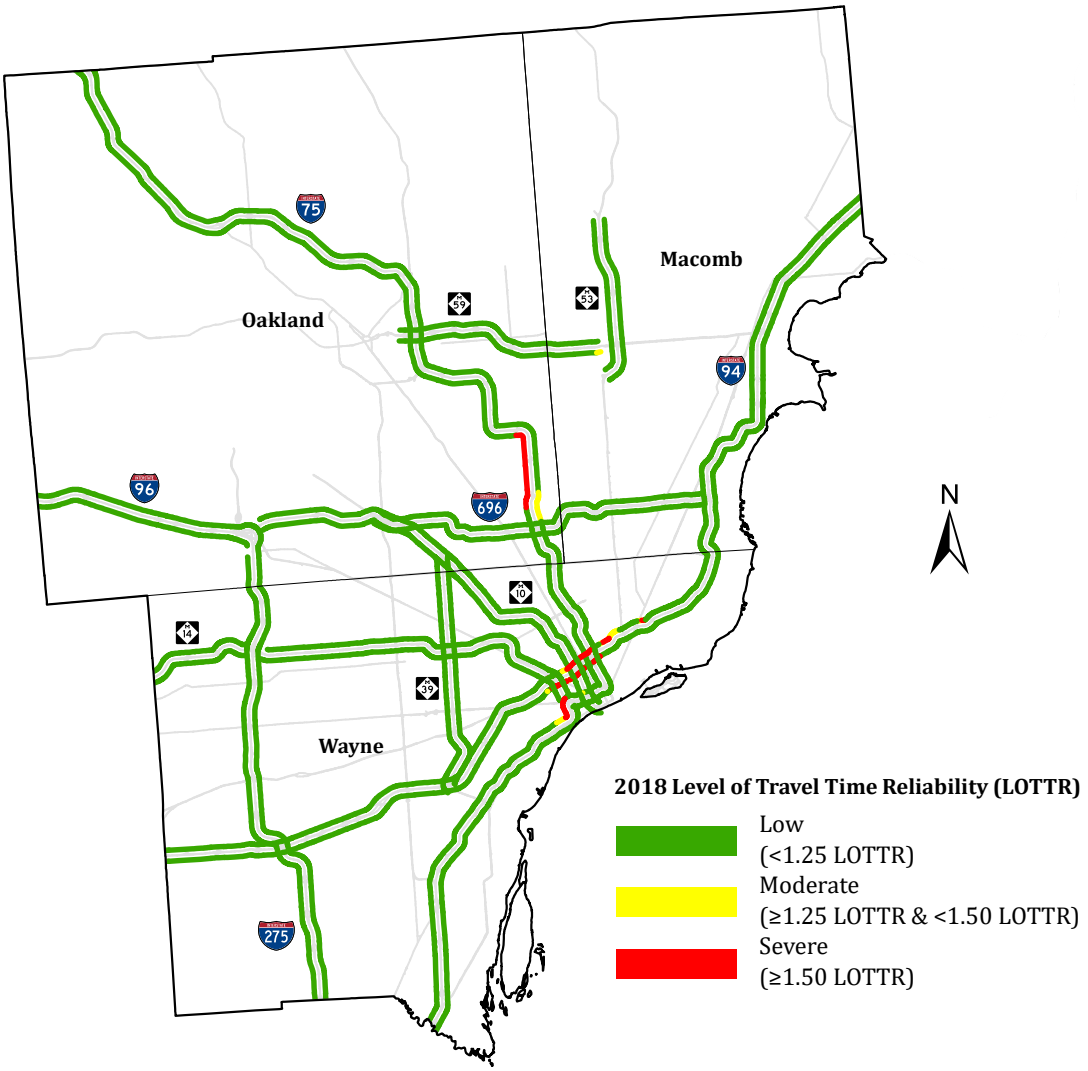


FIGURE 25. 2018 Metro Region Level of Travel Time Reliability (Weekdays between 10:00 AM – 4:00 PM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

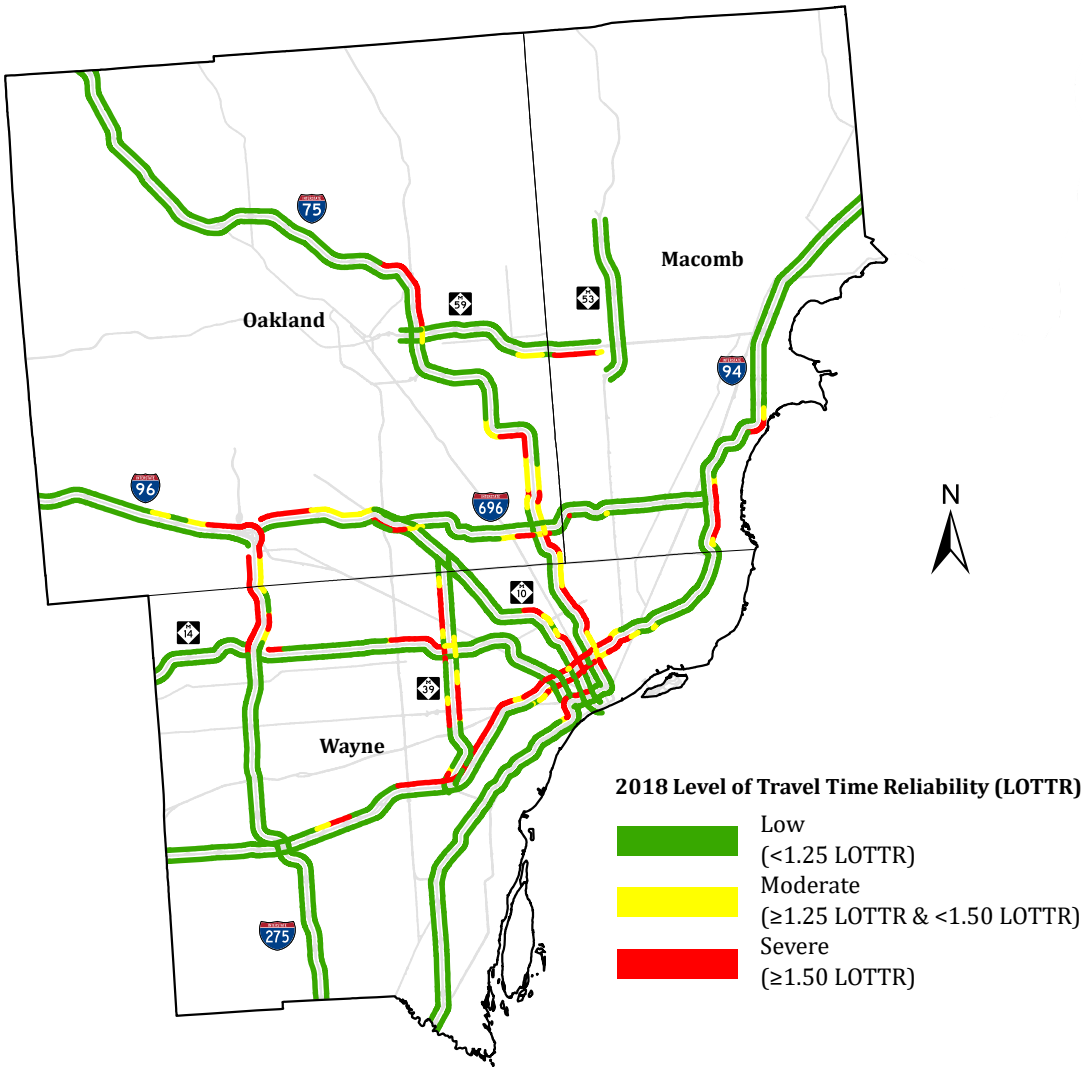


FIGURE 26. 2018 Metro Region Level of Travel Time Reliability (Weekdays between 4:00 PM – 8:00 PM)

STATEWIDE: LEVEL OF TRAVEL TIME RELIABILITY

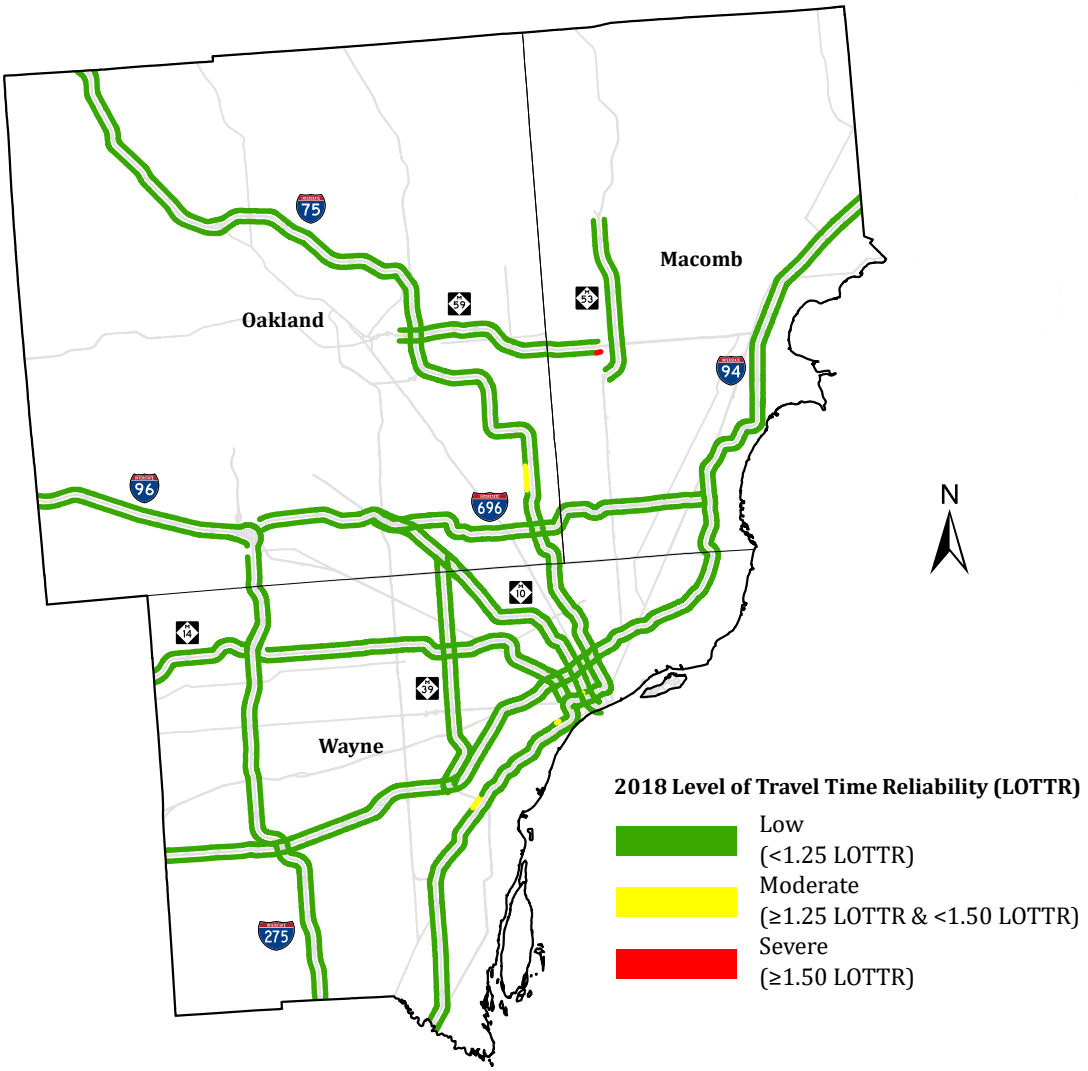


FIGURE 27. 2018 Metro Region Level of Travel Time Reliability (Weekends between 6:00 AM – 8:00 PM)

STATEWIDE: CRASHES/ONE MILLION VEHICLE MILES TRAVELED

Figure 28 displays a map of the number of crashes per one million vehicle miles traveled (VMT) statewide. The crash information was collected from police report forms. The latitude and longitude from the crash report was spatially joined to the nearest TMC road segment. The amount of crashes occurring on each segment was divided by the road segment's VMT. VMT is calculated as the total annual miles of vehicle travel. The number of crashes per one million VMT is broken down by severity level. Figure 29 gives a detailed look into the Metro Region.

STATEWIDE: CRASHES/ONE MILLION VEHICLE MILES TRAVELED

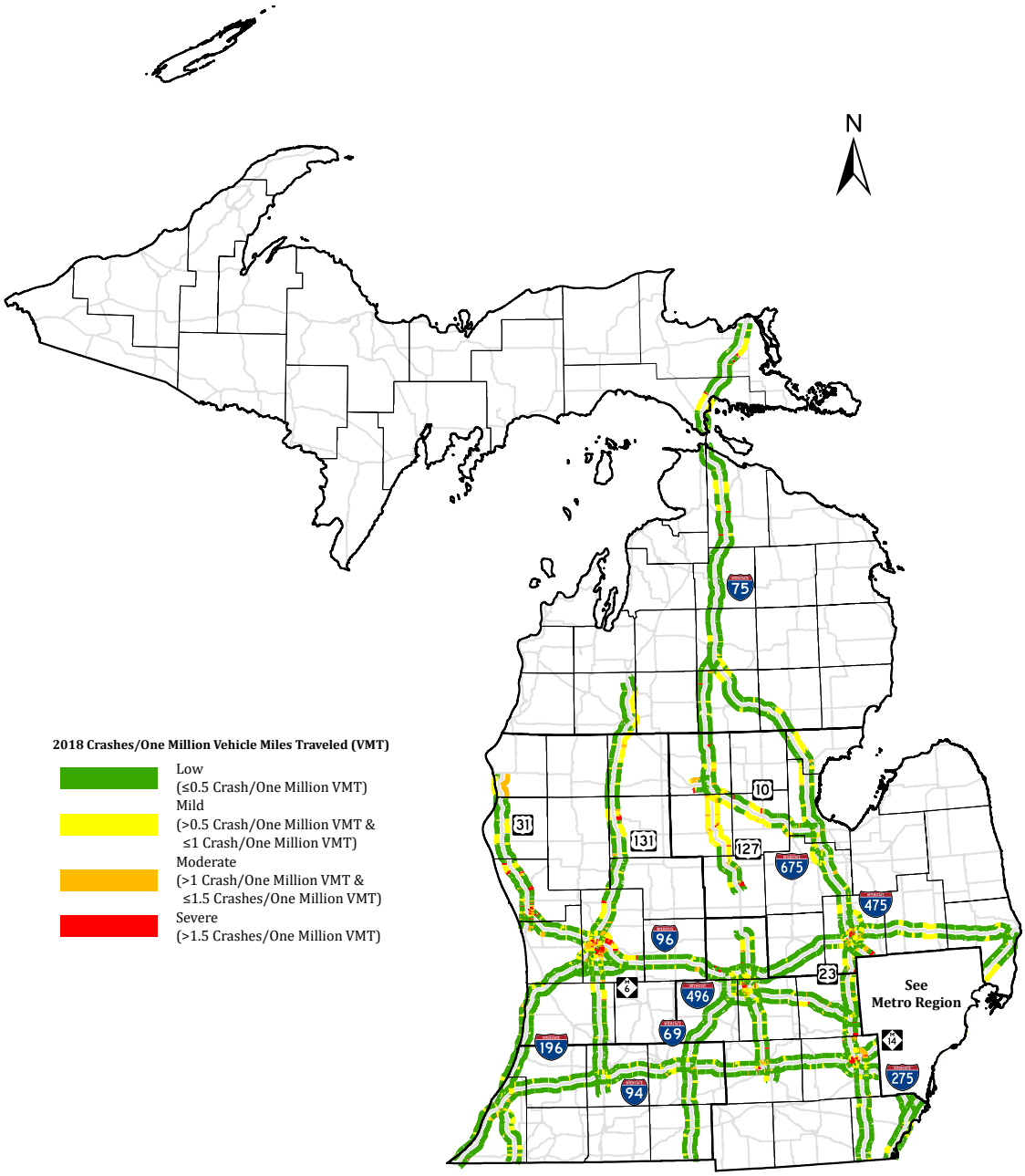


FIGURE 28. 2018 Statewide Crashes per One Million Vehicle Miles Traveled

STATEWIDE: CRASHES/ONE MILLION VEHICLE MILES TRAVELED

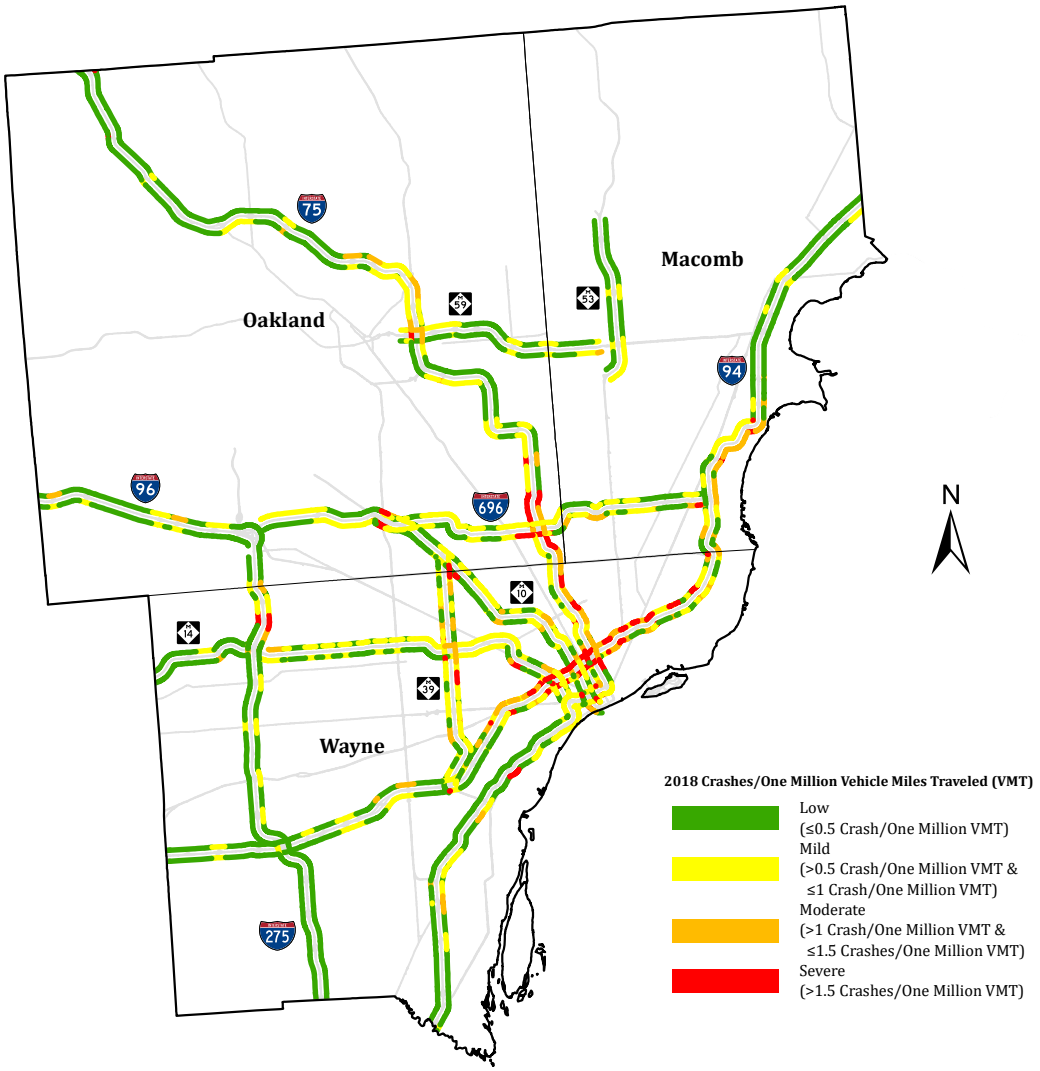


FIGURE 29. 2018 Metro Region Crashes per One Million Vehicle Miles Traveled

CASE STUDIES

The performance measures presented in this report can also be used to look at roadway improvements or regional trends over time. Detroit, Lansing, Ann Arbor, and Grand Rapids were the cities selected for the regional trend analysis. Individual case studies were also included for two construction projects: the now complete US-23 Flex Route near Ann Arbor and the westbound closure of I-696 in 2018. The regional analyses and construction case studies are explained below.

REGIONAL CONGESTION MILE HOURS

Detroit, Lansing, Ann Arbor, and Grand Rapids were the cities selected for this analysis. The 2013-2018 congestion mile hours for these cities are displayed in Figures 30-33, respectively. The number of congestion hours was calculated as the amount of time that a roadway experienced speeds less than 45 MPH. This number was then multiplied by the TMC length to distribute the congestion hours per segment length. This calculation was performed monthly for each freeway. Since the past 5 years of congestion mile hours are displayed, one can determine how the performance of the freeway is changing over time.

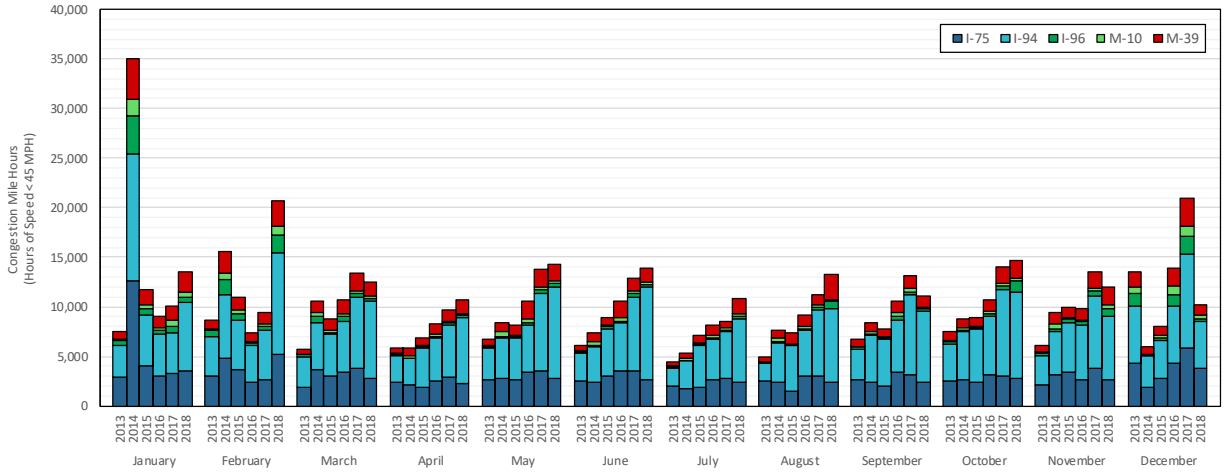


FIGURE 30. 2013-2018 Congestion Mile Hours in Detroit, Michigan

REGIONAL CONGESTION MILE HOURS

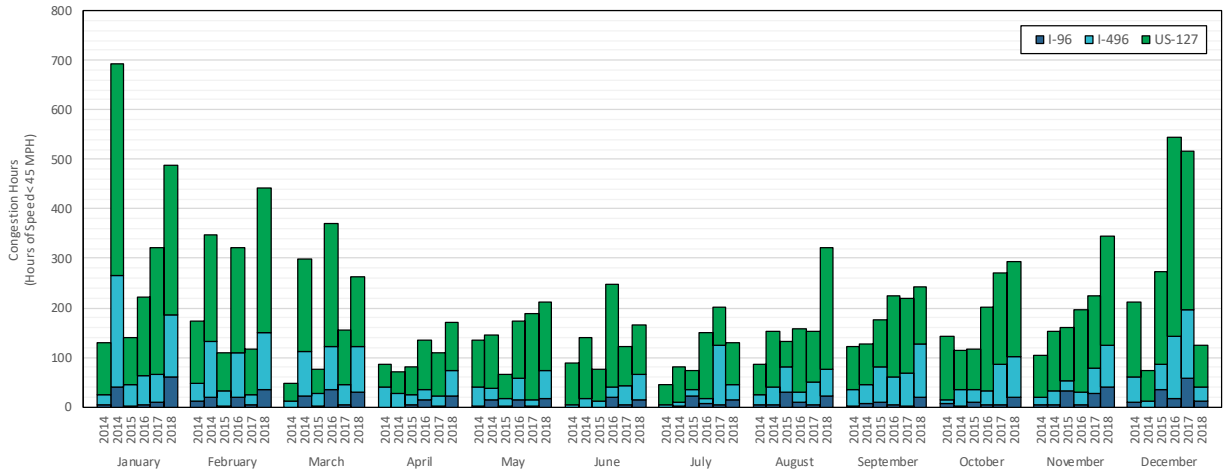


FIGURE 31. 2013-2018 Congestion Mile Hours in Lansing, Michigan

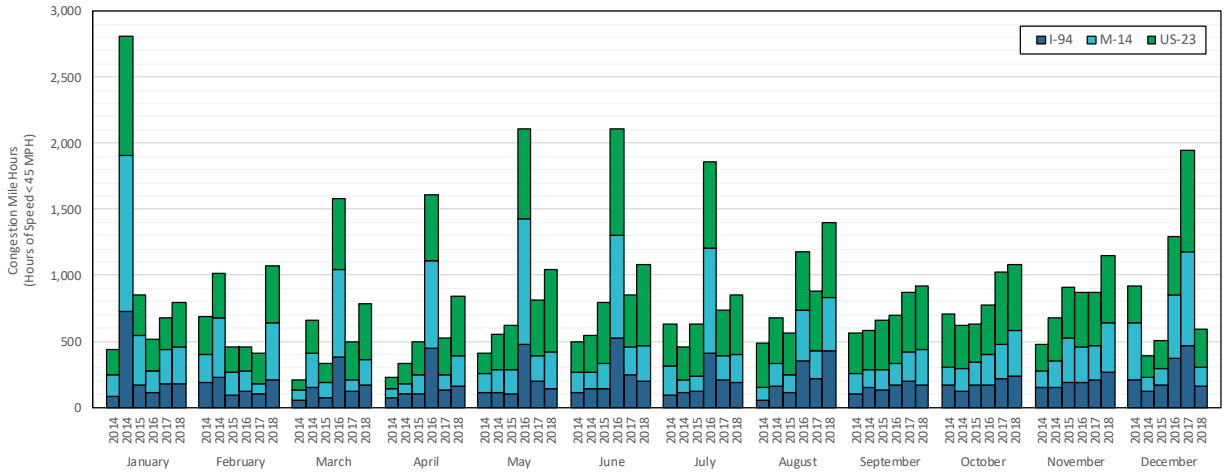


FIGURE 32. 2013-2018 Congestion Mile Hours in Ann Arbor, Michigan

REGIONAL CONGESTION MILE HOURS

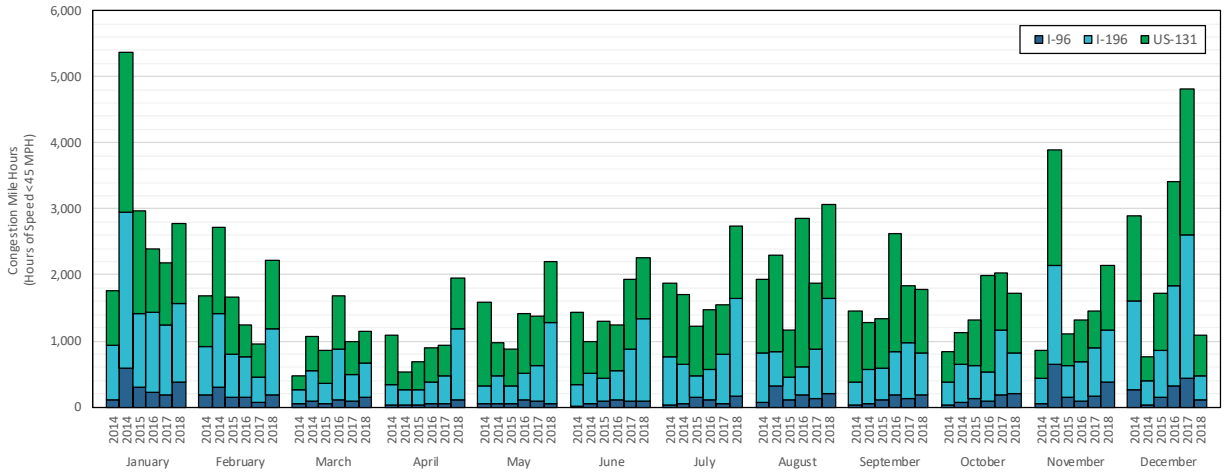


FIGURE 33. 2013-2018 Congestion Mile Hours in Grand Rapids, Michigan

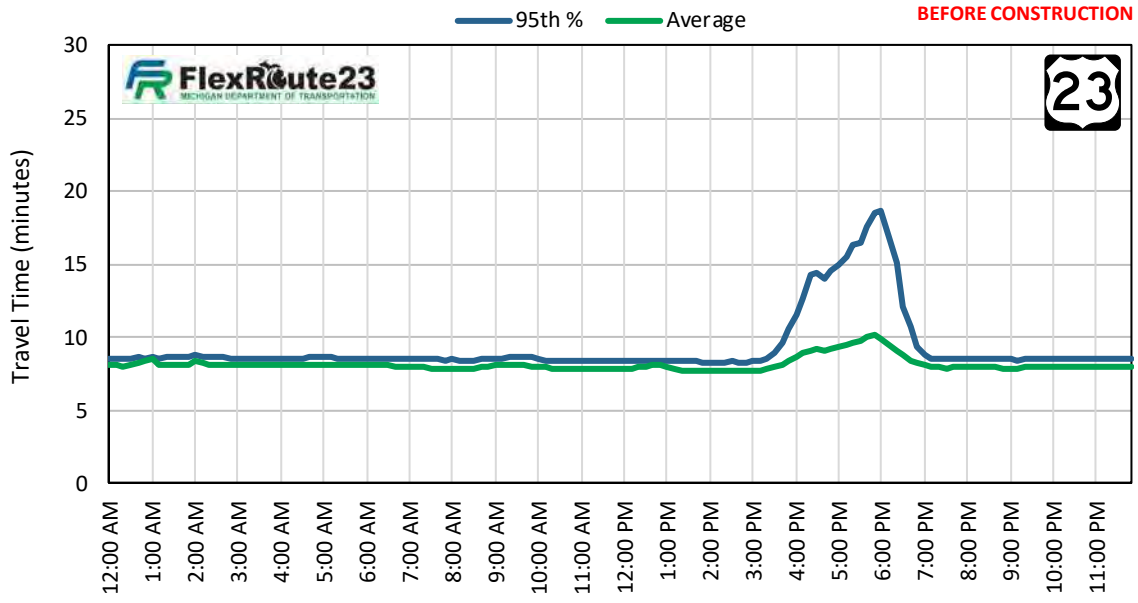
IMPACT OF US-23 FLEX ROUTE

In 2017, a nine-mile restricted use lane was added to US-23 near Ann Arbor. The purpose of this lane was to add capacity to the roadway in the AM and PM peak periods which would reduce congestion.

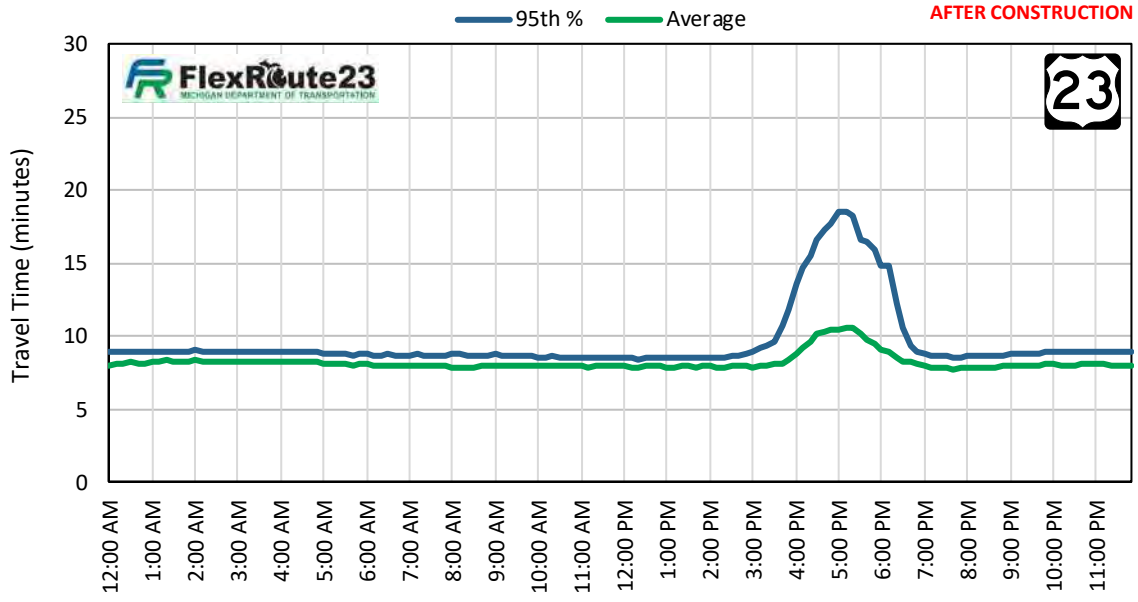
Figures 34 and 35 display the travel time reliability of a portion of US-23 before and after the installation of the Flex Route for the northbound and southbound directions, respectively. From the figures, southbound US-23 had a substantial reduction in travel time during the AM peak hour.

Figures 36 and 37 display the amount of congestion occurring on a portion of US-23 before and after the installation of the Flex Route for the northbound and southbound direction, respectively. The figure displays the number of hours of speed less than 45 MPH that drivers experienced along each direction of travel. As seen in Figure 36, the northbound direction had an increase in congestion between 8 Mile Road and M-36. Southbound US-23 had a substantial decrease in the amount of congestion hours (Figure 37).

IMPACT OF US-23 FLEX ROUTE



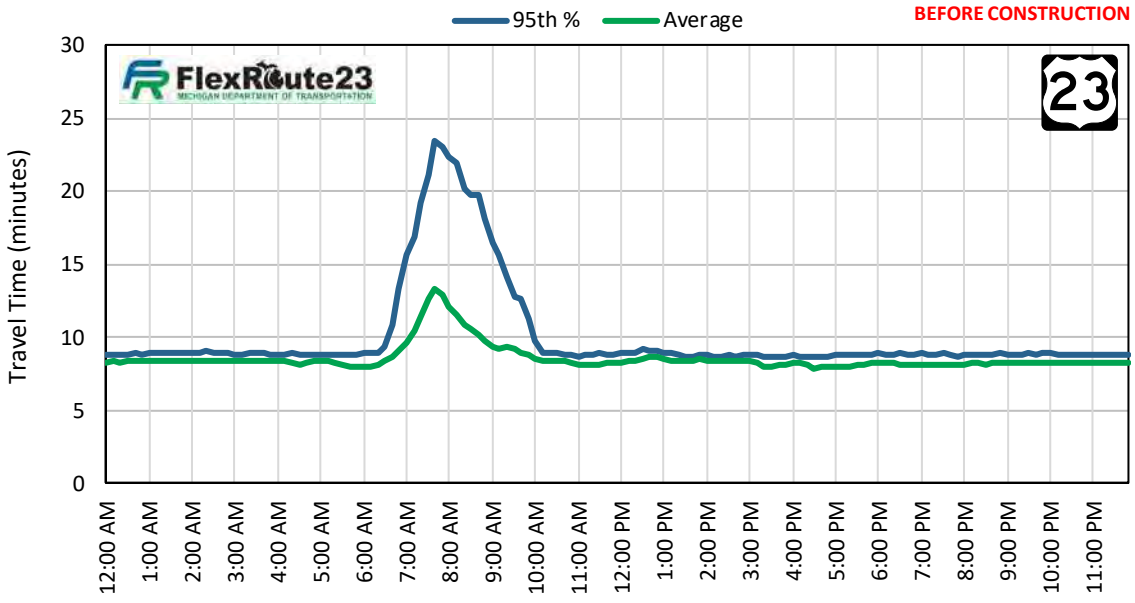
a) Before Construction (2015)



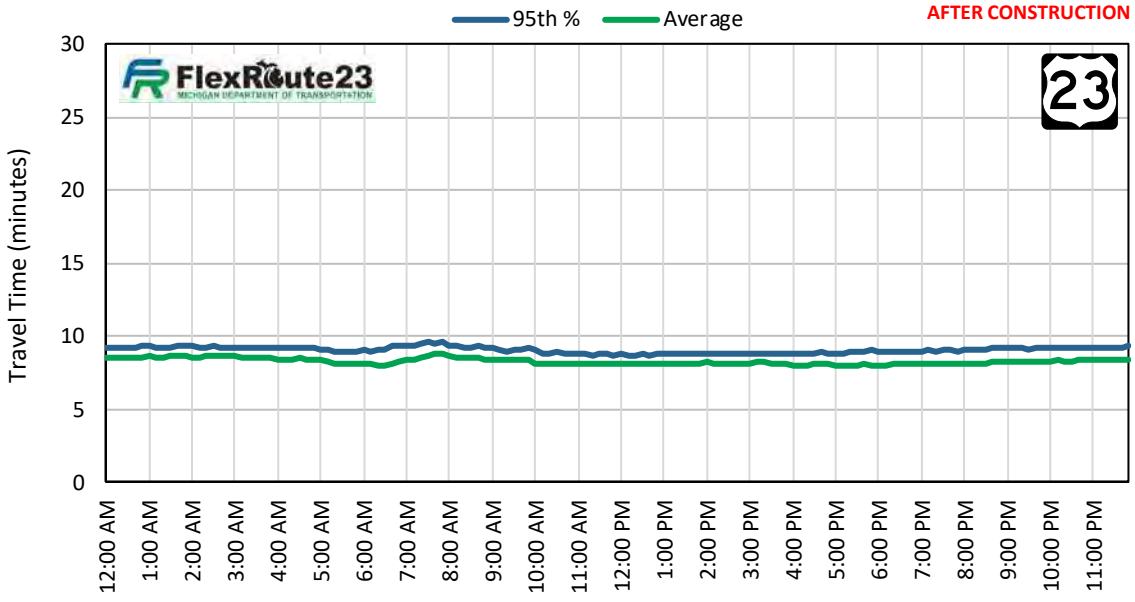
b) After Construction (2018)

FIGURE 34. Travel Time Reliability: Northbound US-23 between M-14 and 9 Mile Road/M-36

IMPACT OF US-23 FLEX ROUTE



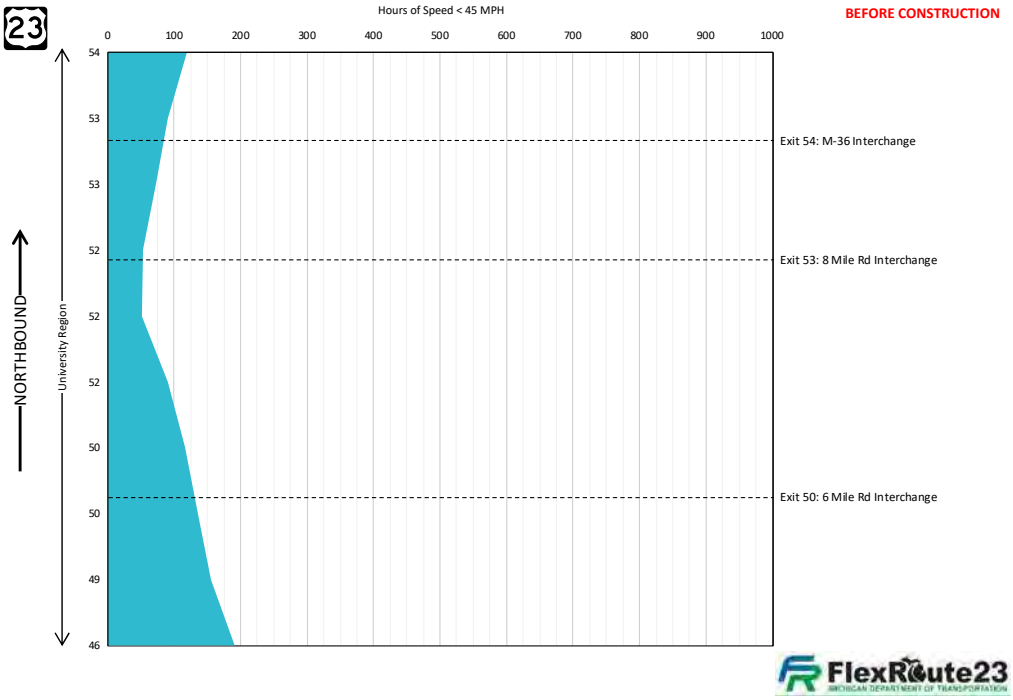
a) Before Construction (2015)



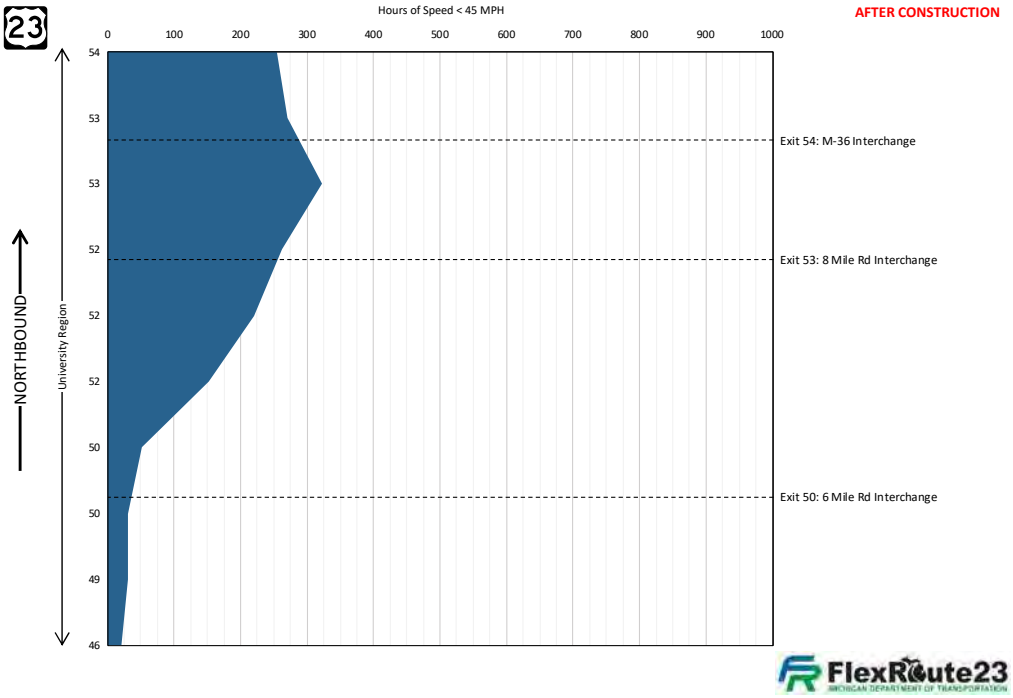
b) After Construction (2018)

FIGURE 35. Travel Time Reliability: Southbound US-23 between M-14 and 9 Mile Road/M-36

IMPACT OF US-23 FLEX ROUTE



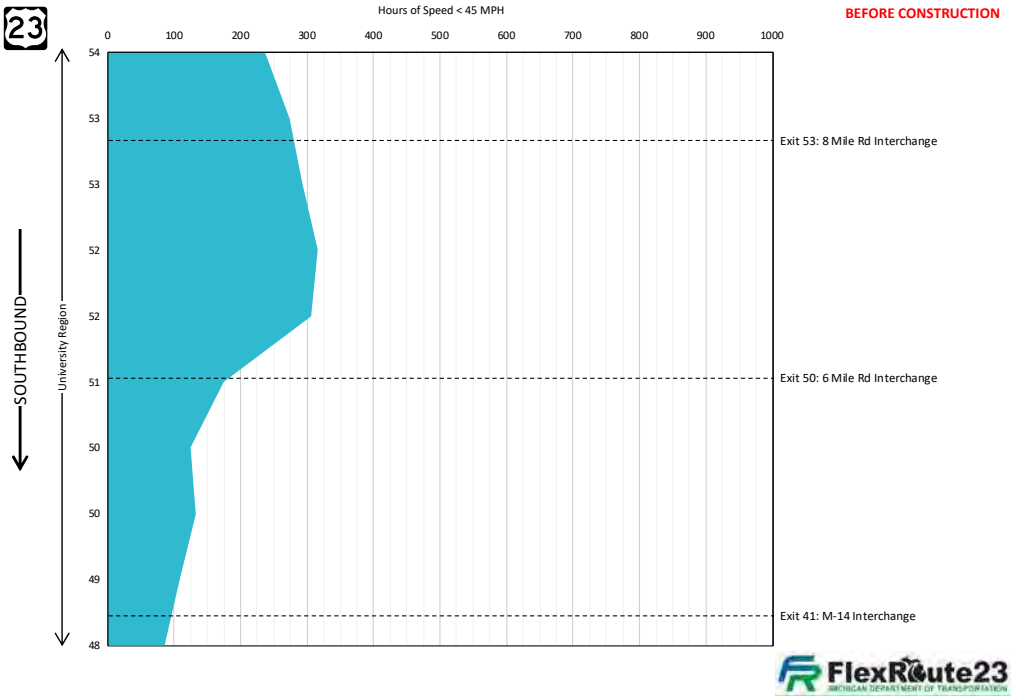
a) Before Construction (2015)



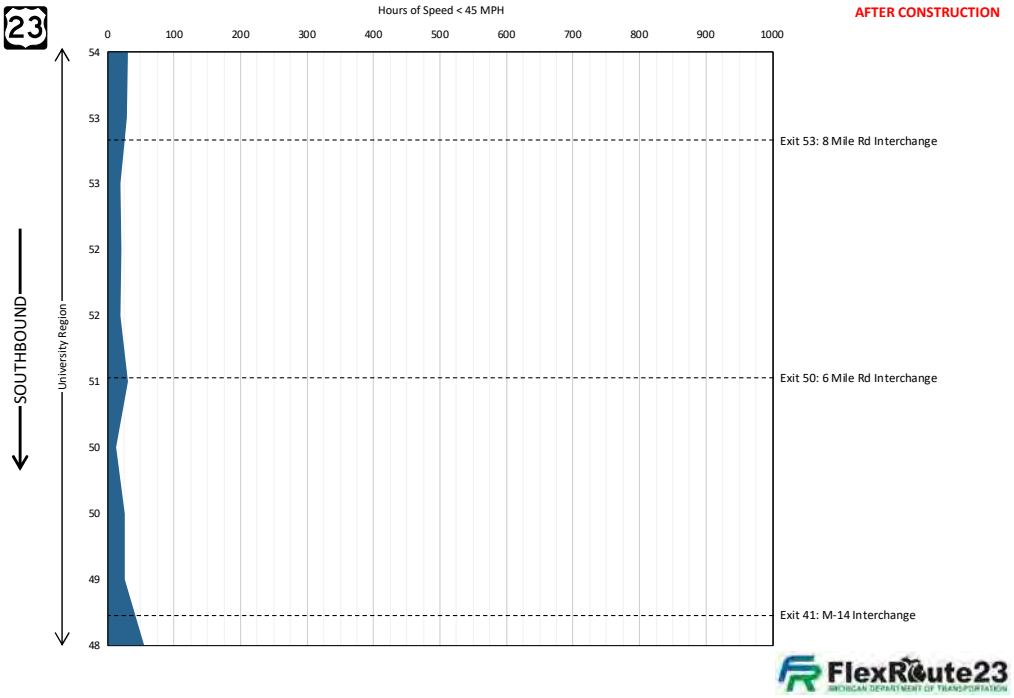
b) *After Construction (2018)*

FIGURE 36. Northbound US-23 between M-14 and 9 Mile Road/M-36

IMPACT OF US-23 FLEX ROUTE



a) Before Construction (2015)



b) *After Construction (2018)*

FIGURE 37. Southbound US-23 between M-14 and 9 Mile Road/M-36

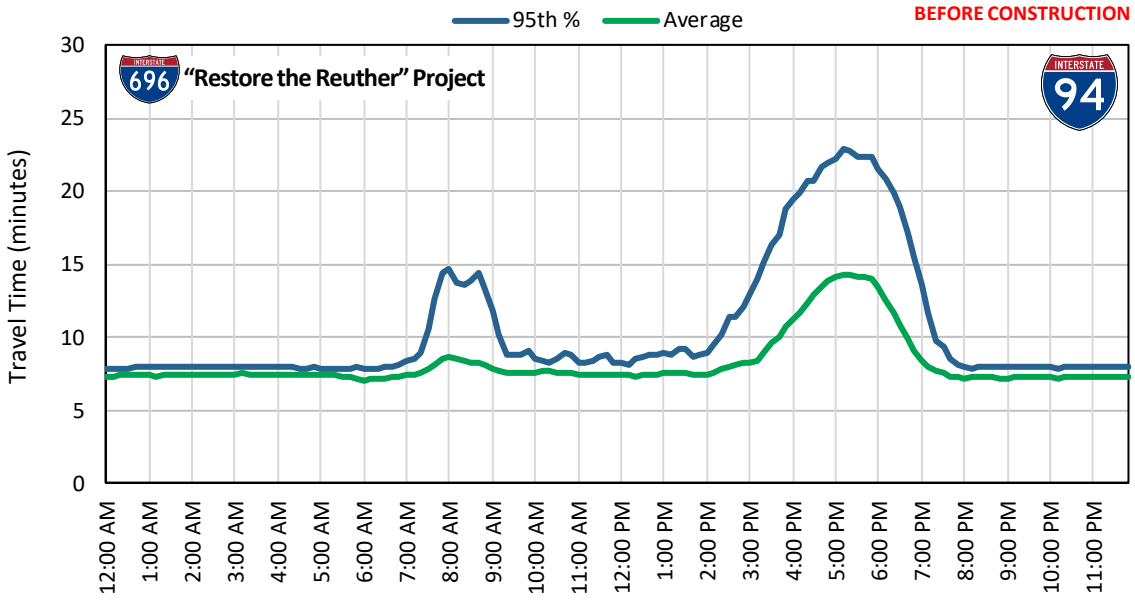
IMPACT OF WESTBOUND I-696 CONSTRUCTION DETOUR ROUTE

Westbound I-696 was closed for reconstruction starting from April of 2018. Two interstates, I-75 and I-94, were part of the official detour for the roadwork.

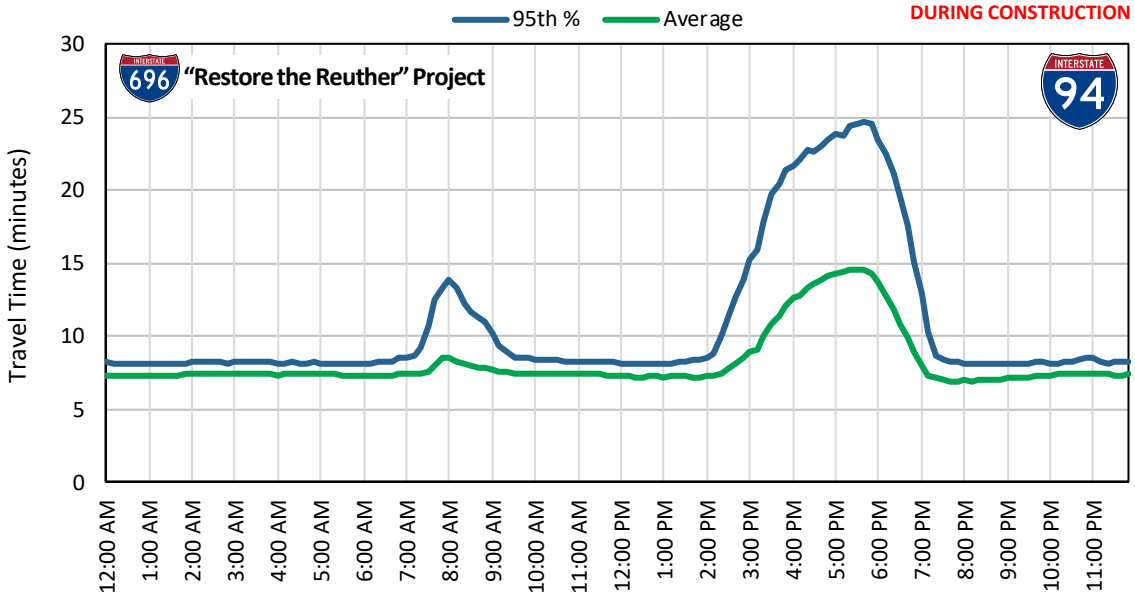
Figures 38 and 39 display the travel time reliability of a portion of westbound I-94 and northbound I-75 before and during the closure of westbound I-696, respectively. From the figures, both detour routes had a decrease in travel time reliability.

Figures 40 and 41 display the amount of congestion occurring on a portion of westbound I-94 and northbound I-75 before and during the closure of westbound I-696, respectively. The figure displays the number of hours of speed less than 45 MPH that drivers experienced along each direction of travel. As seen in both figures, both detour routes had an increase in congestion.

IMPACT OF WESTBOUND I-696 CONSTRUCTION DETOUR ROUTE



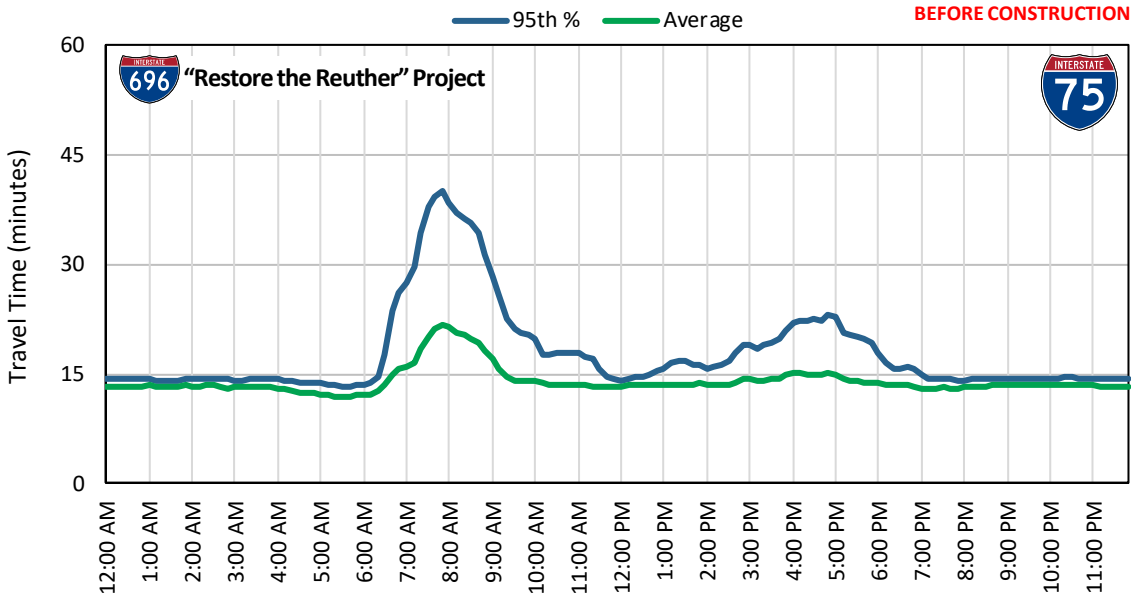
a) Before Construction (2017)



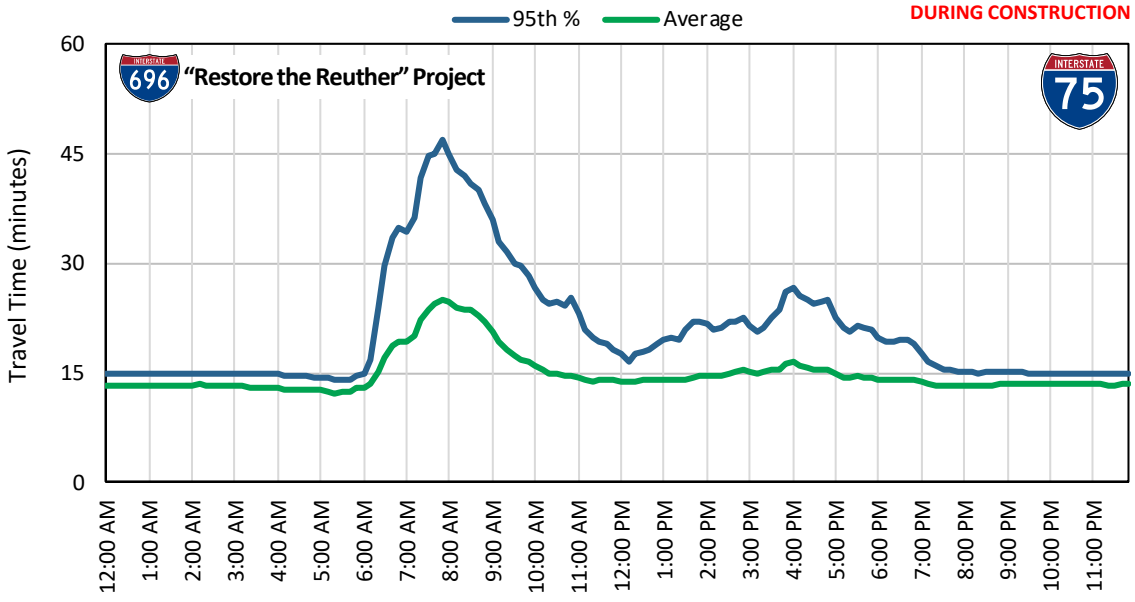
b) During Construction (2018)

FIGURE 38. Travel Time Reliability: Westbound I-94 between I-696 and I-75

IMPACT OF WESTBOUND I-696 CONSTRUCTION DETOUR ROUTE



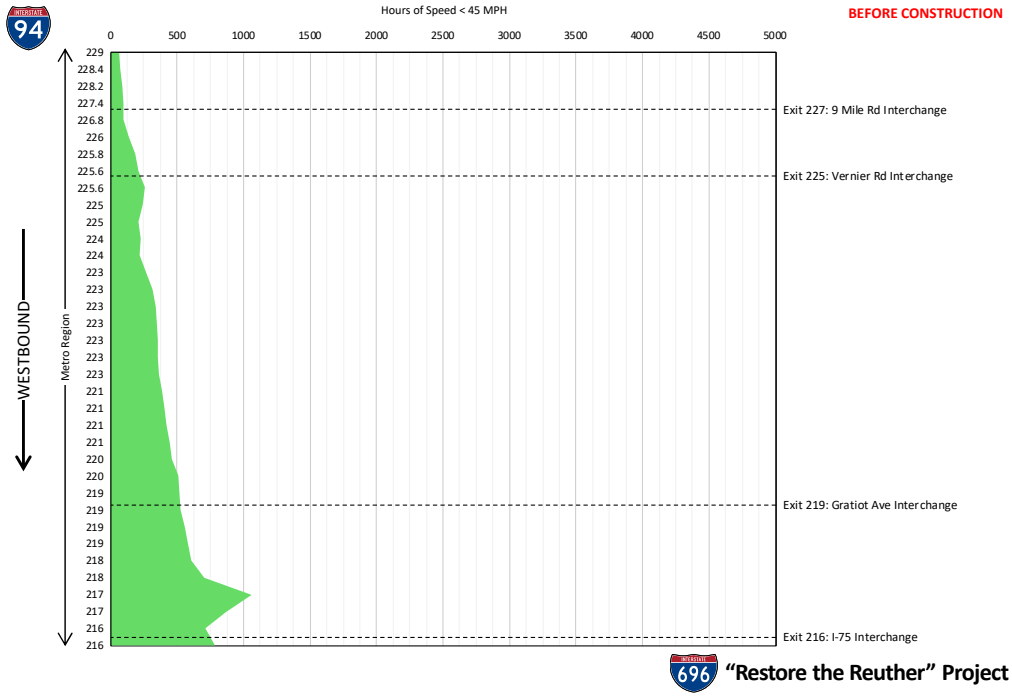
a) Before Construction (2017)



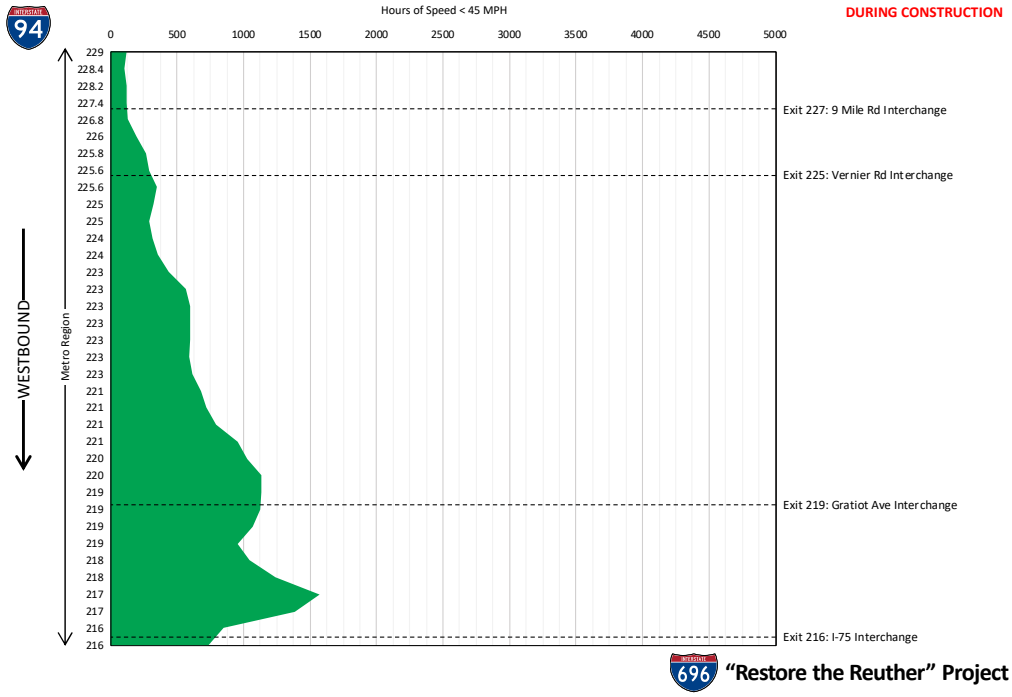
b) During Construction (2018)

FIGURE 39. Travel Time Reliability: Northbound I-75 between I-94 and I-696

IMPACT OF WESTBOUND I-696 CONSTRUCTION DETOUR ROUTE



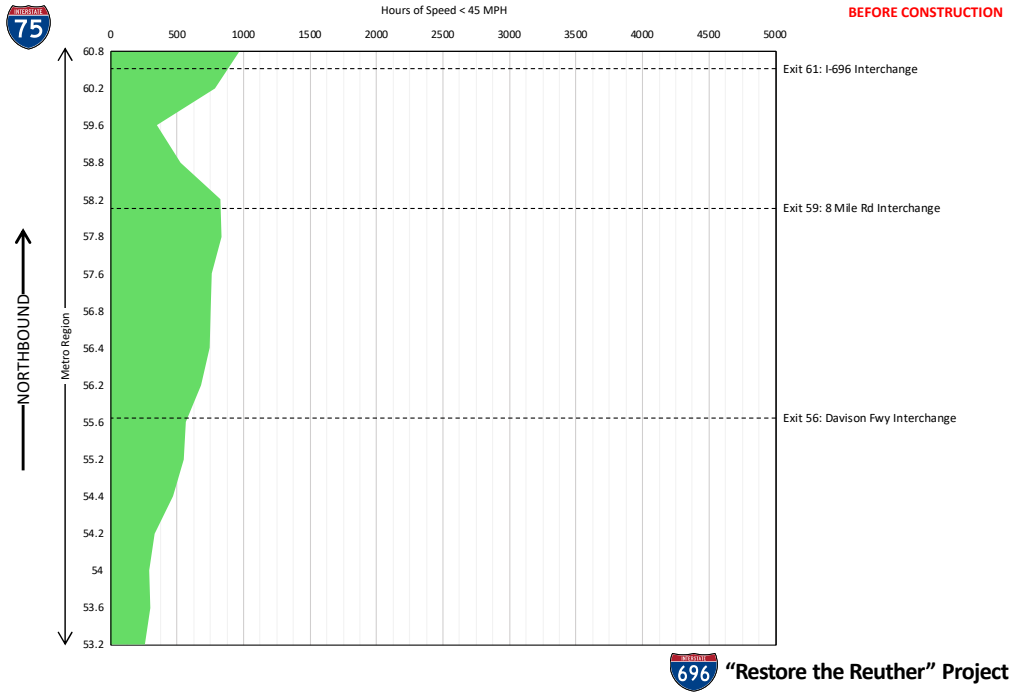
a) Before Construction (2017)



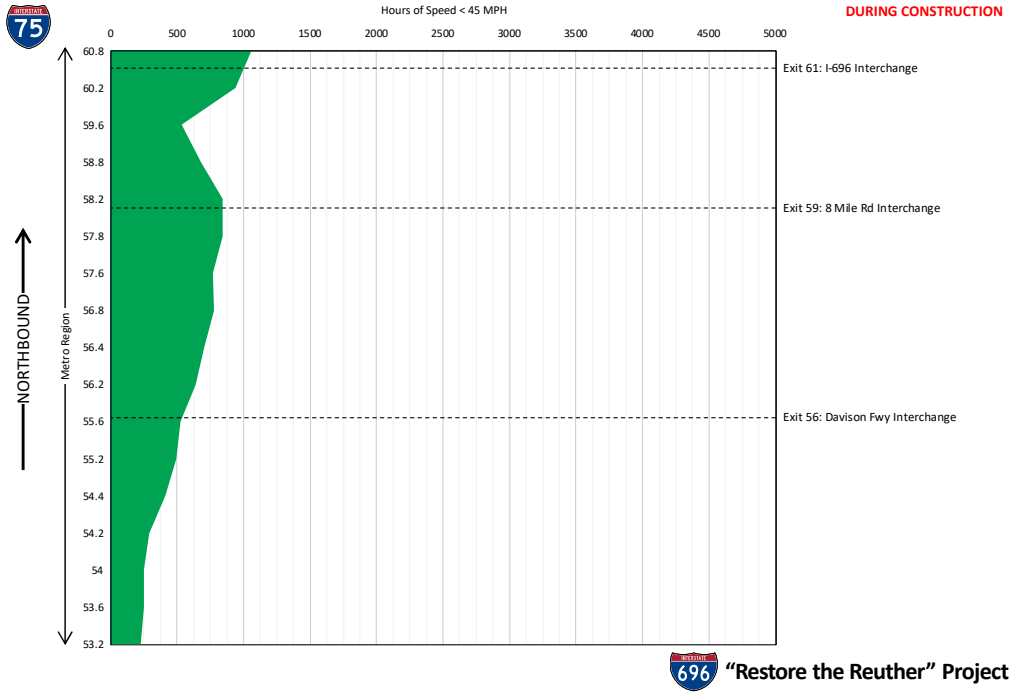
b) During Construction (2018)

FIGURE 40. Westbound I-94 between I-696 and I-75

IMPACT OF WESTBOUND I-696 CONSTRUCTION DETOUR ROUTE



a) Before Construction (2017)



b) During Construction (2018)

FIGURE 41. Northbound I-75 between I-94 and I-696

CONCLUSION

This chapter summarizes the performance of the State of Michigan. The main body of this report shows examples of each type of performance metric that was created using probe data and provides an explanation of its meaning. The regional summary chapters include the performance measures for each MDOT region. These are organized by region, TSC, and route to make it easy to get to the information that is most useful.

It is the Congestion and Reliability Unit's goal that these performance measures are not just numbers and figures, but information to help MDOT personnel understand how traffic is operating on its freeways and make actionable decisions on improving traffic. These metrics could be used to help prioritize projects, determine where and when problems are occurring, and how significant these problems are. We intend to provide these performance measures on an annual basis to help identify trends on the system and to keep MDOT up to date on freeway operations. Various performance measures may change due to changing federal requirements or MDOT needs. As probe data improves, this may expand to non-freeway routes as well. The Congestion and Reliability Unit welcomes any feedback on this report to help us improve it in the future and maximize its usefulness.

CONTACT INFORMATION

Please contact the Congestion and Reliability Unit if you have any questions/comments or would like to have the actual data for further analysis.

Jason Firman, Congestion and Reliability Manager

517-388-3378 | firmanj@michigan.gov