Michigan Department of Transportation

2018 Freeway Congestion & Reliability Report

Chapter 2
BAY REGION SUMMARY

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

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TABLE OF CONTENTS

INTRODUCTION Page 4
PERFORMANCE MEASURES DEFINITIONS Page 5
PERFORMANCE MEASURES VISUALIZATIONS Page 8
BAY REGION: OVERVIEW Page 16
BAY REGION: CORRIDOR GLOSSARY Page 24
I-69: Shiawassee, Genesee, Lapeer, and St. Clair Page 25
I-75: Genesee, Saginaw, Bay, and Arenac Page 36
I-94: St. Clair Page 46
I-475: Genesee Page 51
I-675: Saginaw Page 56
US-10: Clare, Isabella, Midland, and Bay Page 63
US-23: Genesee Page 70
US-127: Gratiot, Isabella, and Clare Page 75
CONCLUSION Page 64
CONTACT INFORMATION Page 85

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 2 of this report provides an overview of the Bay Region. Bay Region is made up of 15 counties and contains the cities of Flint, Saginaw, Mt. Pleasant, and Clare. Eight freeways are analyzed in the section below.

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 1). 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 2.

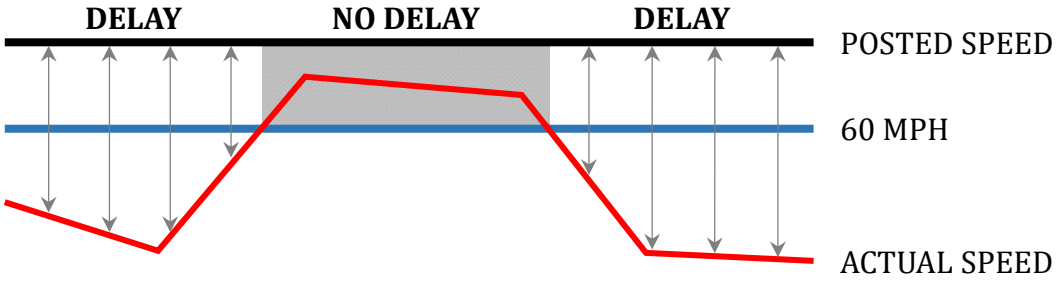


FIGURE 1. Delay Calculation

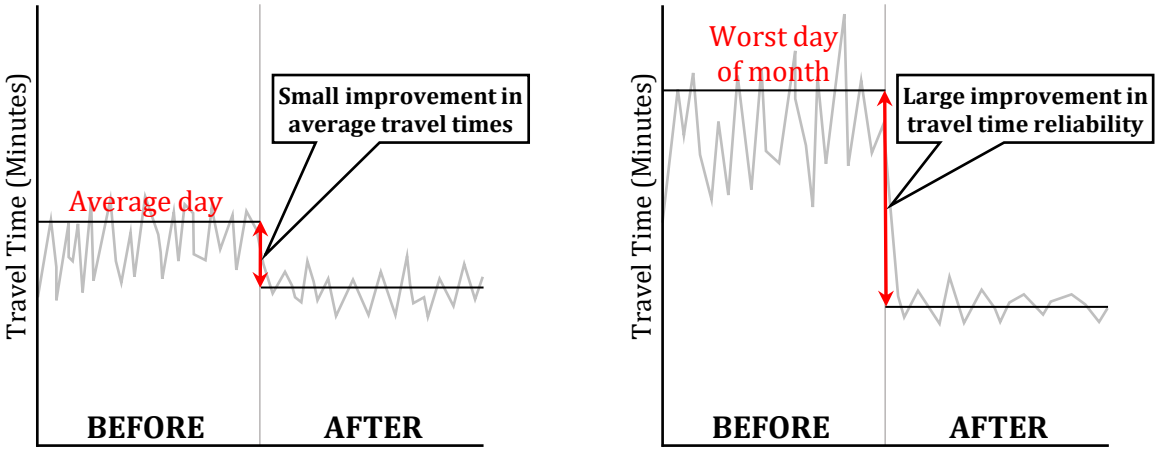


FIGURE 2. Travel Time Average and Reliability Improvements

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-75 through Genesee County in the Bay 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 2016 and December 2017.
e) A delay index per mile value of 46 minutes in January 2018.

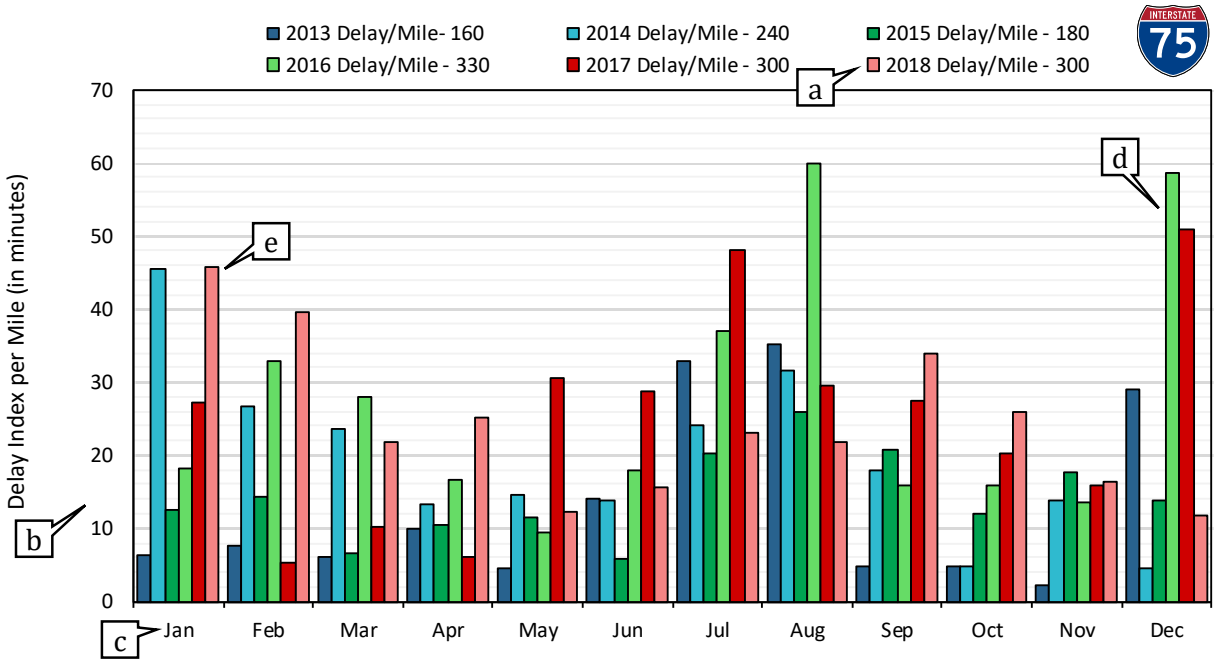


FIGURE 3. Example Delay Index Graph

AVERAGE SPEED

Figure 4 is an example of the average speed graph. This figure represents eastbound I-69 through the Bay 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 4 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 PM peak while approaching I-475 interchange.
g) Example of limited change in speed from year to year.
h) 2018 AM peak average speed is approximately 67 MPH at Exit 163.
i) Example of improvement in the current year as compared to the 5-year historical average.

AVERAGE SPEED

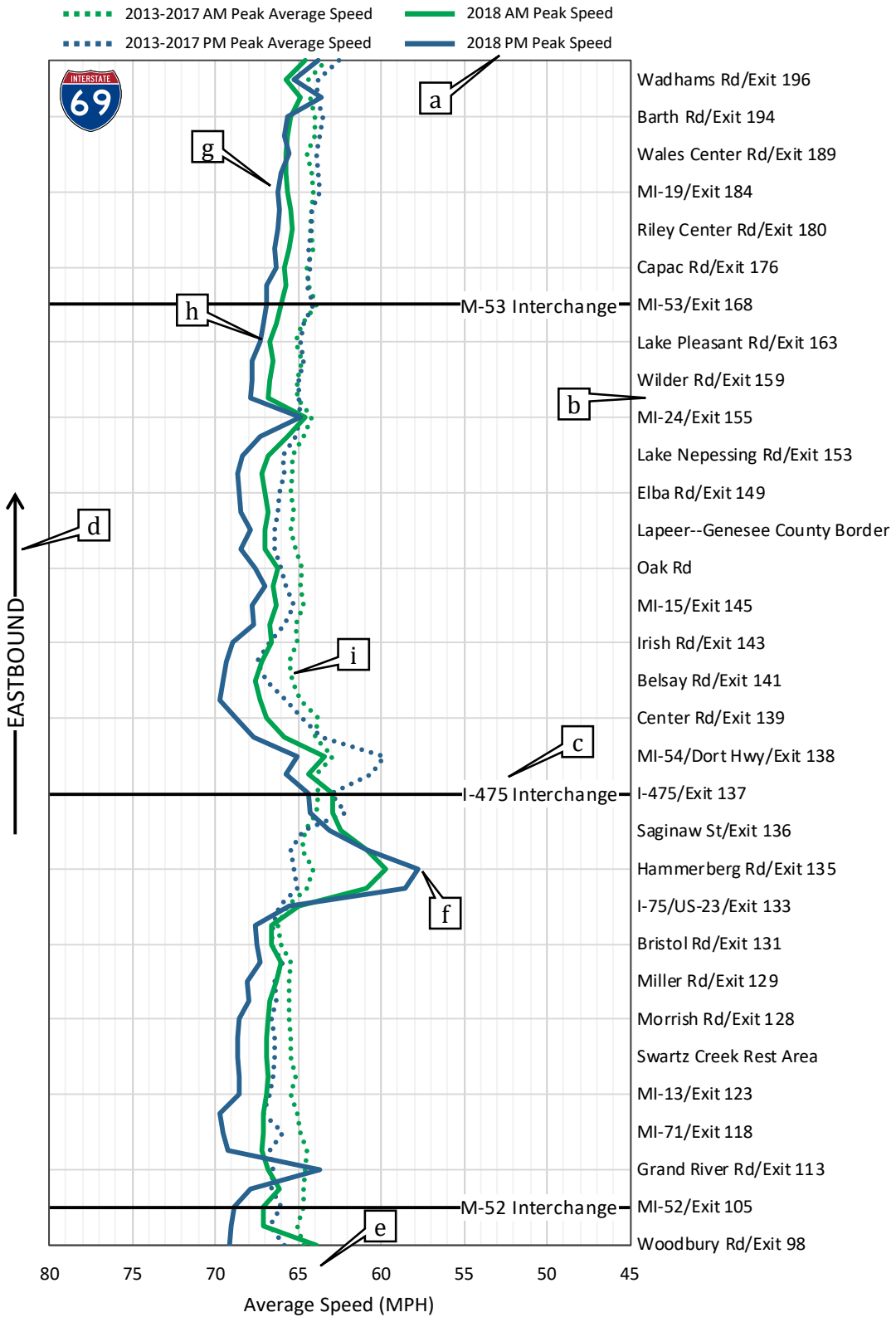


FIGURE 4. Example Average Speed Graph

CONGESTION SEVERITY

Figure 5 shows an example of the congestion severity map. This figure represents Bay Region during the AM 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 5 shows the following:

a) All roads are operating efficiently because there is low congestion.

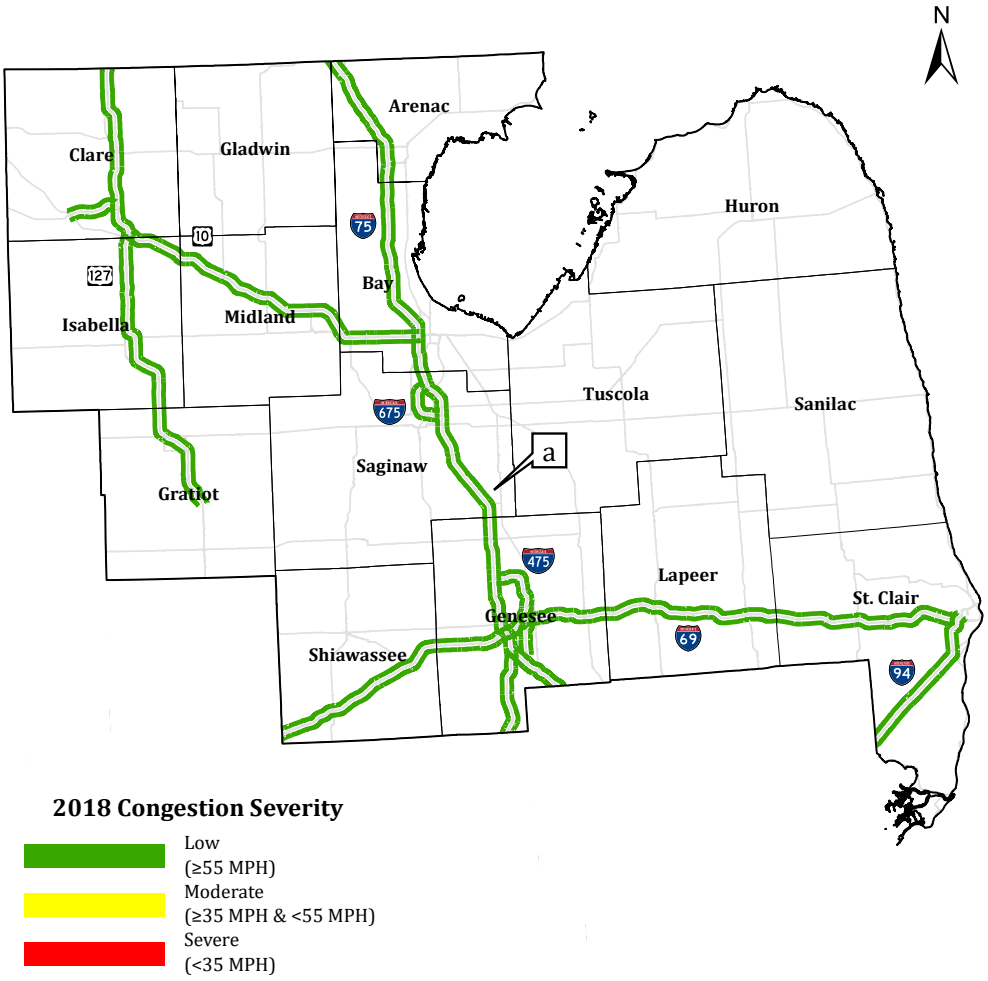


FIGURE 5. Example Congestion Severity Map

TRAVEL TIME RELIABILITY

Figure 6 is an example of the travel time reliability graph. This figure represents a portion of southbound I-75 through the Bay 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 6 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).

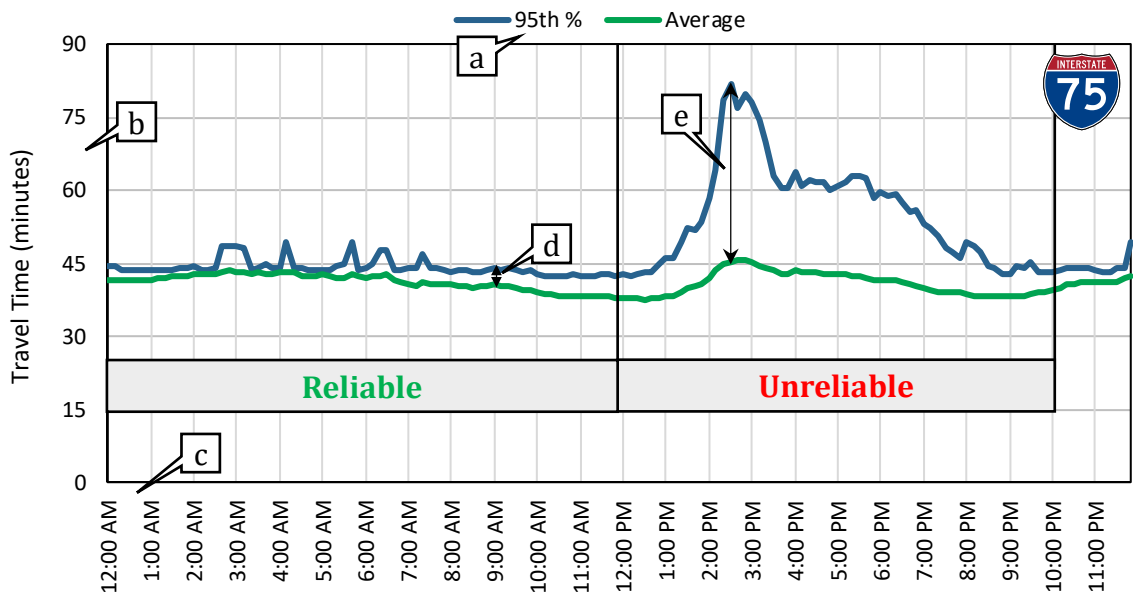


FIGURE 6. Example Travel Time Reliability Graph

LEVEL OF TRAVEL TIME RELIABILITY

Figure 7 shows an example of the level of travel time reliability (LOTTR) figure. This figure represents northbound I-75 through the Bay 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 7 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) This section of roadway has reliable travel times because the LOTTR values of the four time periods are below 1.50.

LEVEL OF TRAVEL TIME RELIABILITY

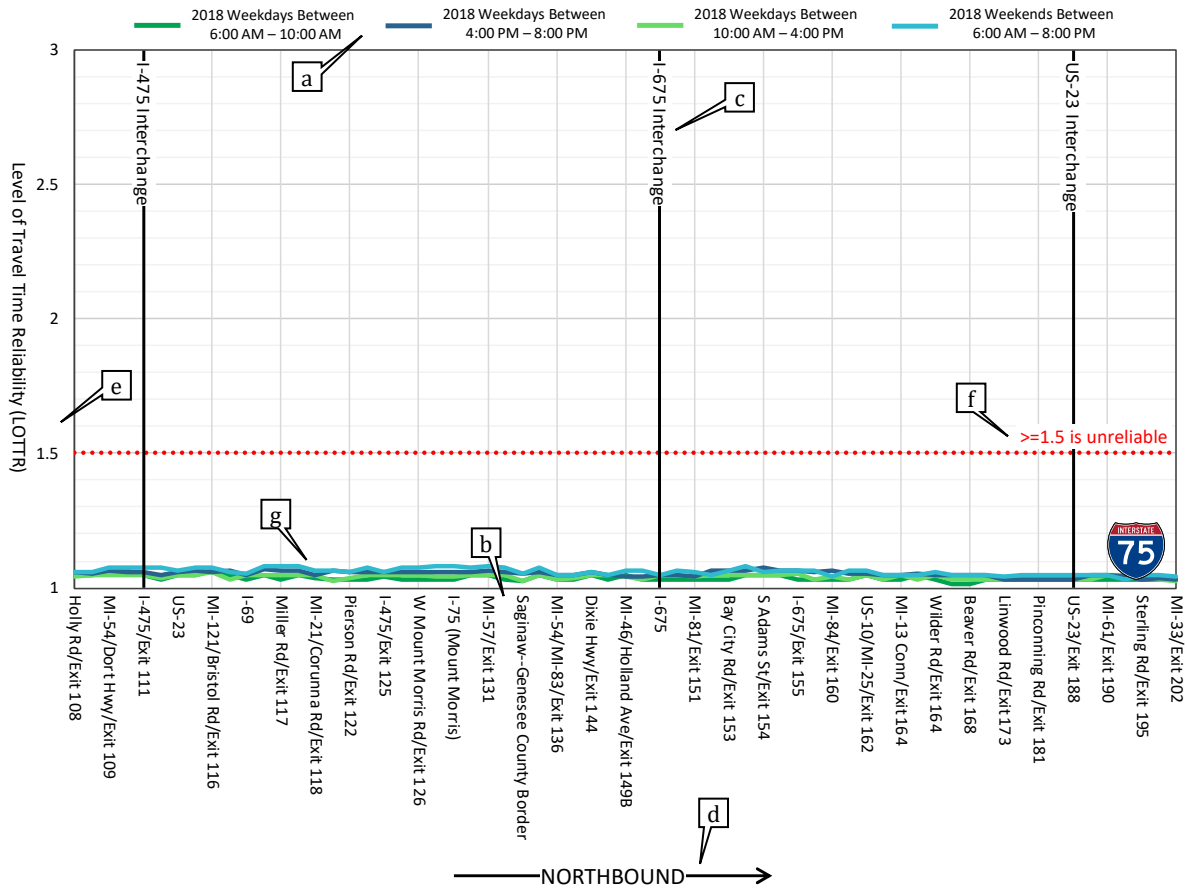


FIGURE 7. Example Level of Travel Time Reliability Figure

Figure 8 shows an example of the level of travel time reliability map. This figure represents Bay Region during weekdays between 6:00 AM – 10:00 AM. This performance metric displays the level of travel time reliability on corridors during 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 8 shows the following:

a) All roads have very reliable travel times because the LOTTR values are below 1.25.

LEVEL OF TRAVEL TIME RELIABILITY

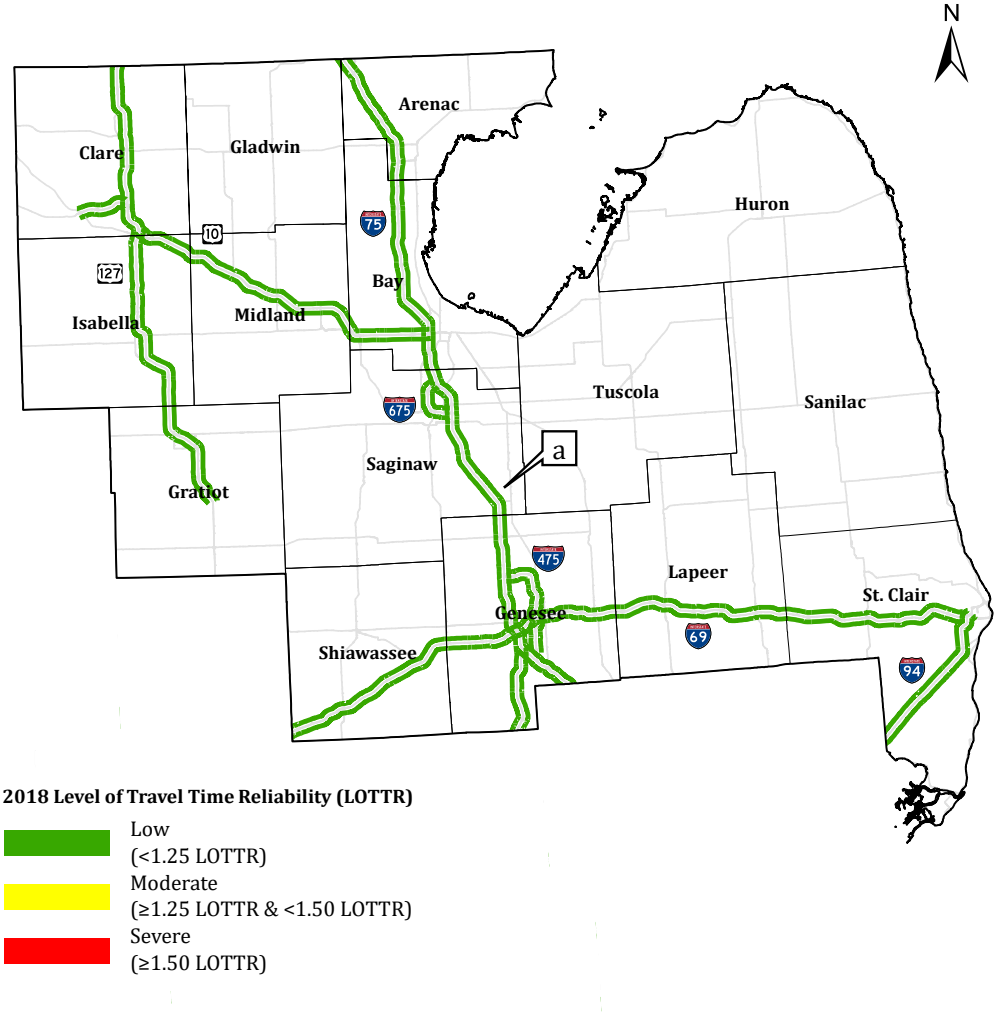


FIGURE 8. Example Level of Travel Time Reliability Map

BAY REGION: OVERVIEW

BAY REGION: DELAY INDEX

The following table ranks the Bay Region freeways based on the delay index. Each freeway segment is presented on a countywide or TSC basis, as appropriate.

TABLE 2. 2018 Bay Region Delay Index Data

Rank	Location (Route, County)	2018 Delay Index per Mile (in minutes)
1	US-23 – Genesee County	512
2	I-69 – Genesee County	327
3	I-75 – Arenac County	323
4	I-675 – Saginaw County	311
5	US-10 – Bay County	308
6	I-75 – Genesee County	293
7	US-127 – Gratiot County	284
8	I-69 – St. Clair County	276
9	US-127 – Isabella County	273
10	I-69 – Lapeer County	269
11	I-94 – St. Clair County	263
12	US-127 – Clare County	257
13	I-69 – Shiawassee County	251
14	I-75 – Bay County	250
15	US-10 – Clare and Isabella County	242
16	I-475 – Genesee County	220
17	I-75 – Saginaw County	205
18	US-10 – Midland County	201

BAY REGION: 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 9-10 represent this information specifically in the Bay Region. Figure 9 shows the congestion severity during the AM peak and Figure 10 shows the congestion severity during the PM peak.

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**

BAY REGION: CONGESTION SEVERITY

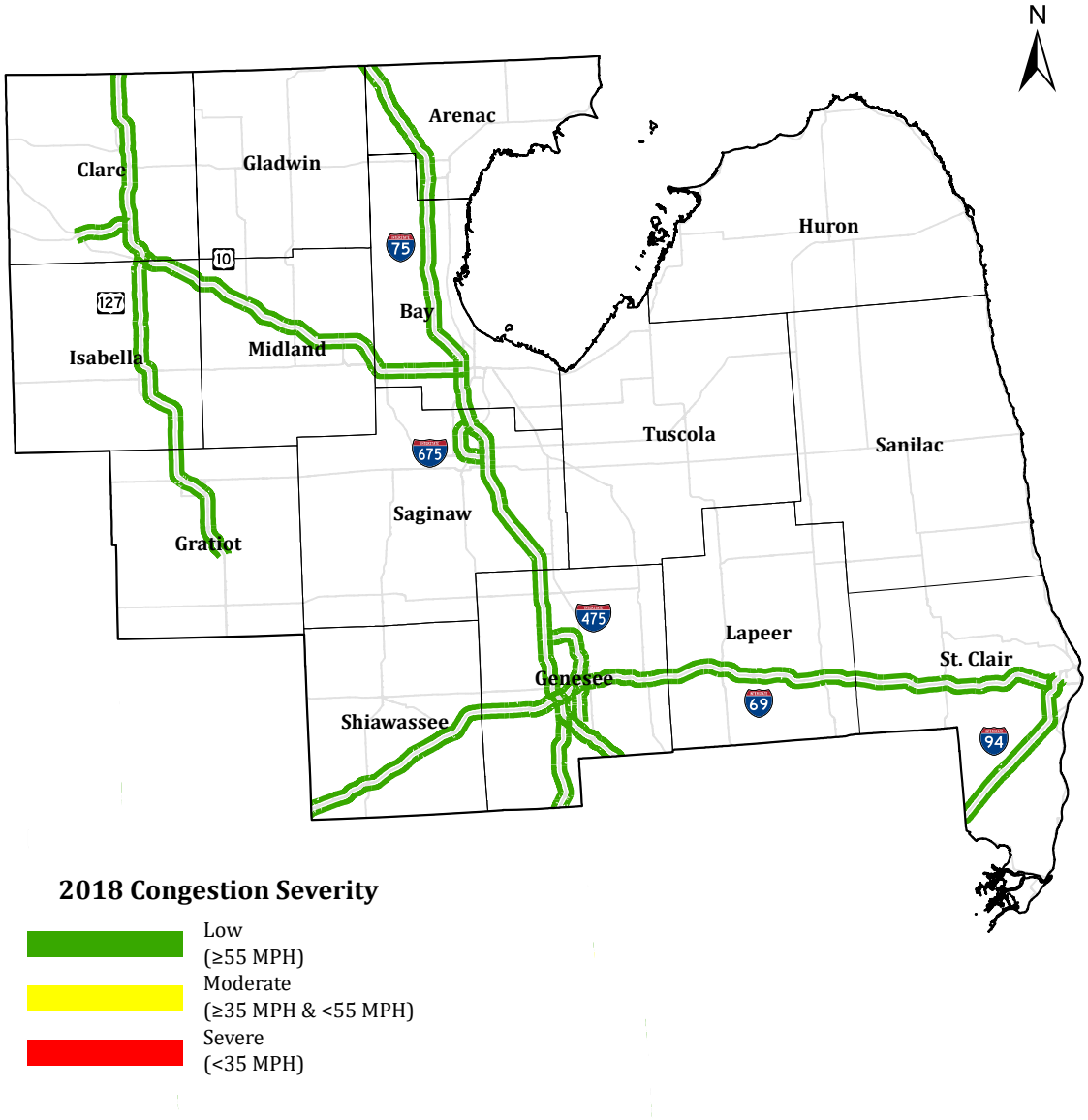


FIGURE 9. 2018 Bay Region AM Peak Congestion Severity

BAY REGION: CONGESTION SEVERITY

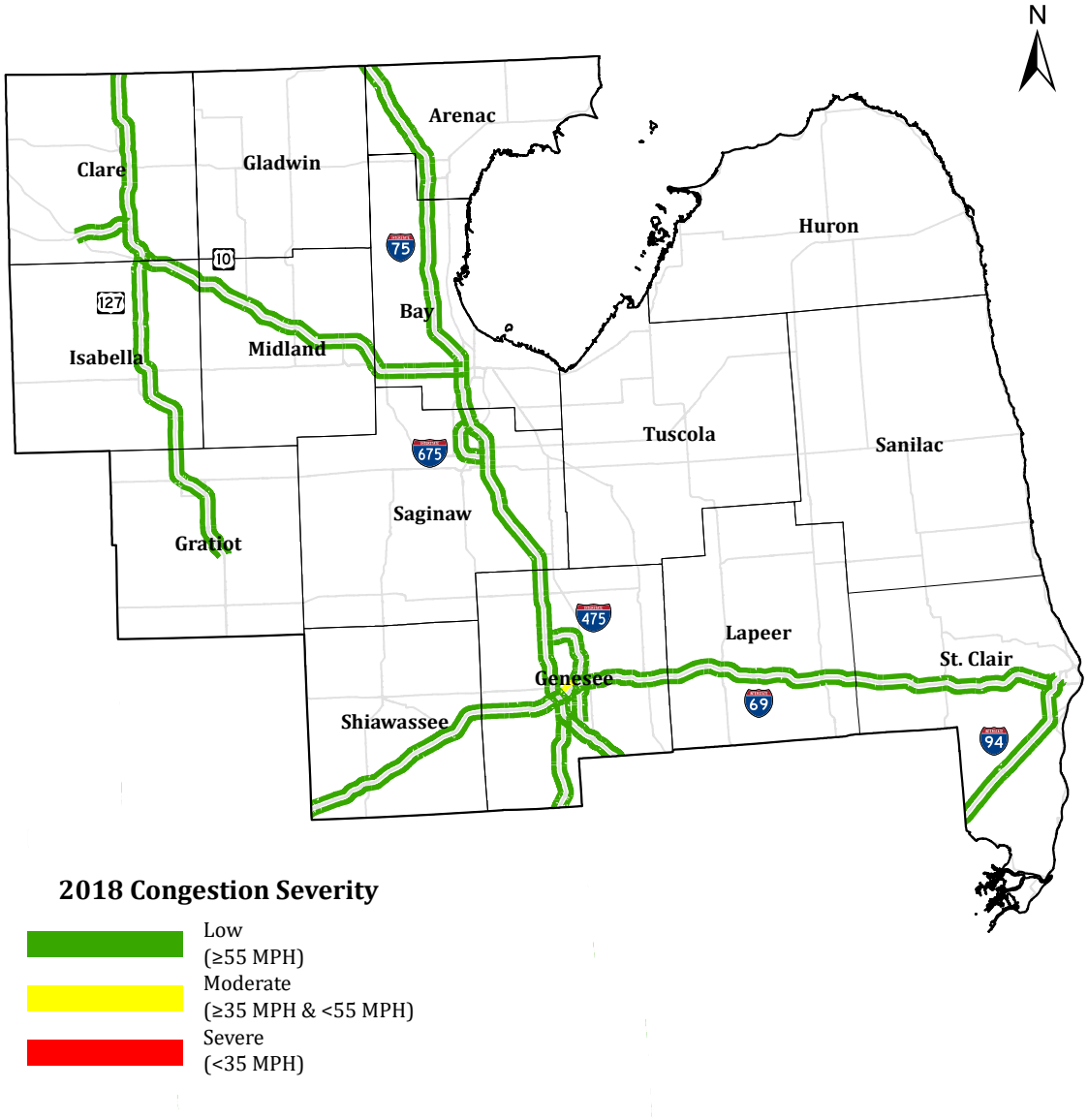


FIGURE 10. 2018 Bay Region PM Peak Congestion Severity

BAY REGION: LEVEL OF TRAVEL TIME RELIABILITY

The following figures display the level of travel time reliability (LOTTR) based on severity level in the Bay Region. Figures 11-13 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 14 displays the LOTTR during weekends between 6:00 AM – 8:00 PM.

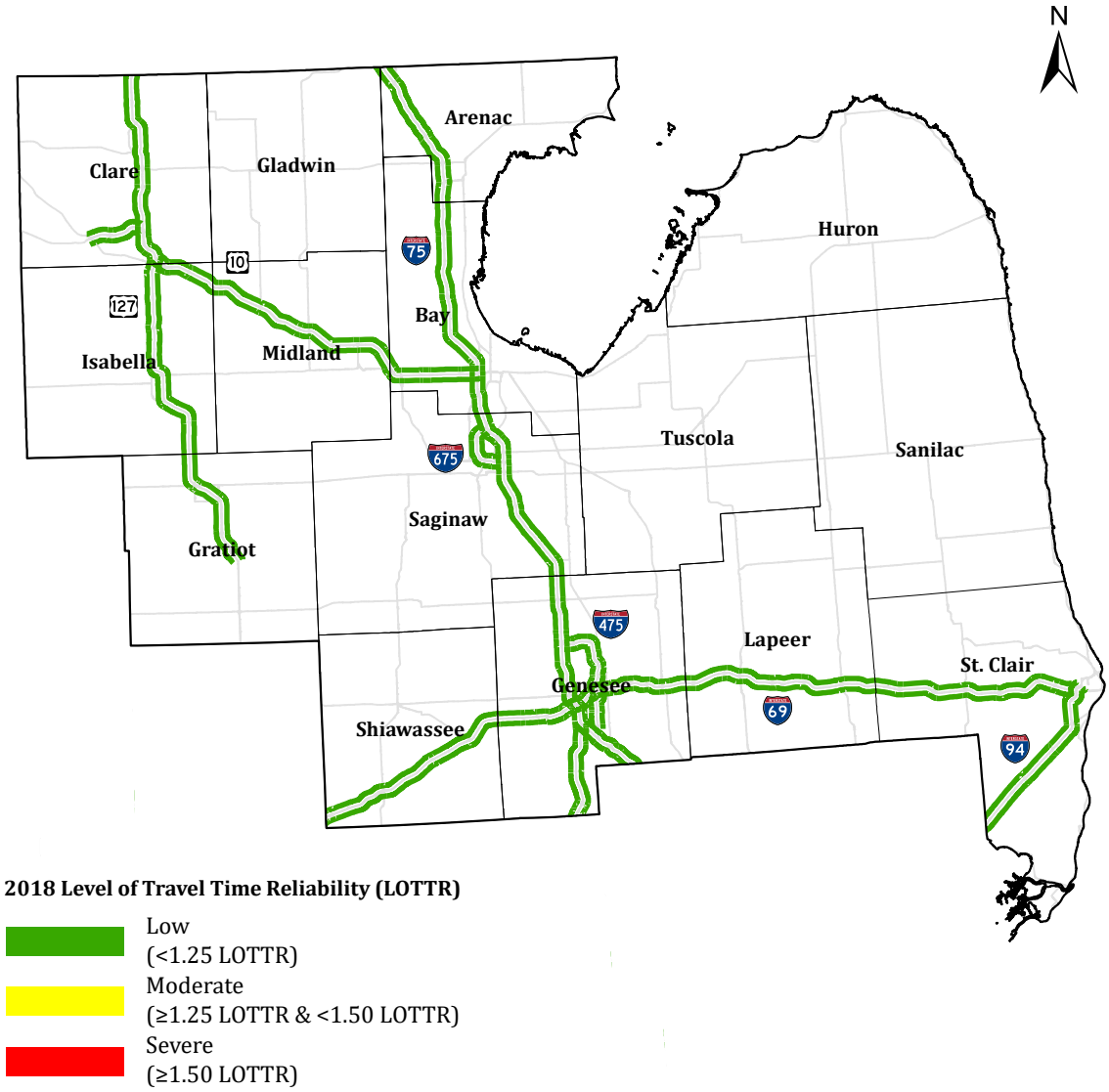


FIGURE 11. 2018 Bay Region Level of Travel Time Reliability (Weekdays between 6:00 AM – 10:00 AM)

BAY REGION: LEVEL OF TRAVEL TIME RELIABILITY

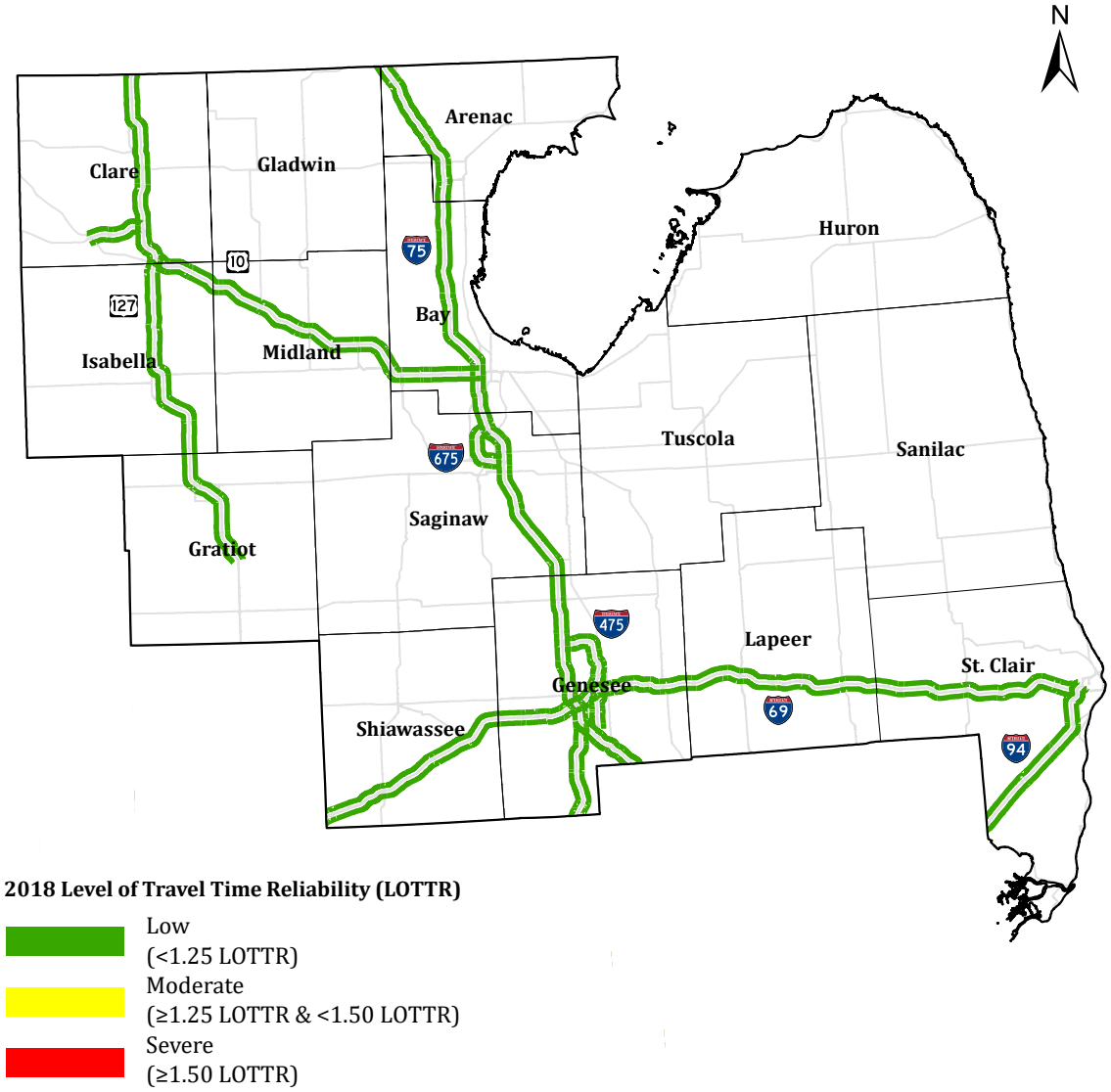


FIGURE 12. 2018 Bay Region Level of Travel Time Reliability (Weekdays between 10:00 AM – 4:00 PM)

BAY REGION: LEVEL OF TRAVEL TIME RELIABILITY

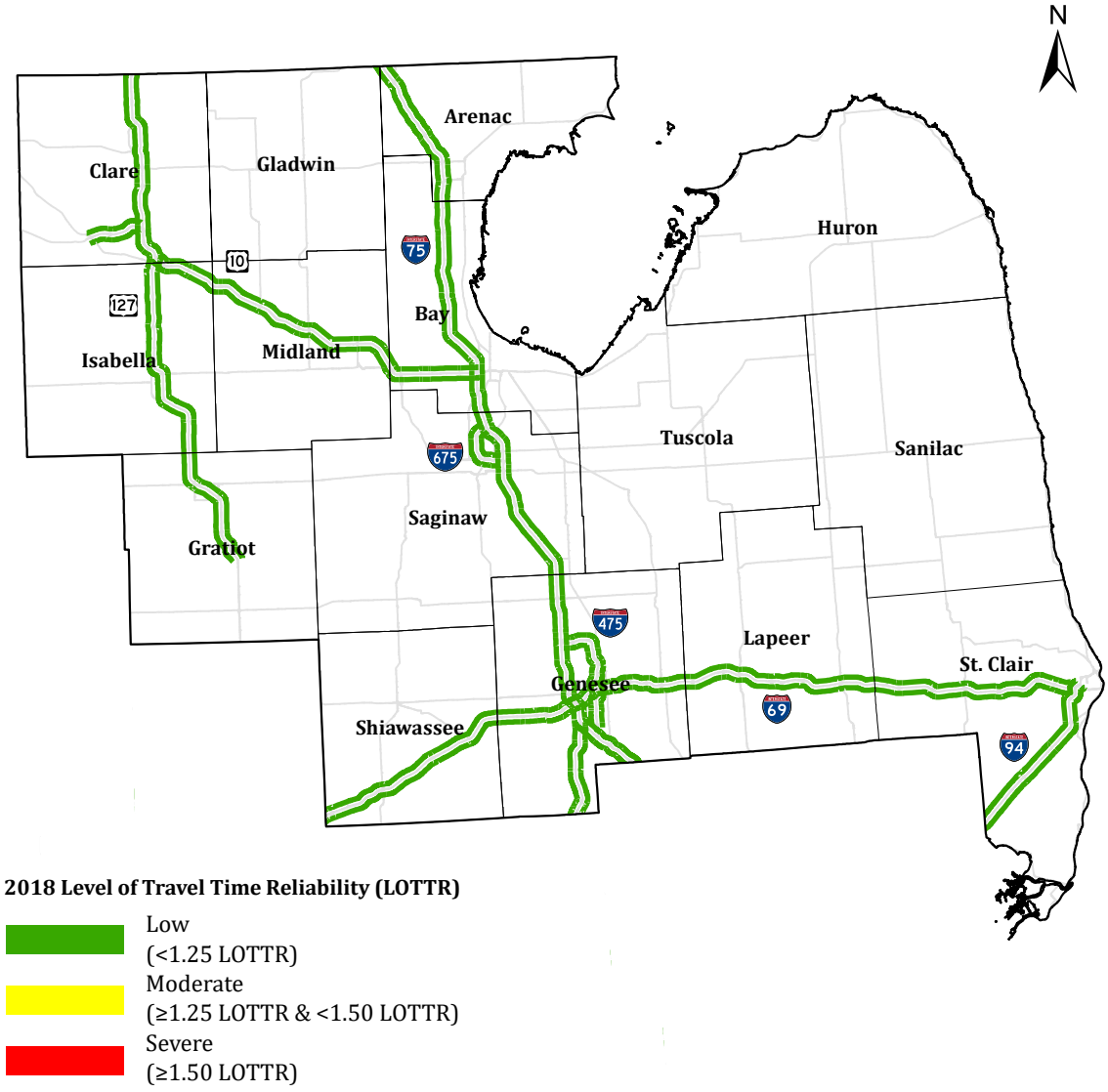


FIGURE 13. 2018 Bay Region Level of Travel Time Reliability (Weekdays between 4:00 PM – 8:00 PM)

BAY REGION: LEVEL OF TRAVEL TIME RELIABILITY

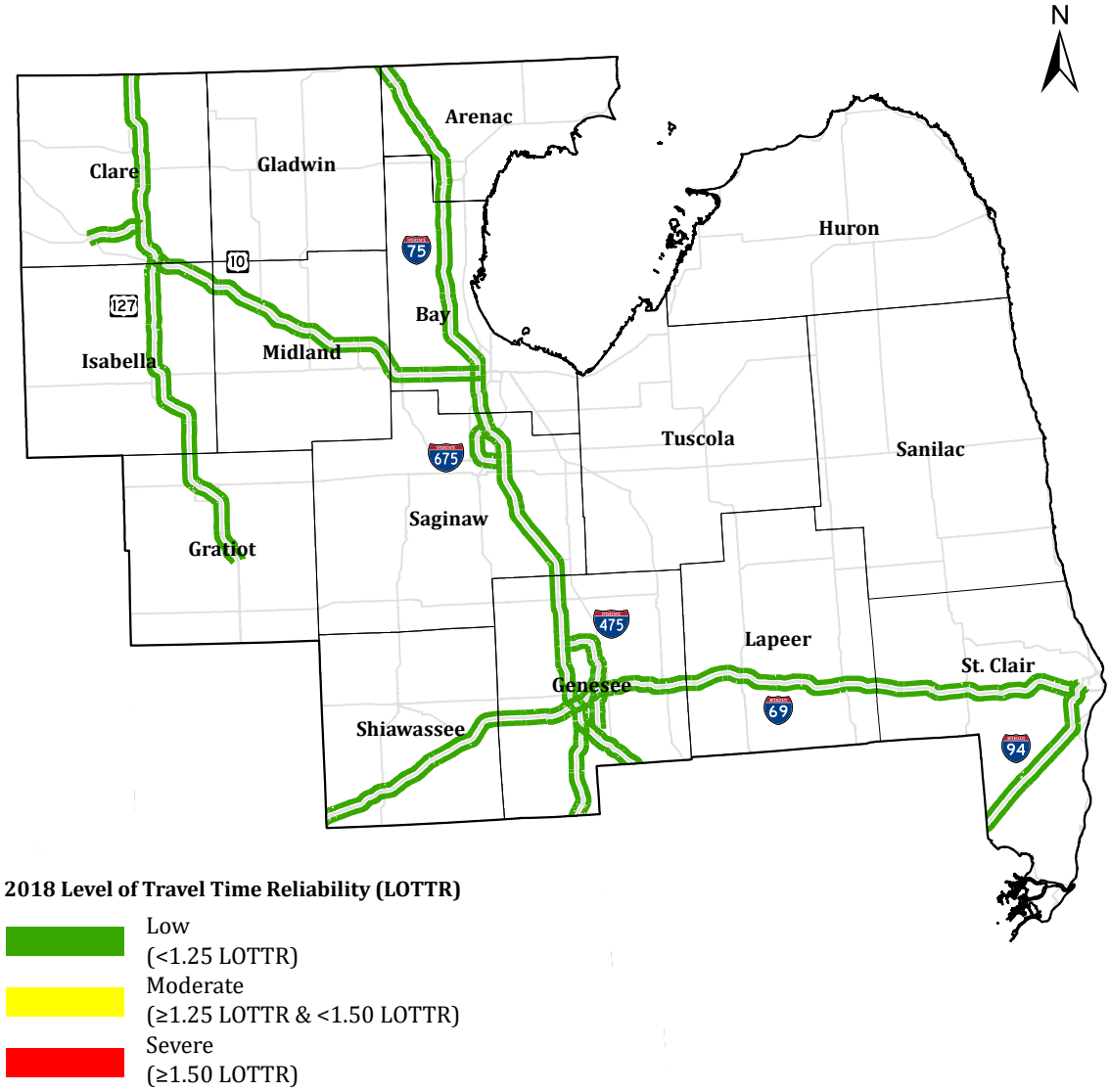
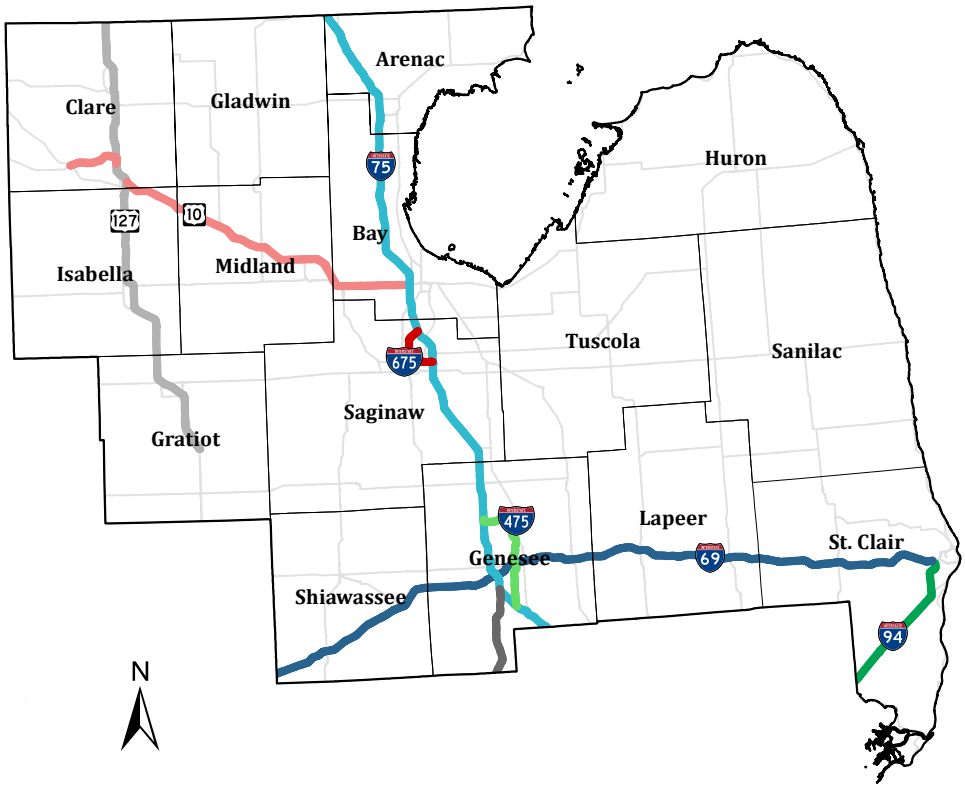


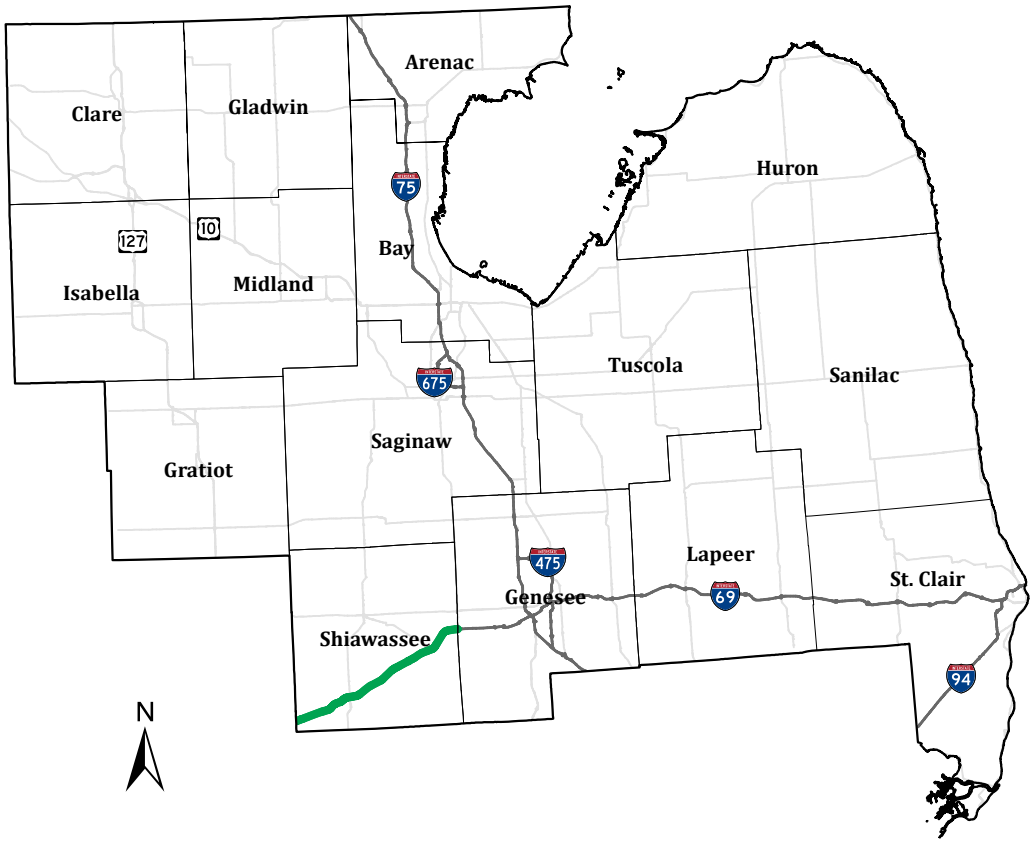
FIGURE 14. 2018 Bay Region Level of Travel Time Reliability (Weekends between 6:00 AM – 8:00 PM)

BAY REGION: CORRIDOR GLOSSARY

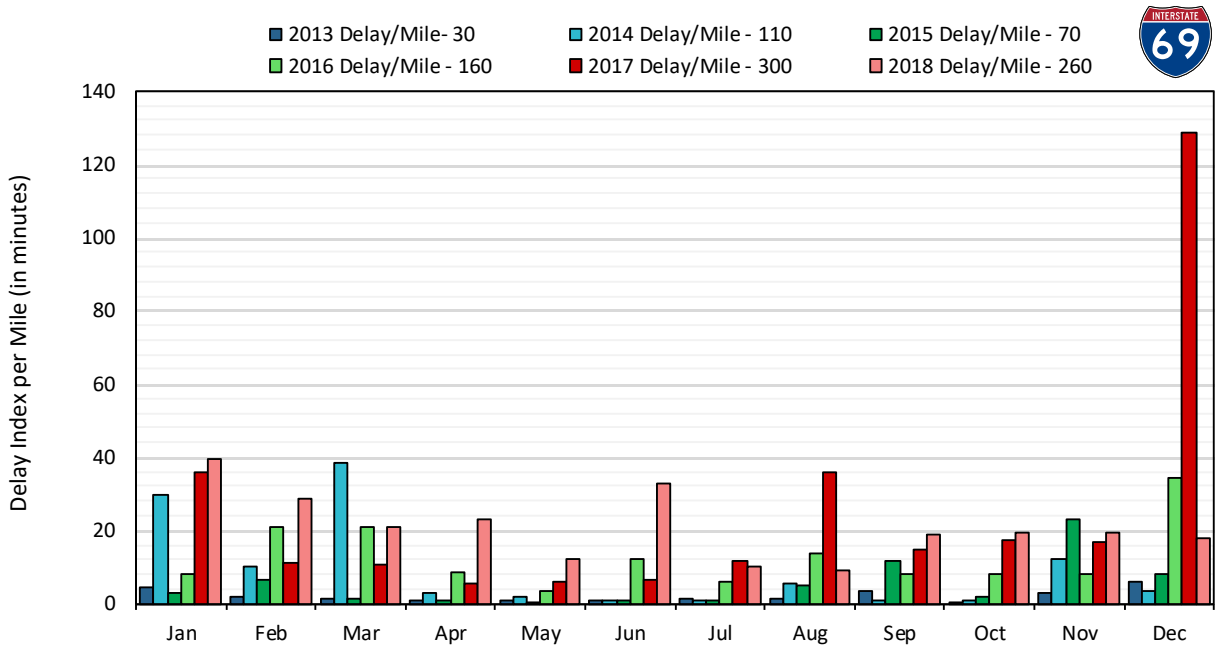


	69	**I-69: Shiawassee, Genesee, Lapeer, and St. Clair**	*Pg. 25*
	75	**I-75: Genesee, Saginaw, Bay, and Arenac**	*Pg. 36*
	94	**I-94: St. Clair**	*Pg. 46*
	475	**I-475: Genesee**	*Pg. 51*
	675	**I-675: Saginaw**	*Pg. 56*
	10	**US-10: Clare, Isabella, Midland, and Bay**	*Pg. 63*
	23	**US-23: Genesee**	*Pg. 70*
	127	**US-127: Gratiot, Isabella, and Clare**	*Pg. 75*

I-69: SHIAWASSEE COUNTY DELAY INDEX



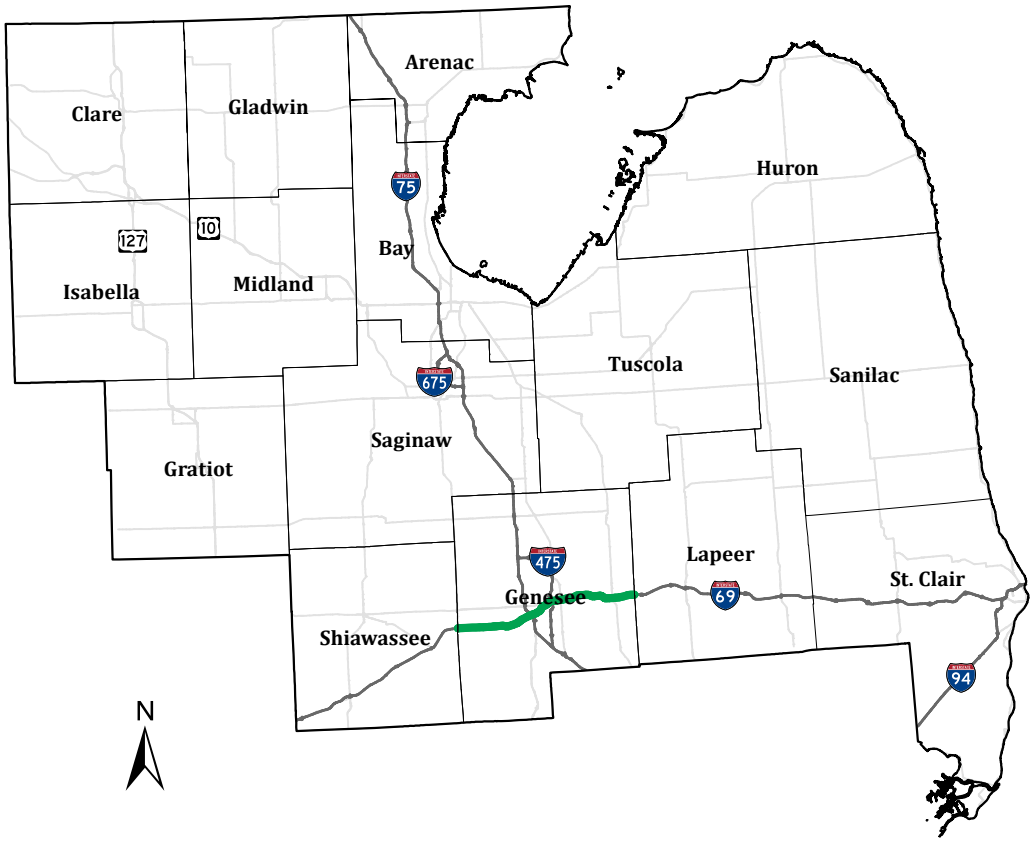
a) Segment Map



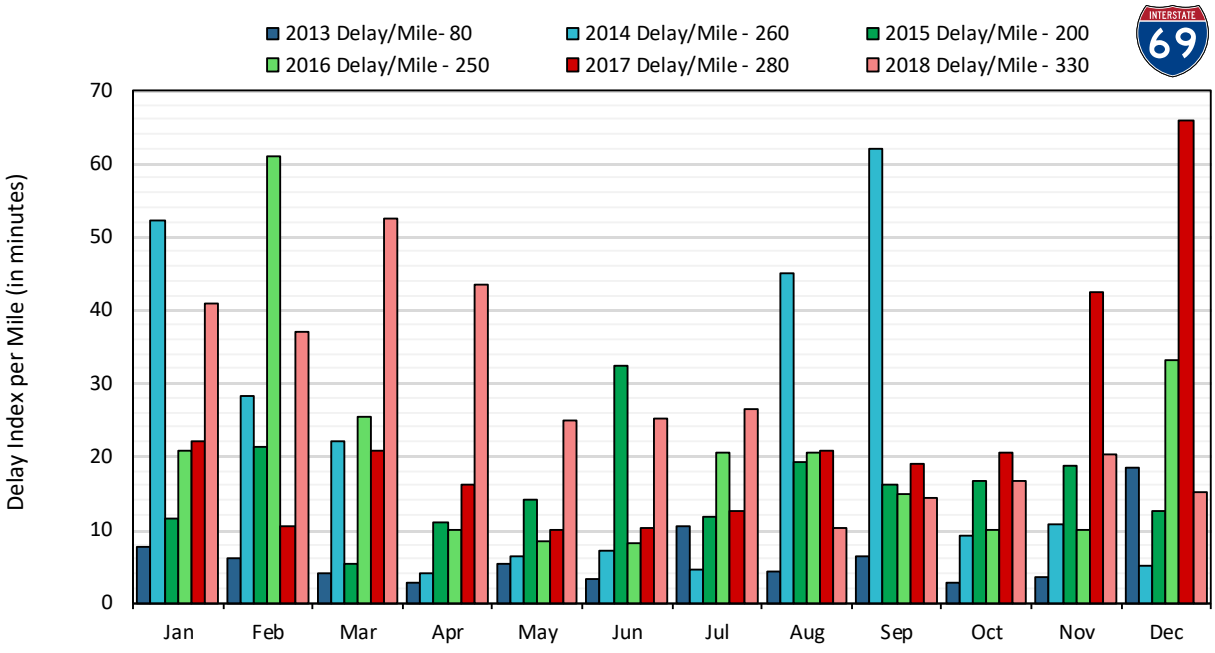
b) Delay Index Graph

FIGURE 15. Shiawassee County I-69 Corridor Delay Index

I-69: GENESEE COUNTY DELAY INDEX



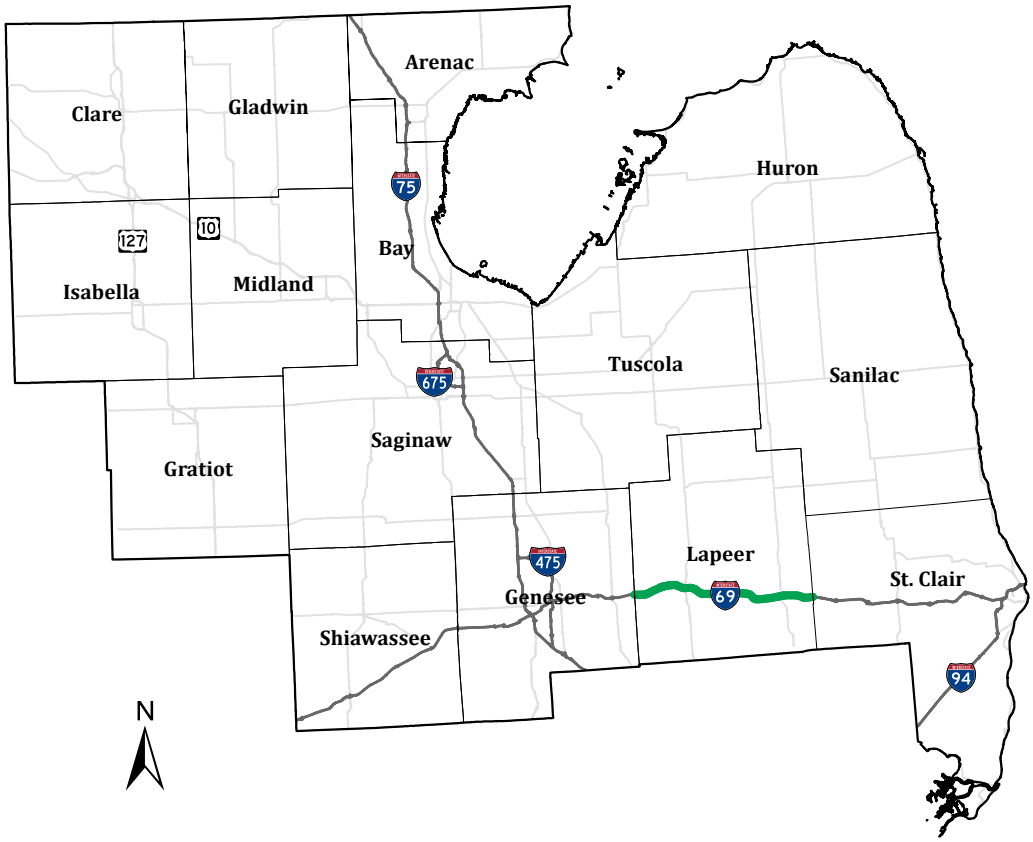
a) Segment Map



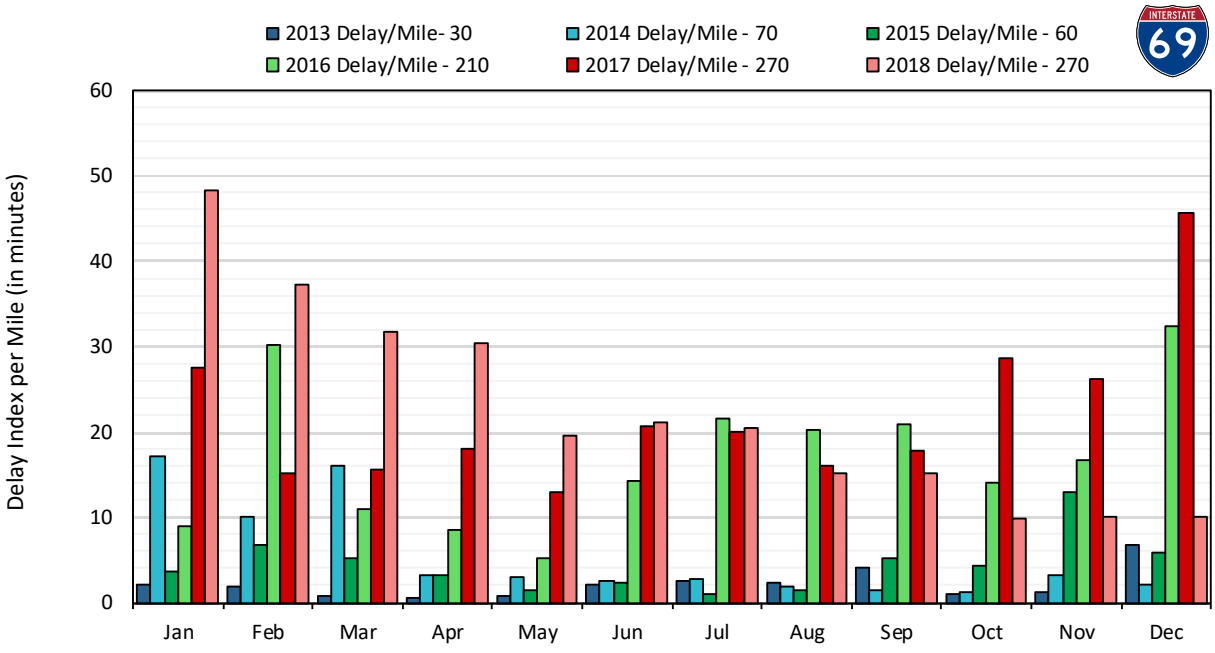
b) Delay Index Graph

FIGURE 16. Genesee County I-69 Corridor Delay Index

I-69: LAPEER COUNTY DELAY INDEX



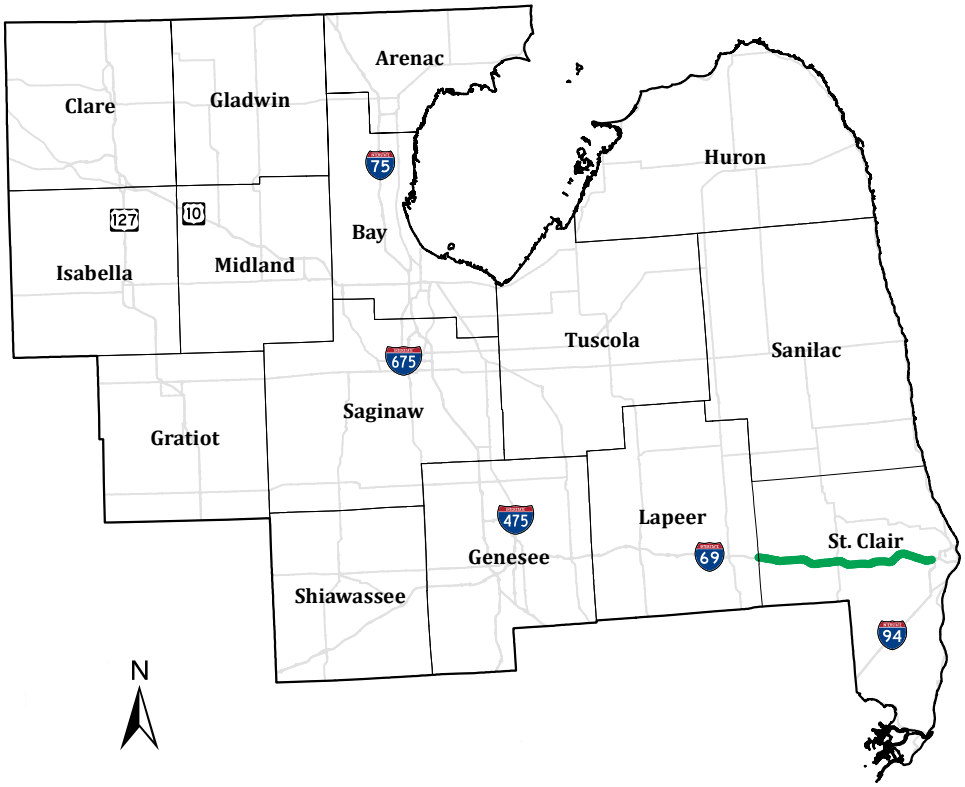
a) Segment Map



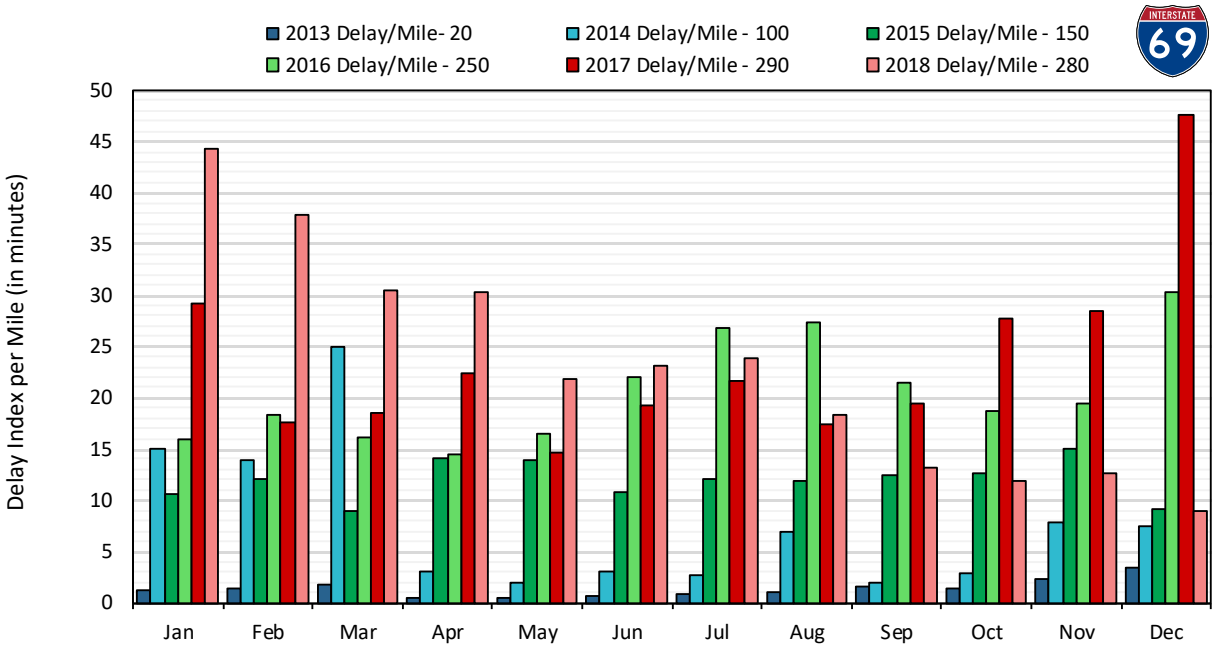
b) Delay Index Graph

FIGURE 17. Lapeer County I-69 Corridor Delay Index

I-69: ST. CLAIR COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 18. St. Clair County I-69 Corridor Delay Index

I-69: AVERAGE SPEED

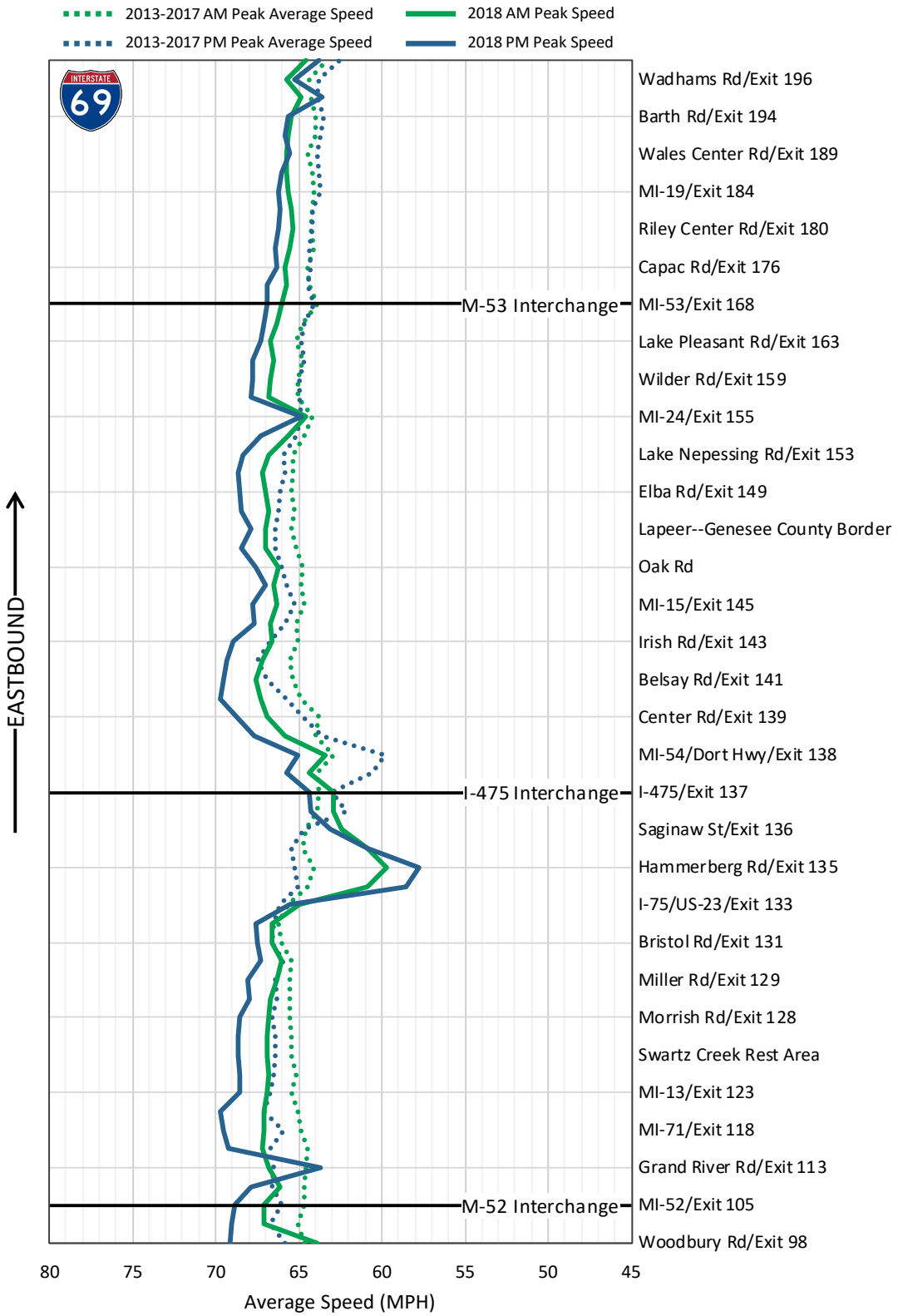


FIGURE 19. Bay Region Eastbound I-69 Average Speed

I-69: AVERAGE SPEED

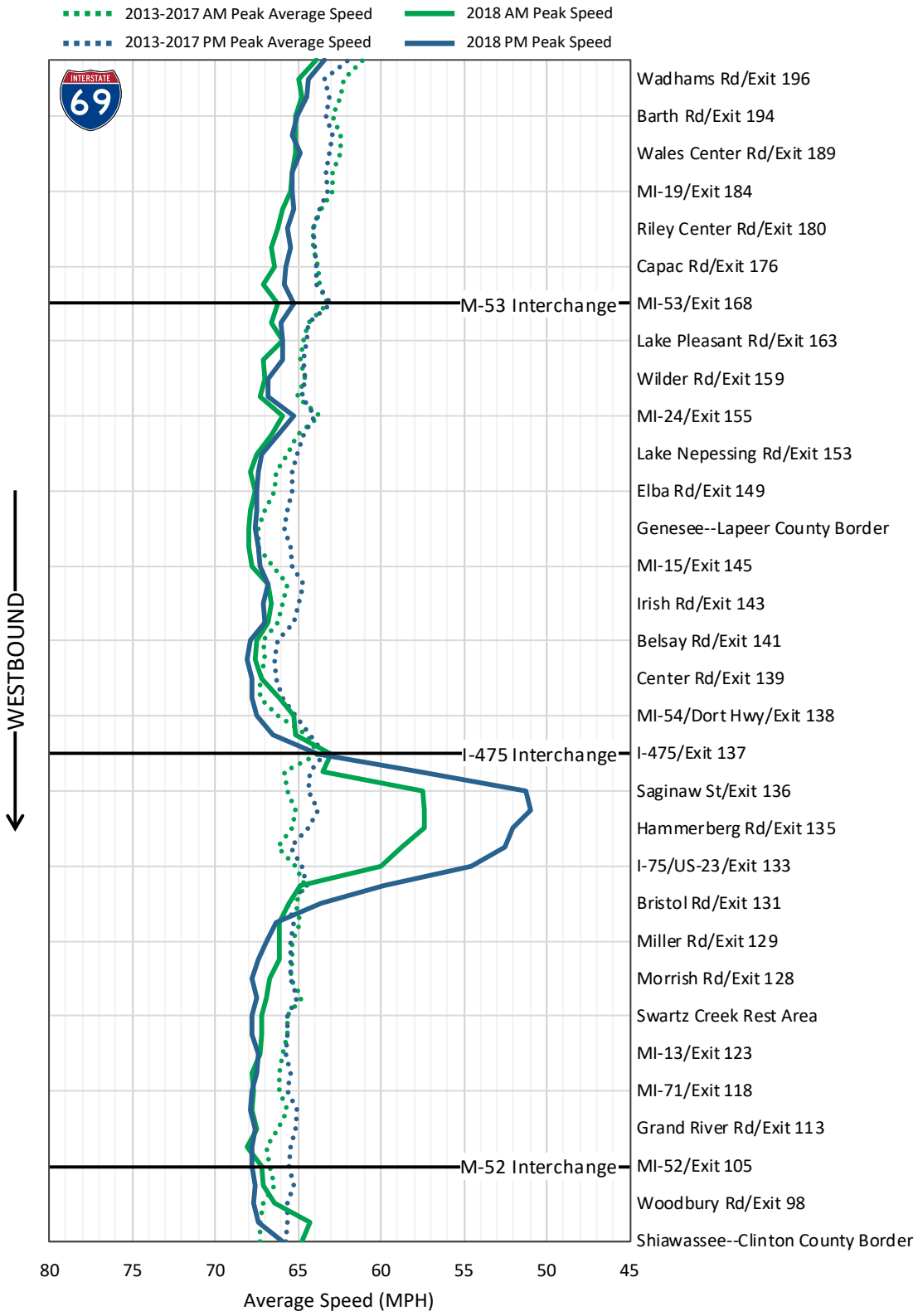
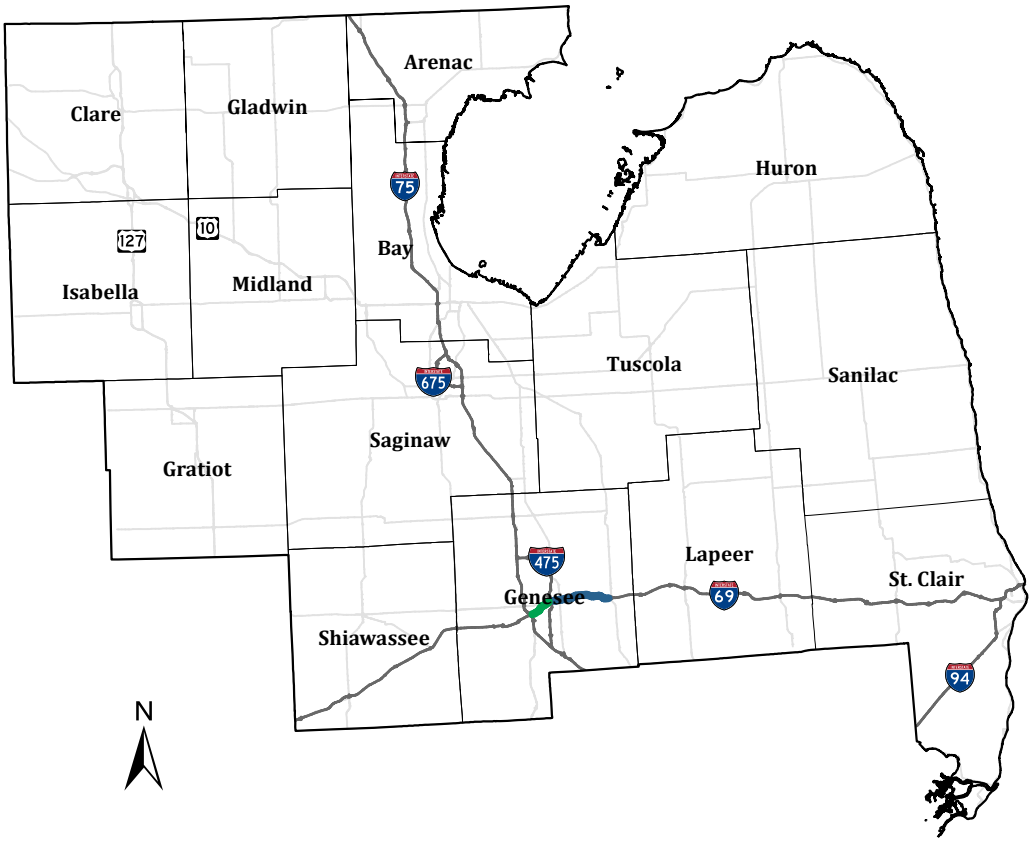
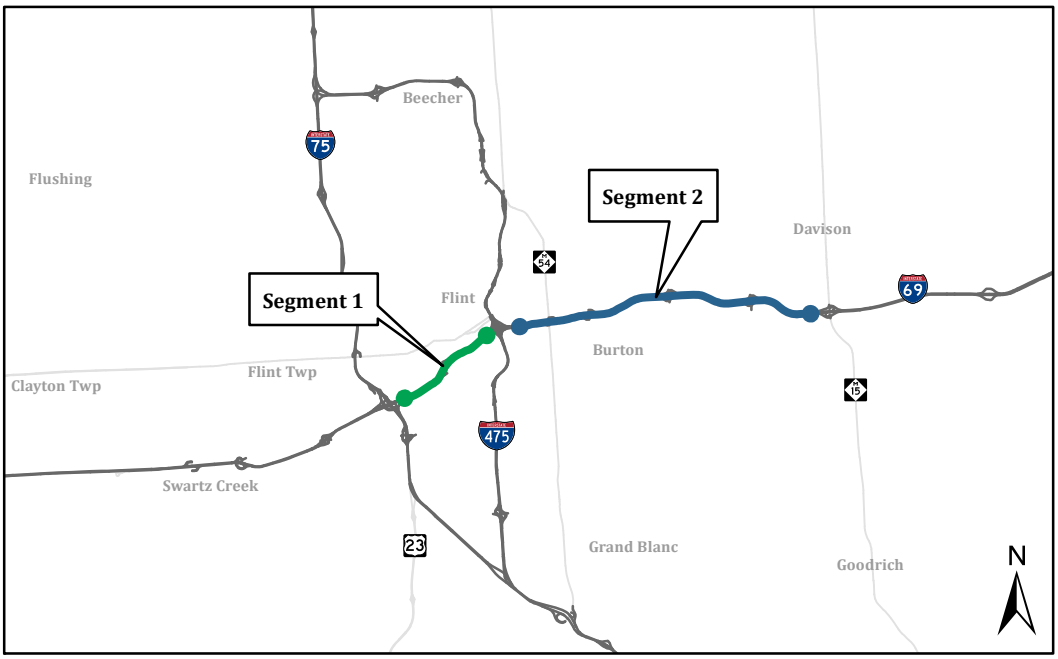


FIGURE 20. Bay Region Westbound I-69 Average Speed

I-69: TRAVEL TIME RELIABILITY



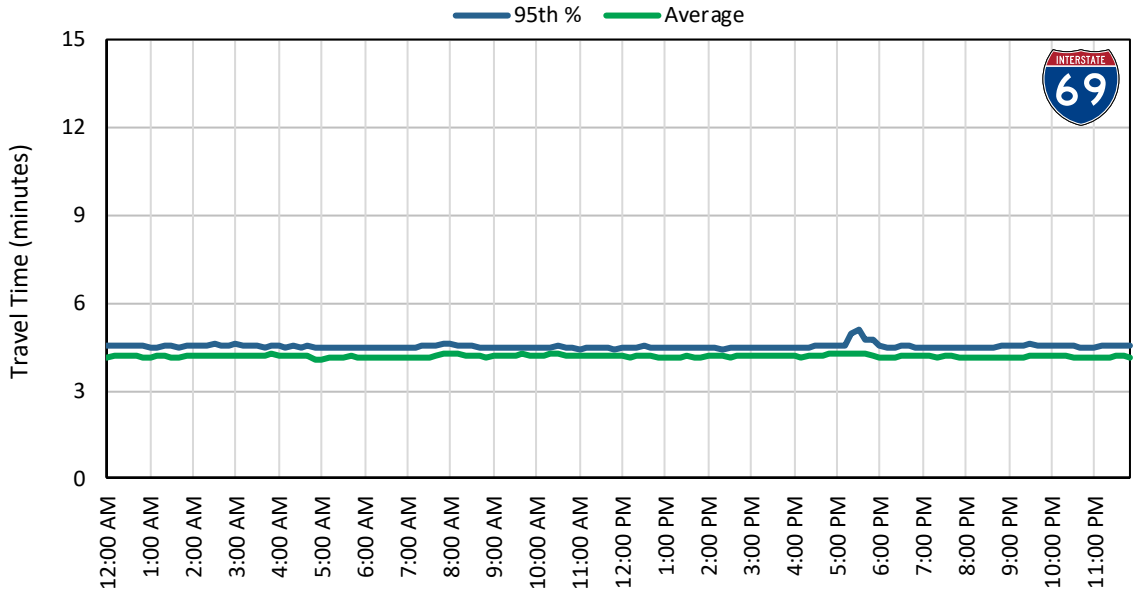
a) Bay Region



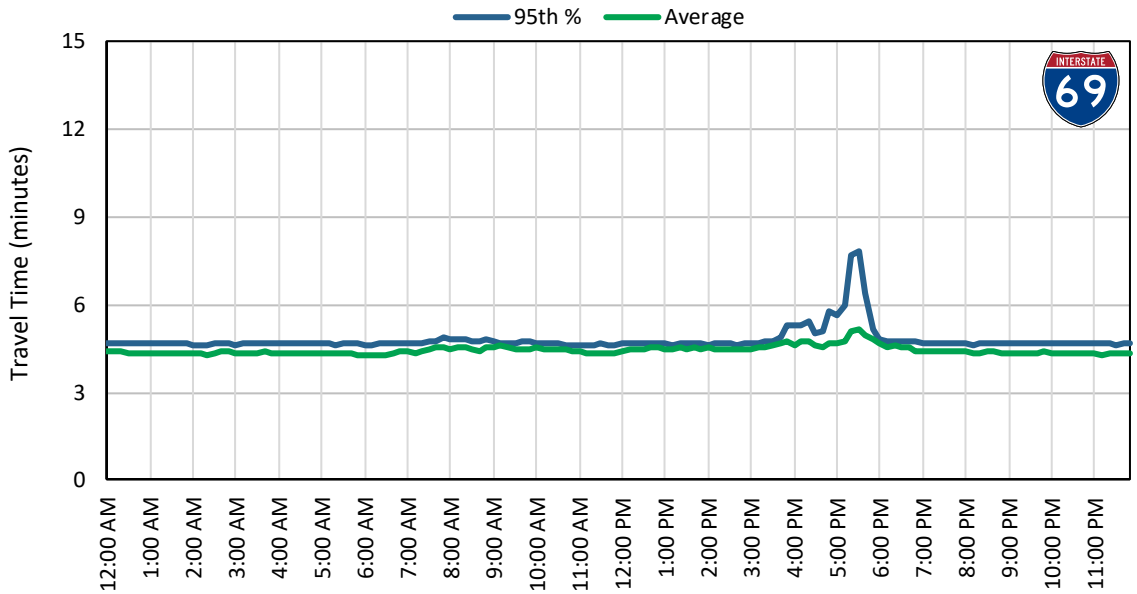
b) Flint, Michigan

FIGURE 21. Travel Time Reliability: I-69

I-69: TRAVEL TIME RELIABILITY



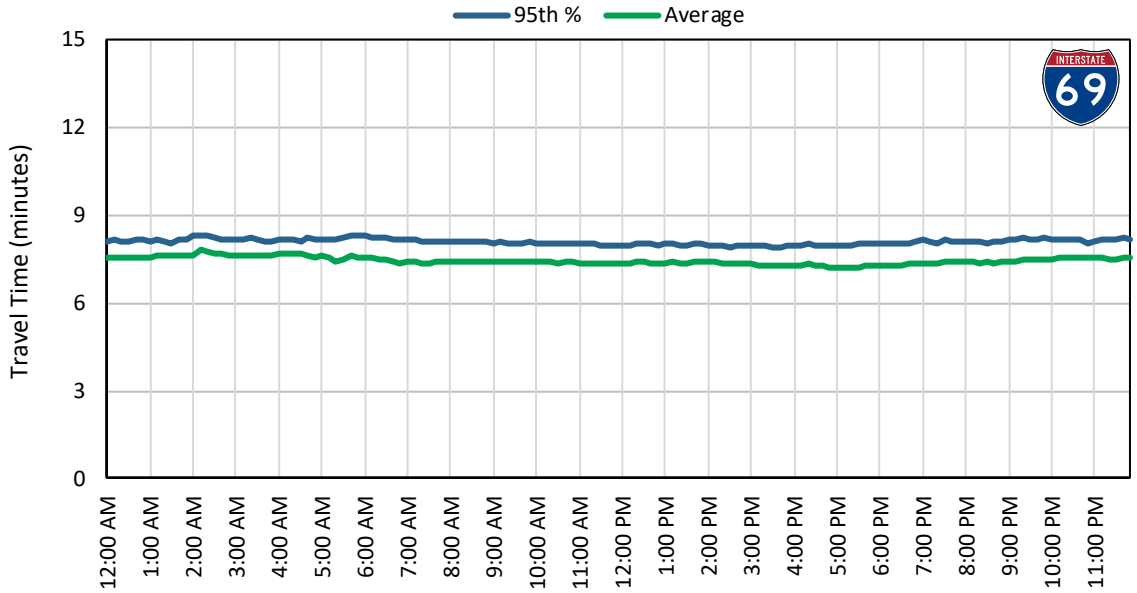
a) Eastbound



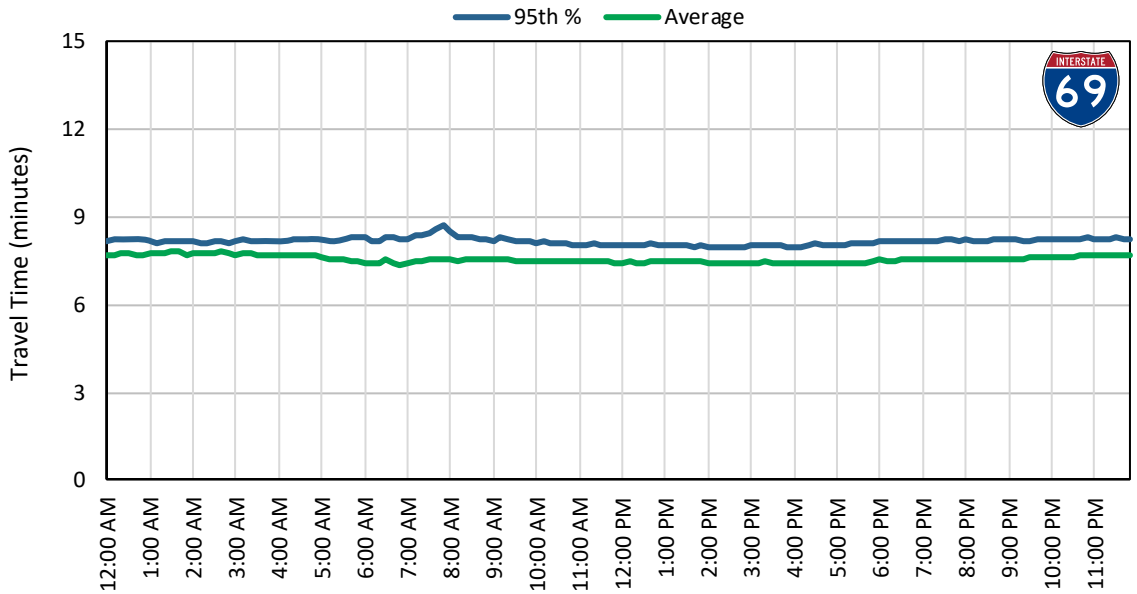
b) Westbound

FIGURE 22. Segment 1 - I-69 between I-75/US-23/Exit 133 and I-475/UAW Fwy/Exit 137

I-69: TRAVEL TIME RELIABILITY



a) Eastbound



b) Westbound

FIGURE 23. Segment 2 - I-69 between I-475/UAW Fwy/Exit 137 and M-15/Exit 145

I-69: LEVEL OF TRAVEL TIME RELIABILITY

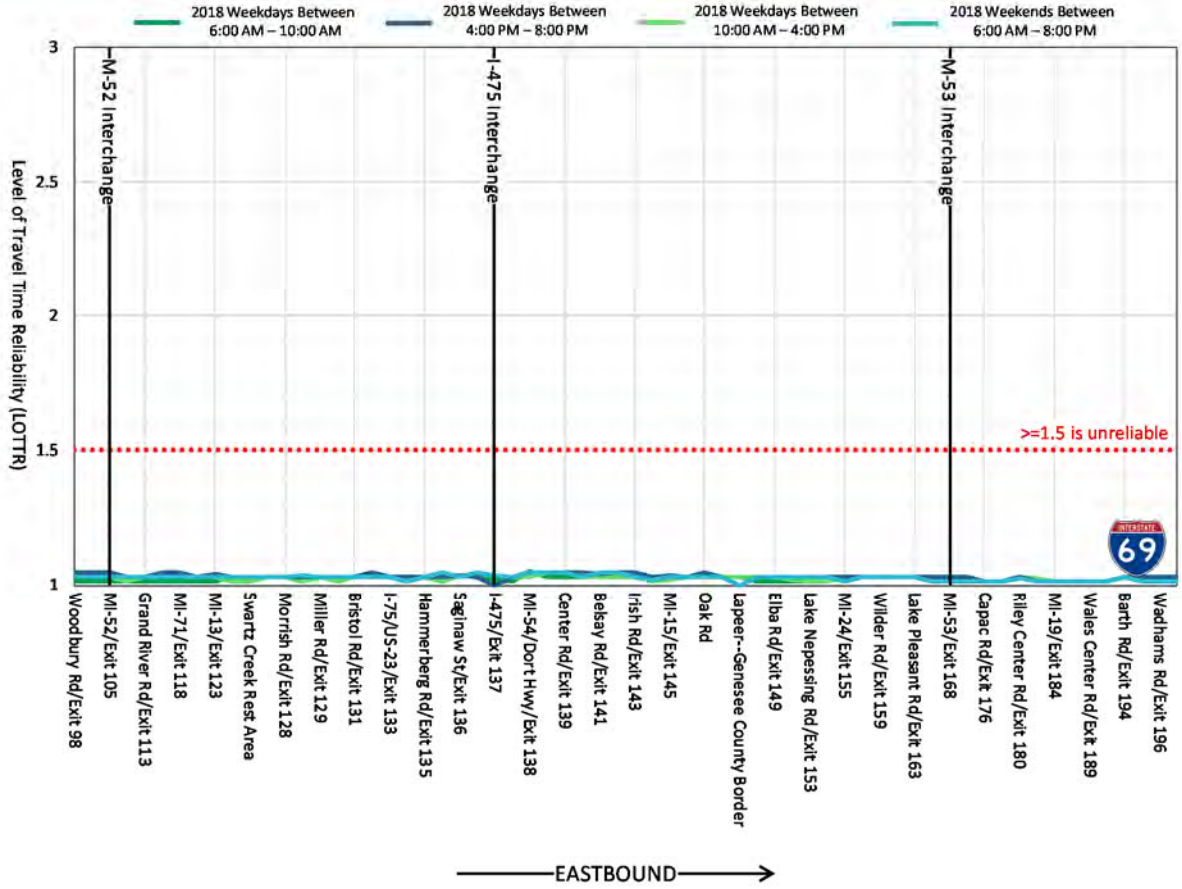


FIGURE 24. **Bay Region Eastbound I-69 Level of Travel Time Reliability**

I-69: LEVEL OF TRAVEL TIME RELIABILITY

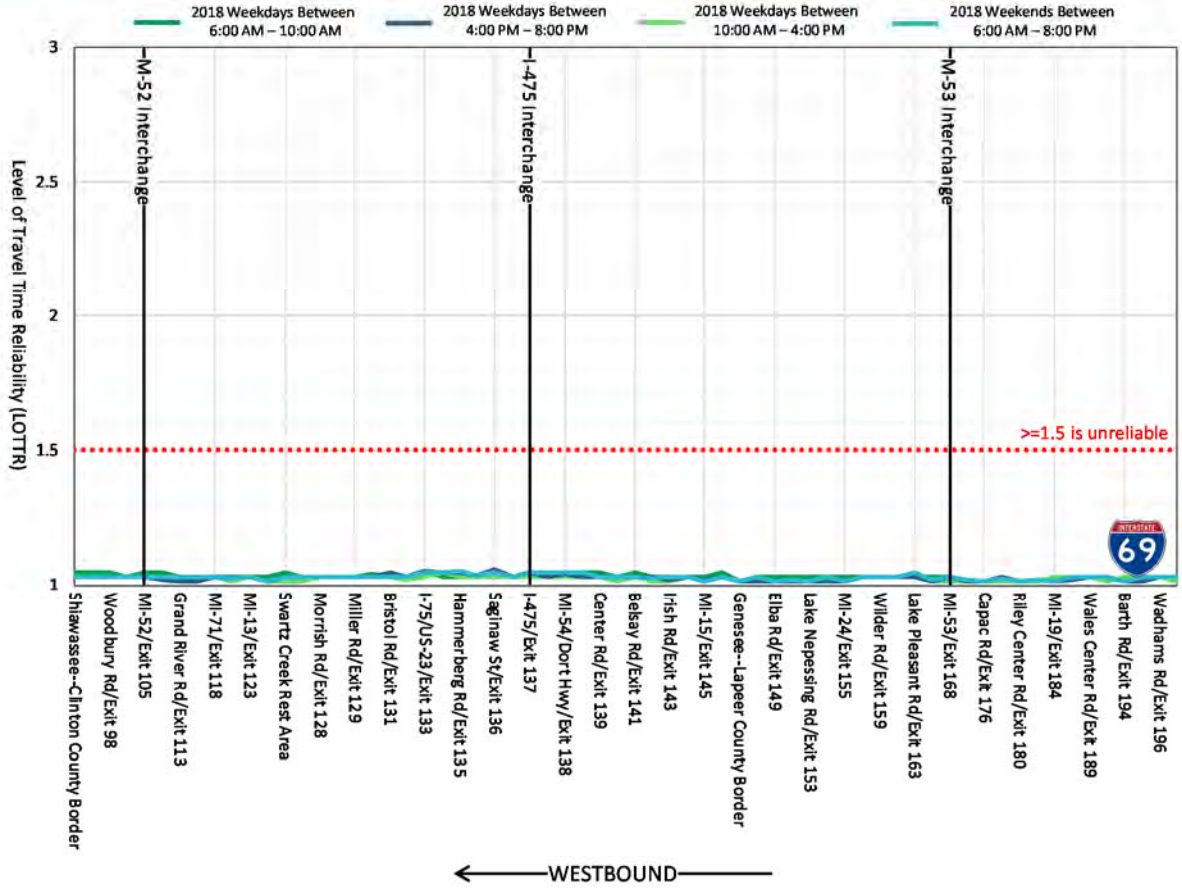
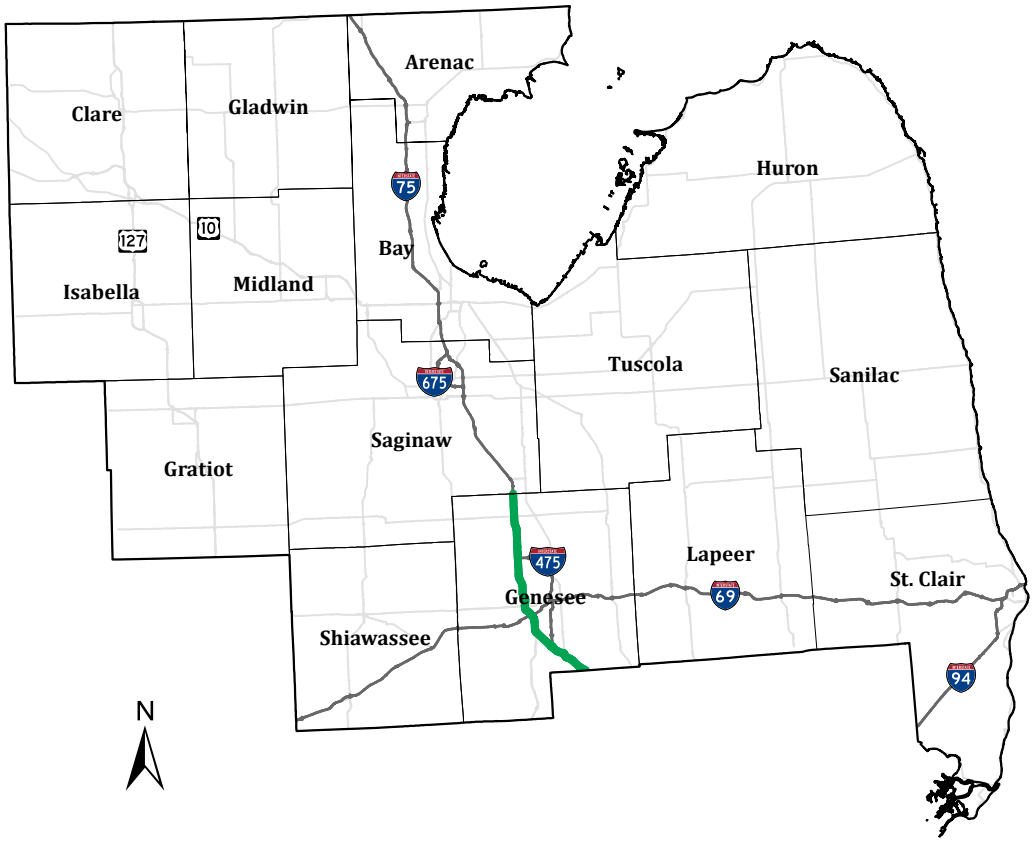
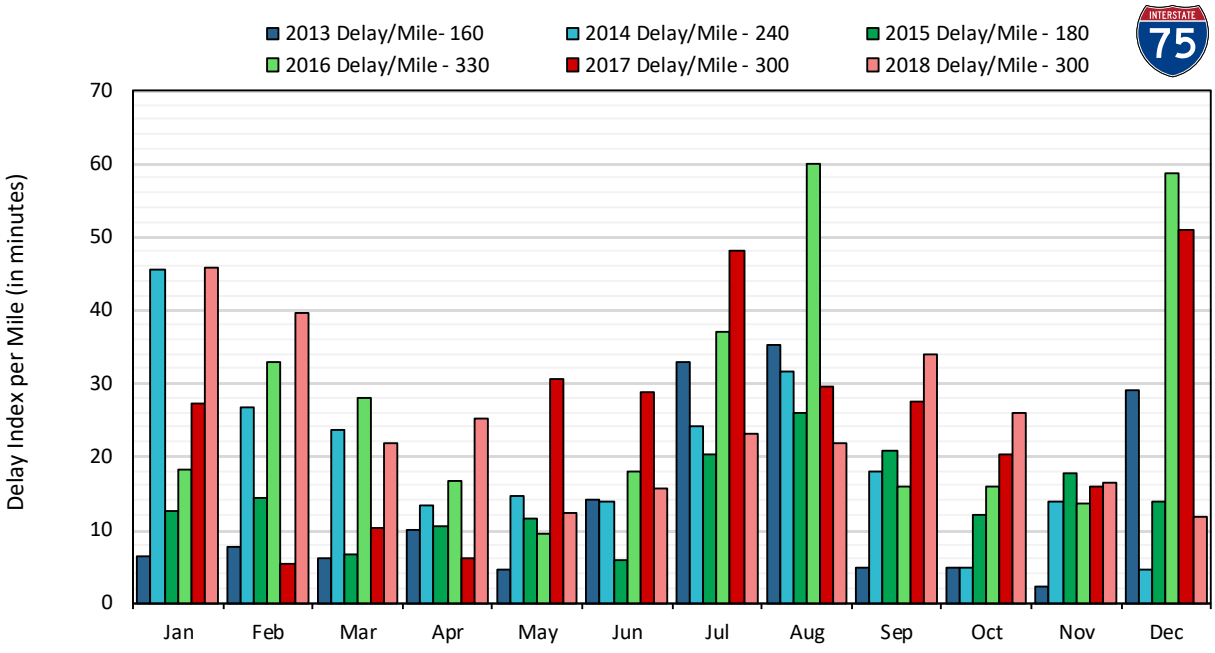


FIGURE 25. **Bay Region Westbound I-69 Level of Travel Time Reliability**

I-75: GENESEE COUNTY DELAY INDEX



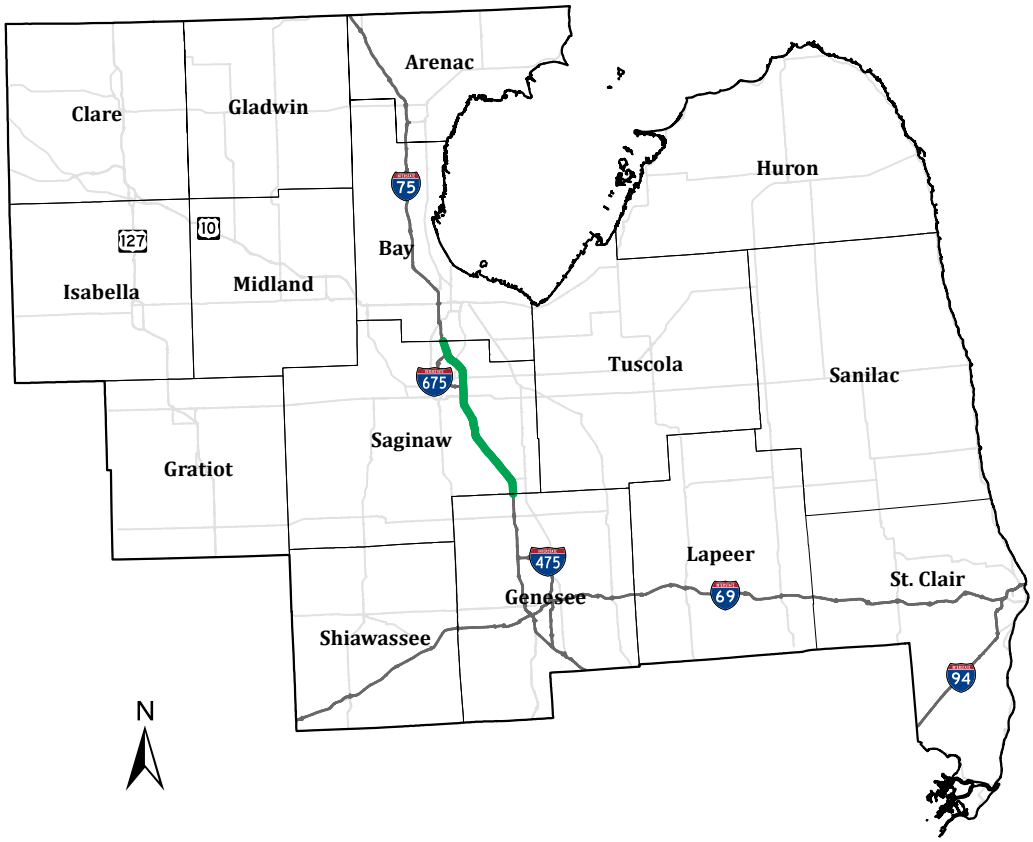
a) Segment Map



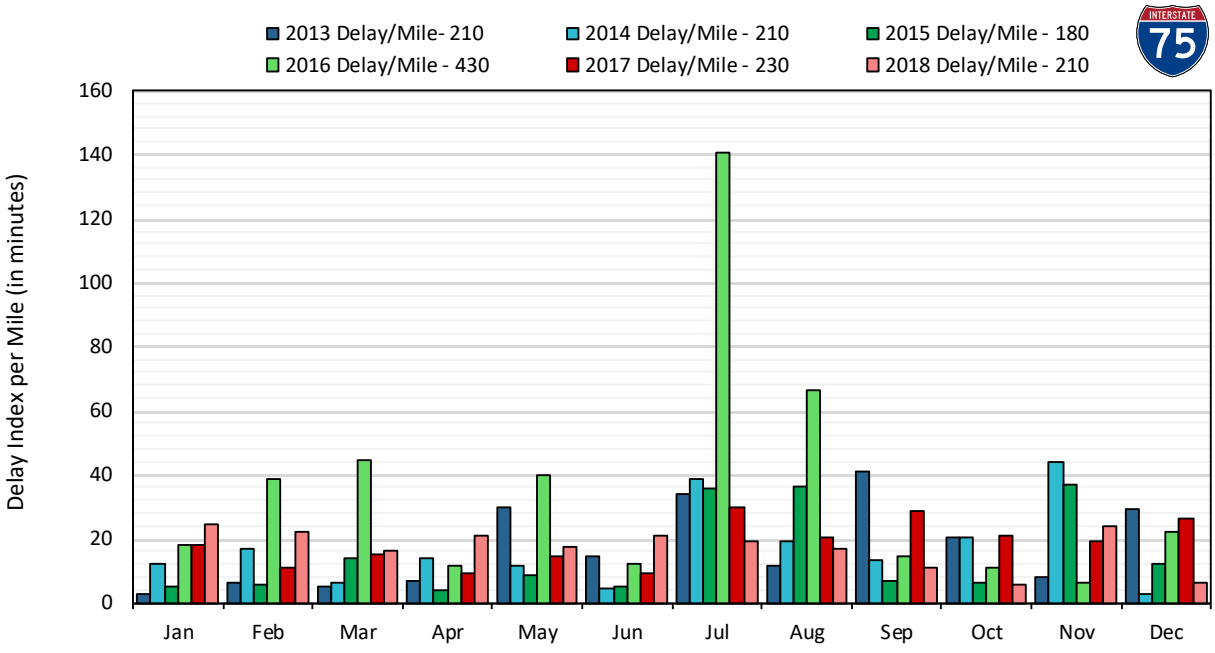
b) Delay Index Graph

FIGURE 26. Genesee County I-75 Corridor Delay Index

I-75: SAGINAW COUNTY DELAY INDEX



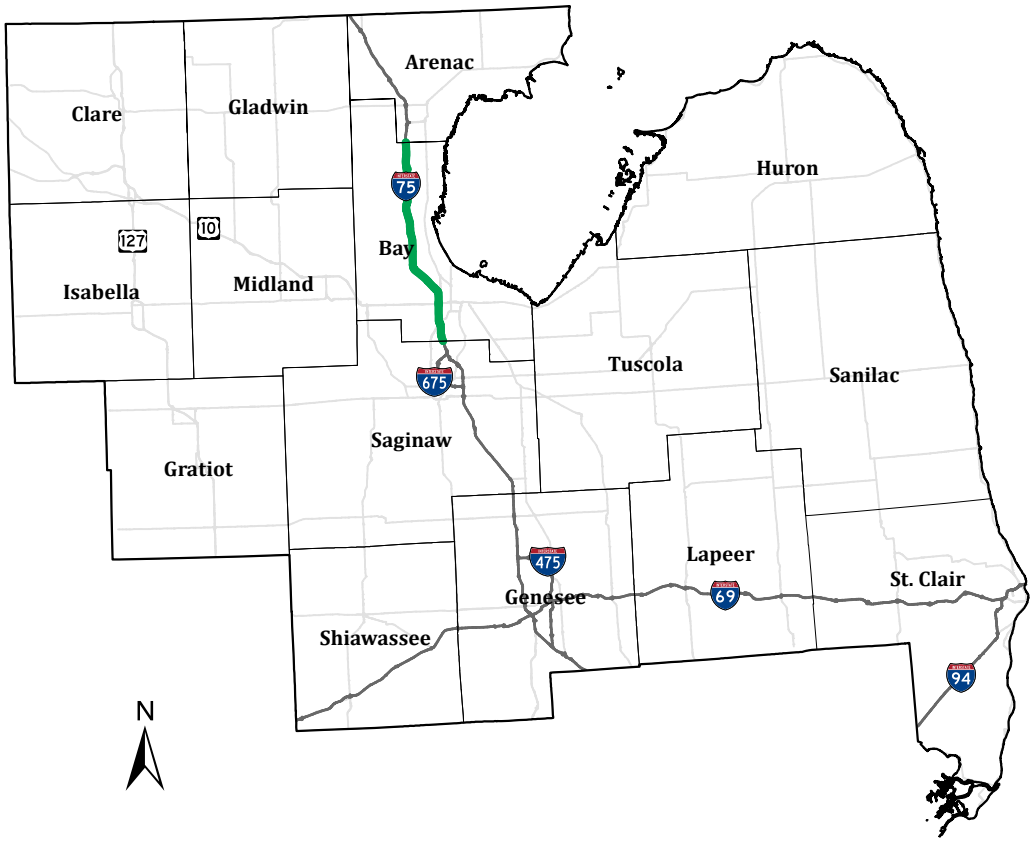
a) Segment Map



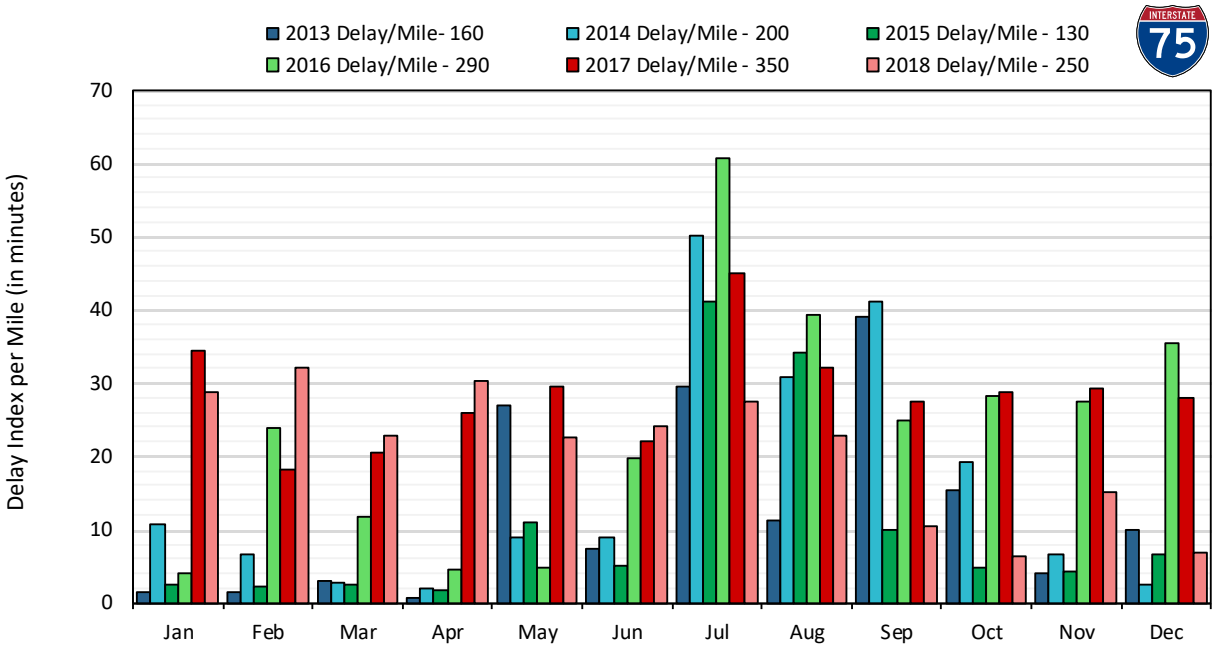
b) Delay Index Graph

FIGURE 27. Saginaw County I-75 Corridor Delay Index

I-75: BAY COUNTY DELAY INDEX



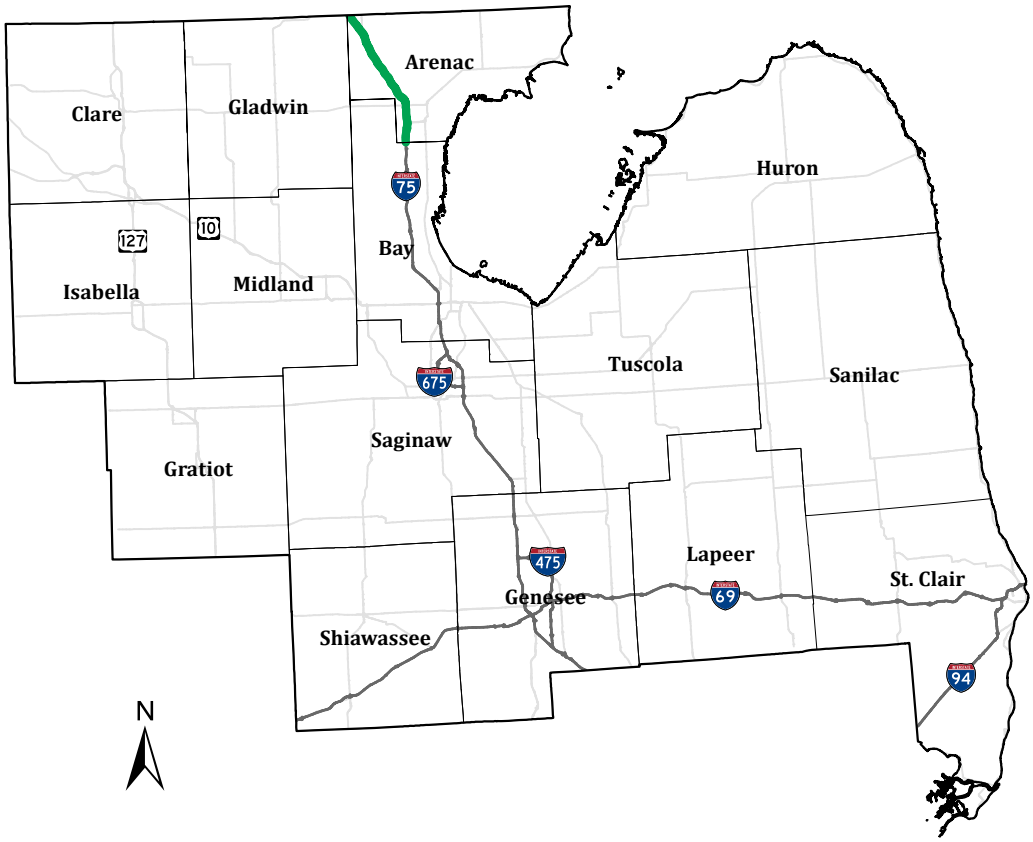
a) Segment Map



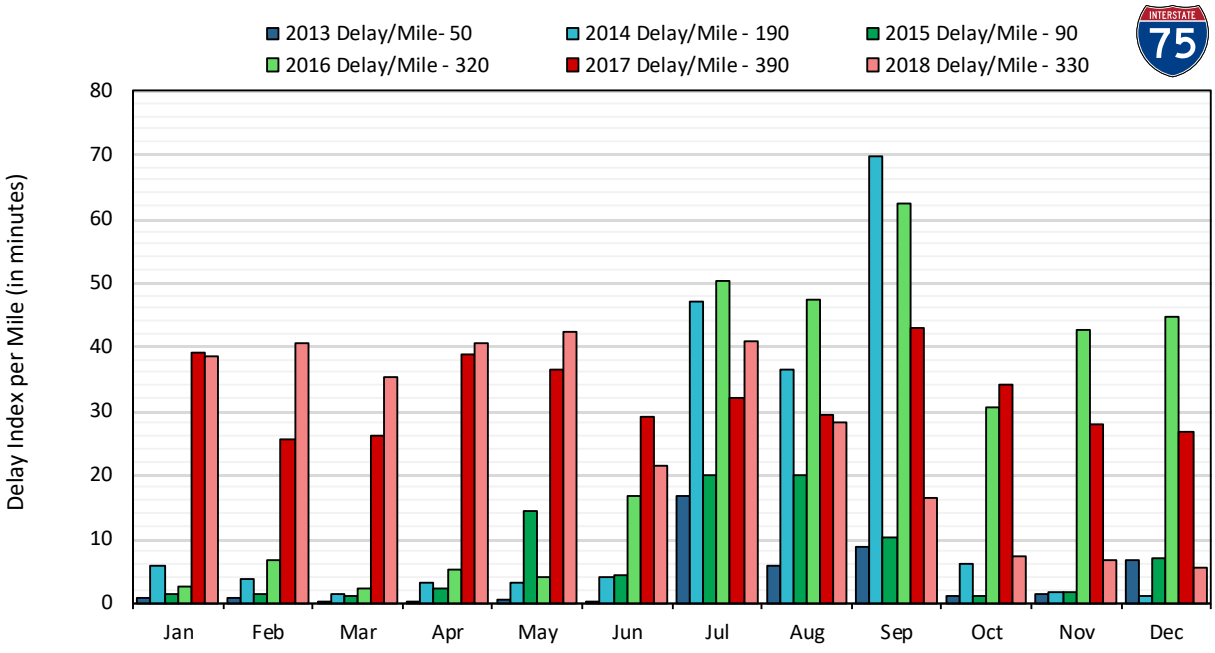
b) Delay Index Graph

FIGURE 28. Bay County I-75 Corridor Delay Index

I-75: ARENAC COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 29. Arenac County I-75 Corridor Delay Index

I-75: AVERAGE SPEED

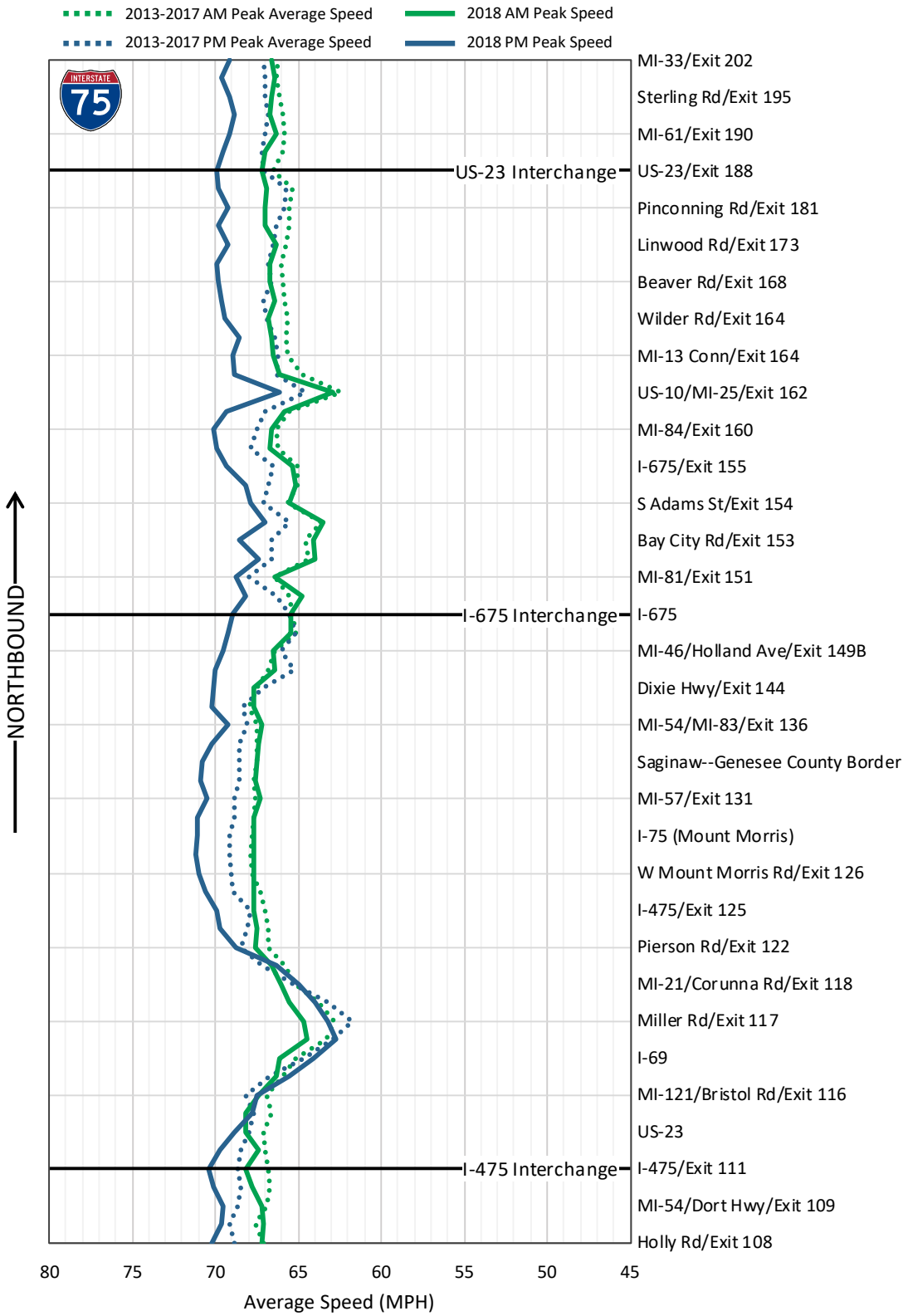


FIGURE 30. Bay Region Northbound I-75 Average Speed

I-75: AVERAGE SPEED

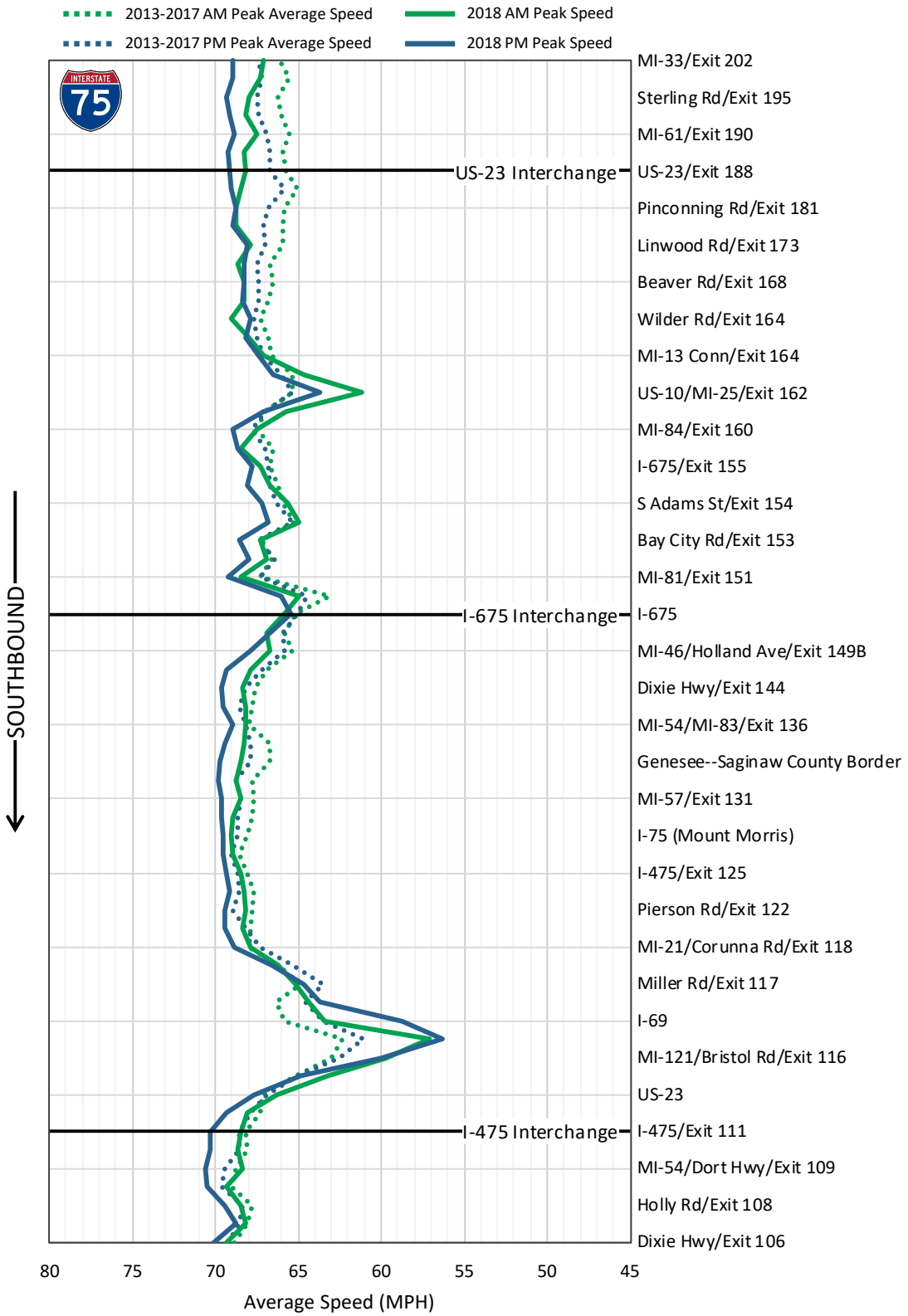
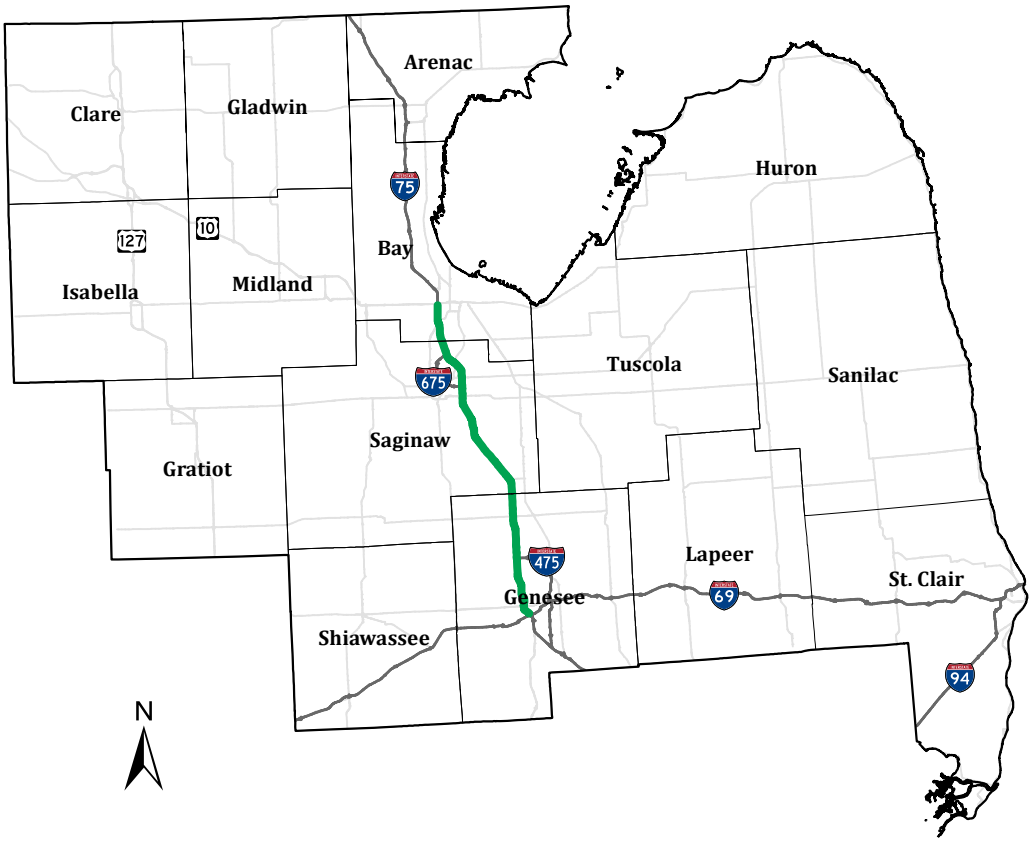


FIGURE 31. Bay Region Southbound I-75 Average Speed

I-75: TRAVEL TIME RELIABILITY

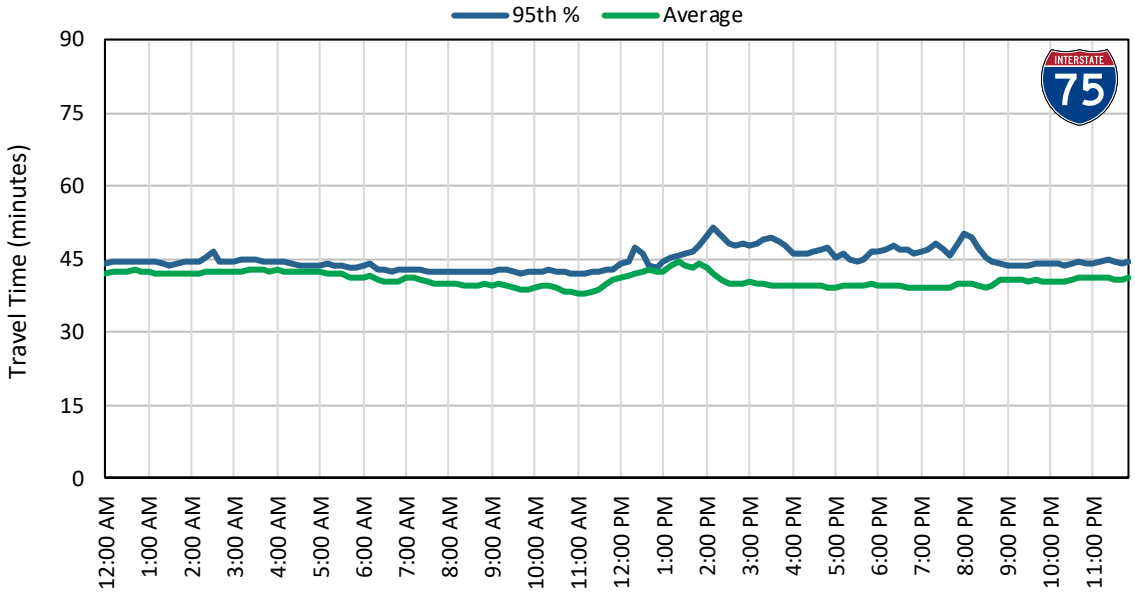


a) Bay Region

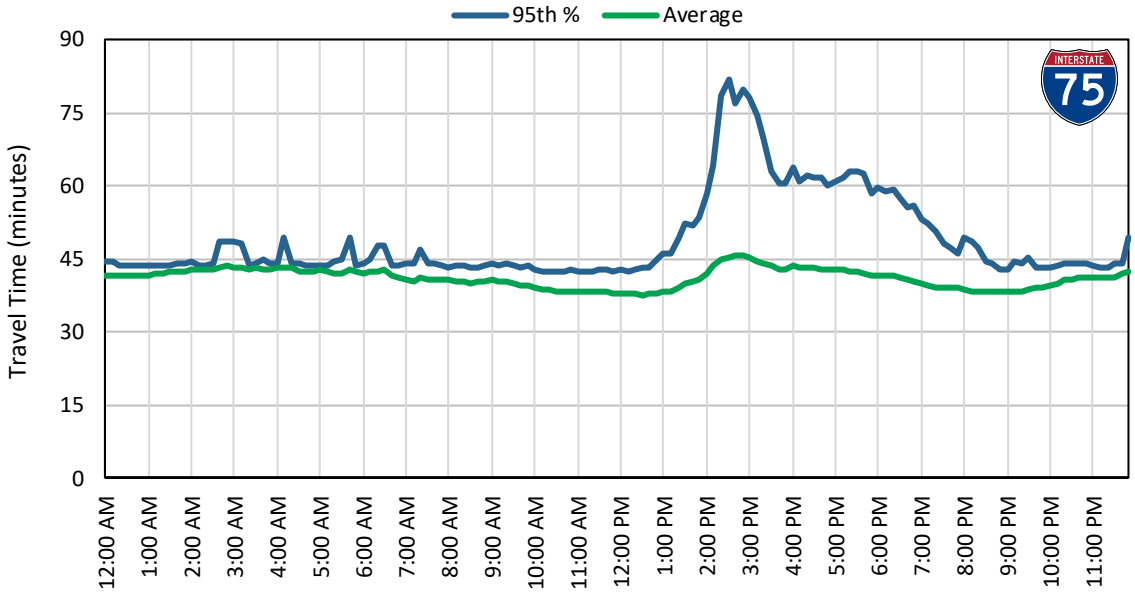
b) Flint, Michigan and Saginaw, Michigan

FIGURE 32. Travel Time Reliability: I-75

I-75: TRAVEL TIME RELIABILITY



a) Northbound between May 1st and September 30th (Fridays only)



b) Southbound between May 1st and September 30th (Sundays only)

FIGURE 33. Segment 1- I-75 between I-69 and US-10/M-25/Exit 162 (Summer)

I-75: LEVEL OF TRAVEL TIME RELIABILITY

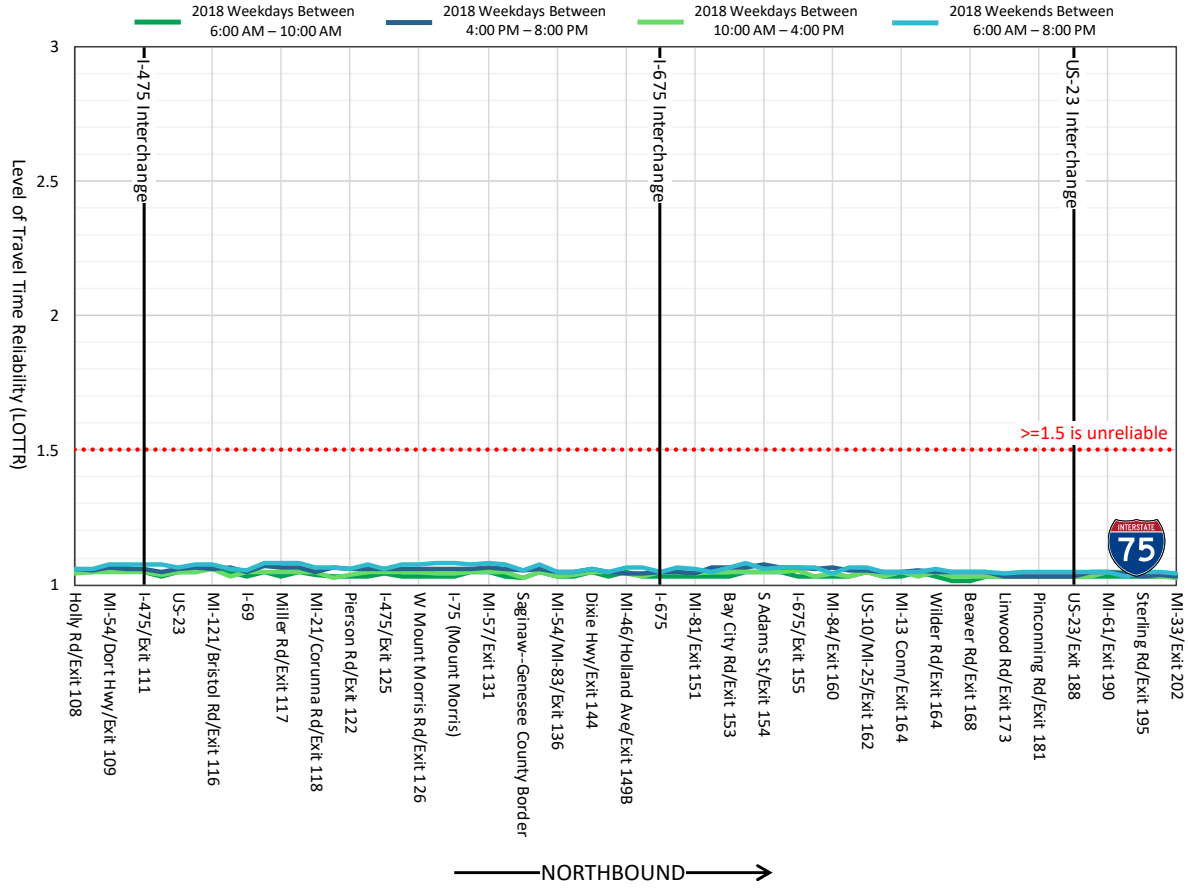


FIGURE 34. **Bay Region Northbound I-75 Level of Travel Time Reliability**

I-75: LEVEL OF TRAVEL TIME RELIABILITY

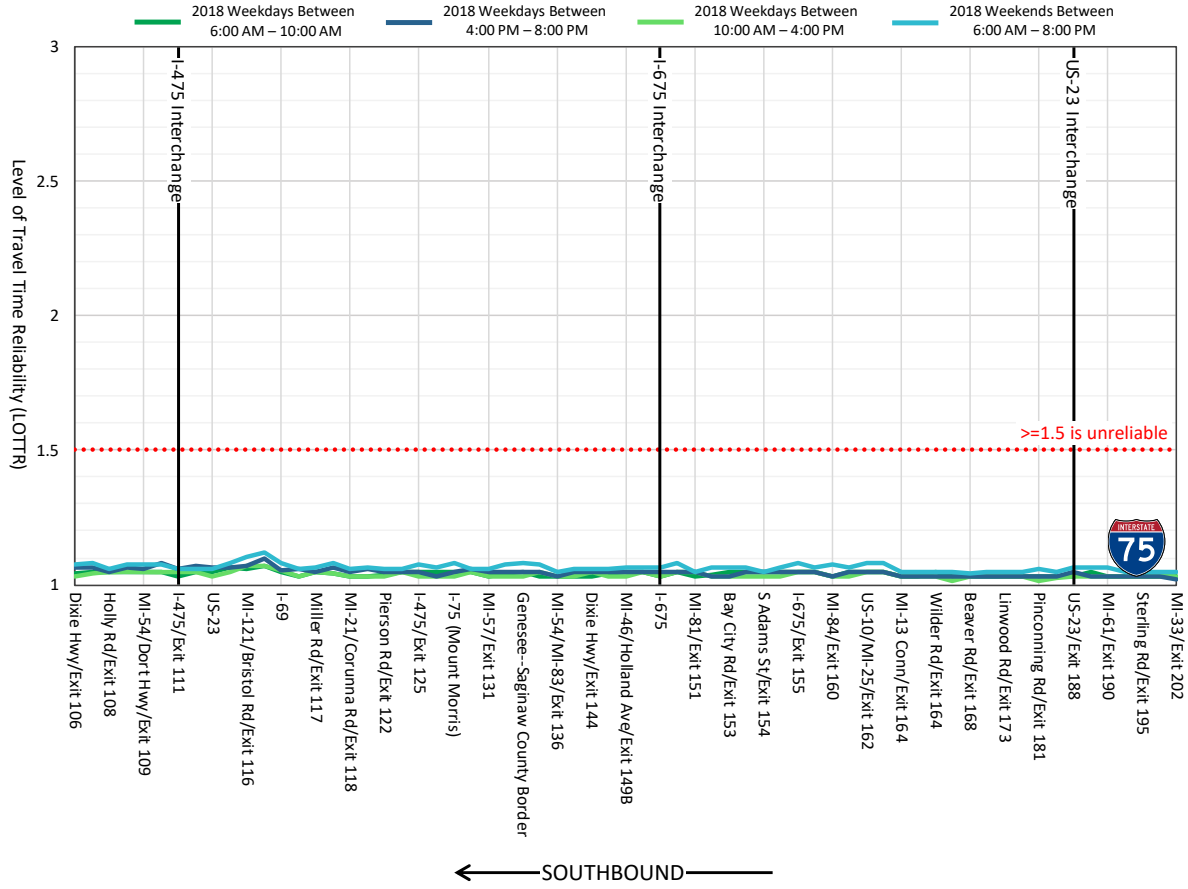
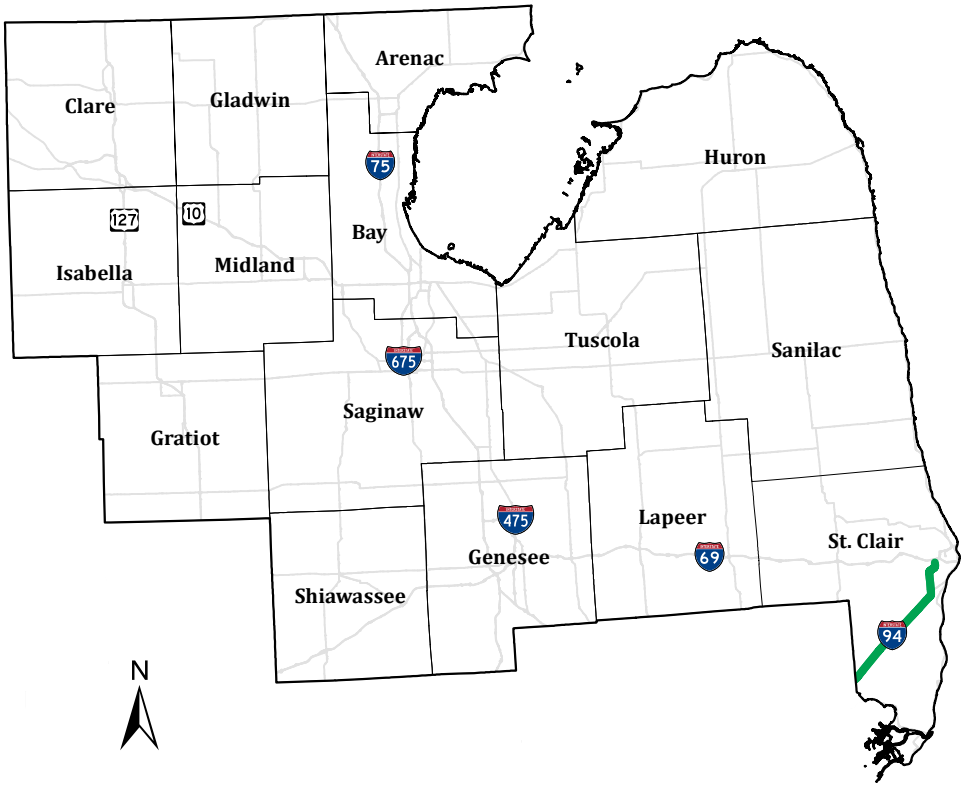
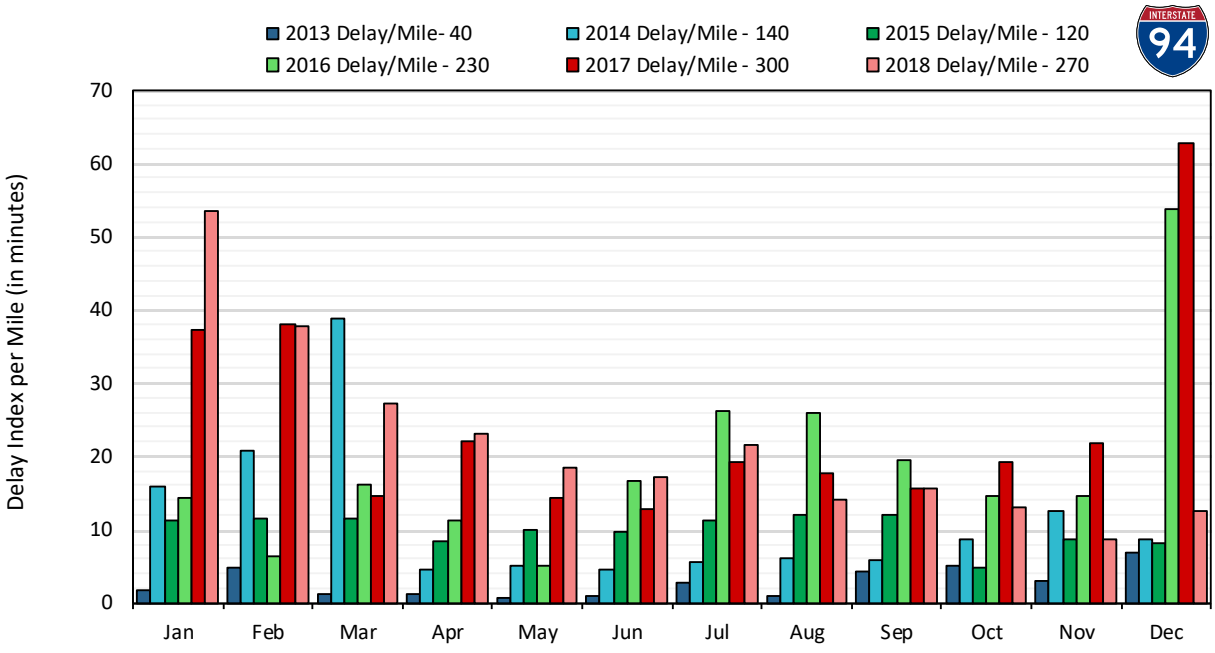


FIGURE 35. Bay Region Southbound I-75 Level of Travel Time Reliability

I-94: ST. CLAIR COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 36. St. Clair County I-94 Corridor Delay Index

I-94: AVERAGE SPEED

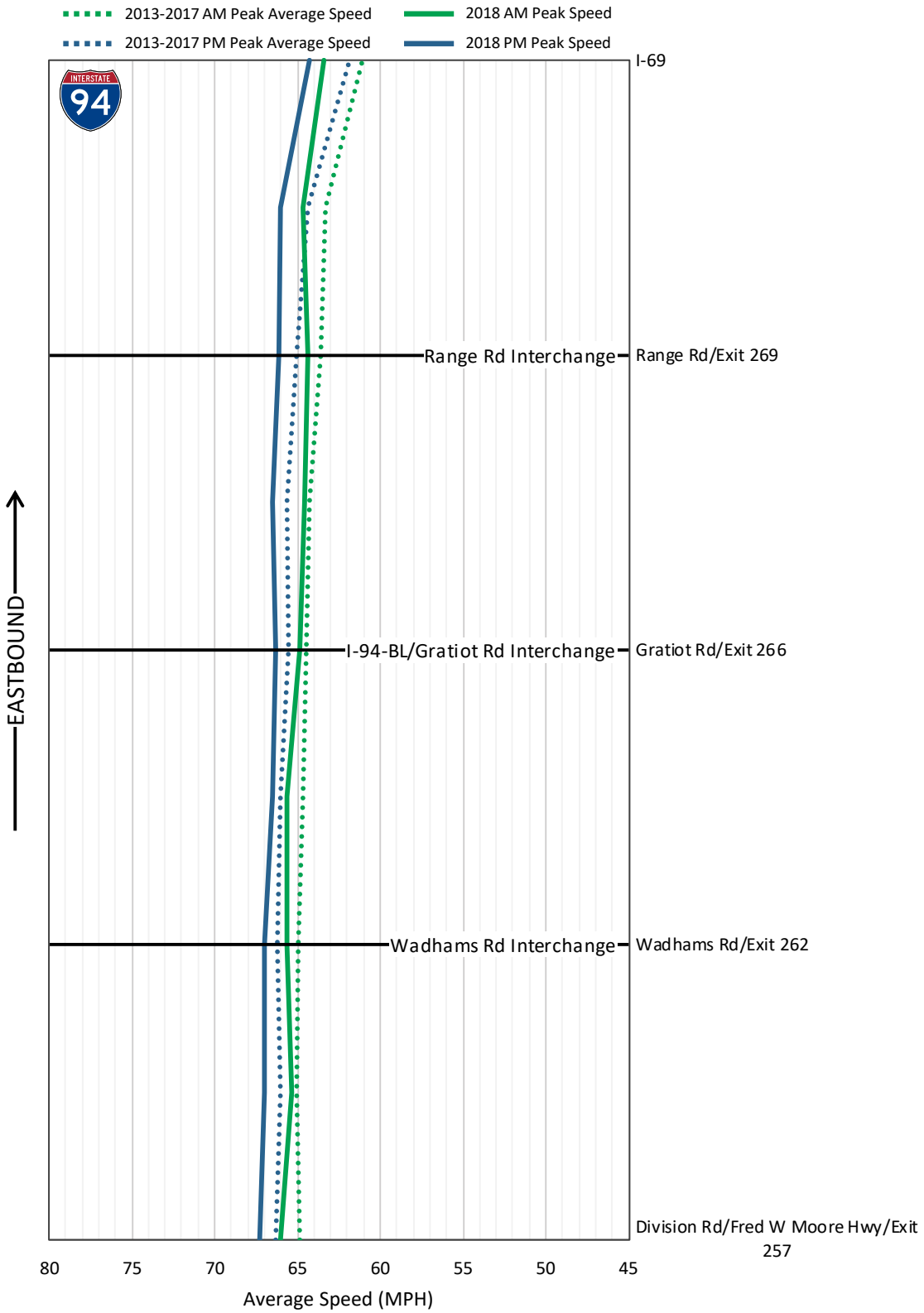


FIGURE 37. Bay Region Eastbound I-94 Average Speed

I-94: AVERAGE SPEED

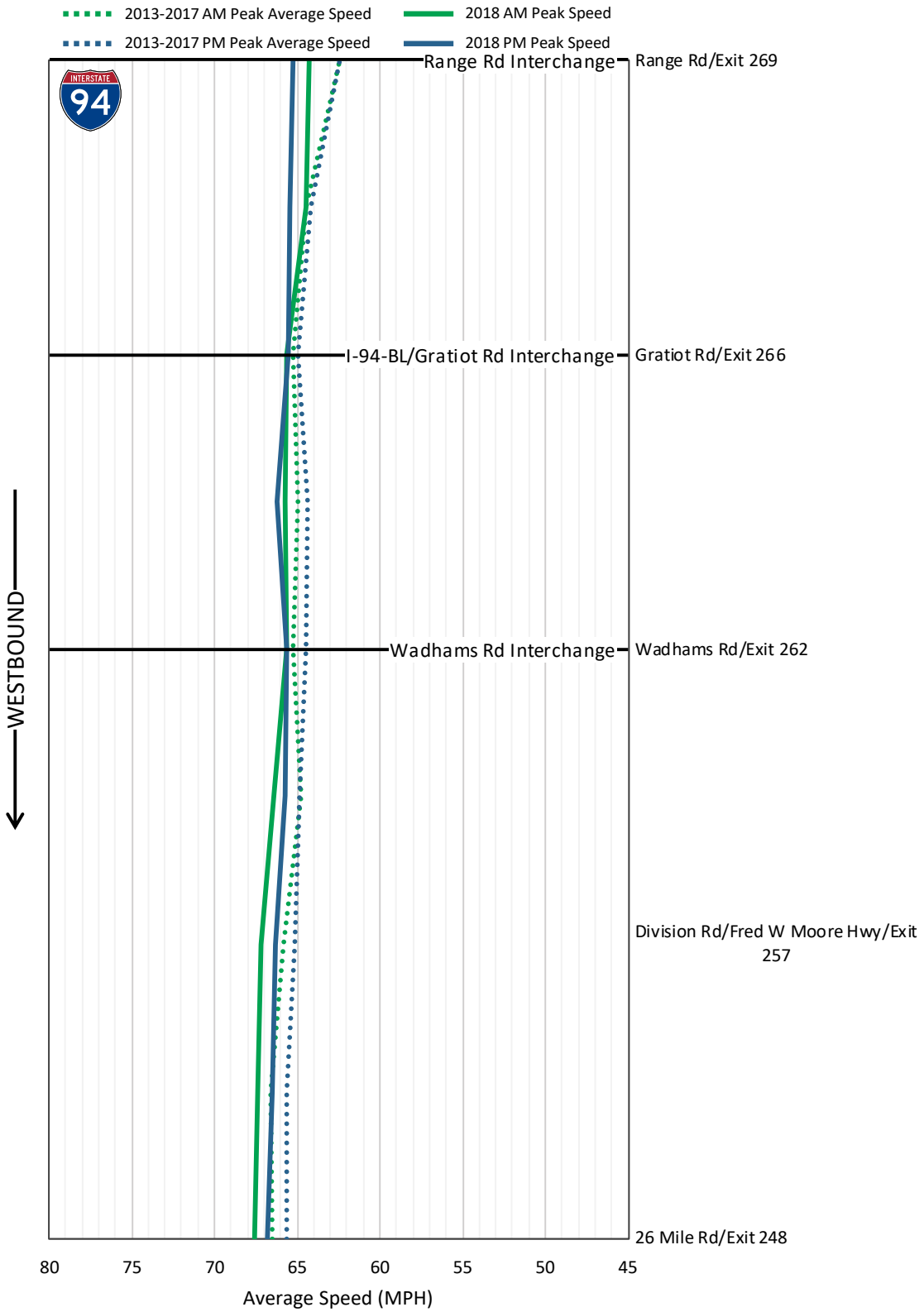


FIGURE 38. Bay Region Westbound I-94 Average Speed

I-94: LEVEL OF TRAVEL TIME RELIABILITY

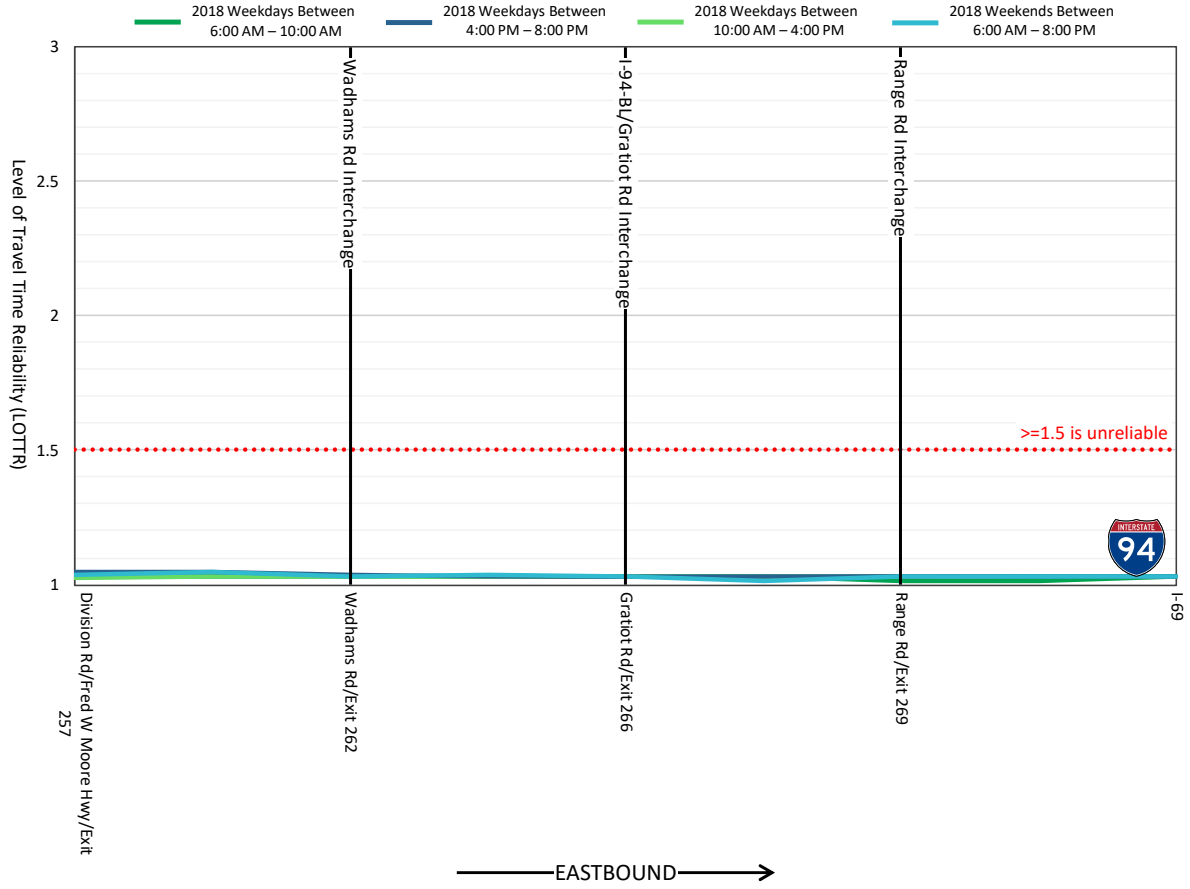


FIGURE 39. **Bay Region Eastbound I-94 Level of Travel Time Reliability**

I-94: LEVEL OF TRAVEL TIME RELIABILITY

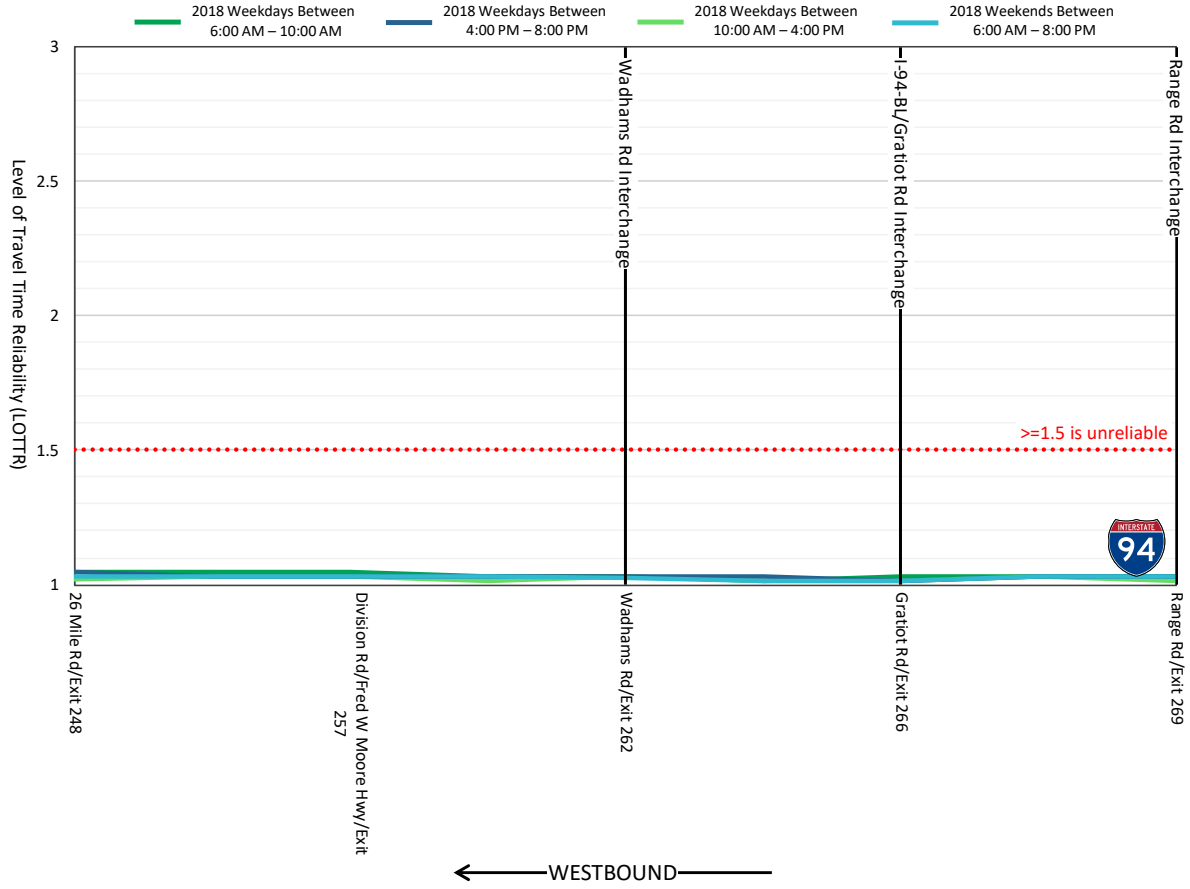
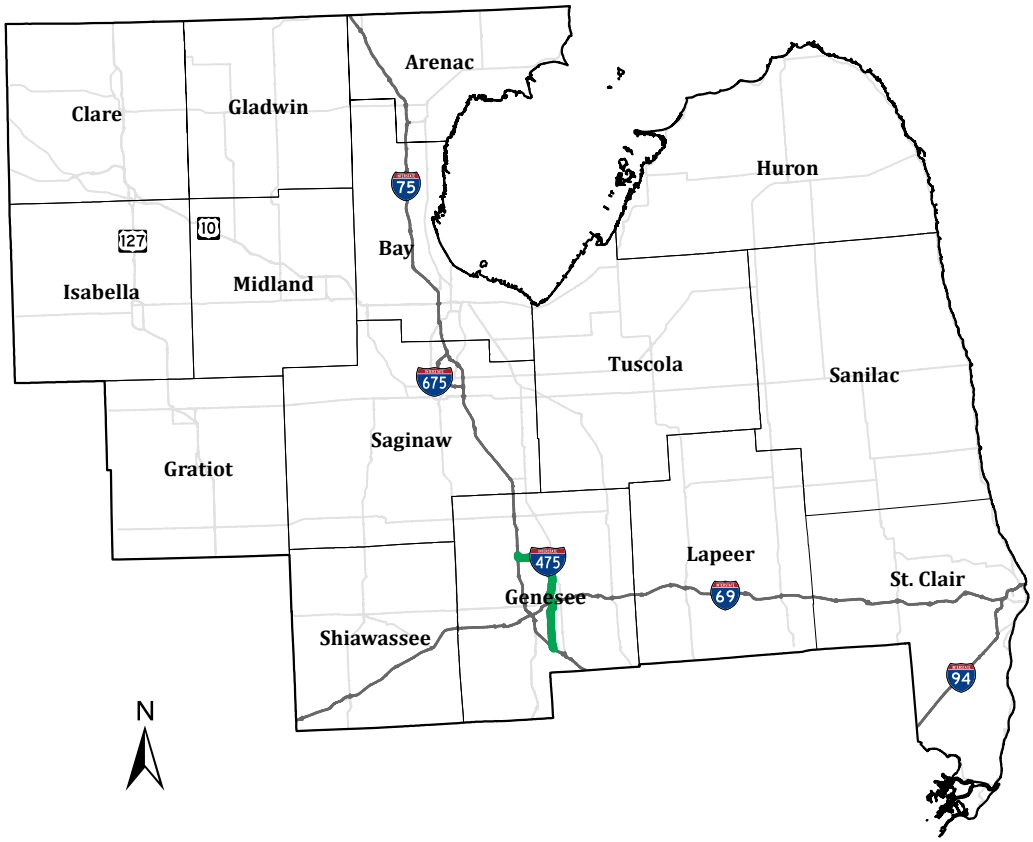
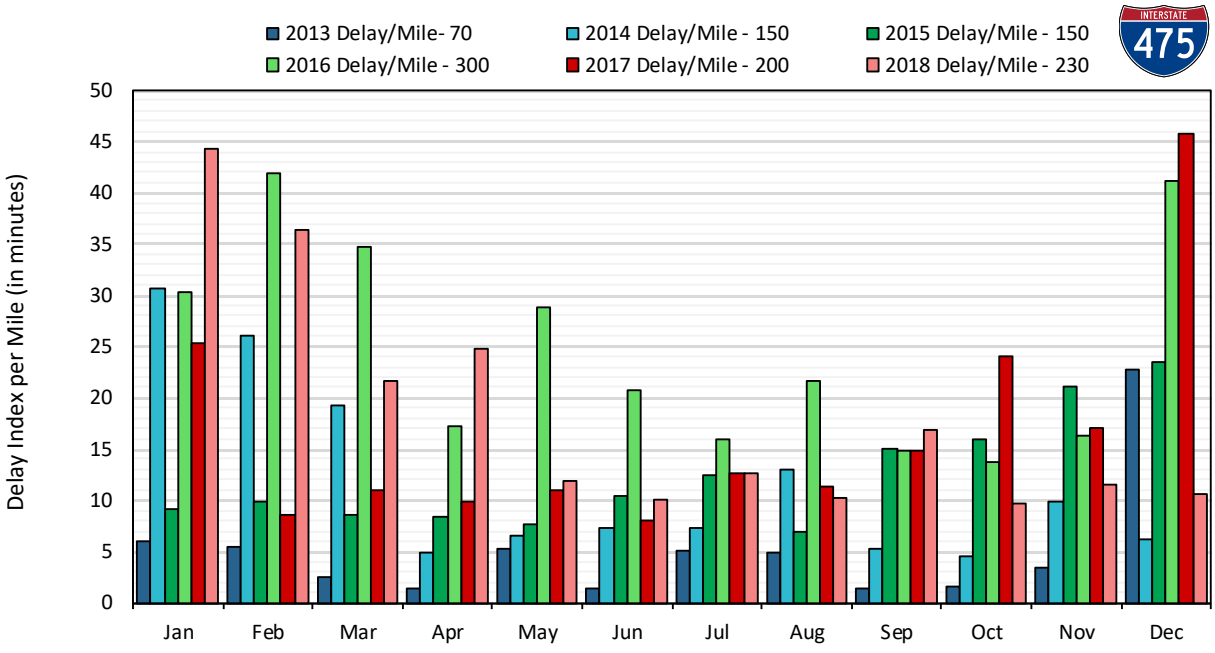


FIGURE 40. Bay Region Westbound I-94 Level of Travel Time Reliability

I-475: GENESEE COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 41. Genesee County I-475 Corridor Delay Index

I-475: AVERAGE SPEED

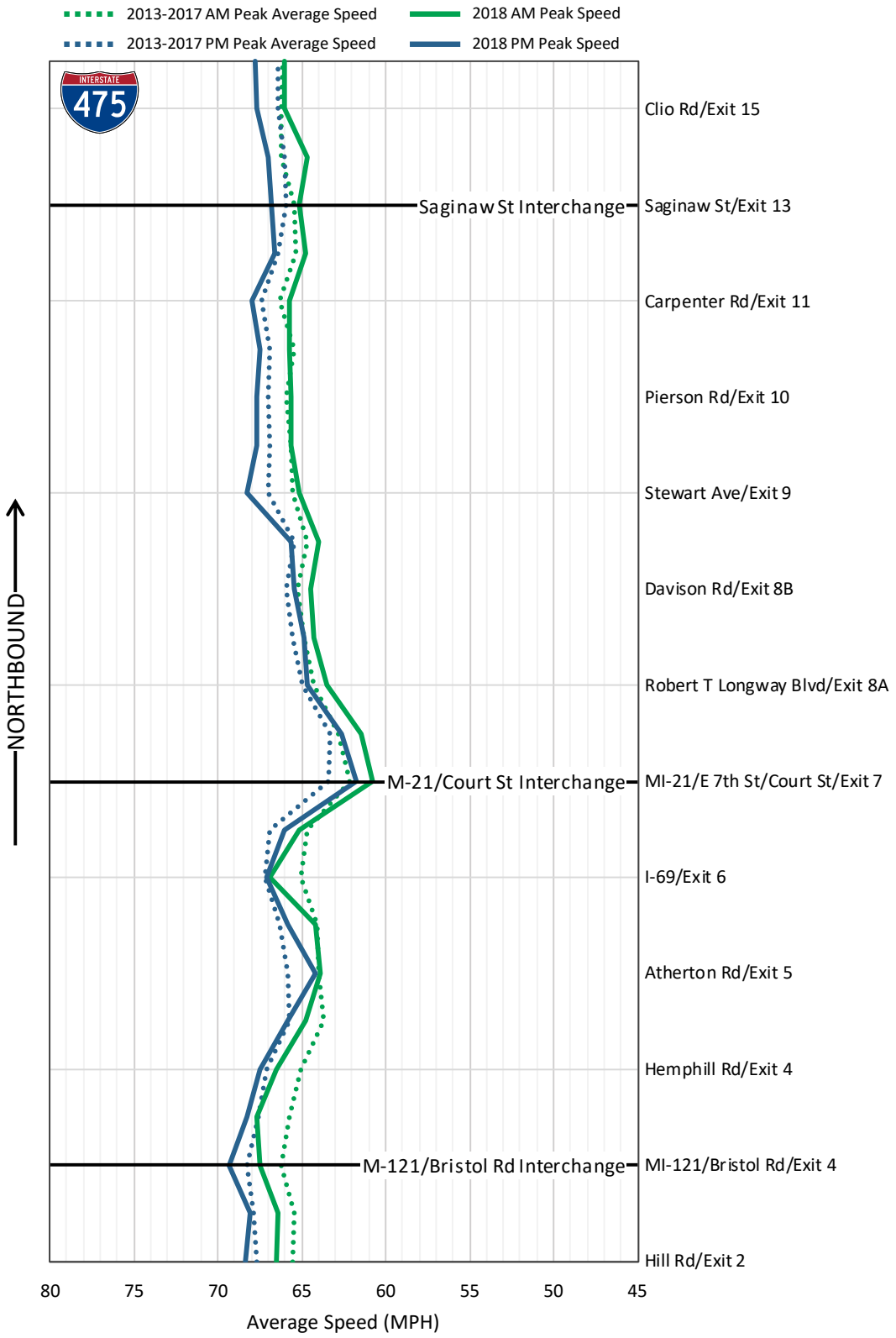


FIGURE 42. Bay Region Northbound I-475 Average Speed

I-475: AVERAGE SPEED

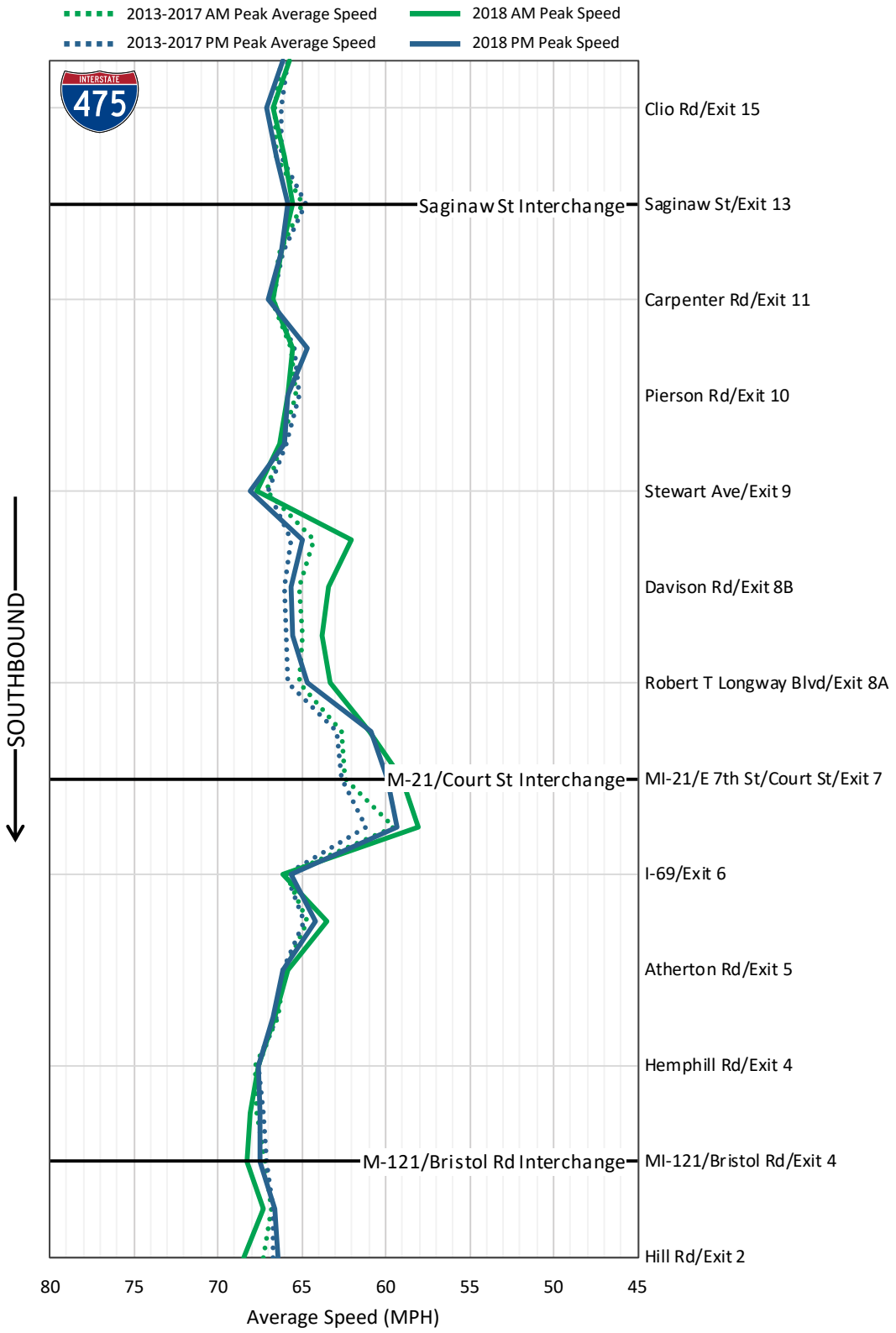


FIGURE 43. Bay Region Southbound I-475 Average Speed

I-475: LEVEL OF TRAVEL TIME RELIABILITY

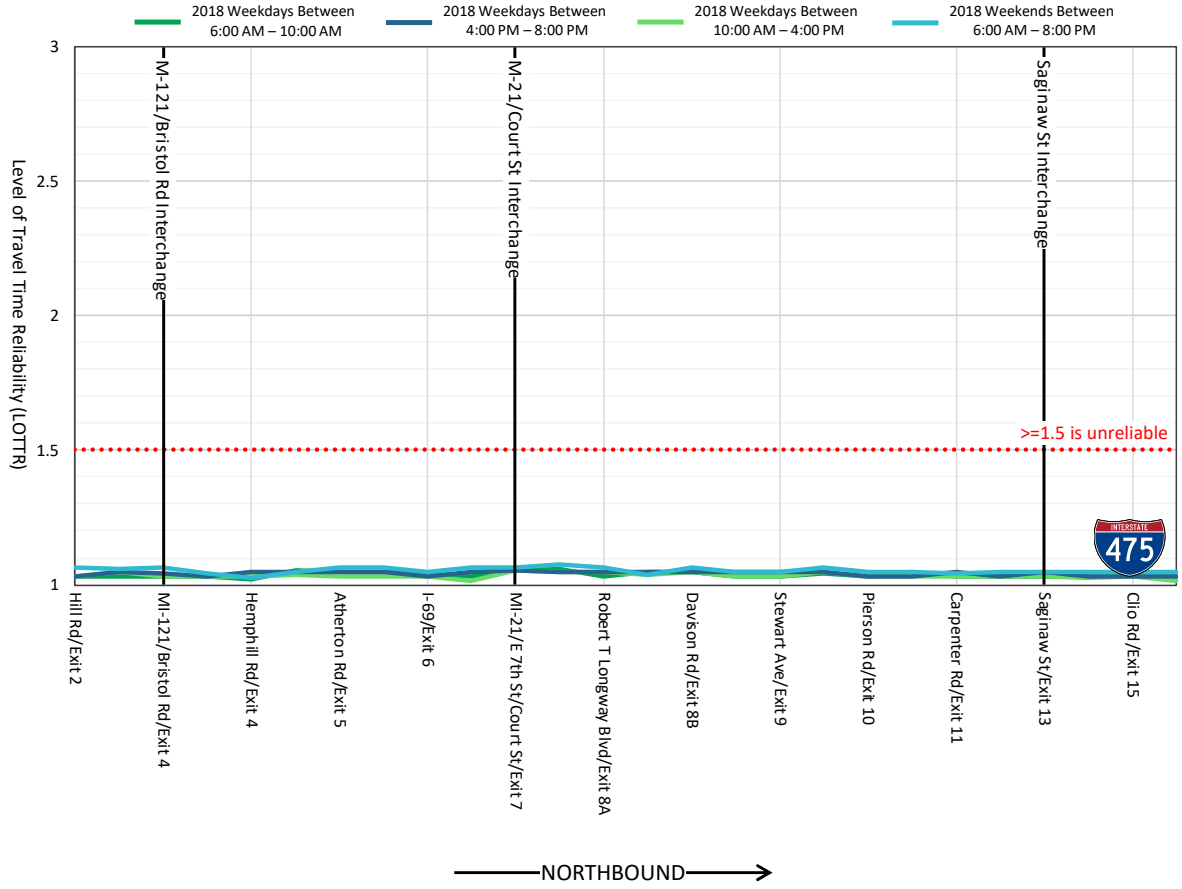


FIGURE 44. Bay Region Northbound I-475 Level of Travel Time Reliability

I-475: LEVEL OF TRAVEL TIME RELIABILITY

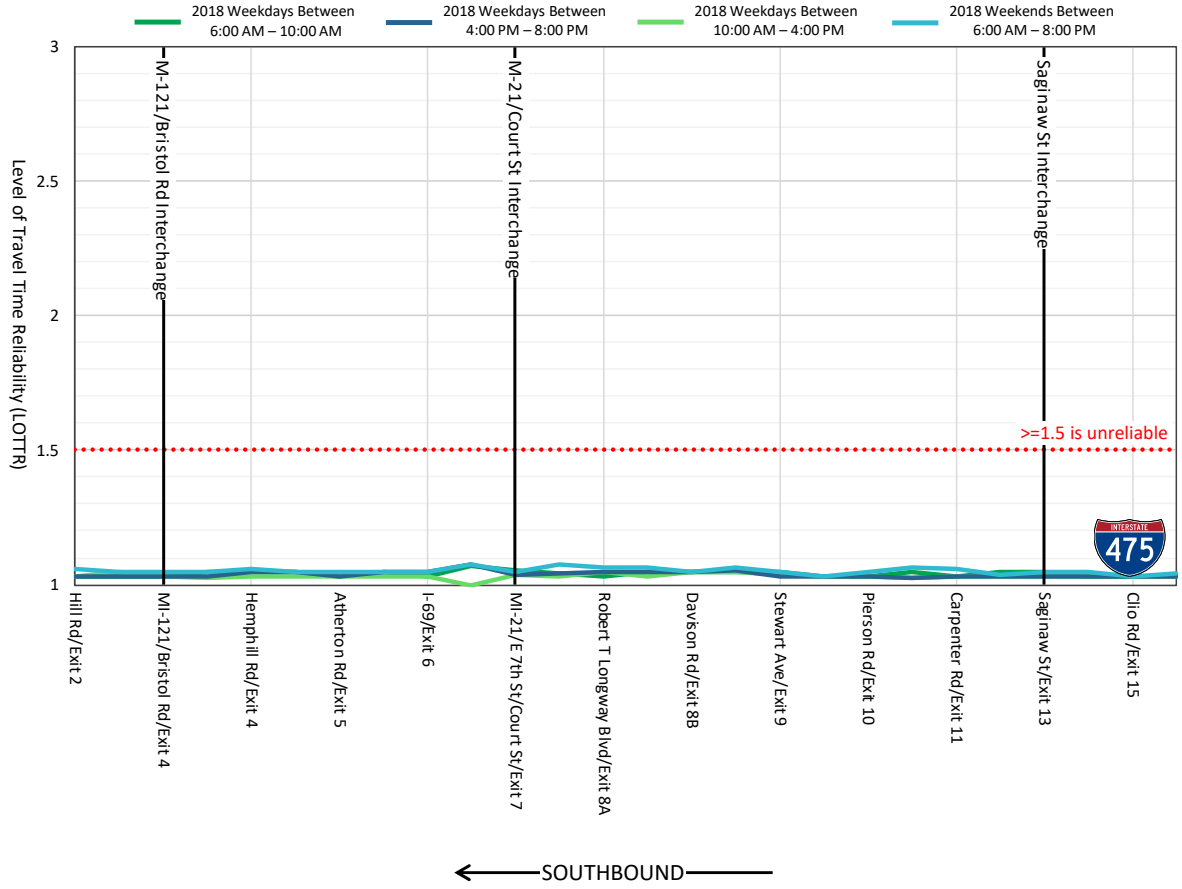
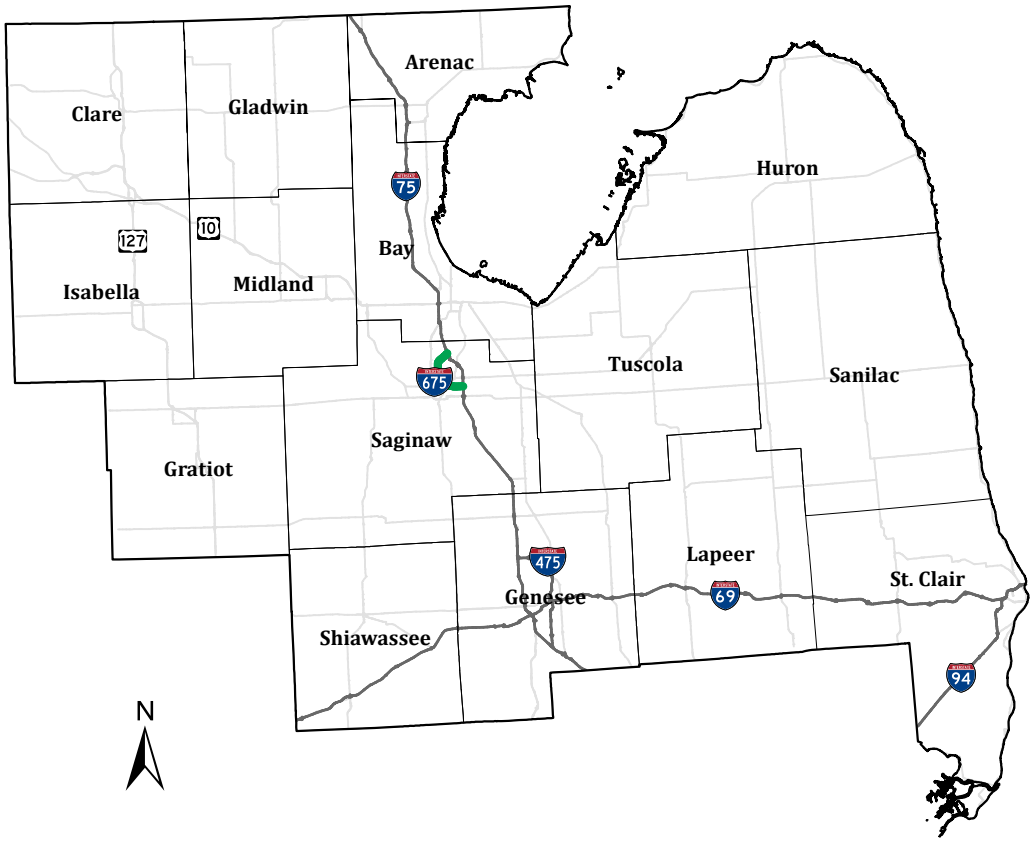
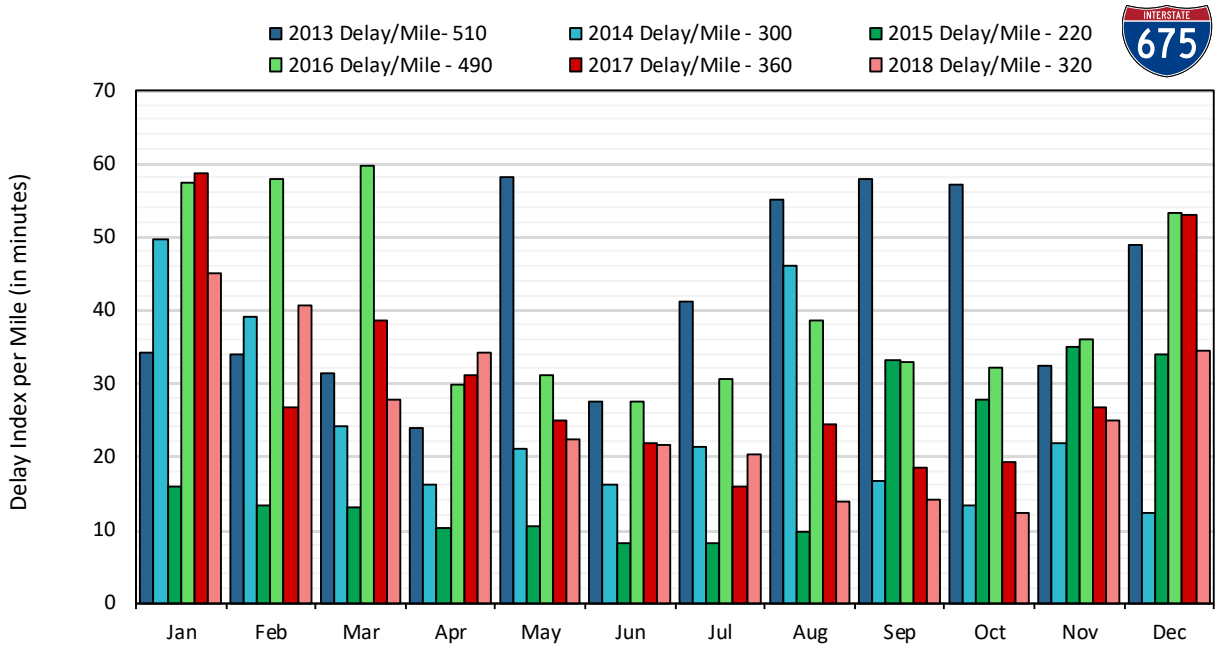


FIGURE 45. Bay Region Southbound I-475 Level of Travel Time Reliability

I-675: SAGINAW COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 46. Saginaw County I-675 Corridor Delay Index

I-675: AVERAGE SPEED

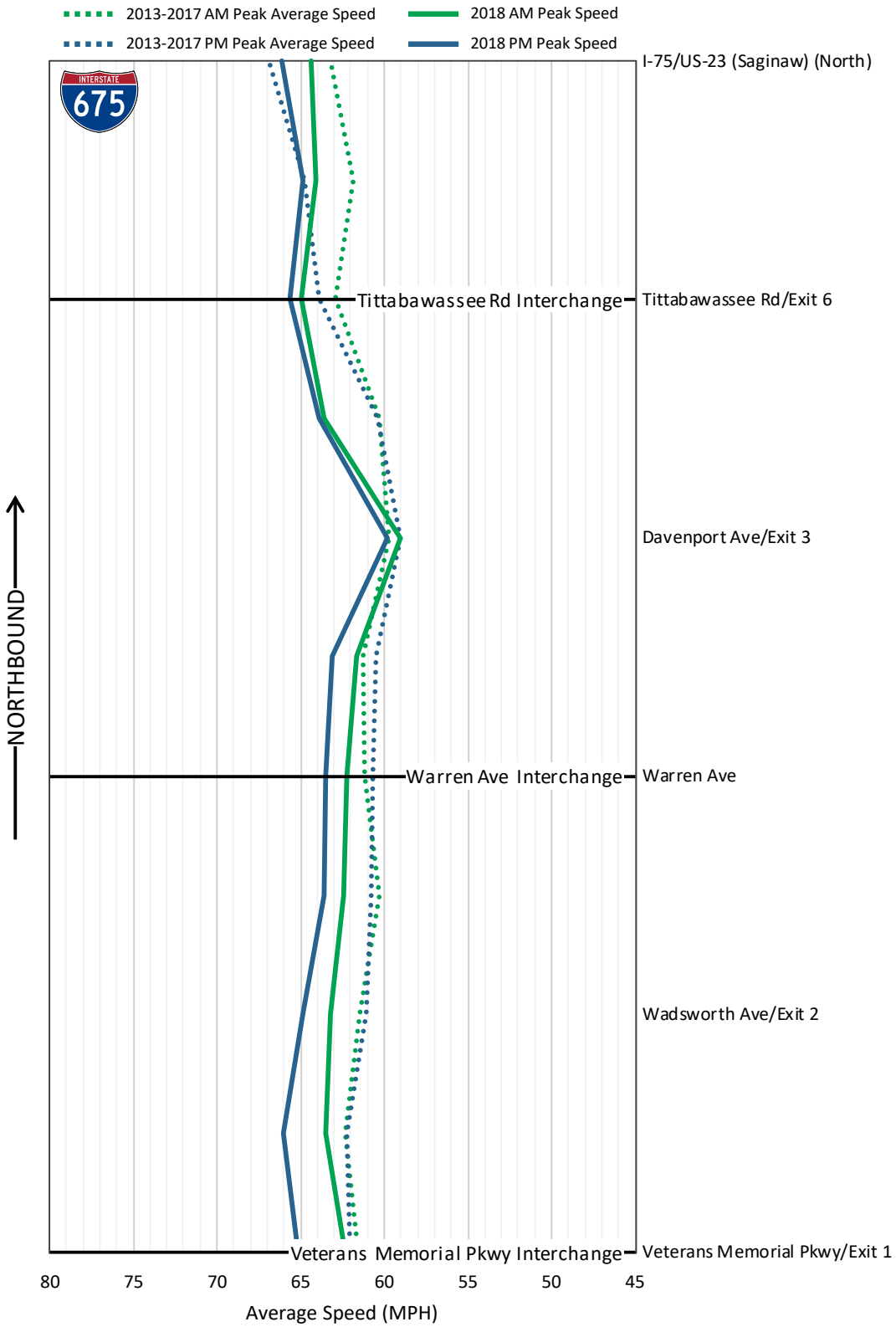


FIGURE 47. Bay Region Northbound I-675 Average Speed

I-675: AVERAGE SPEED

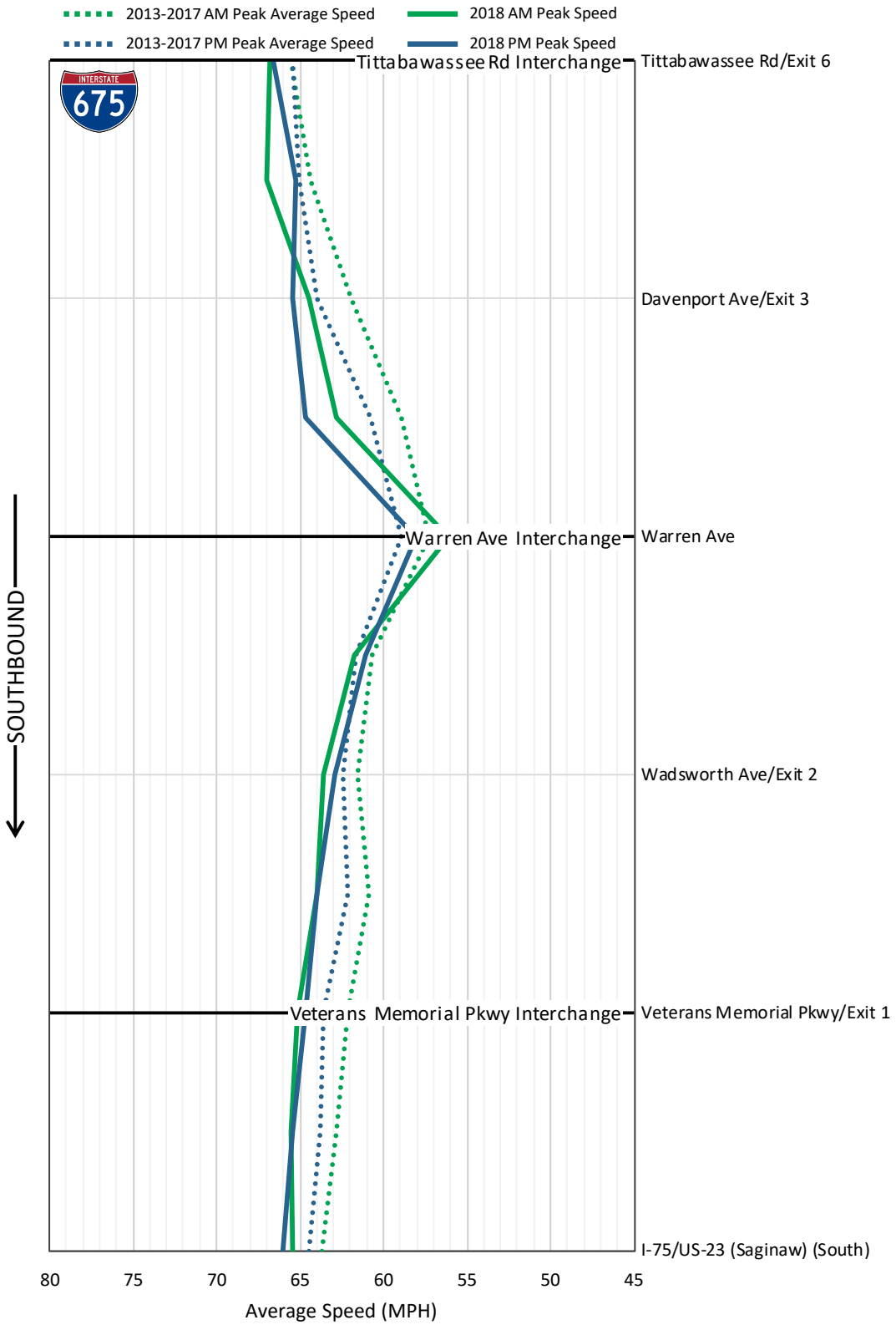
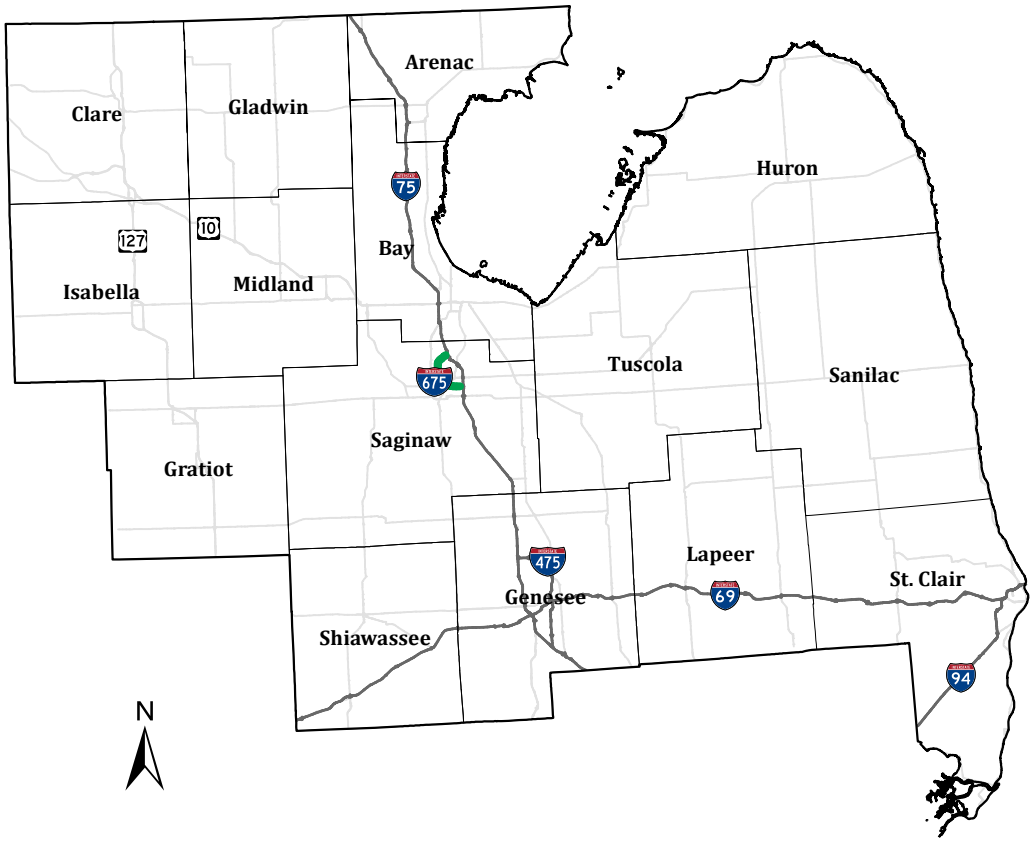
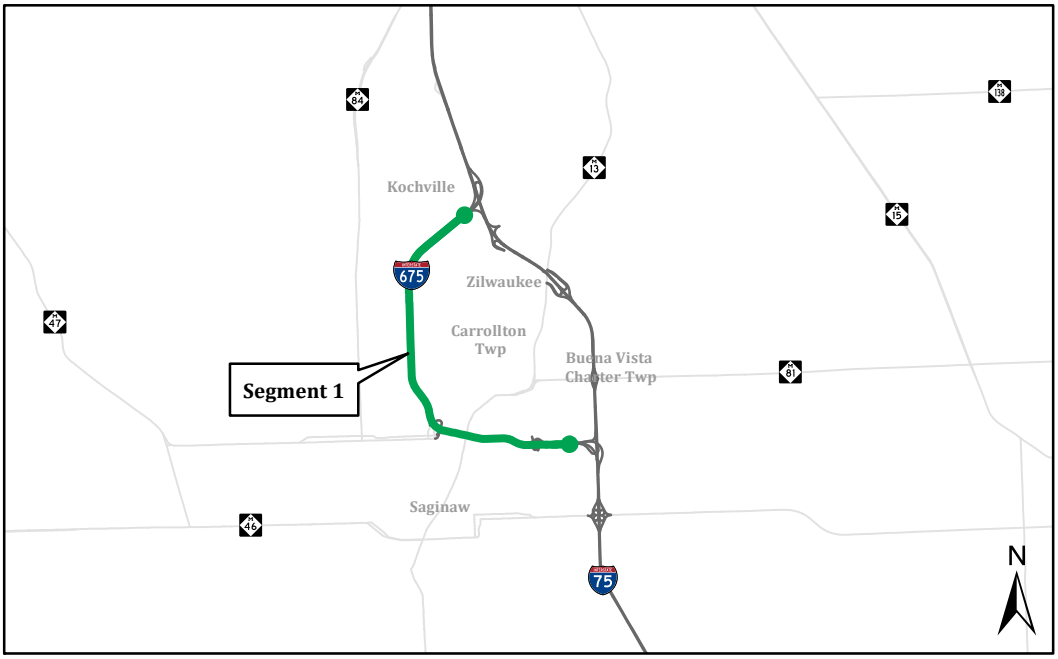


FIGURE 48. Bay Region Southbound I-675 Average Speed

I-675: TRAVEL TIME RELIABILITY



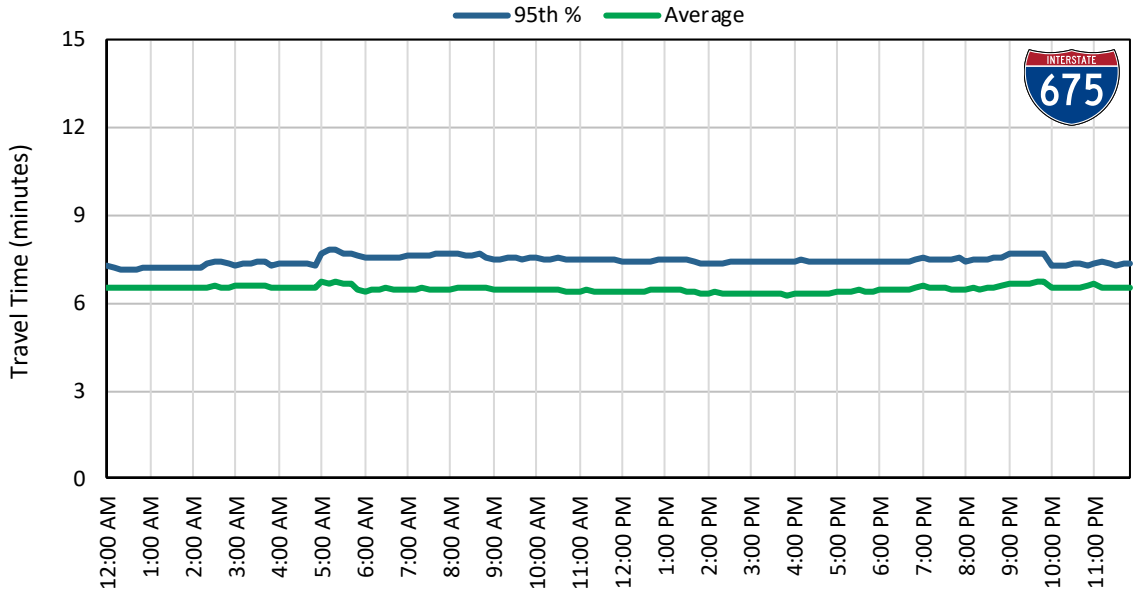
a) Bay Region



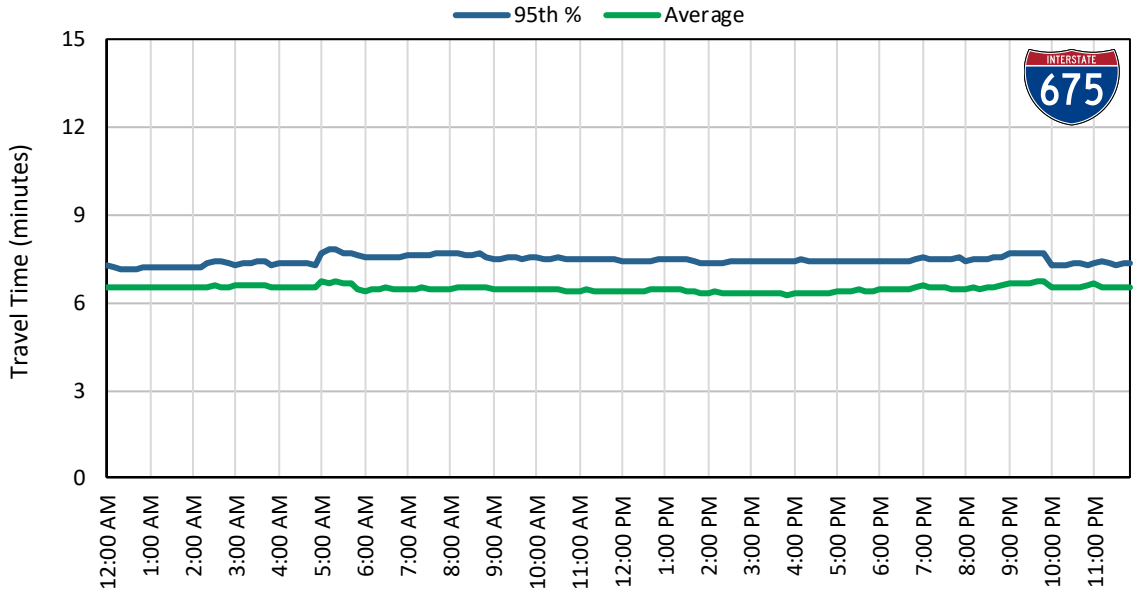
b) Saginaw, Michigan

FIGURE 49. Travel time Reliability: I-675

I-675: TRAVEL TIME RELIABILITY



a) Northbound



b) Southbound

FIGURE 50. Segment 1 - I-675 between I-75/US-23 (FLINT) and I-75/US-23

I-675: LEVEL OF TRAVEL TIME RELIABILITY

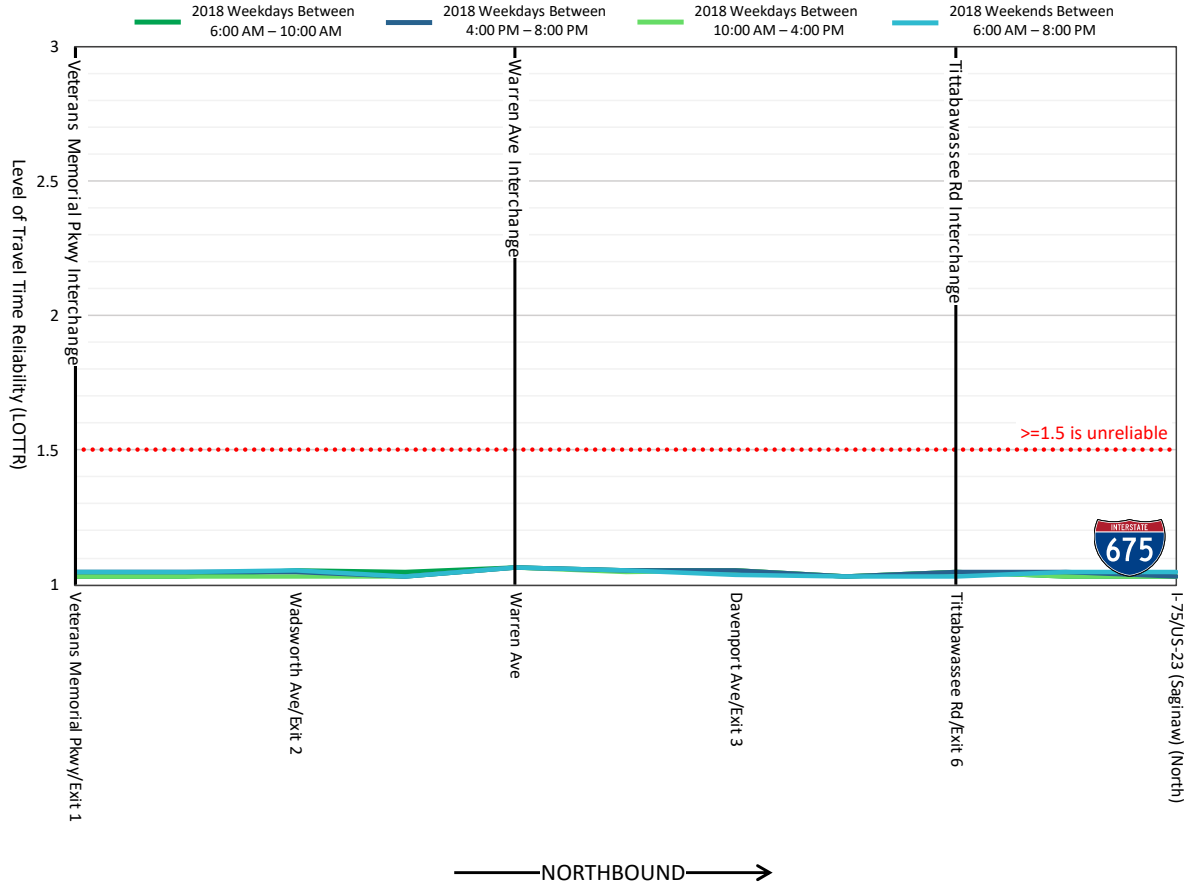


FIGURE 51. Bay Region Northbound I-675 Level of Travel Time Reliability

I-675: LEVEL OF TRAVEL TIME RELIABILITY

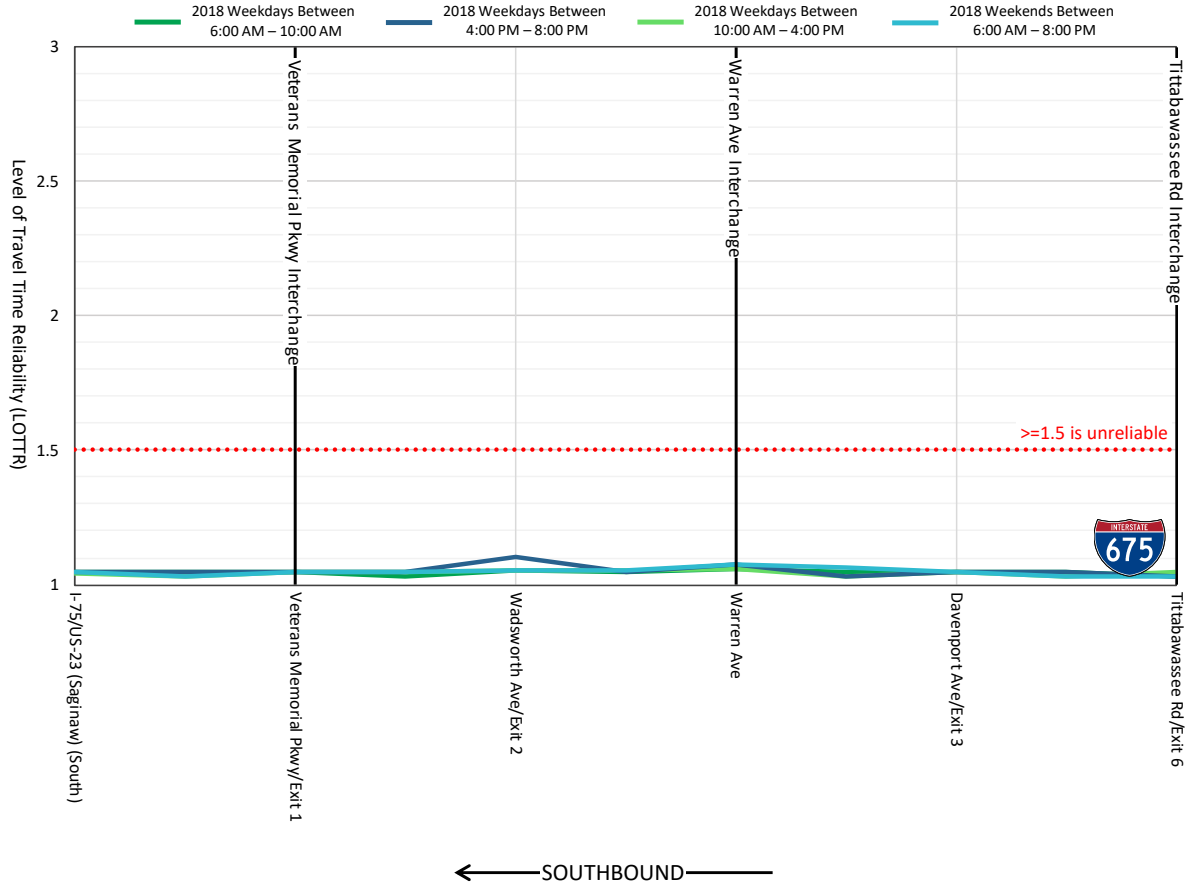
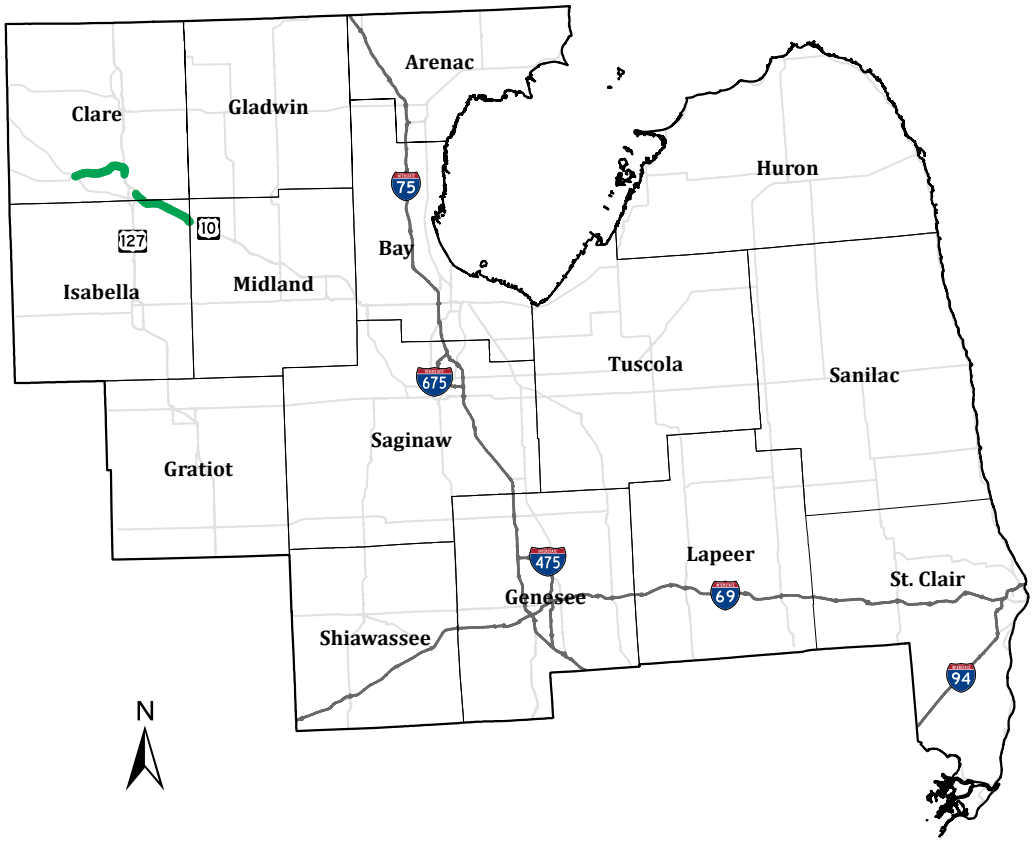
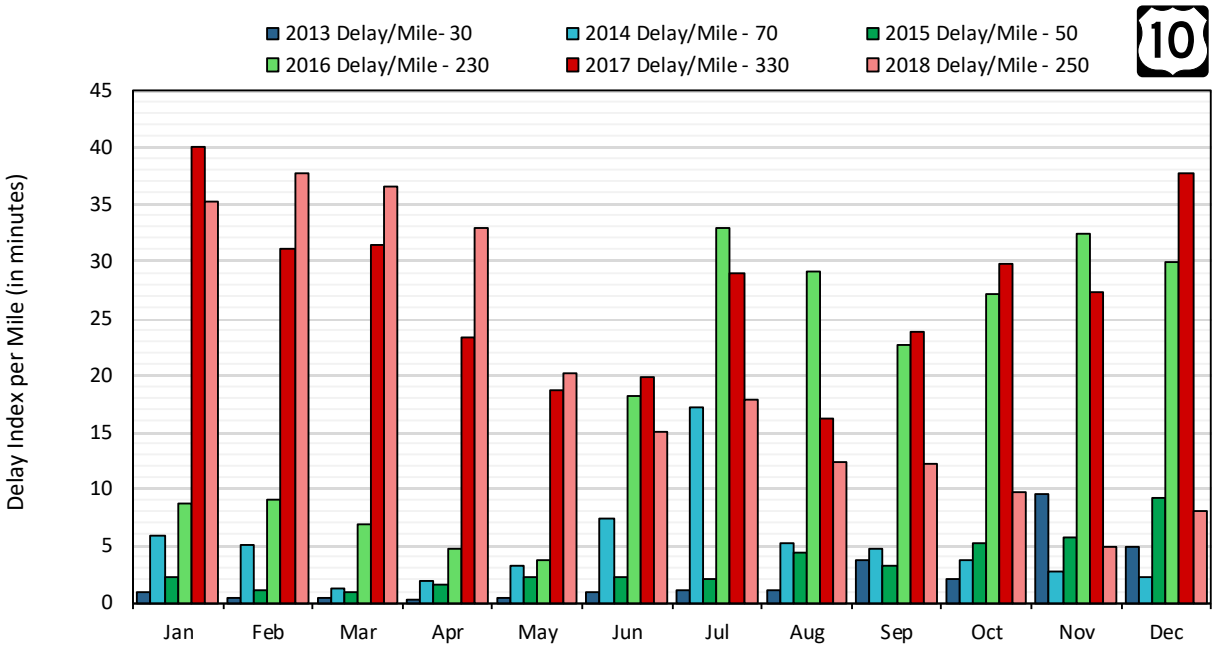


FIGURE 52. Bay Region Southbound I-675 Level of Travel Time Reliability

US-10: CLARE AND ISABELLA COUNTY DELAY INDEX



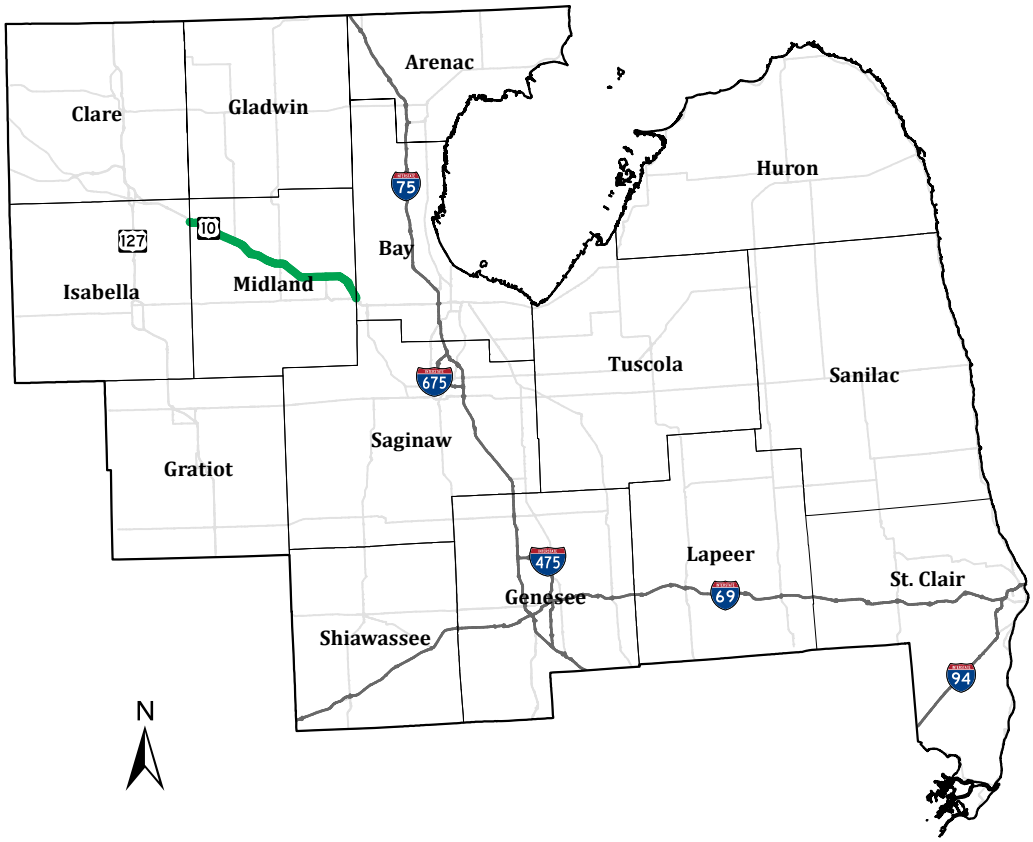
a) Segment Map



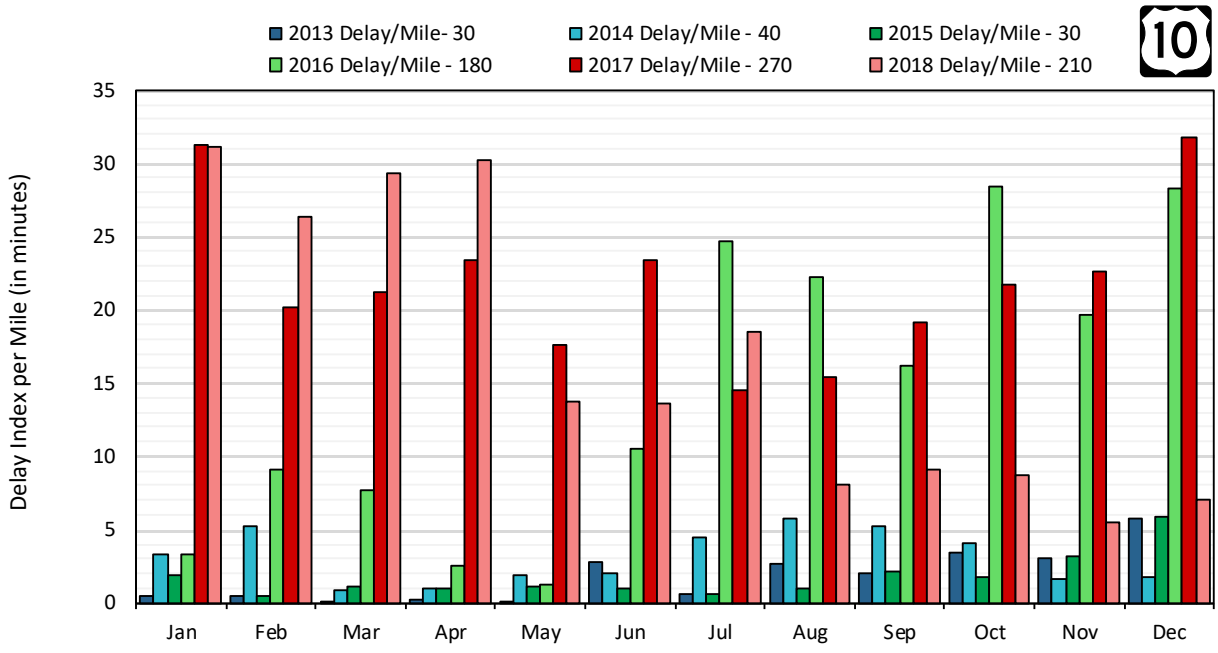
b) Delay Index Graph

FIGURE 53. Clare and Isabella County US-10 Corridor Delay Index

US-10: MIDLAND COUNTY DELAY INDEX



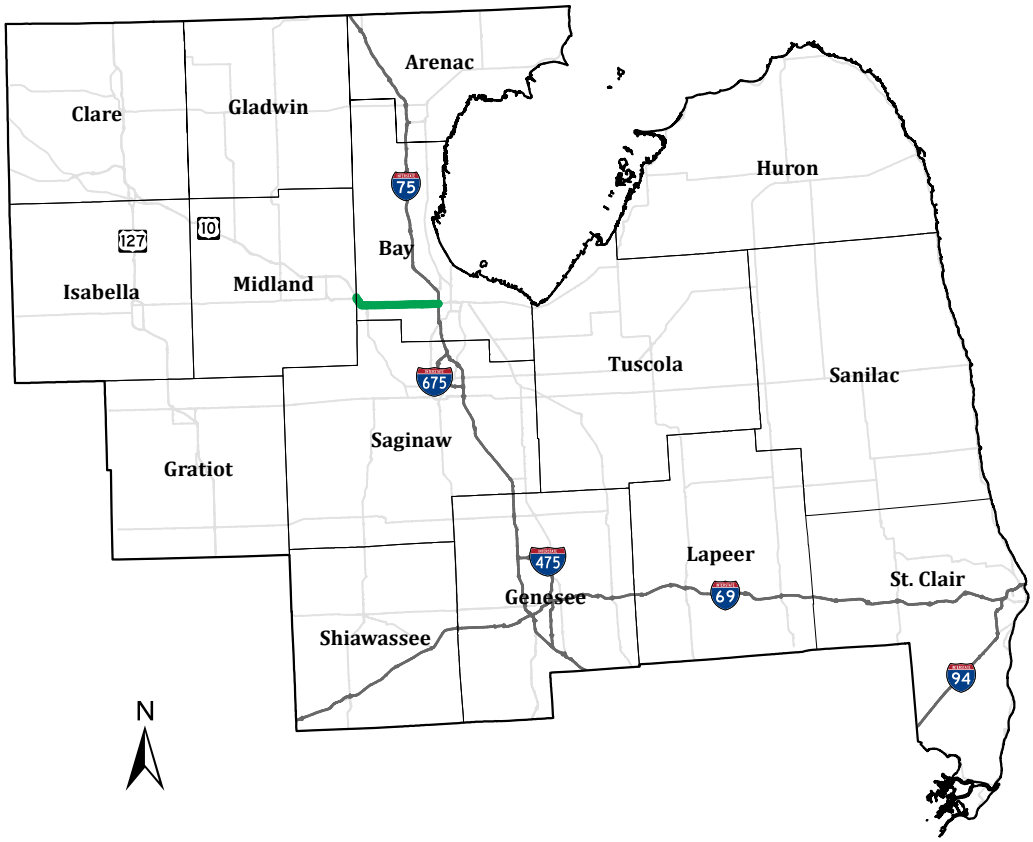
a) Segment Map



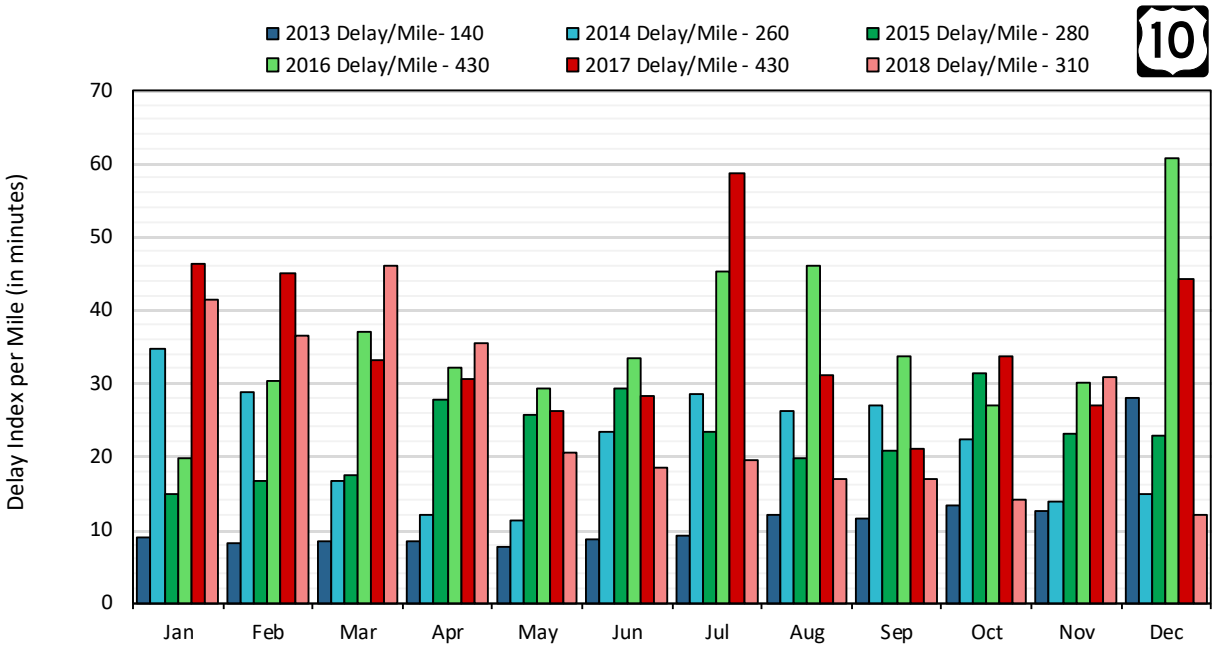
b) Delay Index Graph

FIGURE 54. Midland County US-10 Corridor Delay Index

US-10: BAY COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 55. Bay County US-10 Corridor Delay Index

US-10: AVERAGE SPEED

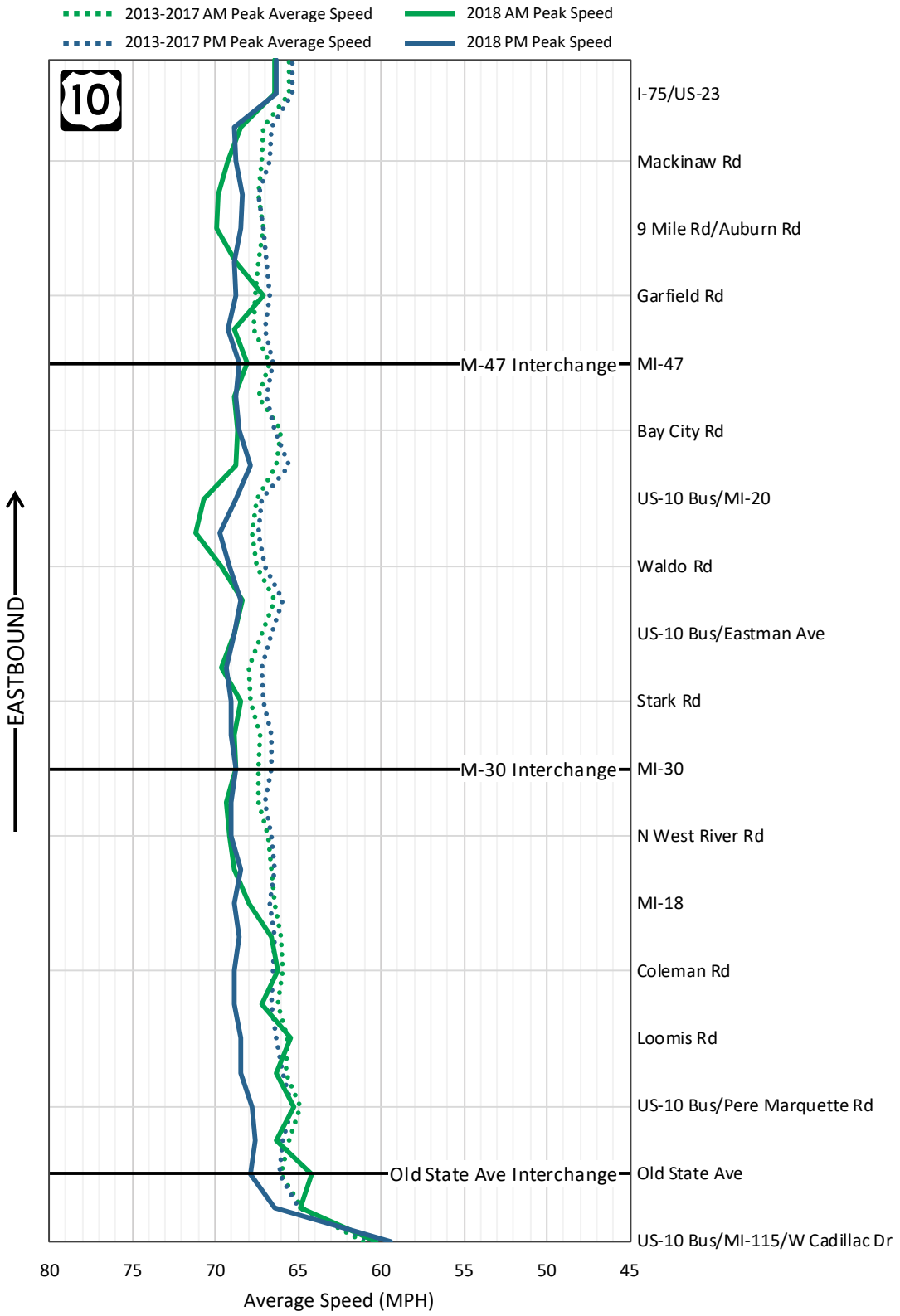


FIGURE 56. Bay Region Eastbound US-10 Average Speed

US-10: AVERAGE SPEED

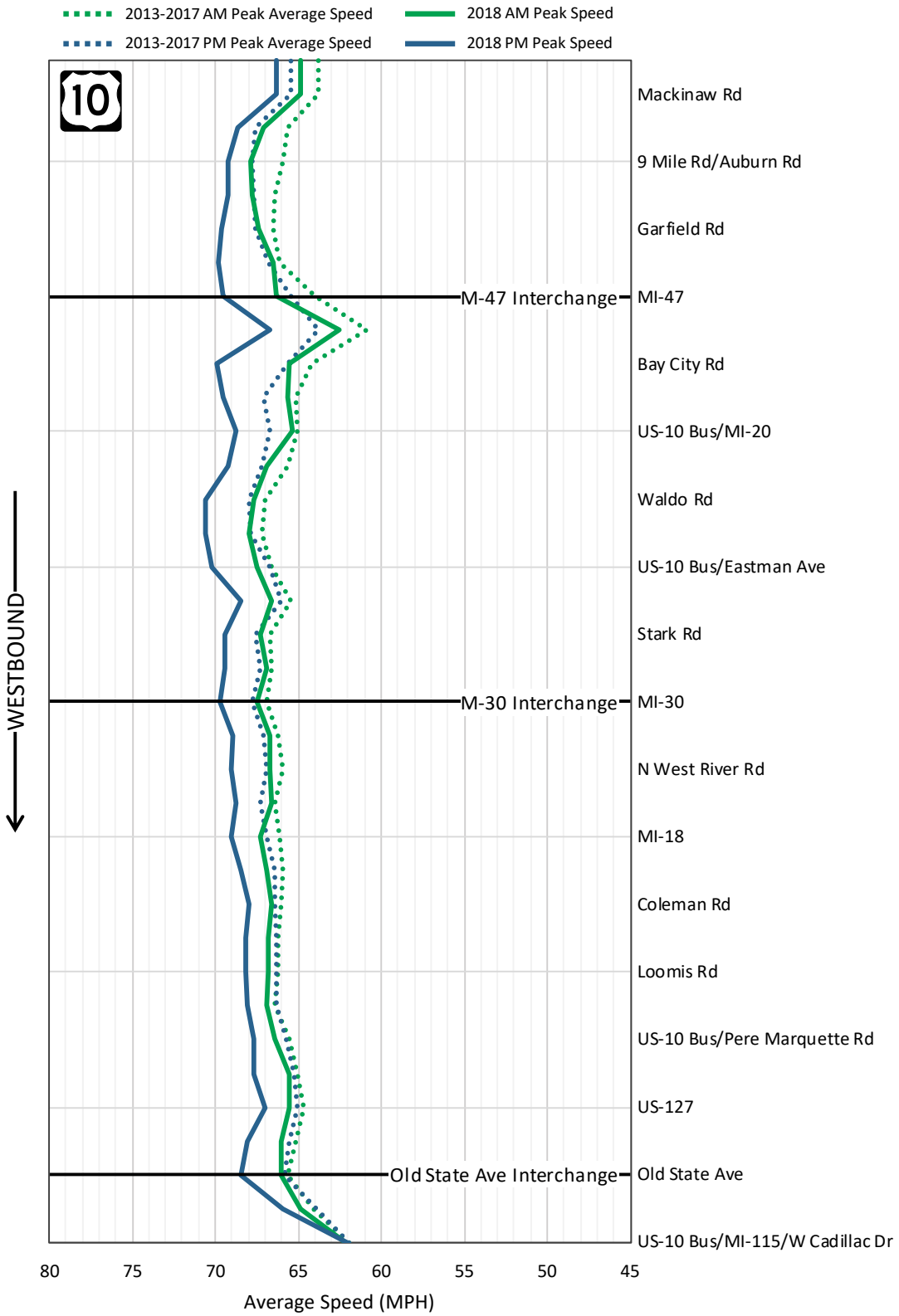


FIGURE 57. Bay Region Westbound US-10 Average Speed

US-10: LEVEL OF TRAVEL TIME RELIABILITY

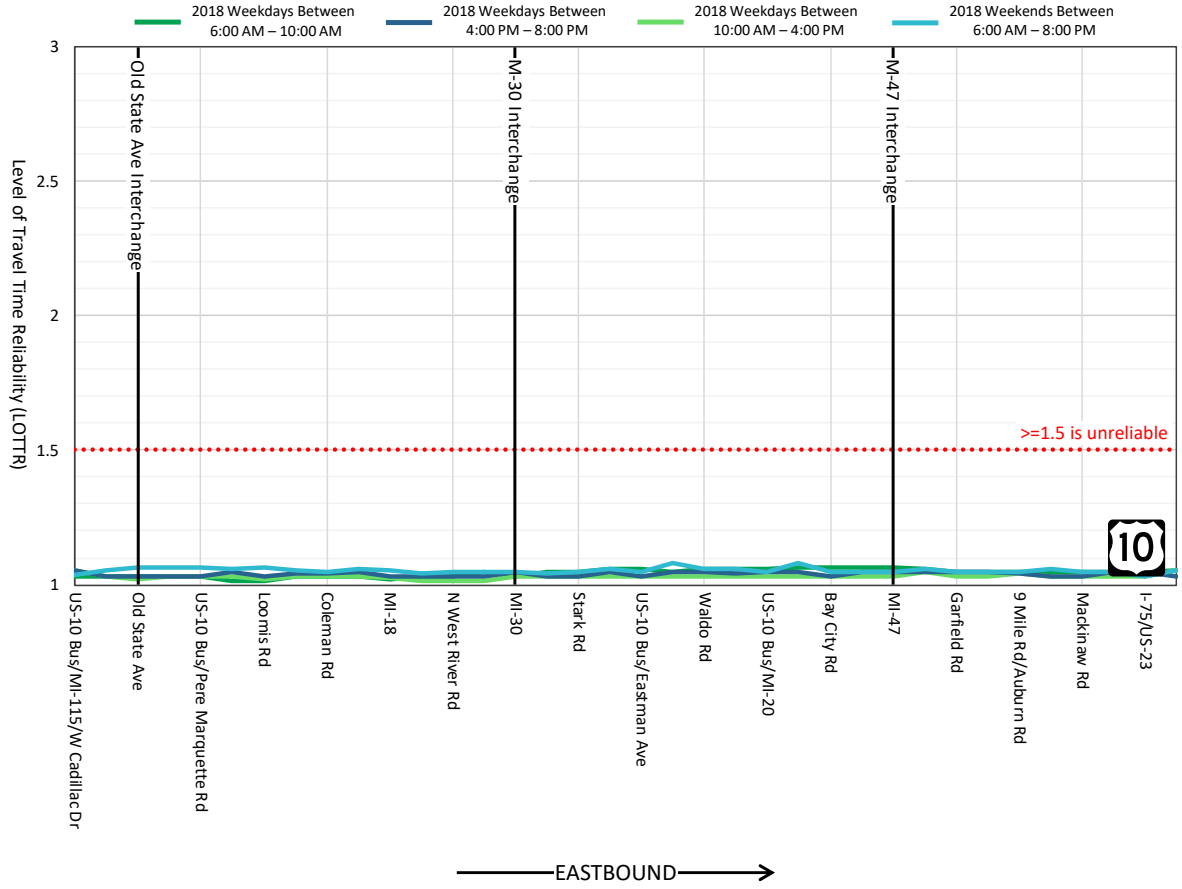


FIGURE 58. **Bay Region Eastbound US-10 Level of Travel Time Reliability**

US-10: LEVEL OF TRAVEL TIME RELIABILITY

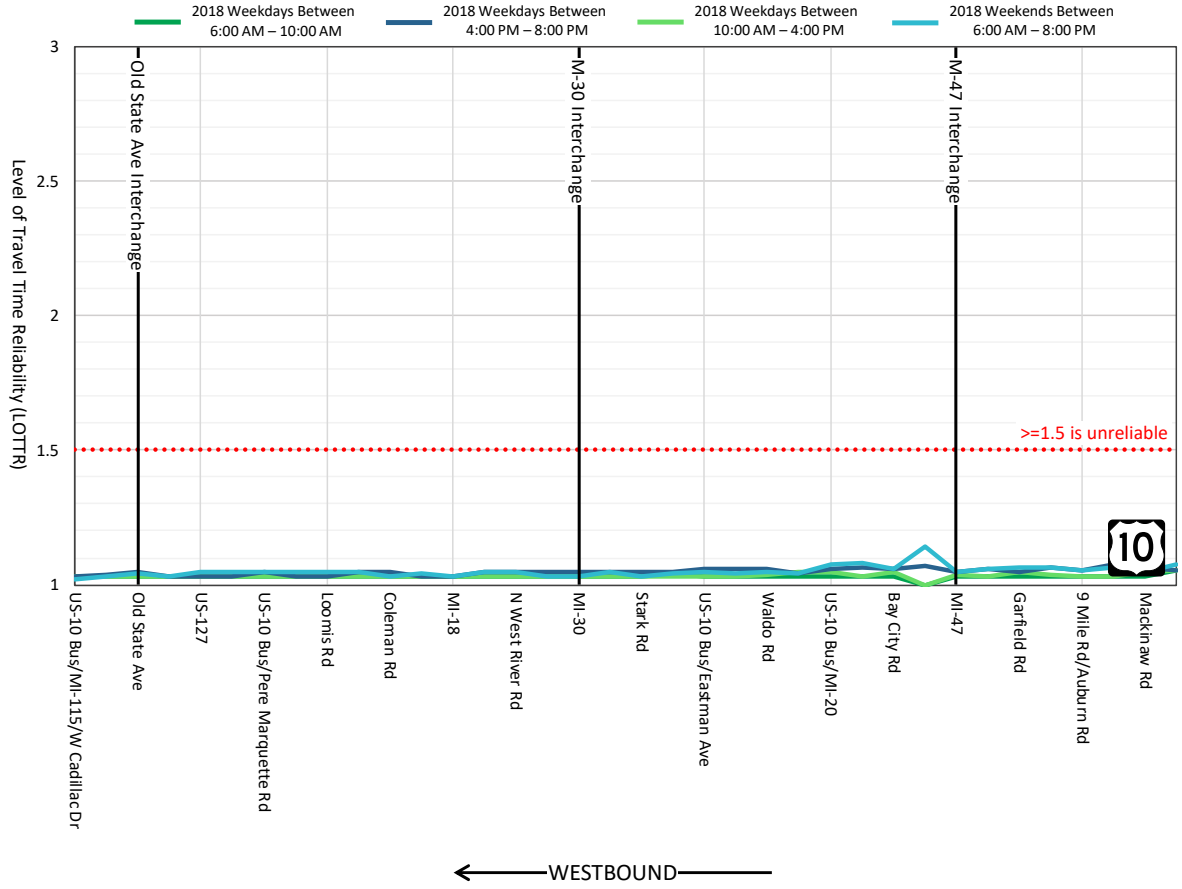
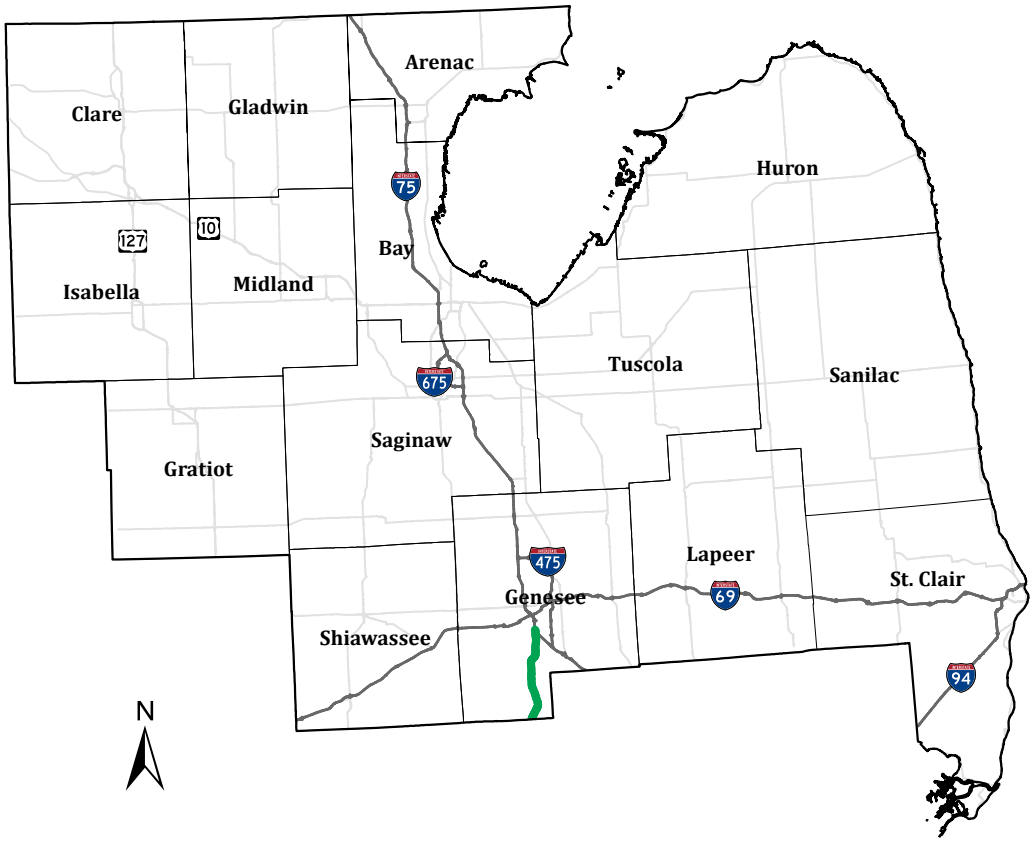
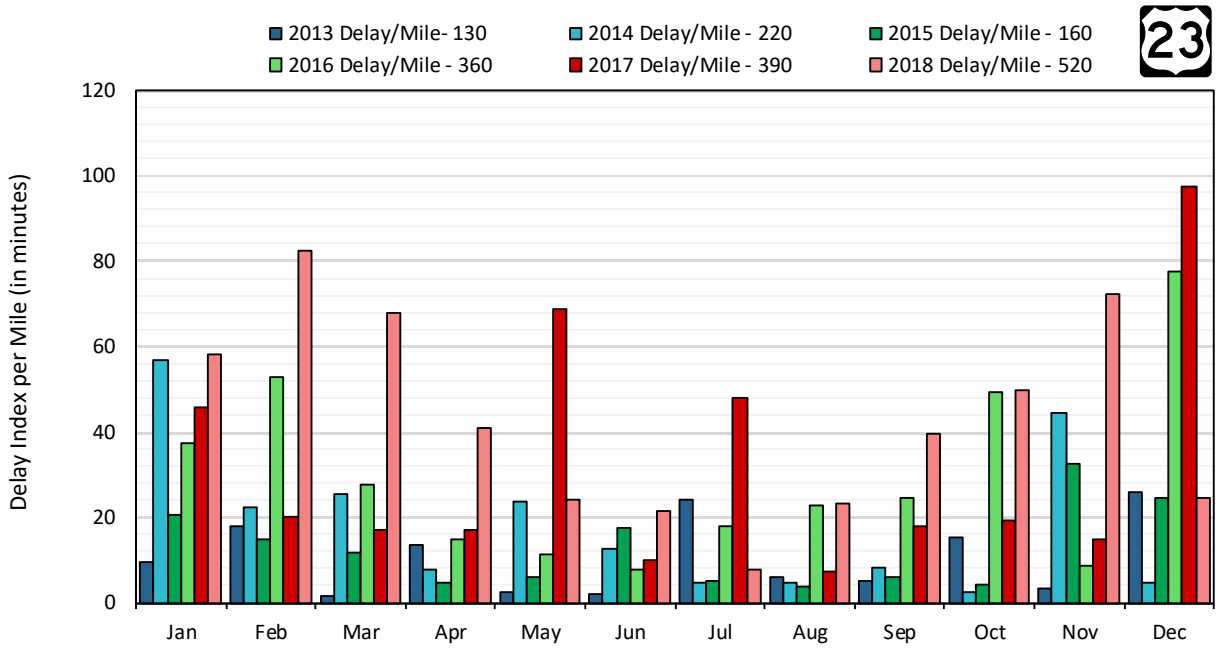


FIGURE 59. Bay Region Westbound US-10 Level of Travel Time Reliability

US-23: GENESEE COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 60. Genesee County US-23 Corridor Delay Index

US-23: AVERAGE SPEED

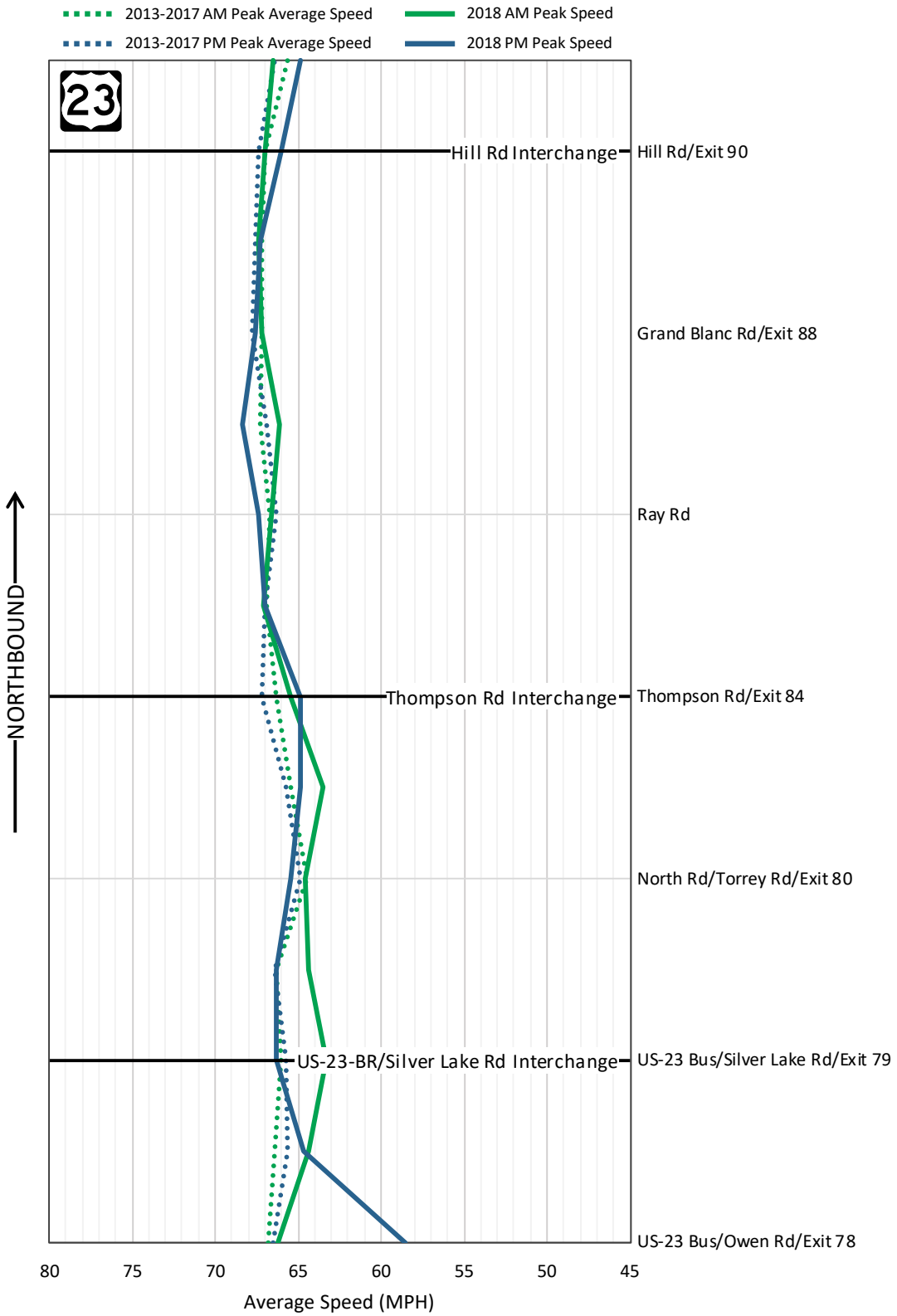


FIGURE 61. Bay Region Northbound US-23 Average Speed

US-23: AVERAGE SPEED

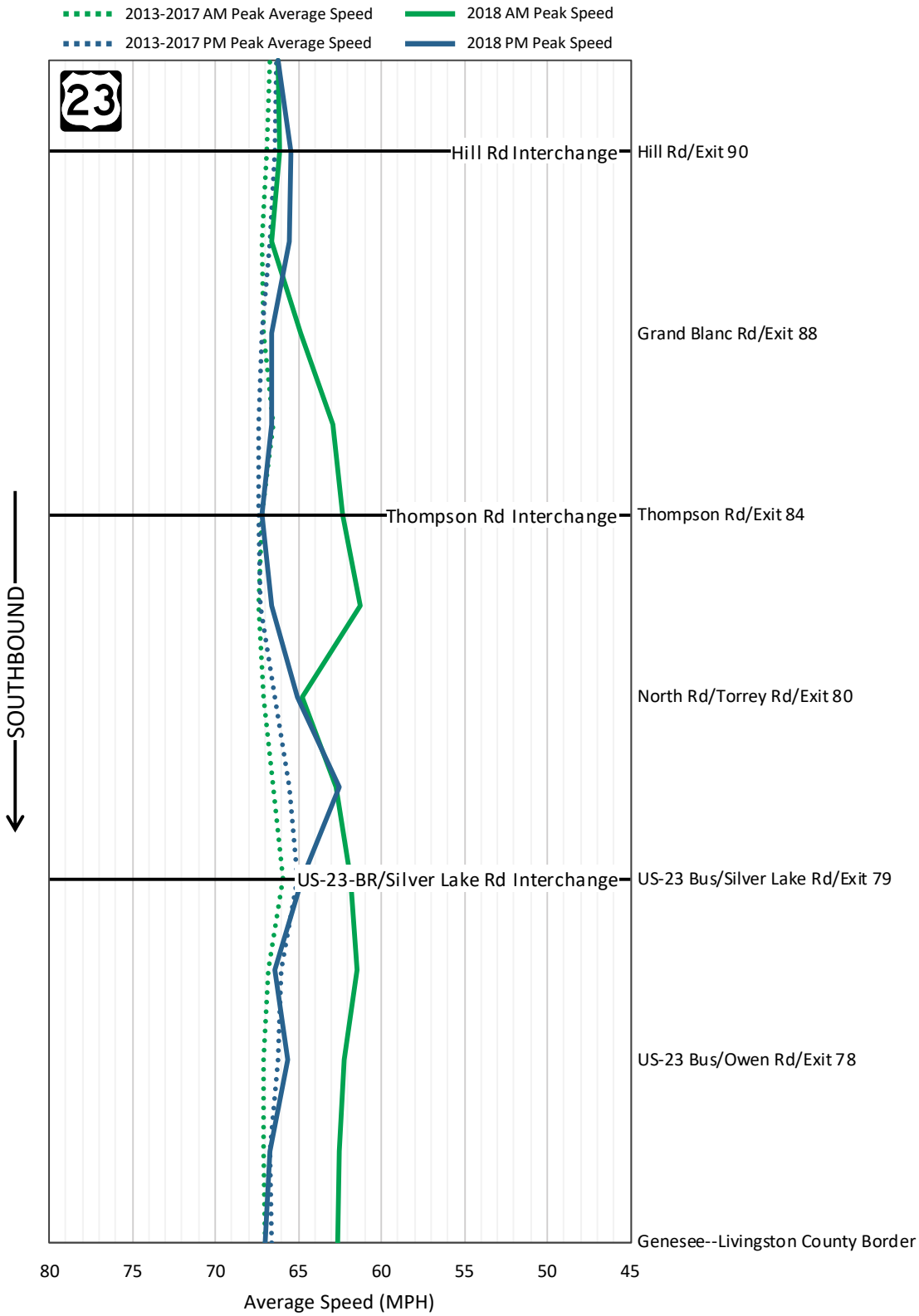


FIGURE 62. Bay Region Southbound US-23 Average Speed

US-23: LEVEL OF TRAVEL TIME RELIABILITY

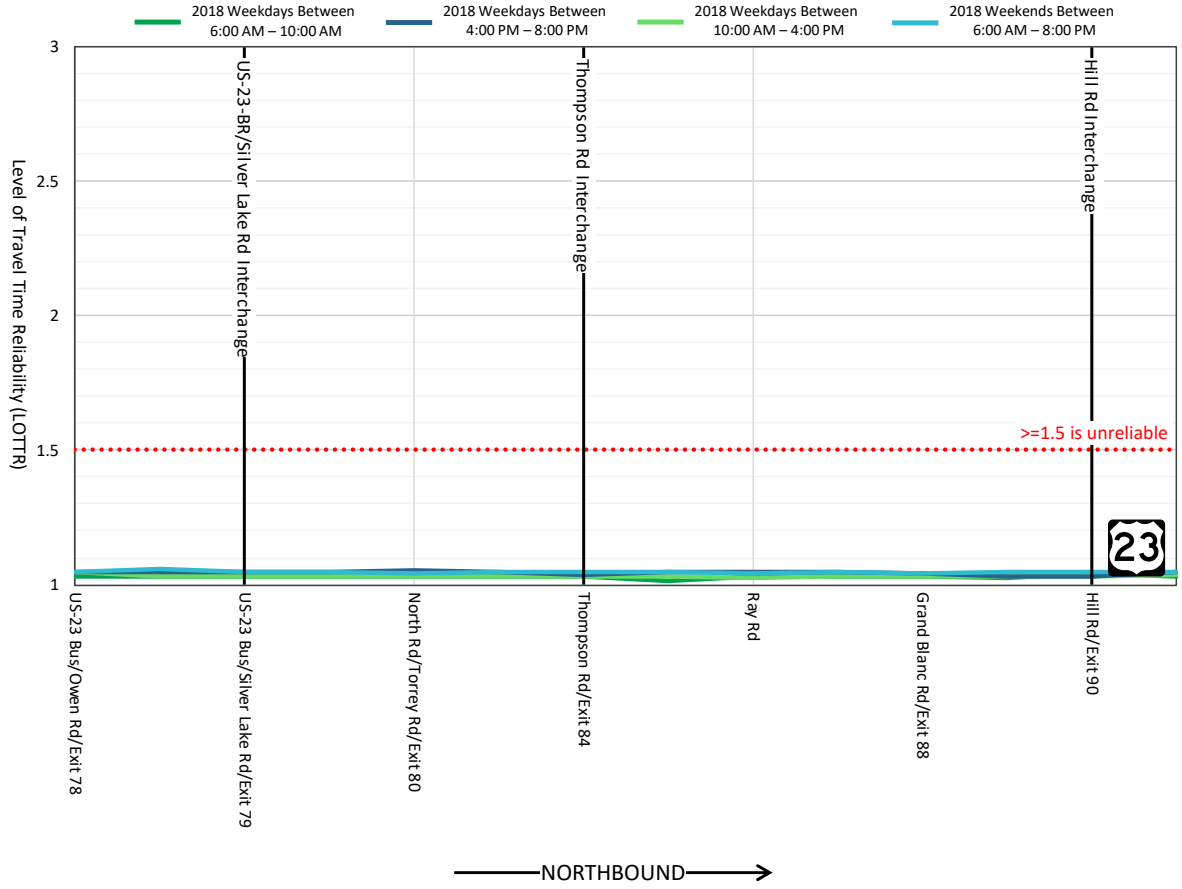


FIGURE 63. Bay Region Northbound US-23 Level of Travel Time Reliability

US-23: LEVEL OF TRAVEL TIME RELIABILITY

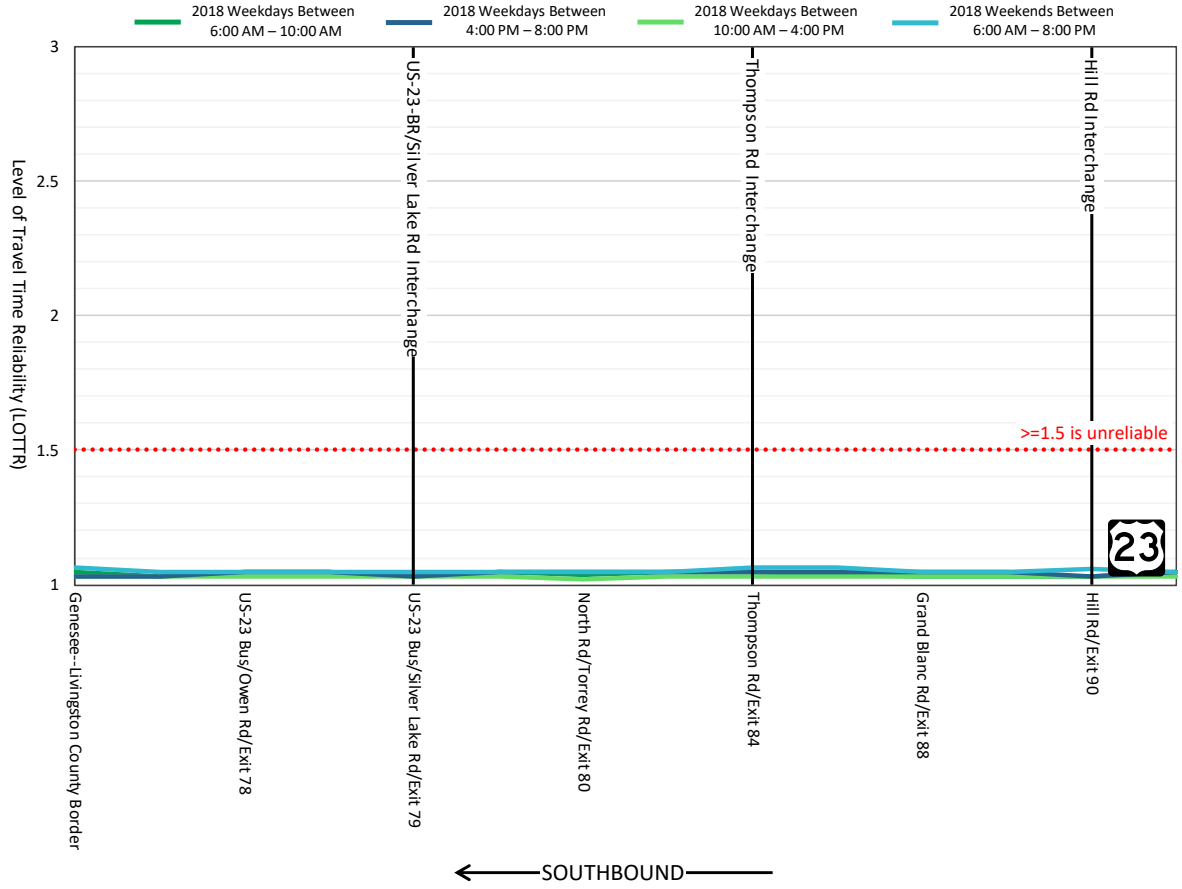
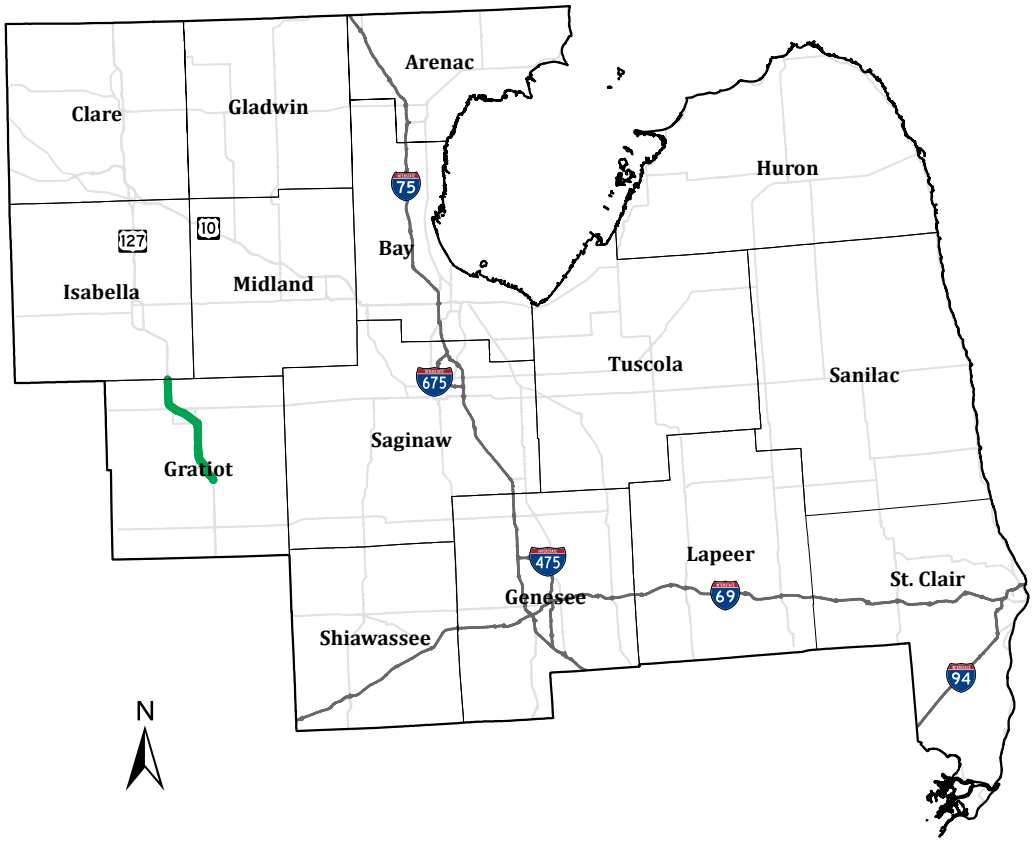
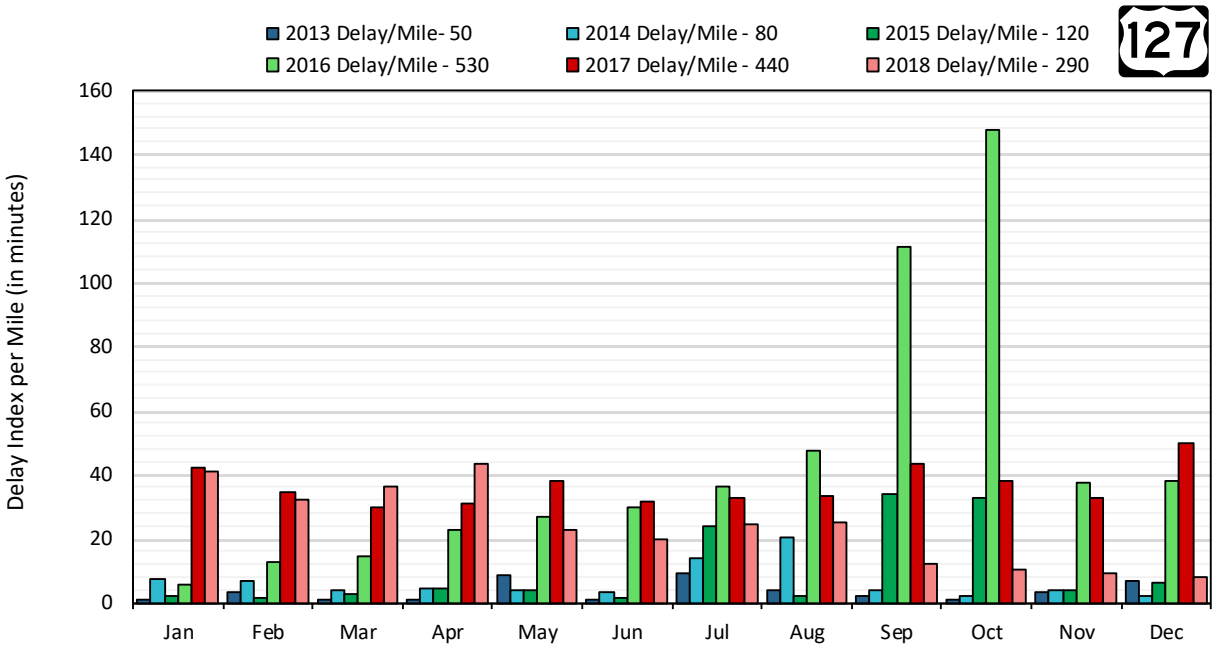


FIGURE 64. Bay Region Southbound US-23 Level of Travel Time Reliability

US-127: GRATIOT COUNTY DELAY INDEX



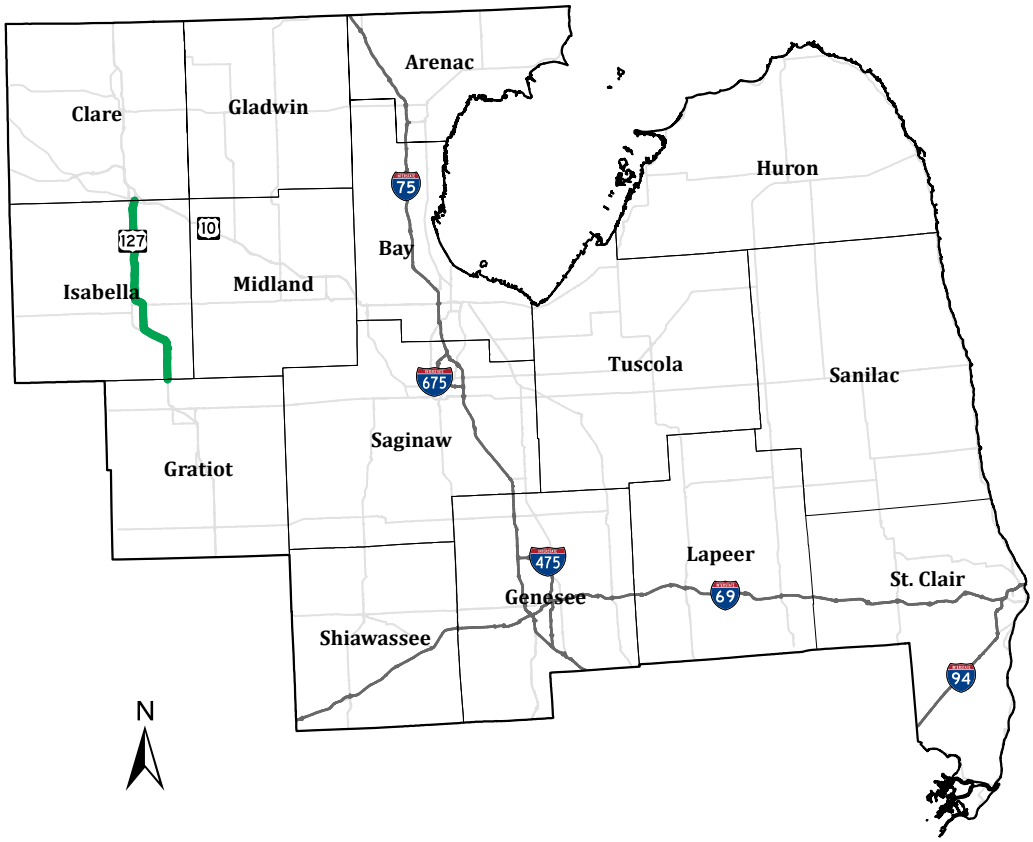
a) Segment Map



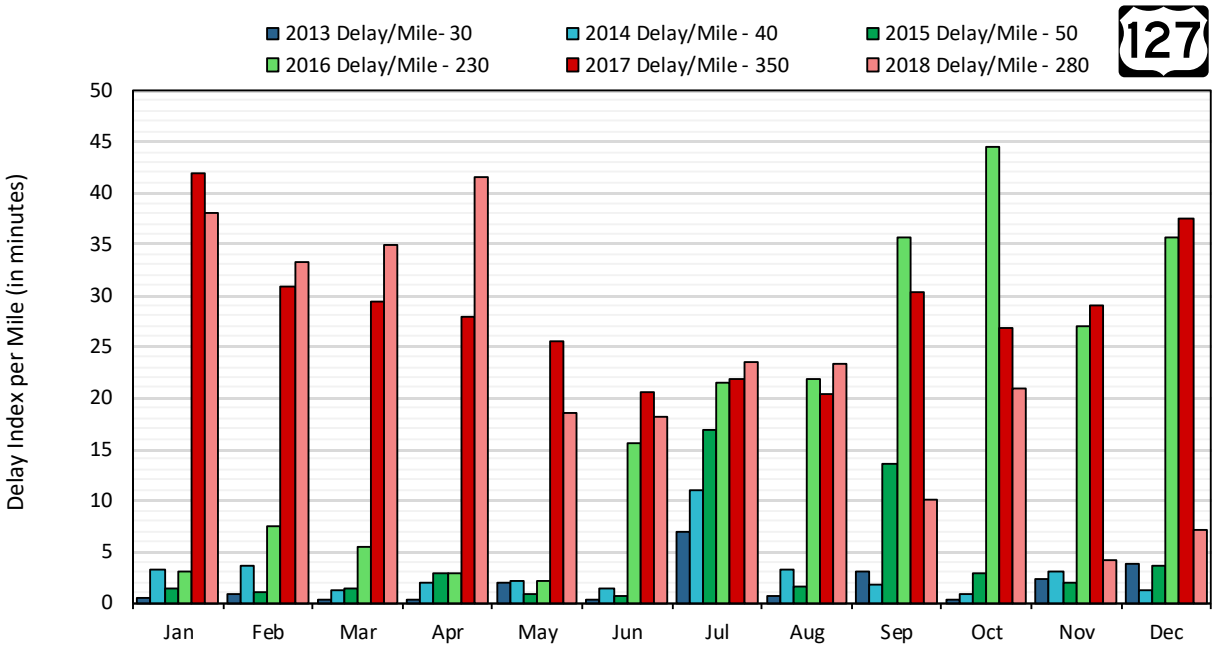
b) Delay Index Graph

FIGURE 65. Gratiot County US-127 Corridor Delay Index

US-127: ISABELLA COUNTY DELAY INDEX



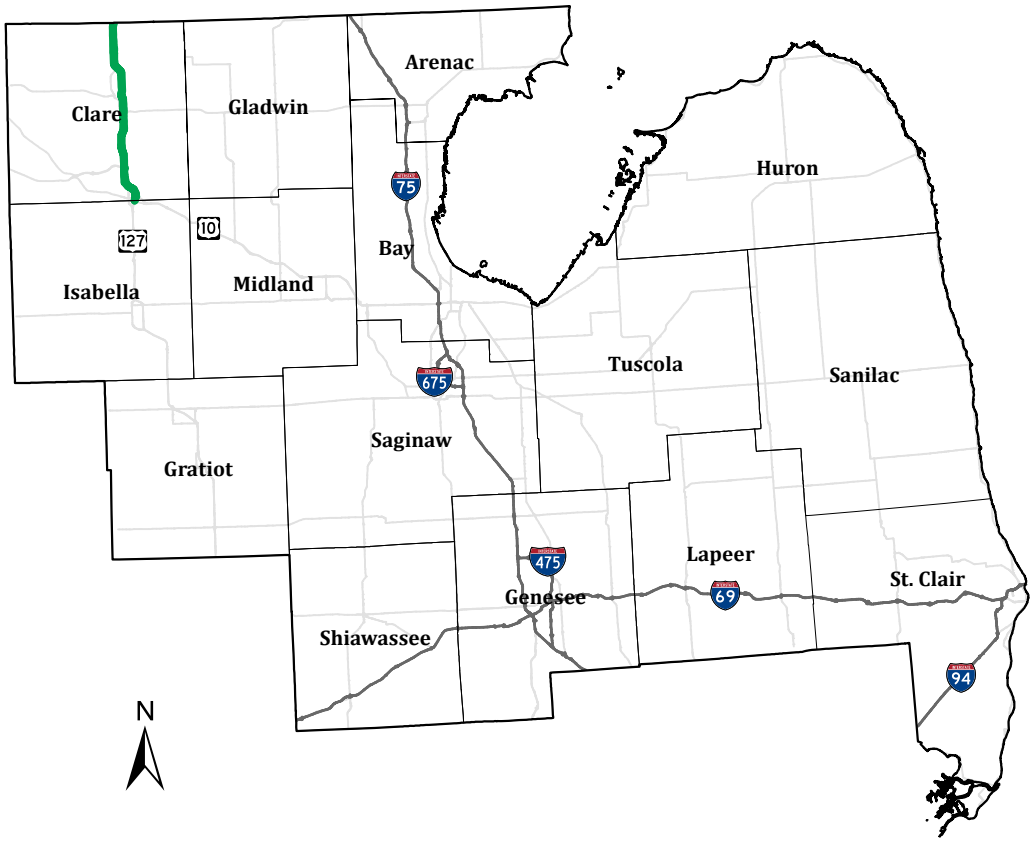
a) Segment Map



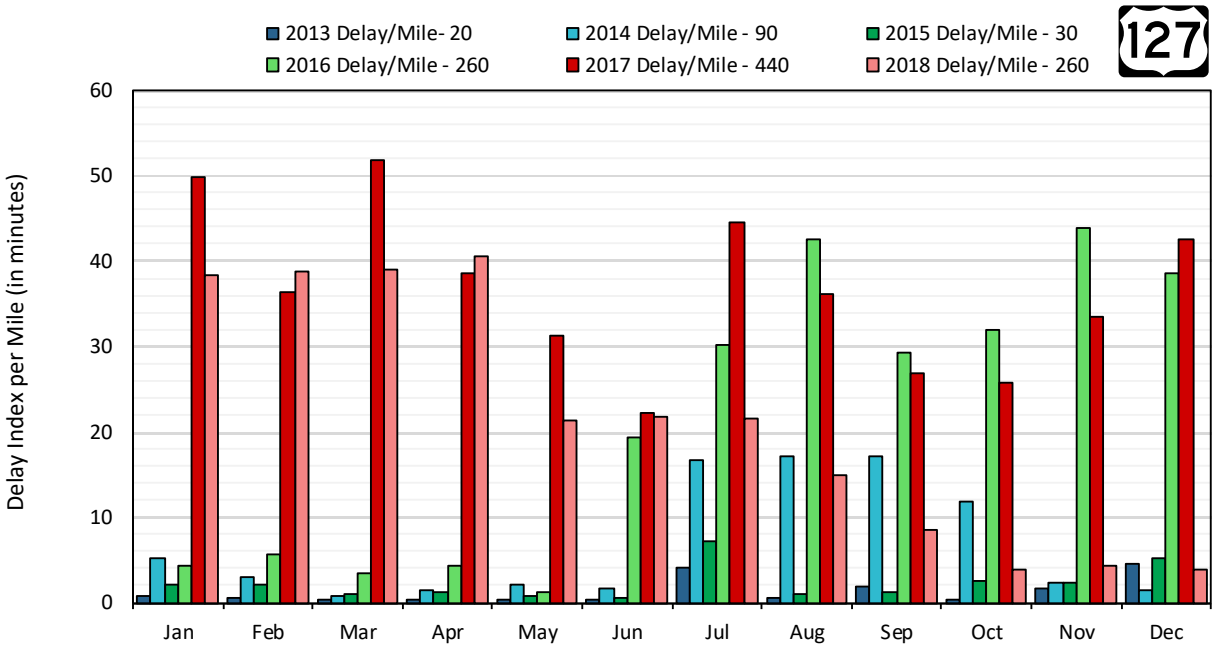
b) Delay Index Graph

FIGURE 66. Isabella County US-127 Corridor Delay Index

US-127: CLARE COUNTY DELAY INDEX



a) Segment Map



b) Delay Index Graph

FIGURE 67. Clare County US-127 Corridor Delay Index

US-127: AVERAGE SPEED

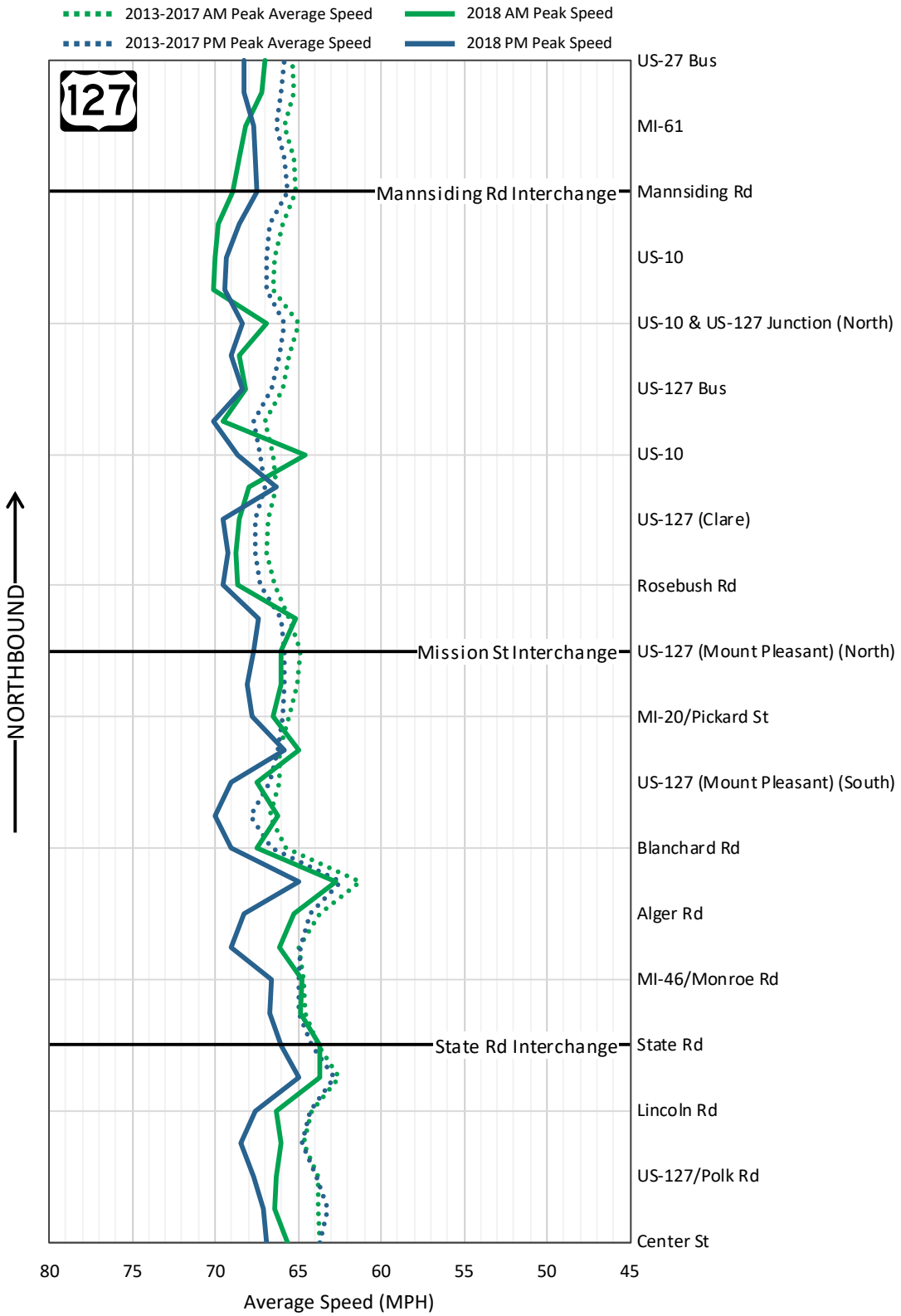


FIGURE 68. Bay Region Northbound US-127 Average Speed

US-127: AVERAGE SPEED

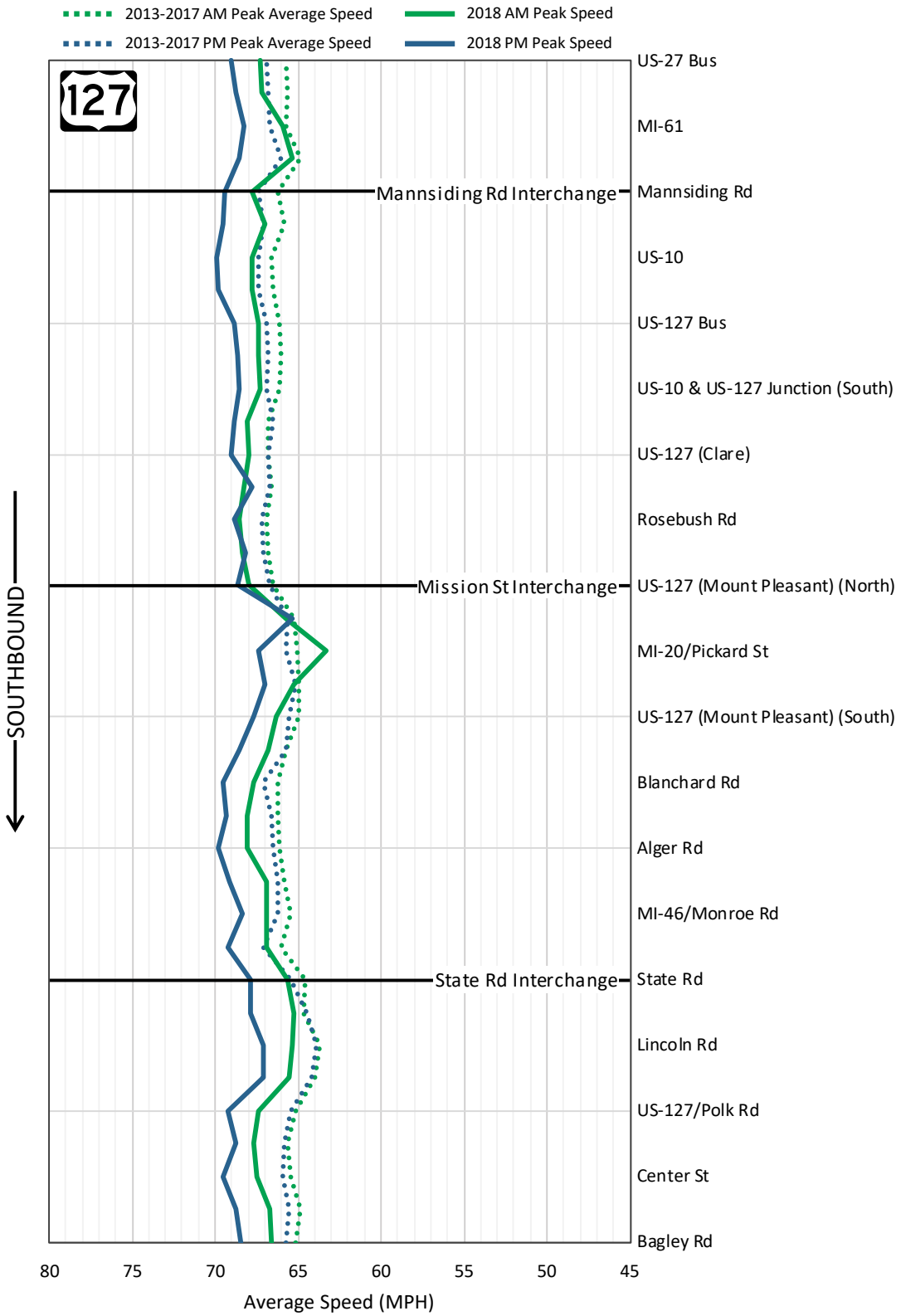
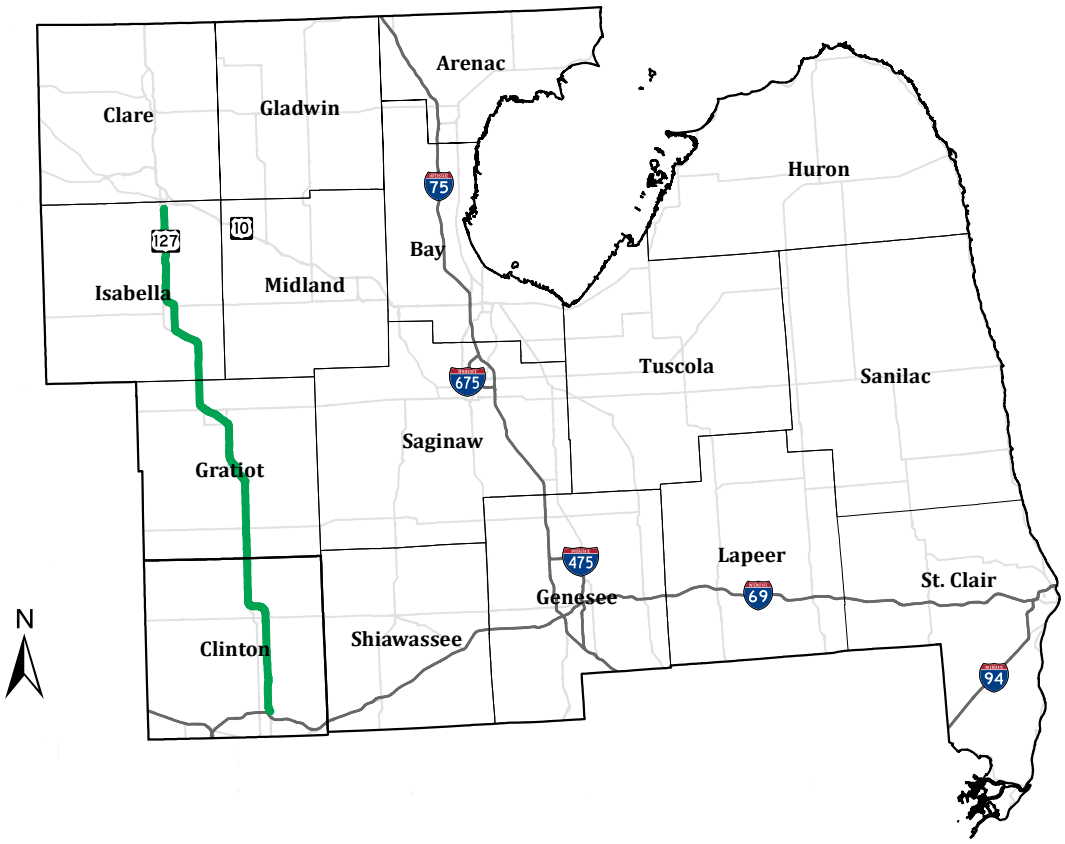
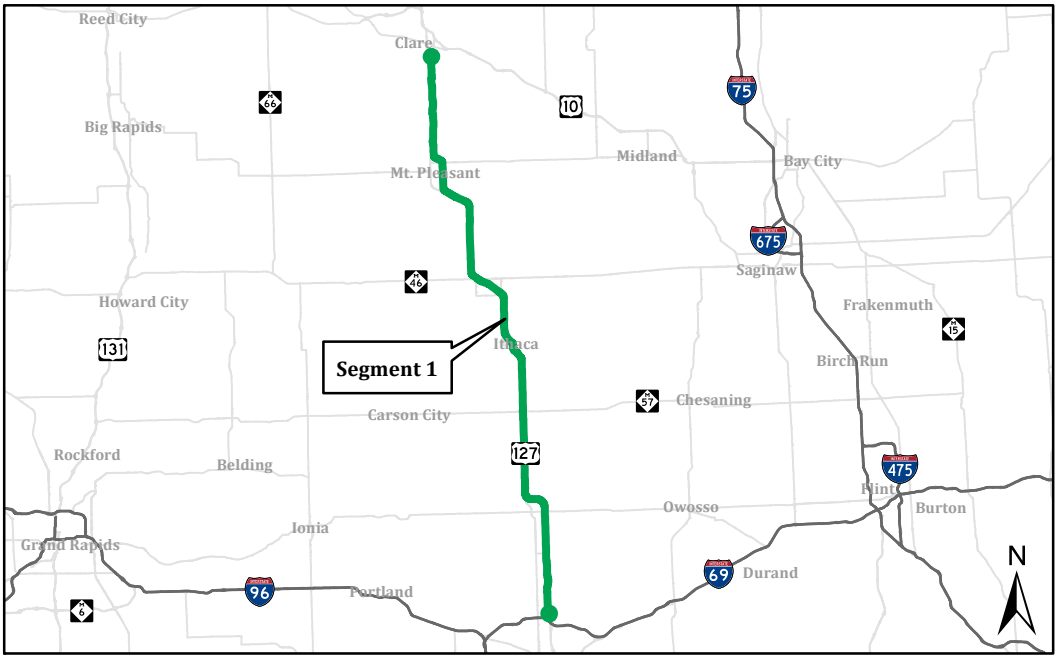


FIGURE 69. Bay Region Southbound US-127 Average Speed

US-127: TRAVEL TIME RELIABILTY



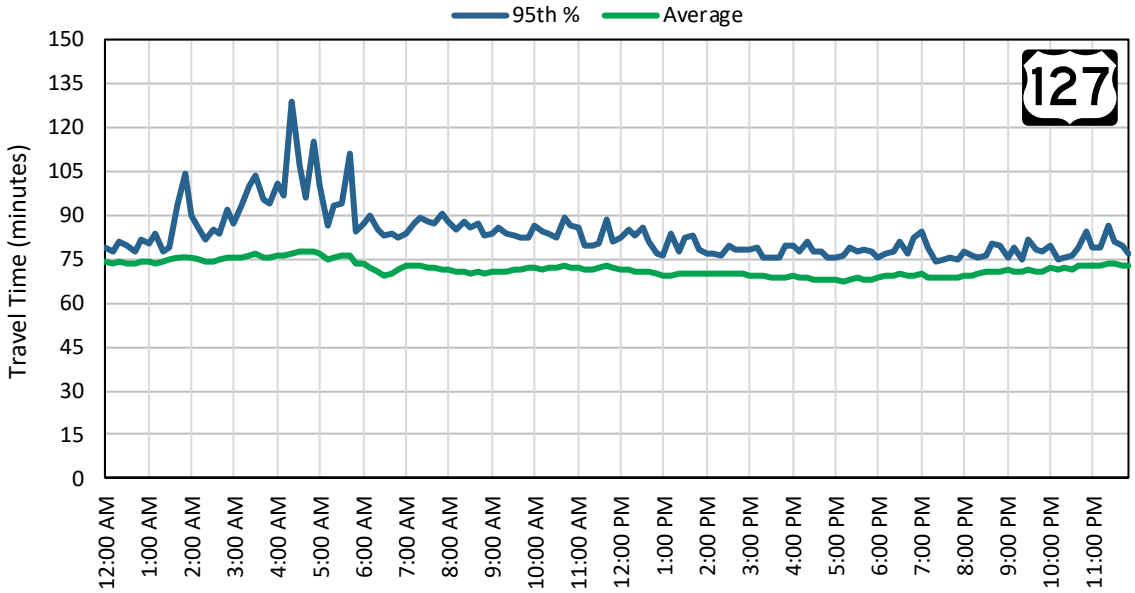
a) Bay Region and Clinton County



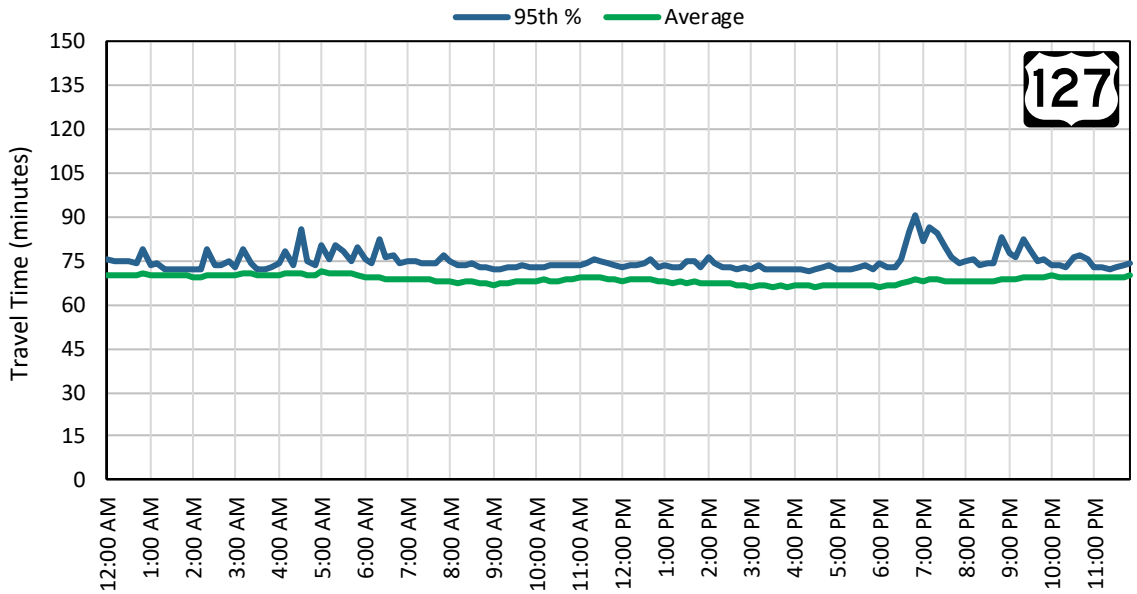
b) Mt. Pleasant, Michigan and Clare, Michigan

FIGURE 70. Travel Time Reliability: US-127

US-127: TRAVEL TIME RELIABILTY



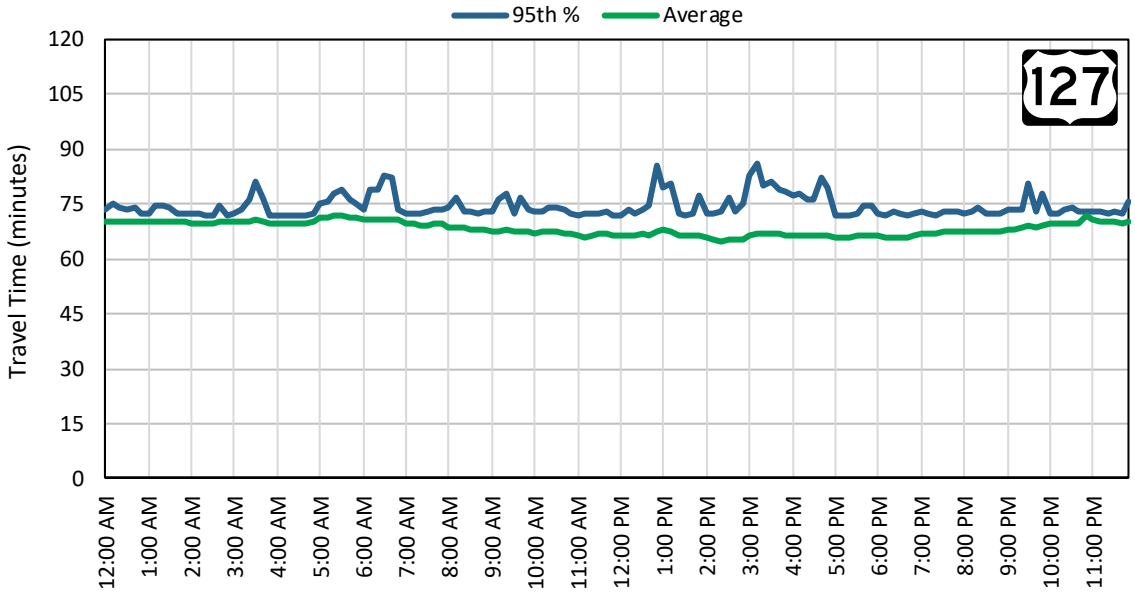
a) Northbound between January 1st and April 30th (Fridays only)



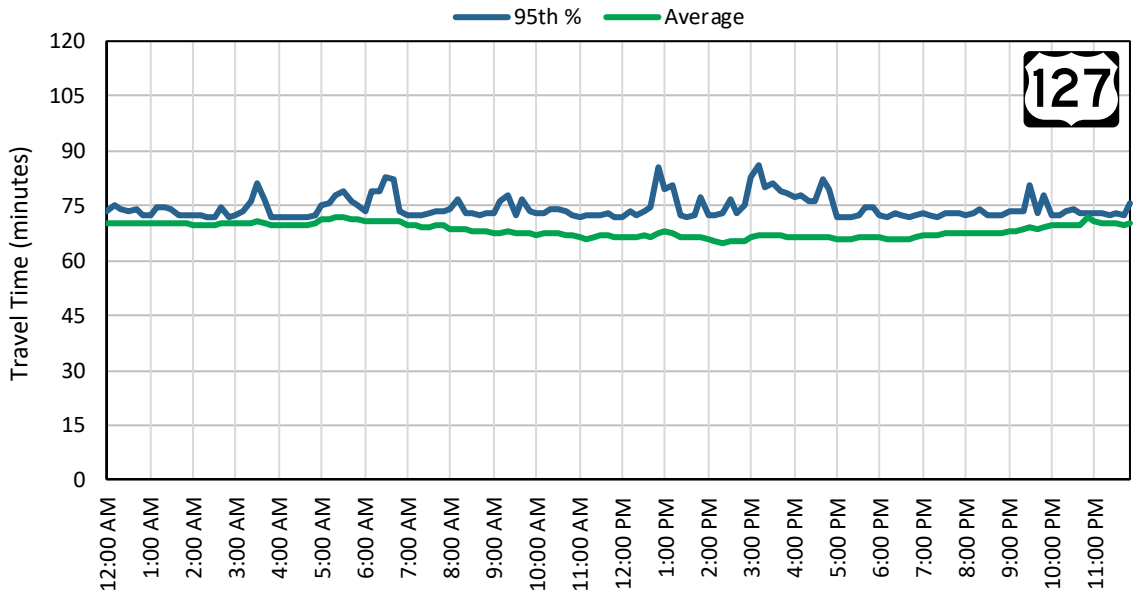
b) Northbound between October 1st and December 31st (Fridays only)

FIGURE 71. Segment 1 - US-127 between I-69/Exit 82 and US-10 (Non-Summer)

US-127: TRAVEL TIME RELIABILTY



a) Southbound between January 1st and April 30th (Sundays only)



b) Southbound between October 1st and December 31st (Sundays only)

FIGURE 72. Segment 1 - US-127 between I-69/Exit 82 and US-10 (Non-Summer)

US-127: LEVEL OF TRAVEL TIME RELIABILITY

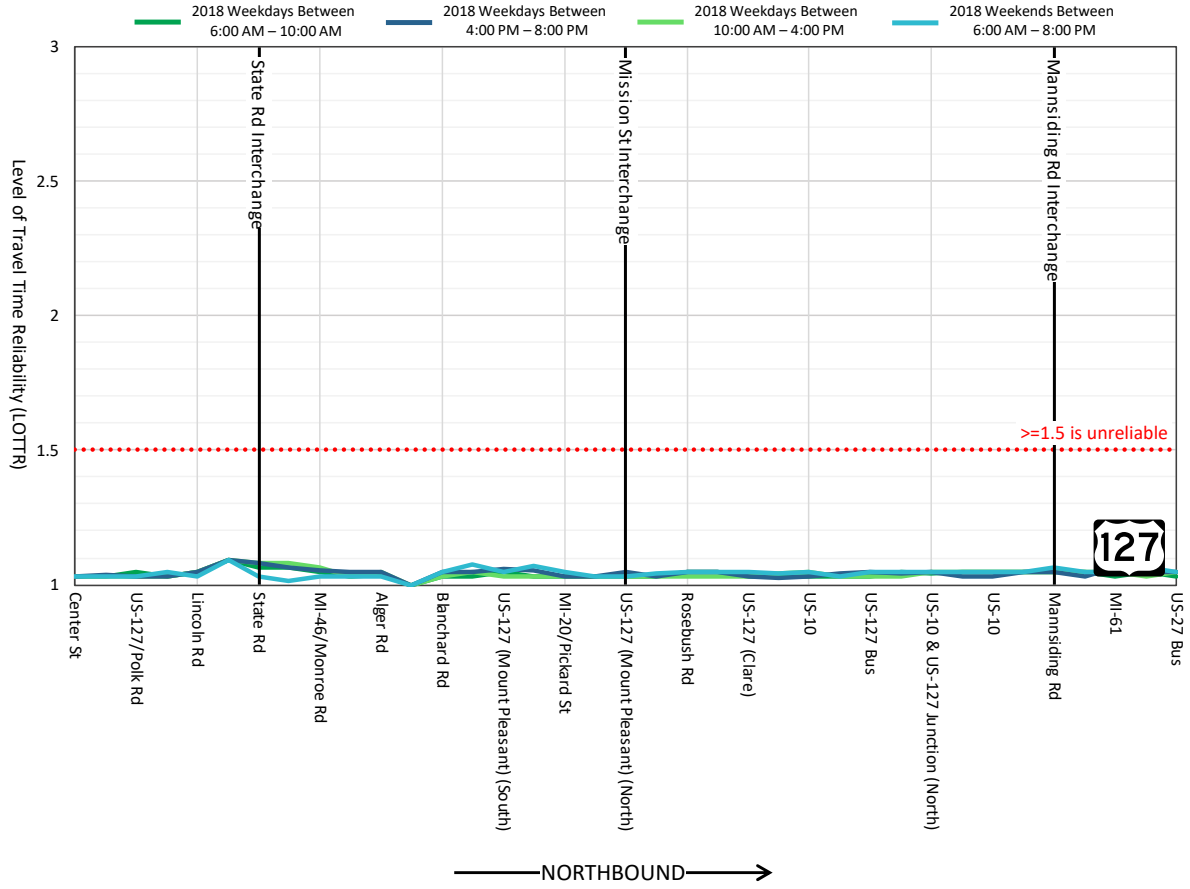


FIGURE 73. Bay Region Northbound US-127 Level of Travel Time Reliability

US-127: LEVEL OF TRAVEL TIME RELIABILITY

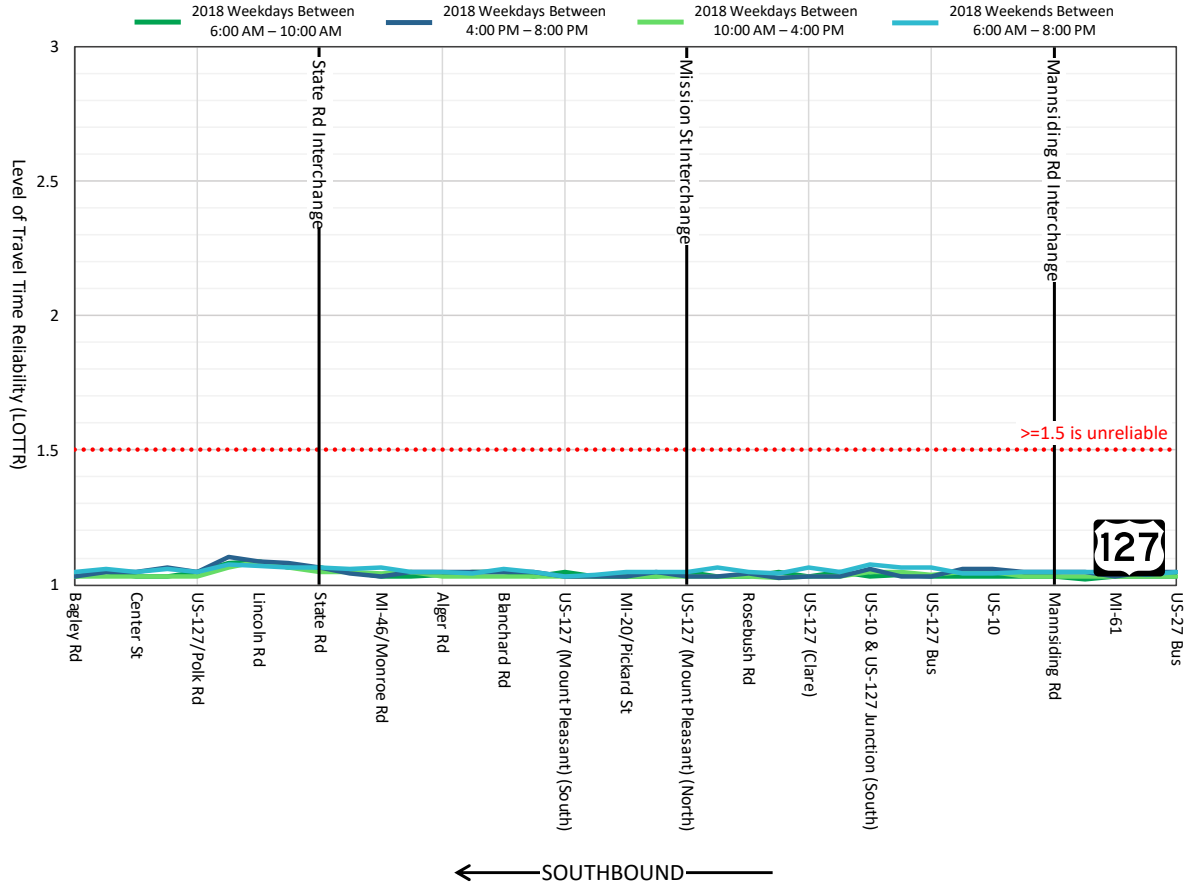


FIGURE 74. **Bay Region Southbound US-127 Level of Travel Time Reliability**

CONCLUSION

This chapter summarizes the performance of the Bay Region. 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

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