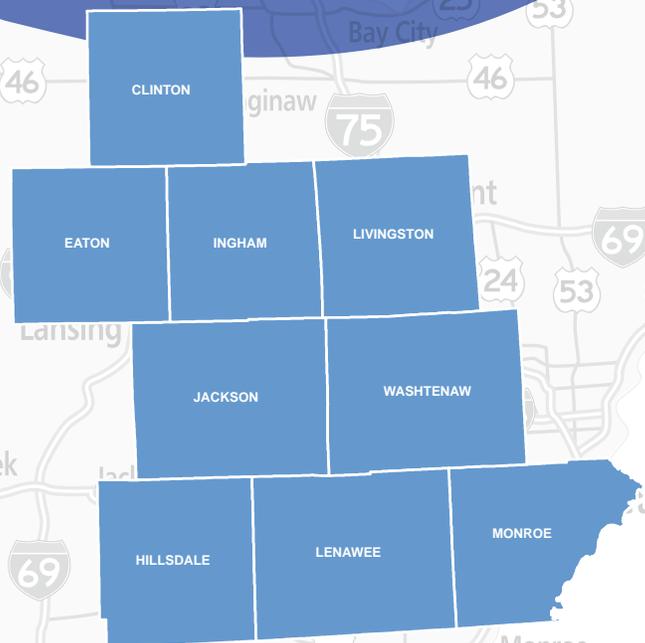


Congestion & Mobility Report



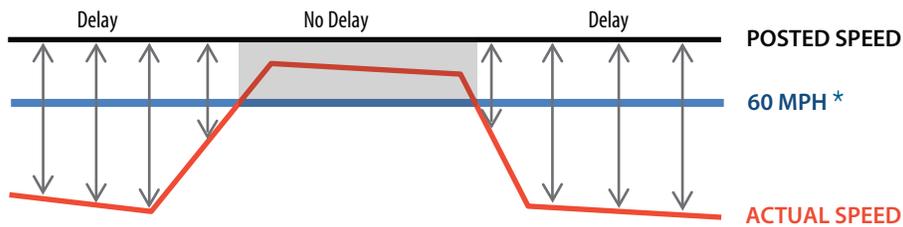
Chapter 8 UNIVERSITY REGION SUMMARY



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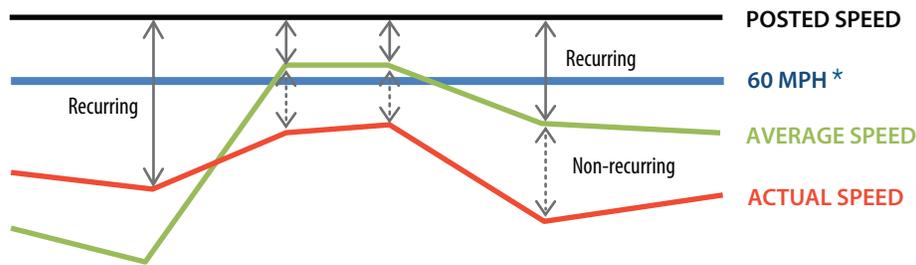
Performance Measures Definitions



Total delay > Delay is calculated by taking the difference between actual speeds when they fall below 60 mph and the posted speed limit for freeways posted at 70 mph. This is to take out the delay caused by the lower average speeds from commercial vehicles.

Total delay per mile > Delay per mile is calculated by taking the total delay and dividing it by the length of the freeway. This was performed for each route in each county.

Non-recurring/recurring delay > Non-recurring delay is calculated by taking the difference between the actual speed (any time the speed falls below 60 mph) and the average speed. Recurring is measured by taking the difference of the total delay and non-recurring delay.

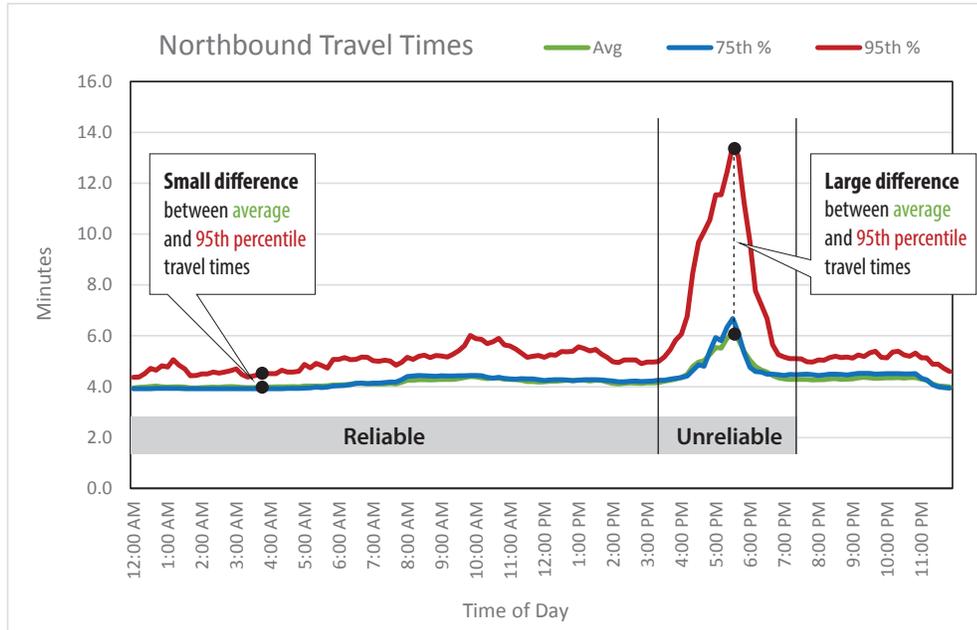


User Delay Cost > User Delay Costs (UDC) is calculated by multiplying delay x hourly volume per hourly user cost. Delay is calculated by taking the difference between actual speeds when they fall below 60 mph and the posted speed limit. Hourly volumes are derived from Average Daily Traffic (ADT) and Commercial Average Daily Traffic (CADT). Hourly user costs are based on Federal Highway Administration (FHWA) publication number FHWA-SA-98-079, "Life-Cycle Cost Analysis in Pavement Design."

Congestion > Congestion is calculated as the number of hours below 45 mph 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.

* On segments with a speed limit of 55 mph, delay is calculated when speeds fall below 55 mph.

Performance Measures Definitions



Travel Time Reliability > 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.

75th Percentile Travel Time > The amount of time a customer should budget to be on-time three out of four days (75% of the time).

95th Percentile Travel Time > The amount of time a customer should budget to be on-time nineteen out of twenty days (95% of the time). The 95th percentile travel time is also known as the planning time.

Figure 1. 2015 University Region user delay cost per mile

2015 University Region User Delay Cost per Mile

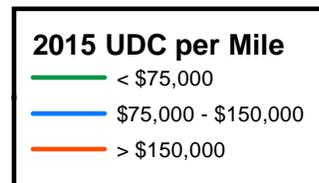
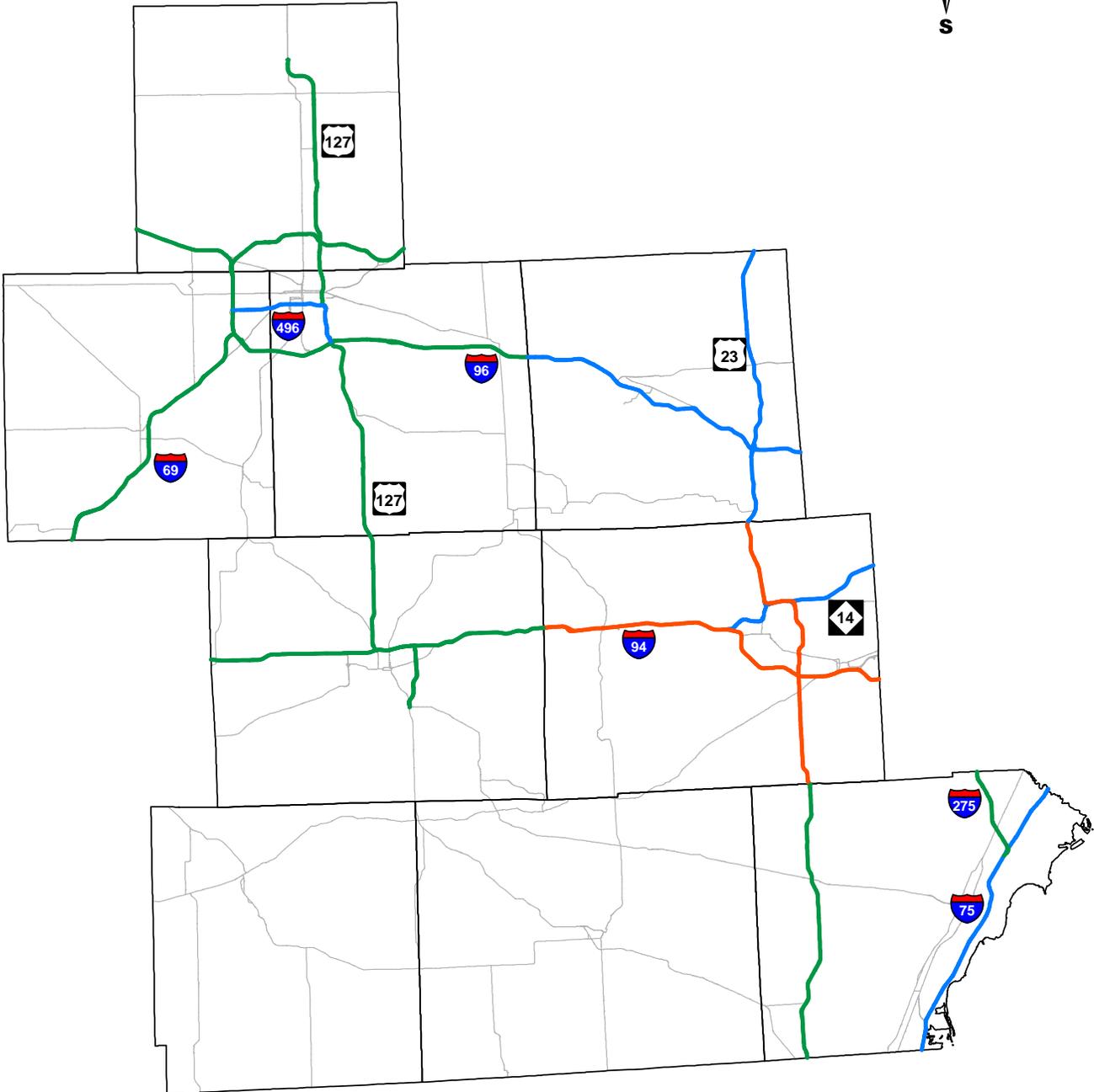
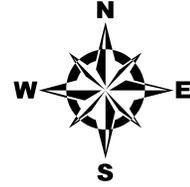


Figure 2. 2015 University Region congestion hours northbound/eastbound

2015 University Region Congestion Hours Northbound/Eastbound

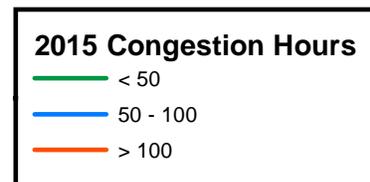
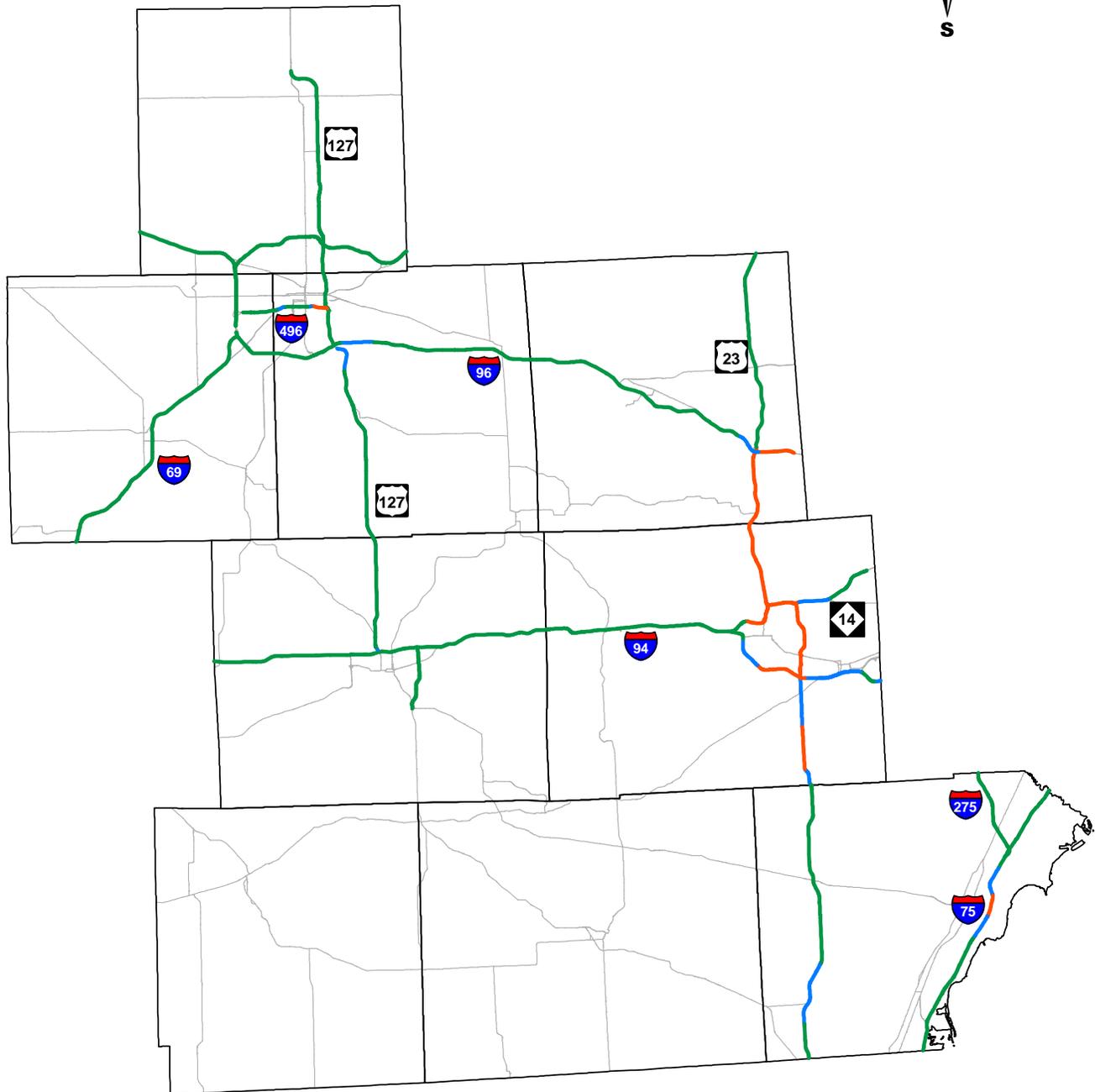
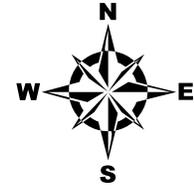


Figure 3. 2015 University Region congestion hours southbound/westbound

2015 University Region Congestion Hours Southbound/Westbound

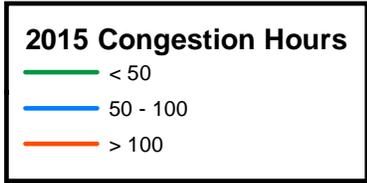
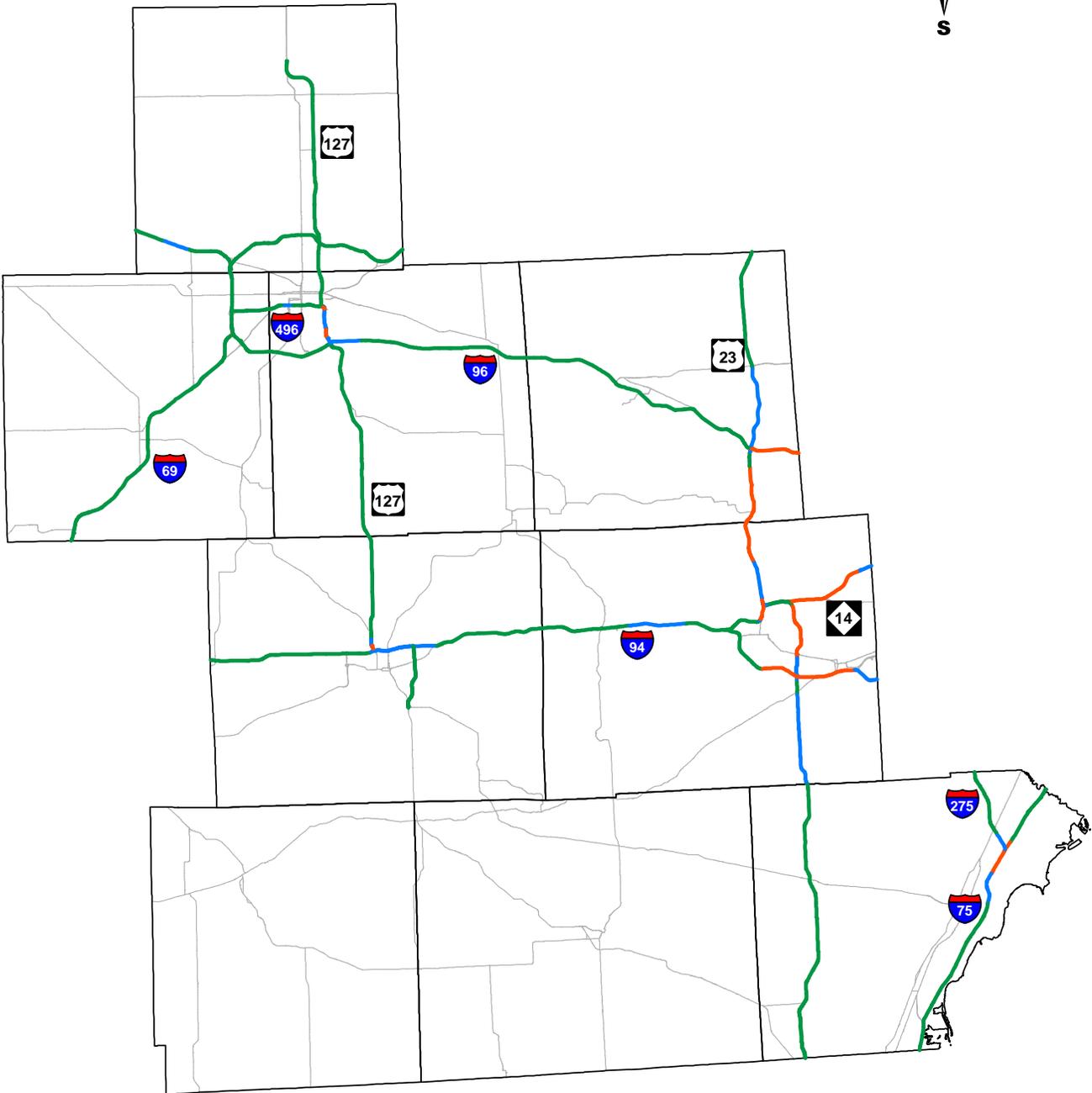
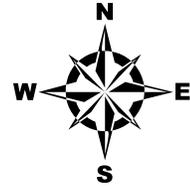


Figure 4. 2015 University Region UDC Data

2012-2014 Average		
Rank	UDC Per Mile	Location (Route, County)
1	\$284,736	US-23 Washtenaw Co.
2	\$202,808	I-94 Washtenaw Co.
3	\$147,484	I-496 Eaton/Ingham Co.
4	\$138,296	M-14 Washtenaw Co.
5	\$127,684	I-75 Monroe Co.
6	\$118,465	US-23 Livingston Co.
7	\$89,062	I-96 Livingston Co.
8	\$75,238	I-94 Jackson Co.
9	\$70,832	US-23 Monroe Co.
10	\$67,053	US-127 Ingham Co.
11	\$64,492	US-127 Jackson Co. (70 mph section)
12	\$47,215	I-96 Ingham Co.
13	\$45,988	I-275 Monroe Co.
14	\$43,643	I-69 Eaton Co.
15	\$43,248	I-96 Clinton/Eaton Co.
16	\$26,685	I-69 Clinton Co.
17	\$16,771	US-127 Clinton Co. (70mph section)

2015		
Rank	UDC Per Mile	Location (Route, County)
1	\$308,637	US-23 Washtenaw Co.
2	\$178,221	I-94 Washtenaw Co.
3	\$142,223	US-23 Livingston Co.
4	\$129,798	I-75 Monroe Co.
5	\$105,050	M-14 Washtenaw Co.
6	\$102,099	I-96 Livingston Co.
7	\$81,452	I-496 Eaton/Ingham Co.
8	\$40,802	I-96 Ingham Co.
9	\$40,087	I-94 Jackson Co.
10	\$37,245	US-127 Jackson Co. (70 mph section)
11	\$35,235	US-127 Ingham Co.
12	\$30,003	US-23 Monroe Co.
13	\$29,748	I-96 Clinton/Eaton Co.
14	\$20,168	I-275 Monroe Co.
15	\$15,719	I-69 Eaton Co.
16	\$8,617	I-69 Clinton Co.
17	\$4,667	US-127 Clinton Co. (70mph section)

2012-2014 Average		
Rank	Total UDC	Location (Route, County)
1	\$15,660,492	US-23 Washtenaw Co.
2	\$13,182,490	I-94 Washtenaw Co.
3	\$6,894,942	I-75 Monroe Co.
4	\$5,923,248	US-23 Livingston Co.
5	\$5,040,954	I-94 Jackson Co.
6	\$4,987,453	I-96 Livingston Co.
7	\$4,702,057	M-14 Washtenaw Co.
8	\$3,669,133	US-127 Ingham Co.
9	\$3,612,457	US-23 Monroe Co.
10	\$3,097,167	I-496 Eaton/Ingham Co.
11	\$2,502,410	I-96 Ingham Co.
12	\$2,313,105	I-69 Eaton Co.
13	\$2,128,246	US-127 Jackson Co. (70 mph section)
14	\$1,773,148	I-96 Clinton/Eaton Co.
15	\$987,332	I-69 Clinton Co.
17	\$965,746	I-275 Monroe Co.
18	\$704,365	US-127 Clinton Co. (70mph section)
Total =	\$78,144,745	

2015		
Rank	Total UDC	Location (Route, County)
1	\$16,975,036	US-23 Washtenaw Co.
2	\$11,584,385	I-94 Washtenaw Co.
3	\$7,111,174	US-23 Livingston Co.
4	\$7,009,089	I-75 Monroe Co.
5	\$5,717,518	I-96 Livingston Co.
6	\$3,571,716	M-14 Washtenaw Co.
7	\$2,685,804	I-94 Jackson Co.
8	\$2,162,488	I-96 Ingham Co.
9	\$1,928,084	US-127 Ingham Co.
10	\$1,710,490	I-496 Eaton/Ingham Co.
11	\$1,530,152	US-23 Monroe Co.
12	\$1,229,075	US-127 Jackson Co. (70 mph section)
13	\$1,219,654	I-96 Clinton/Eaton Co.
14	\$833,102	I-69 Eaton Co.
15	\$423,535	I-275 Monroe Co.
17	\$318,841	I-69 Clinton Co.
18	\$196,020	US-127 Clinton Co. (70mph section)
Total =	\$66,206,161	

Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 5. Eaton County I-69 Corridor total user delay cost

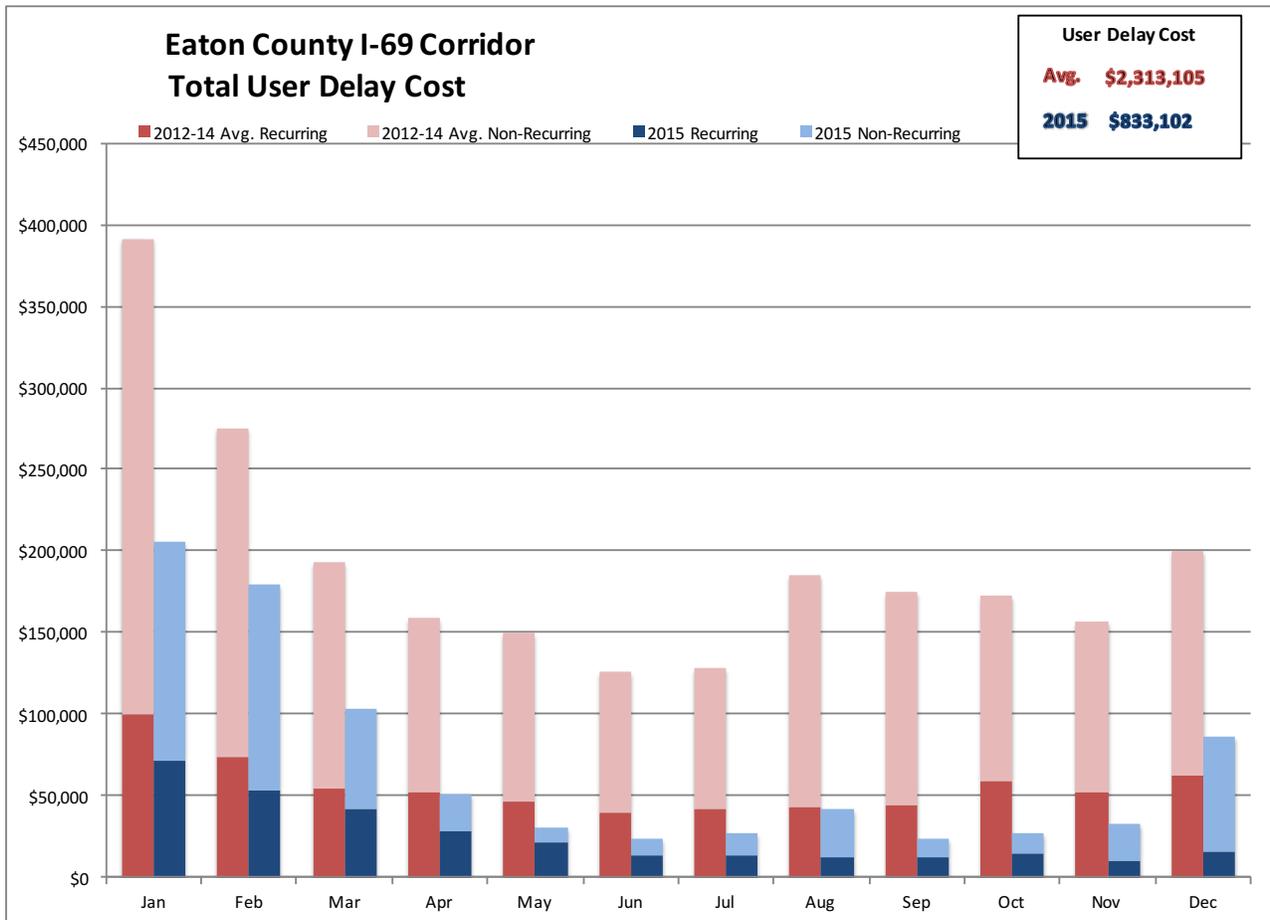
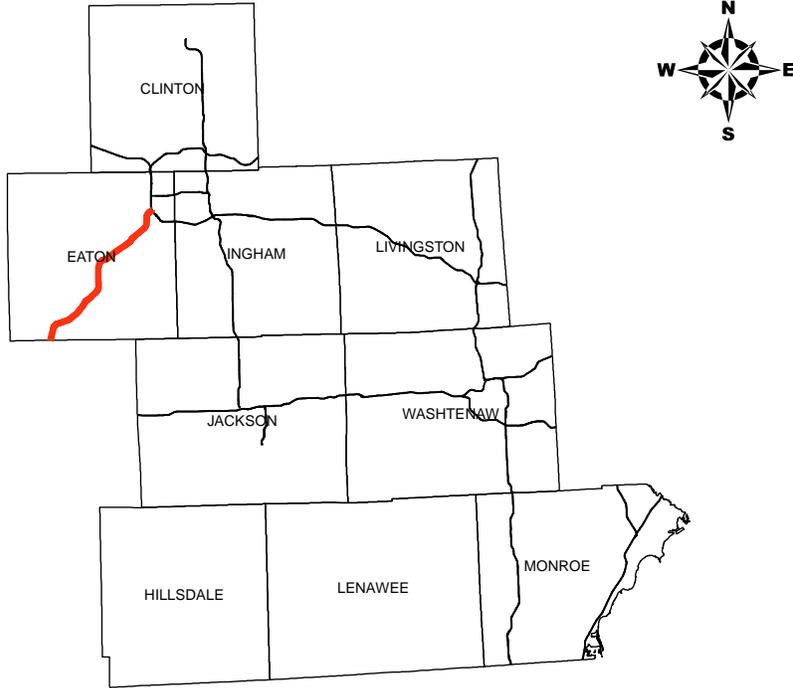


Figure 6. Clinton County I-69 Corridor total user delay cost

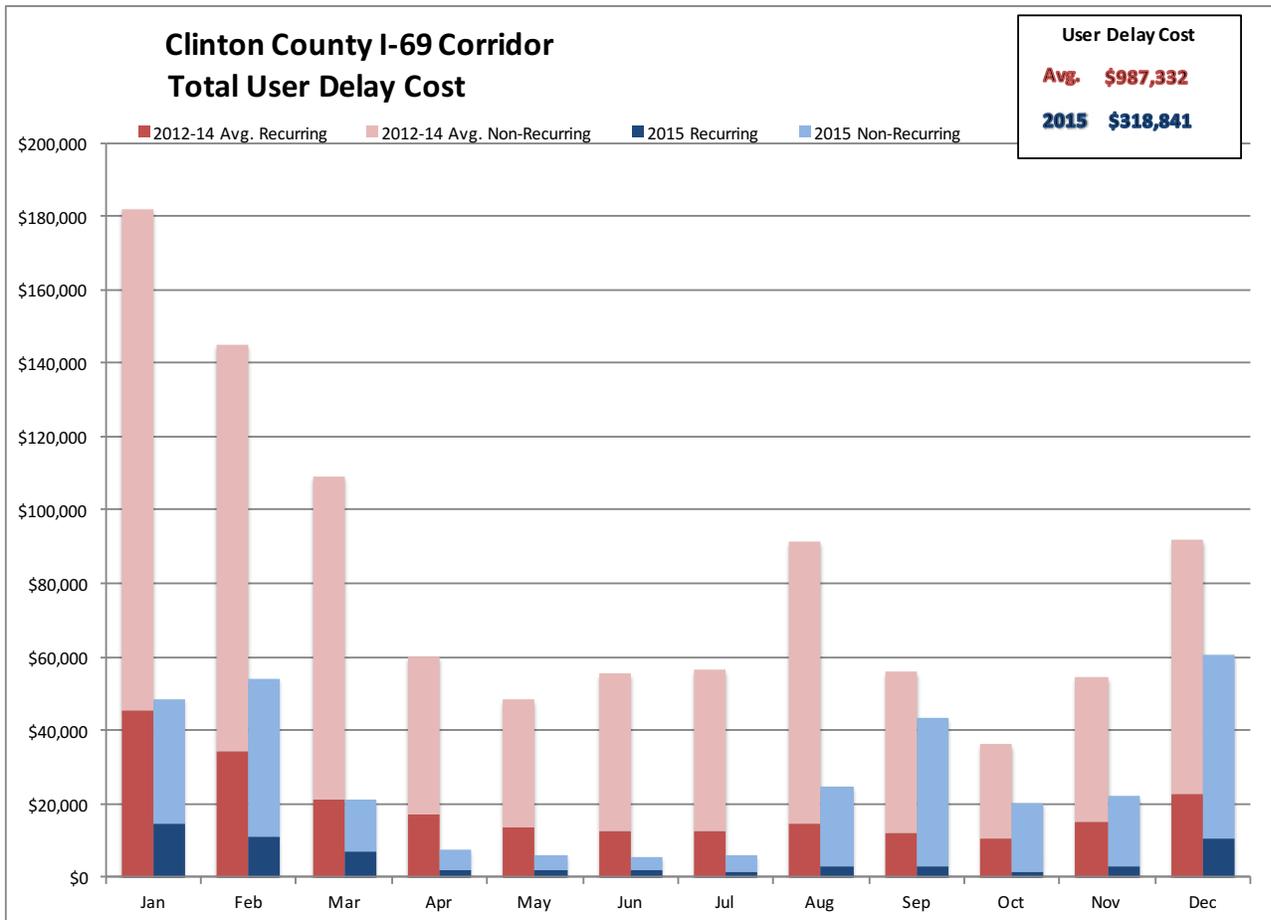
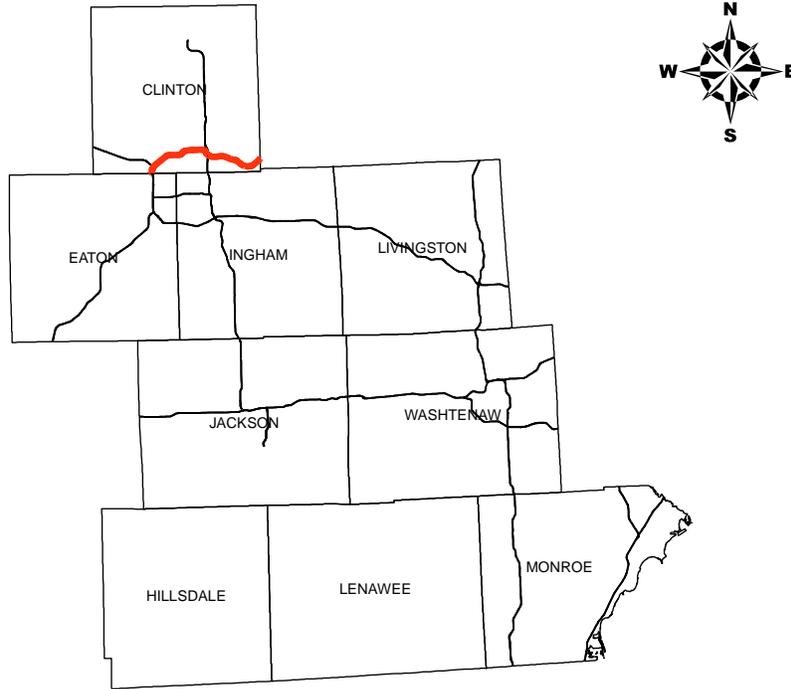


Figure 7. University Region I-69 northeastbound

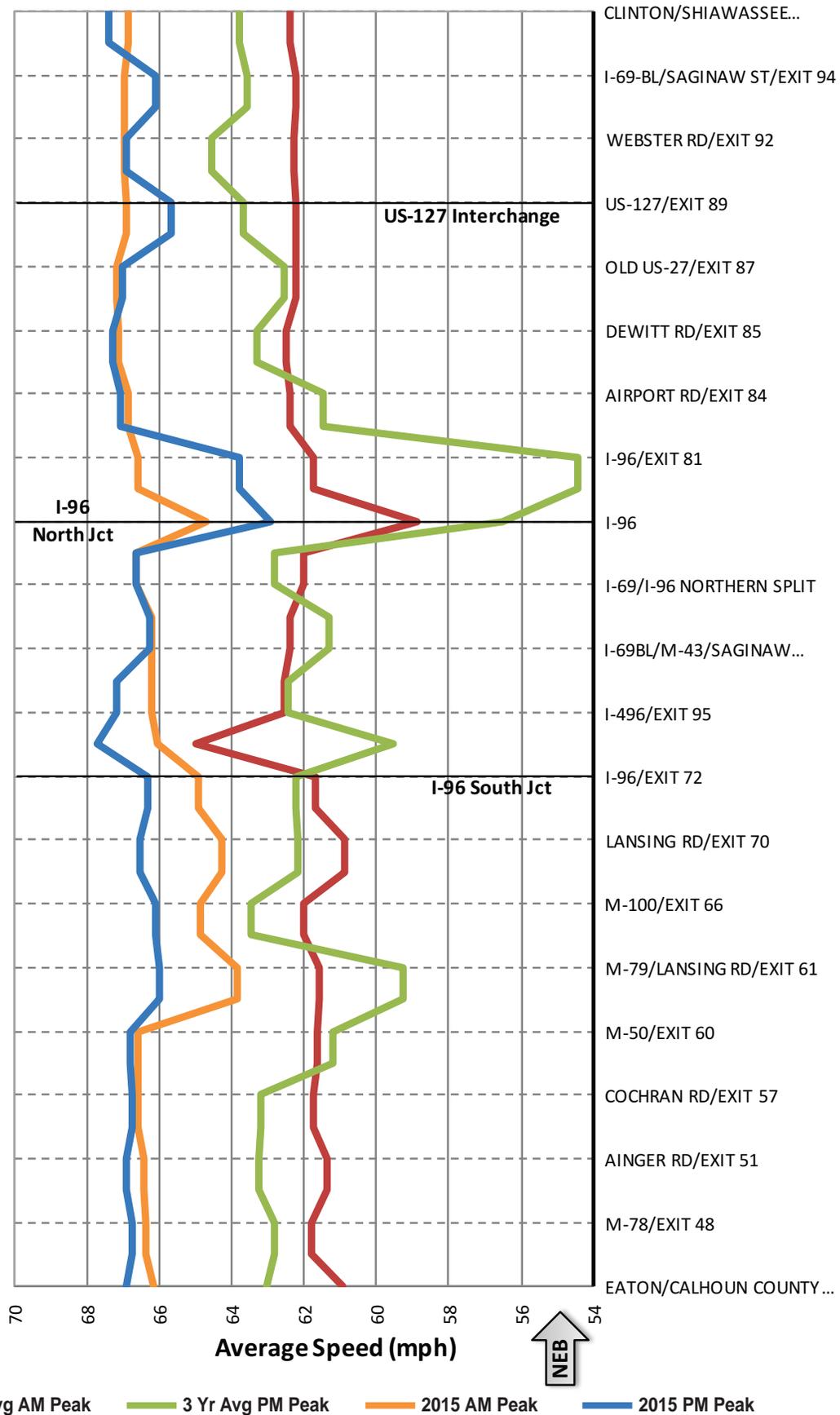
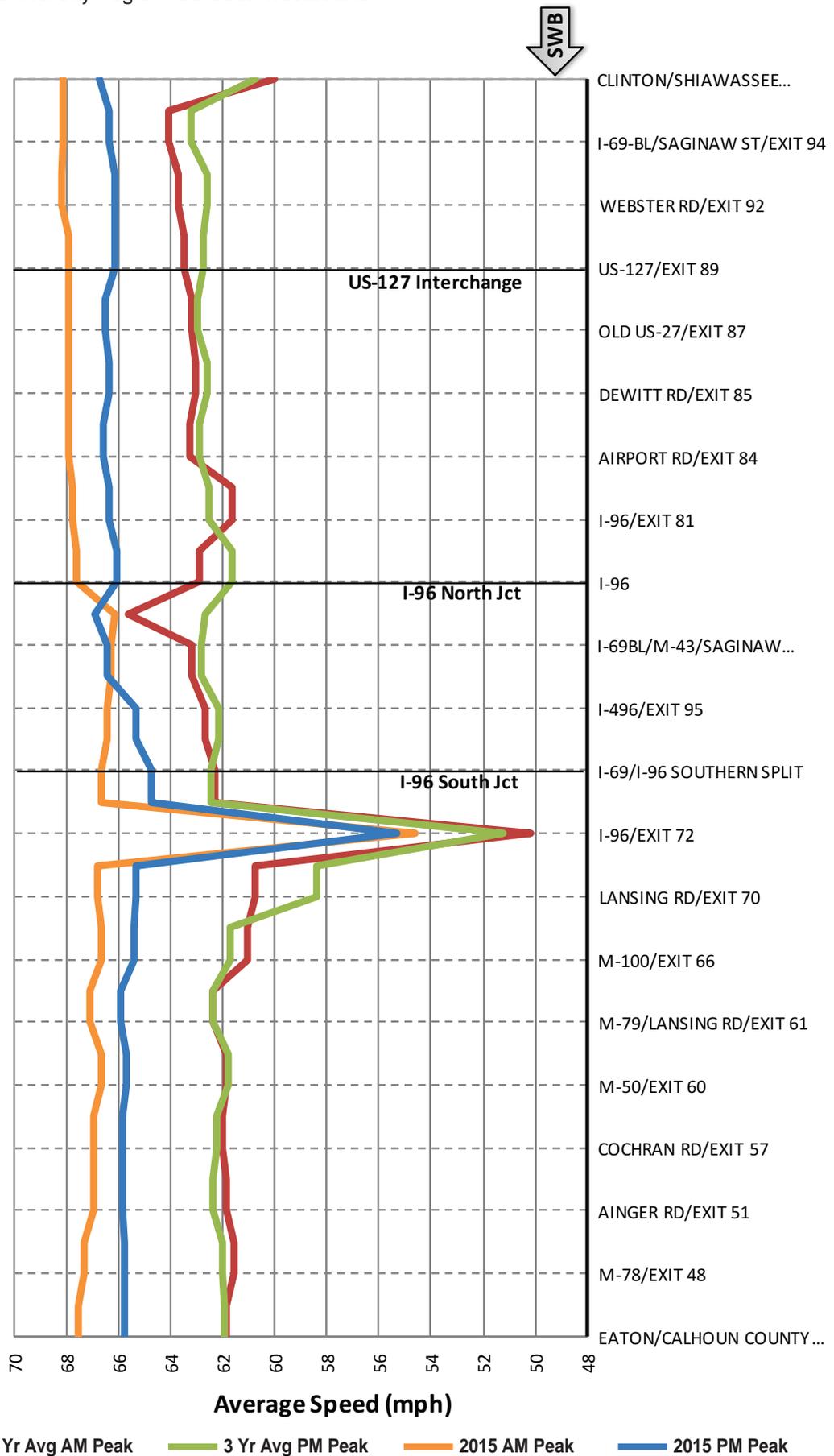


Figure 8. University Region I-69 southwestbound



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 9. Monroe County I-75 Corridor total user delay cost

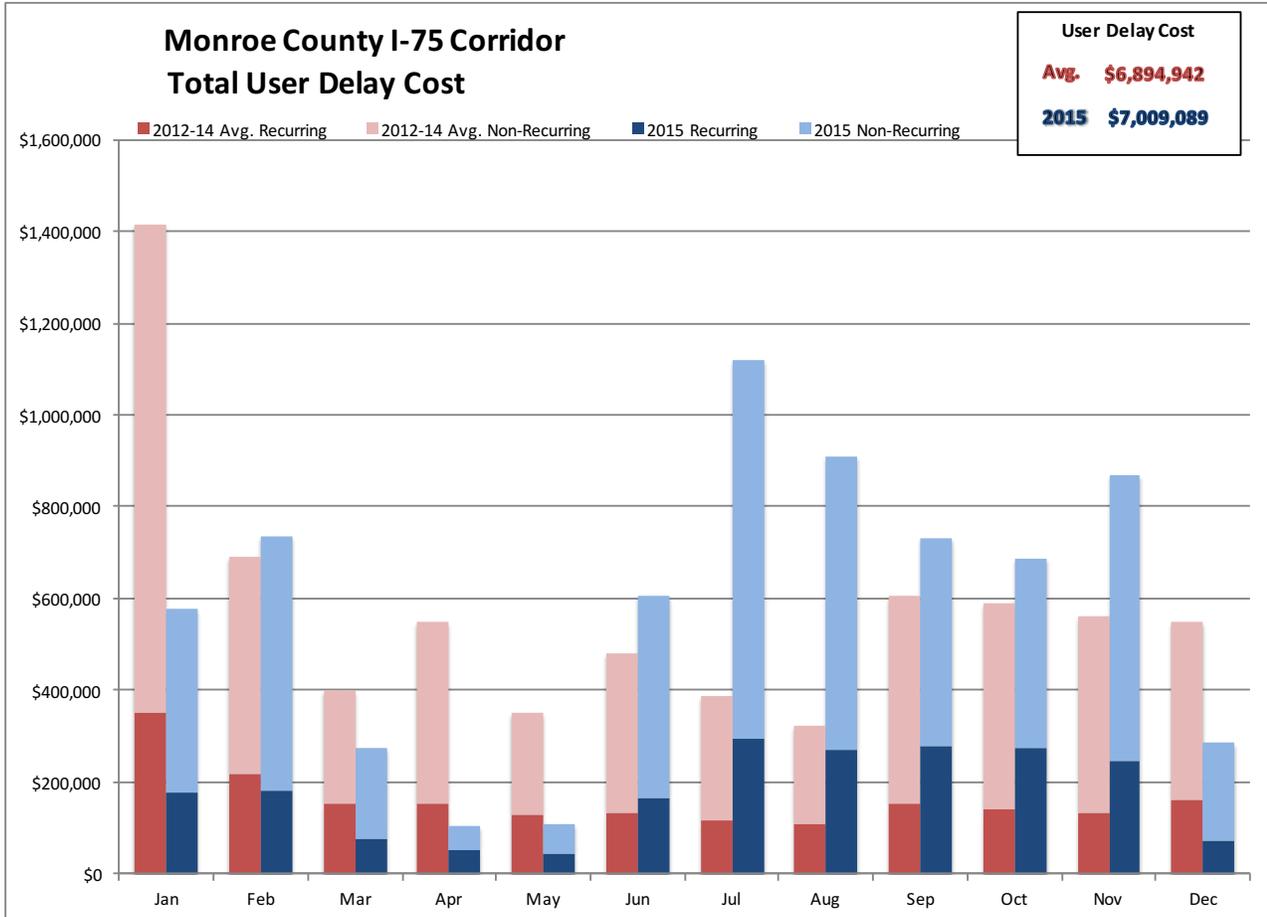
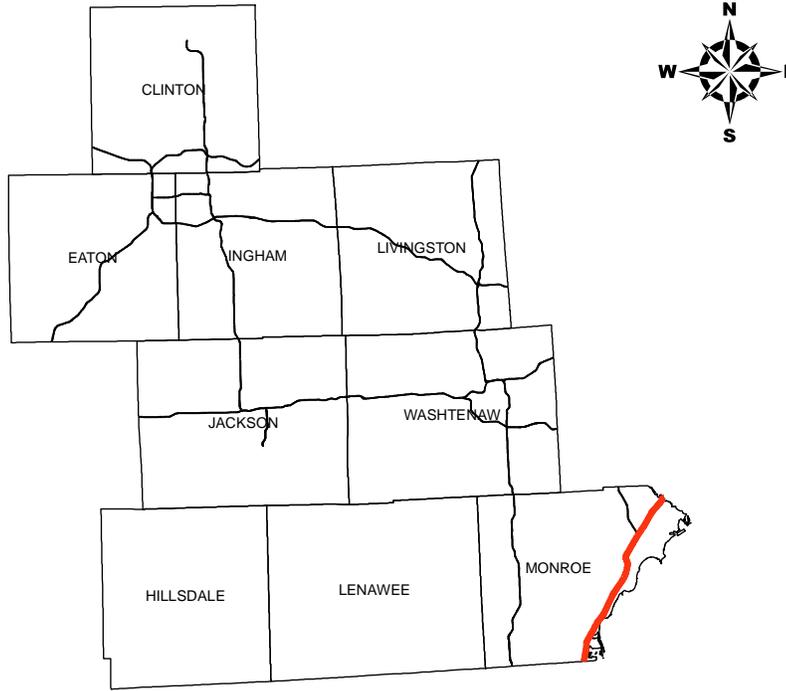


Figure 10. University Region I-75 northbound

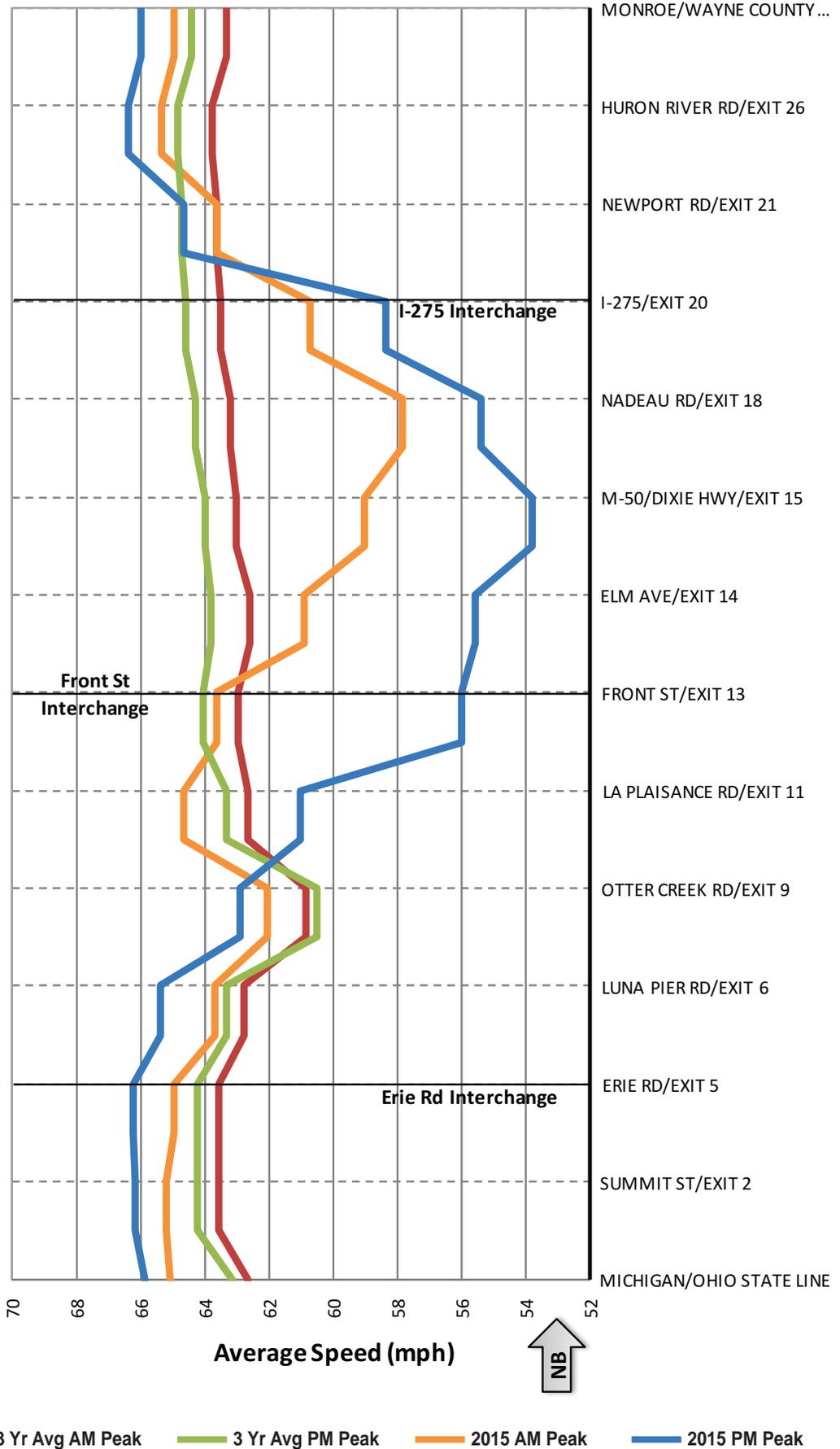
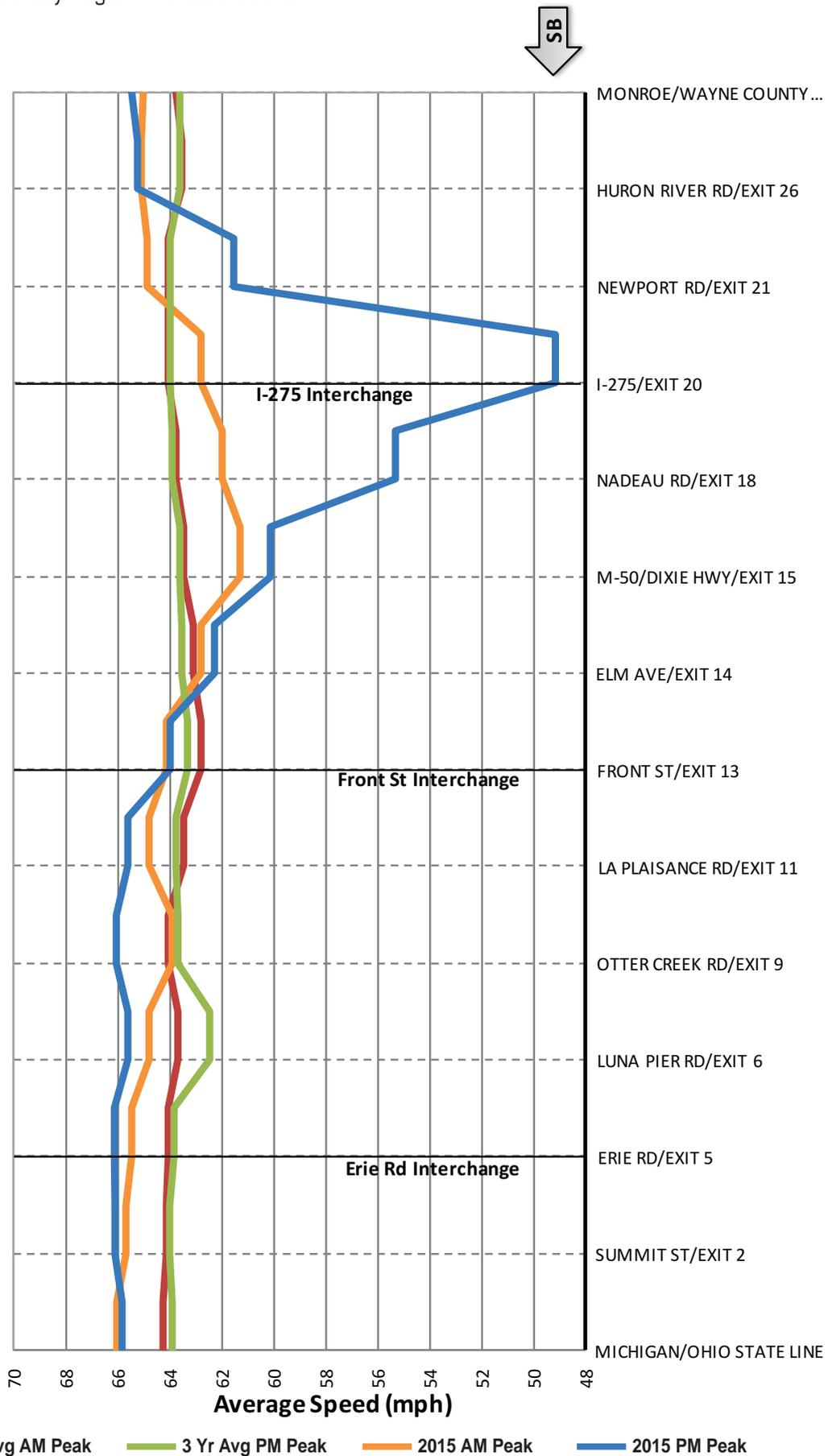


Figure 11. University Region I-75 southbound



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 12. Jackson County I-94 Corridor total user delay cost

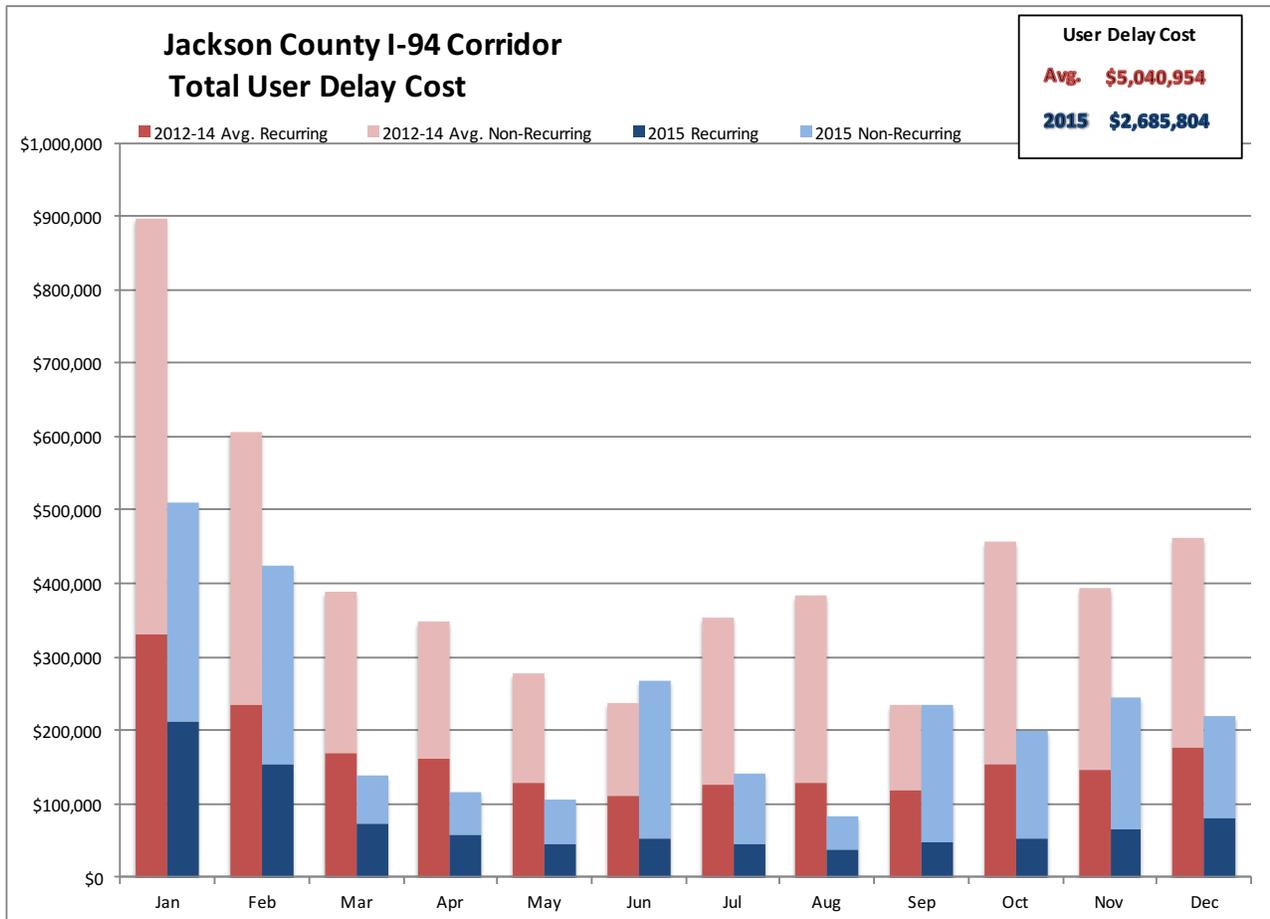
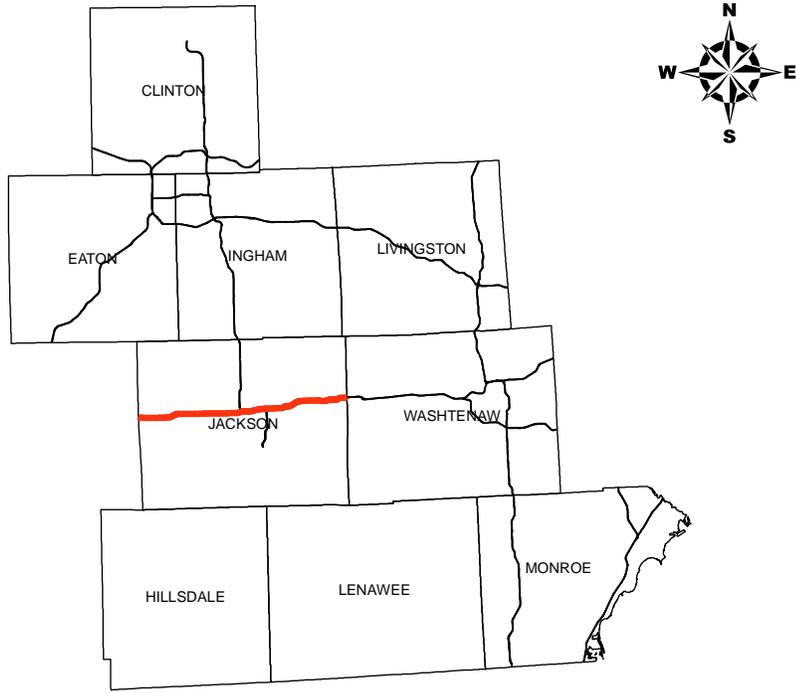


Figure 13. Washtenaw County I-94 Corridor total user delay cost

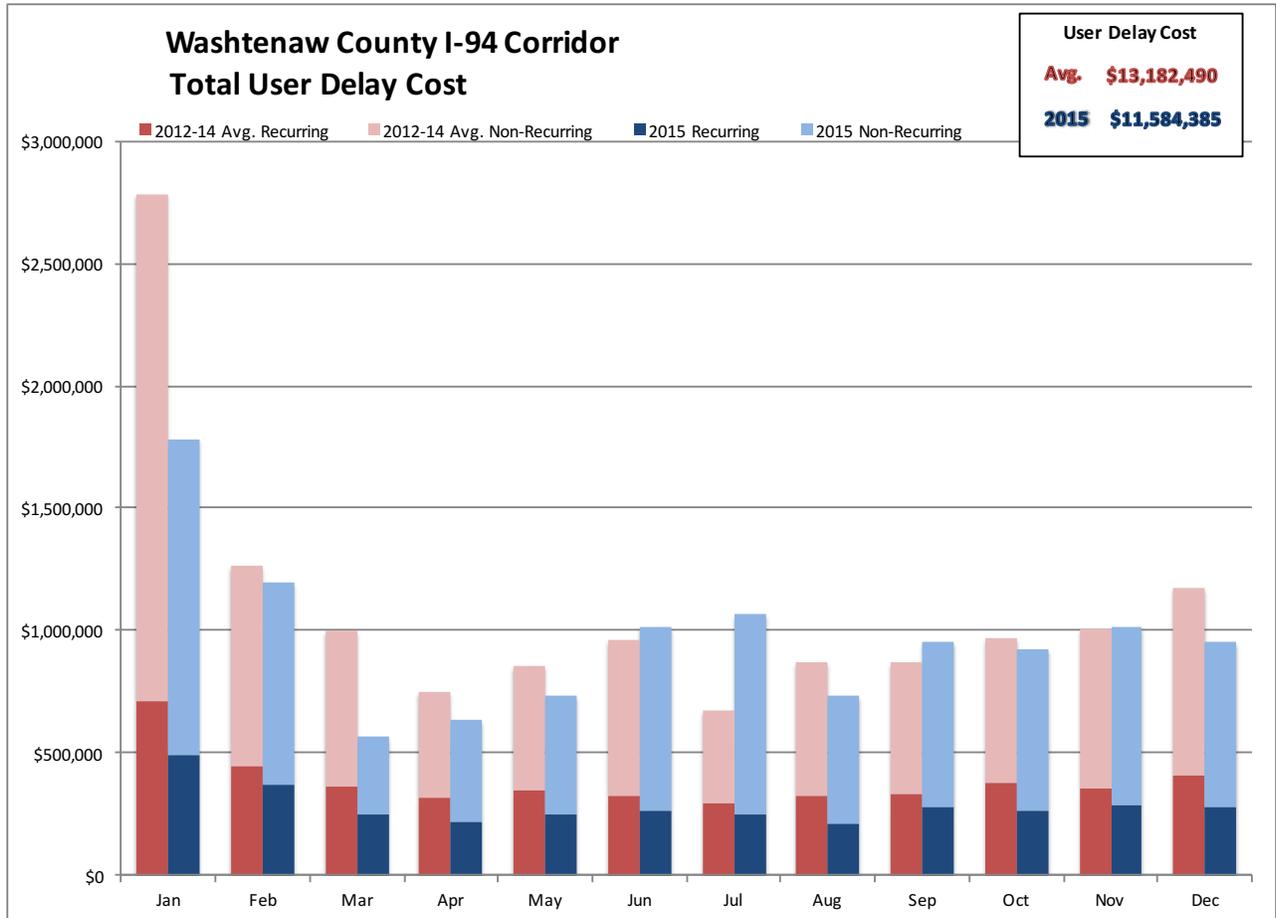
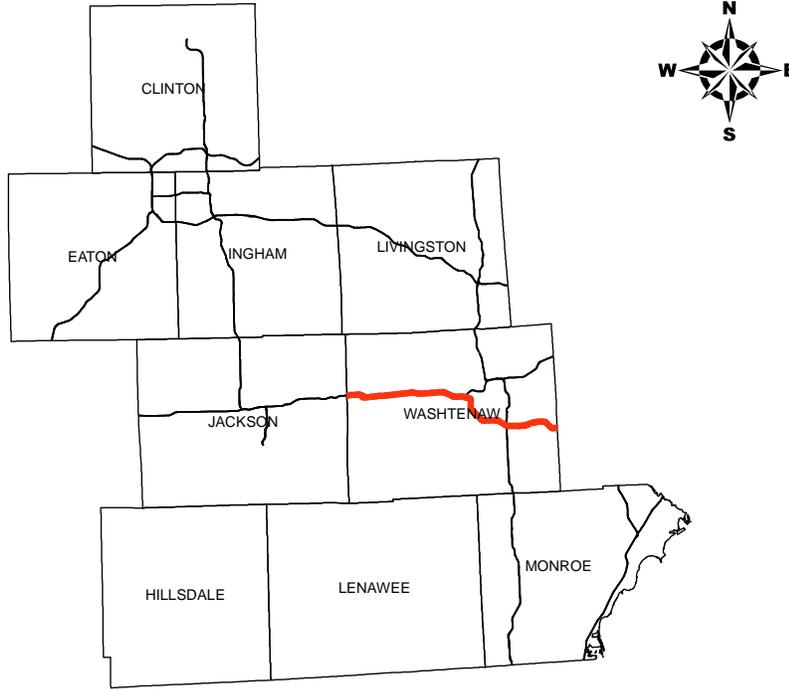


Figure 14. University Region I-94 eastbound

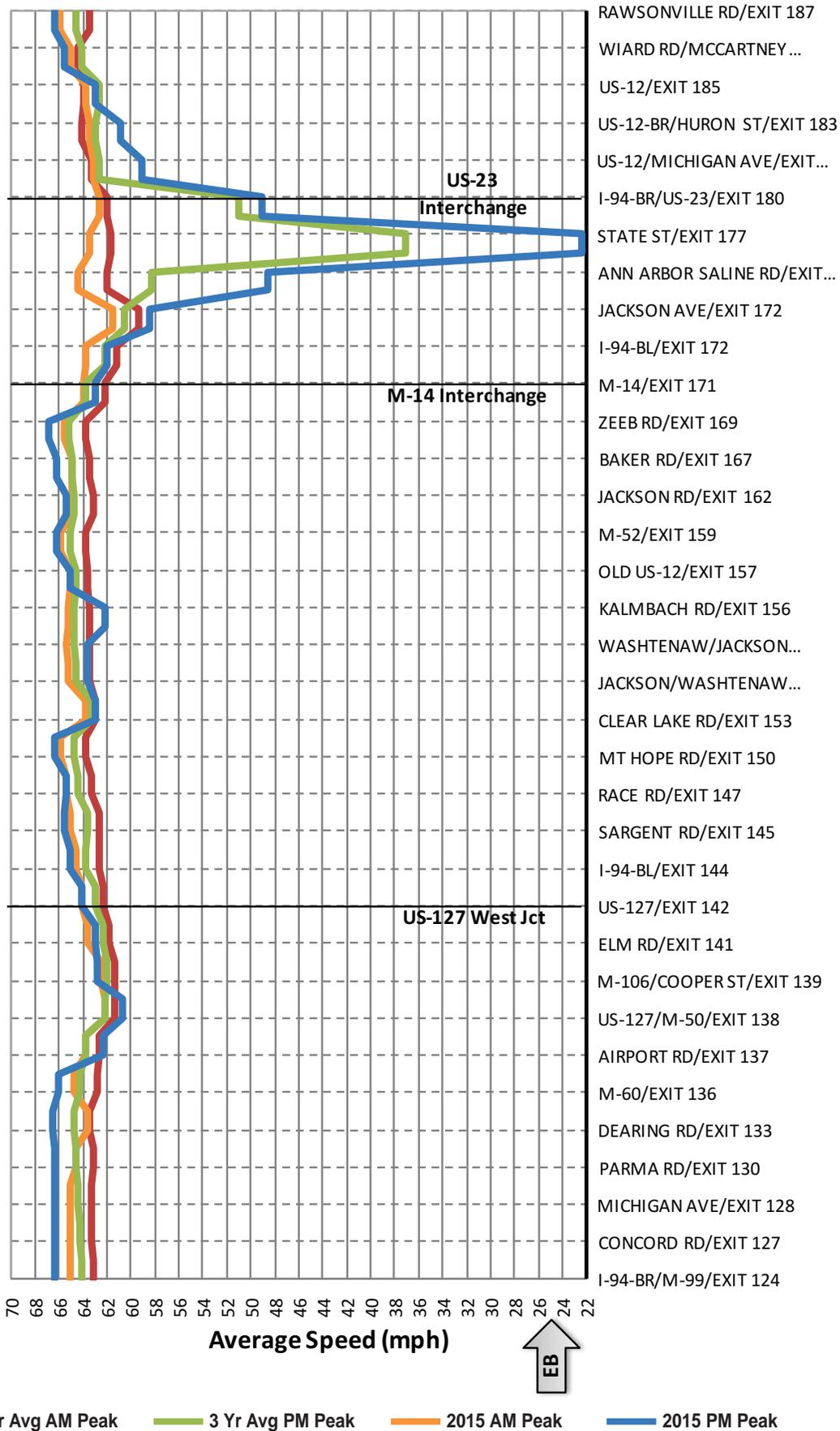
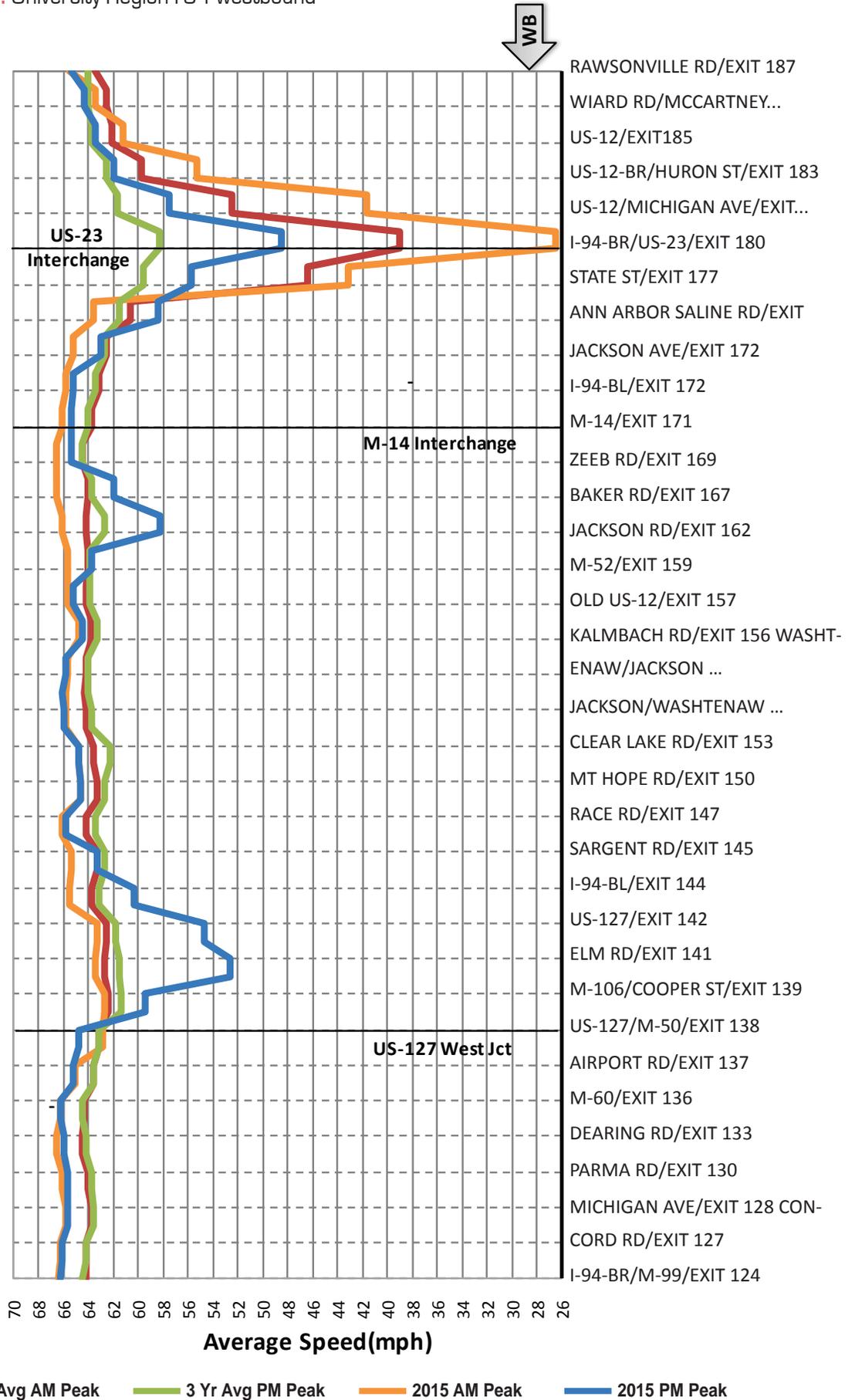
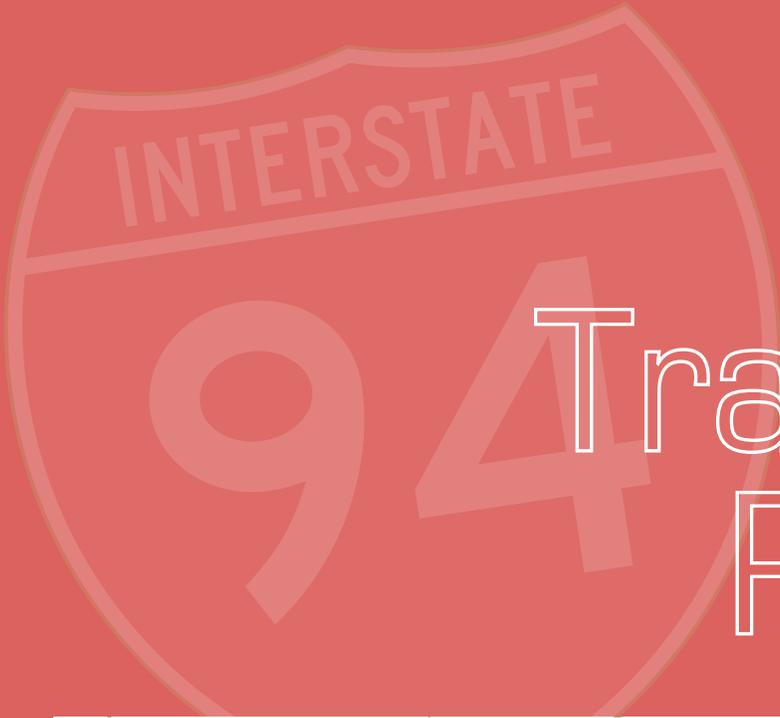


Figure 15. University Region I-94 westbound





Travel Time Reliability

Figure 16. Travel time reliability I-94



Figure 17. Segment 1- I-94 between M-60 and Sargent Rd

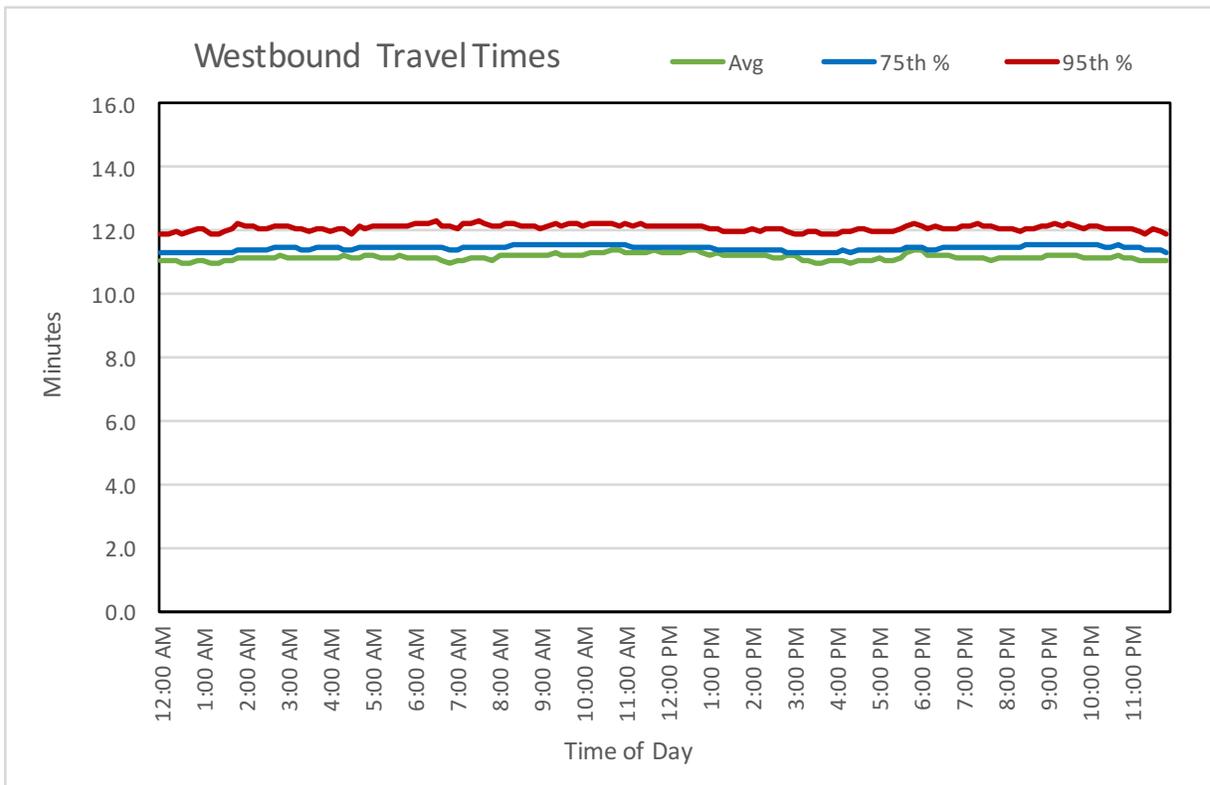
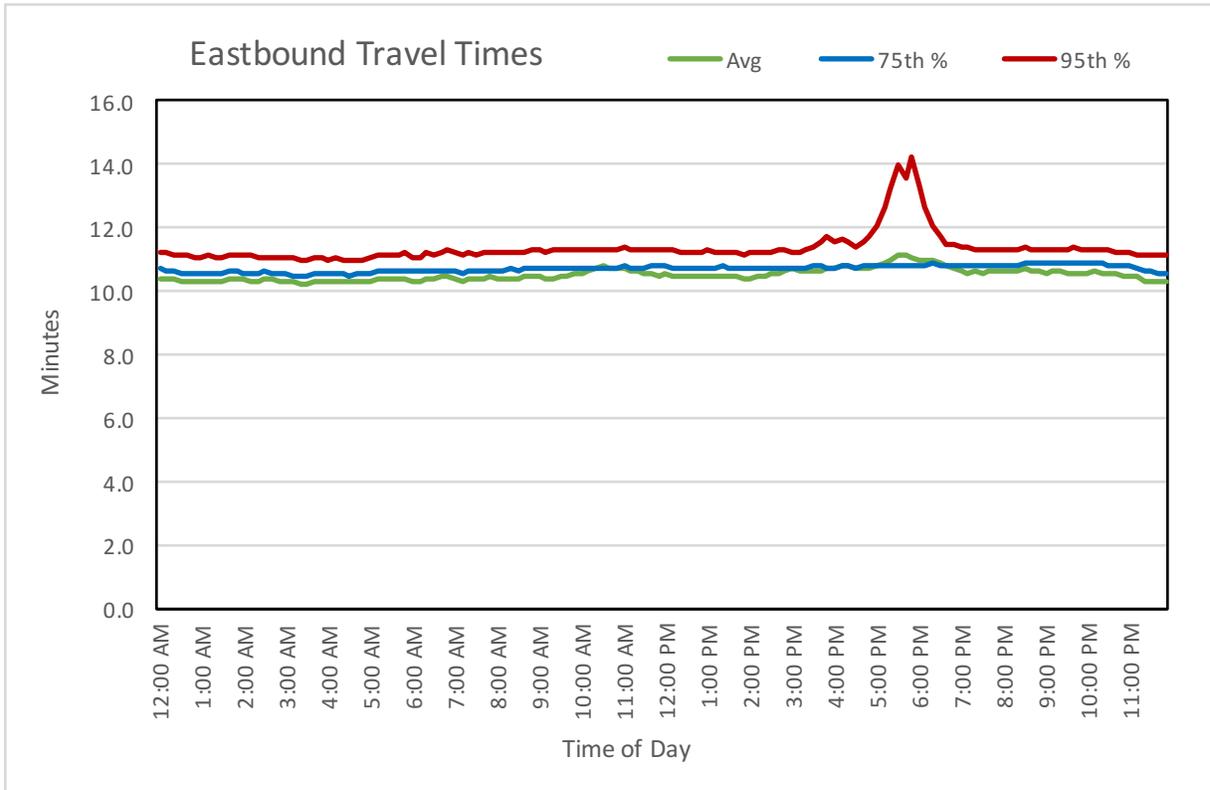


Figure 18. Segment 2- I-94 between M-14 and I-94-BR/US-23

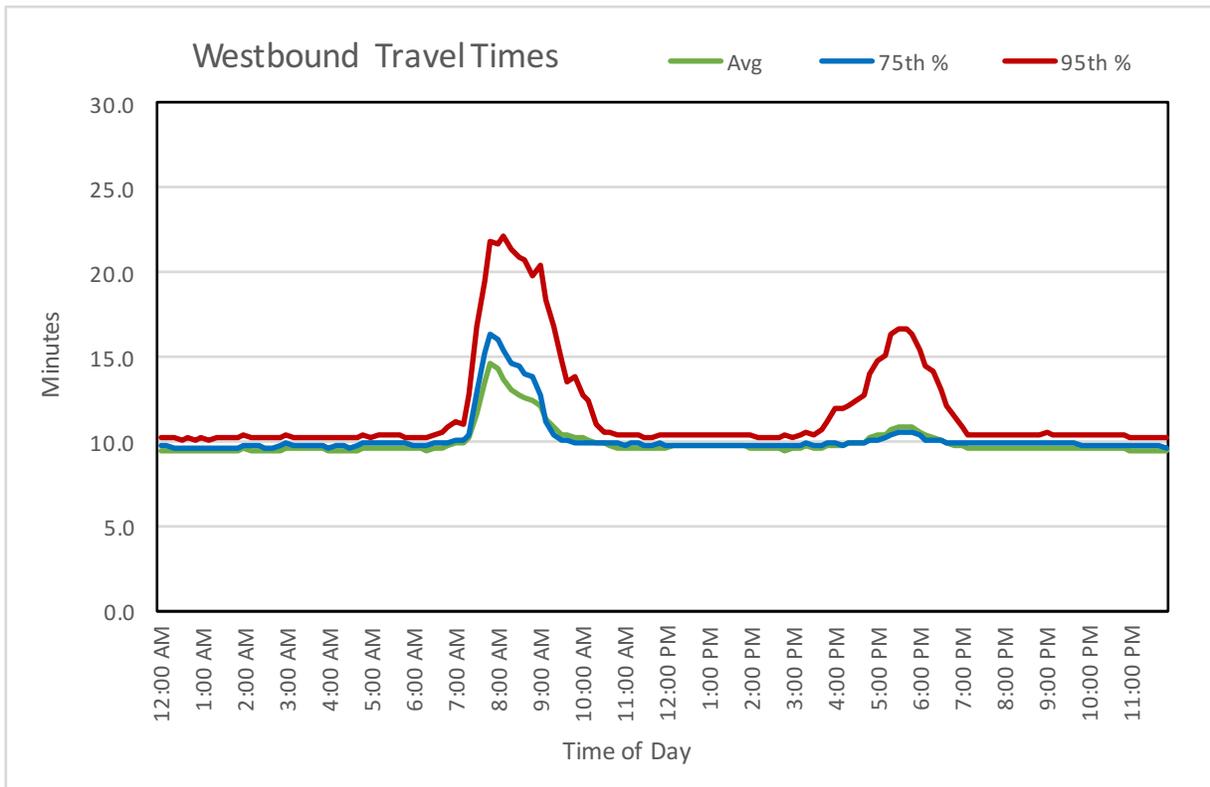
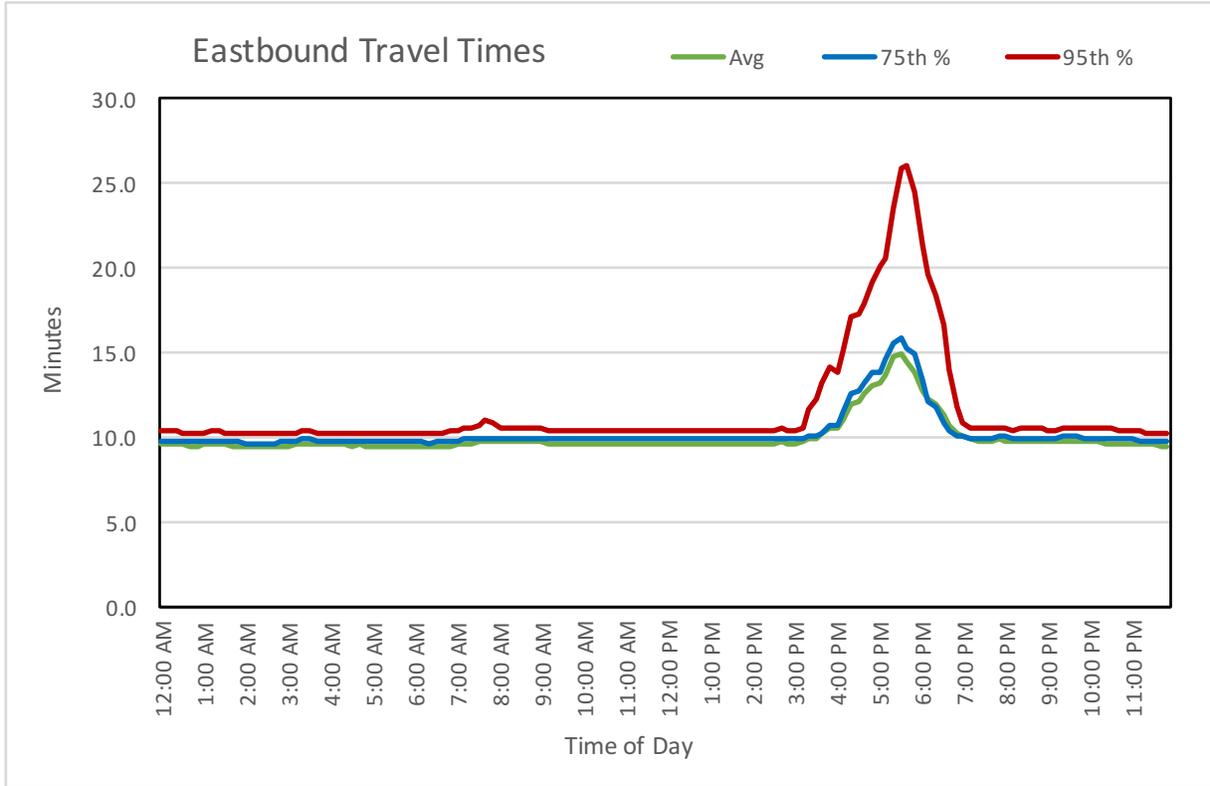
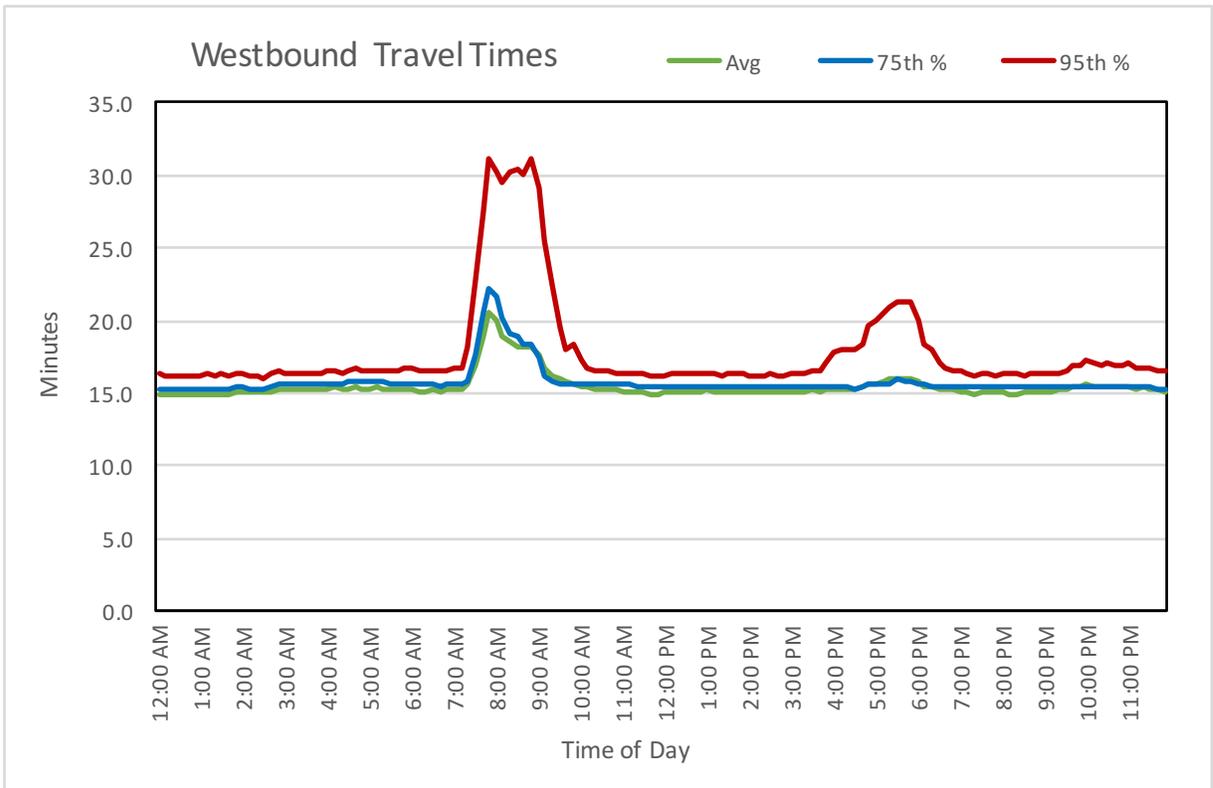
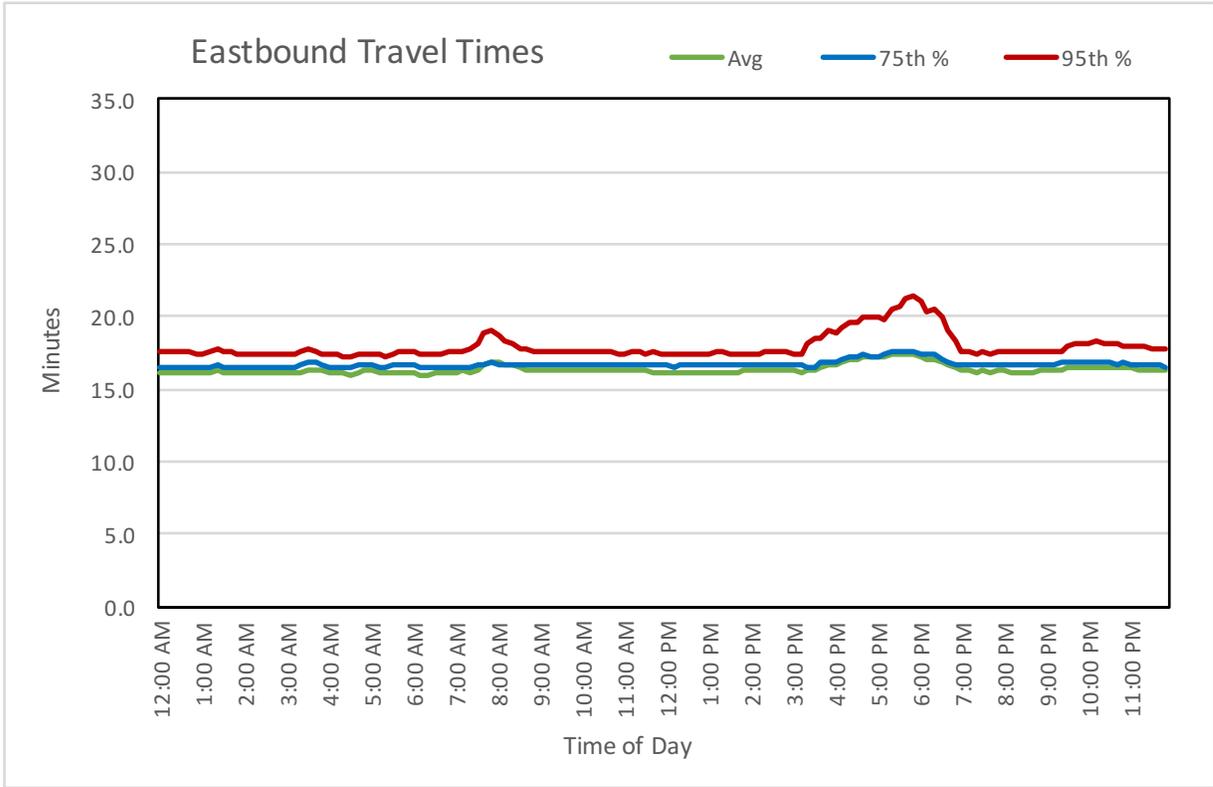


Figure 19. Segment 1- I-94 between I-94-BR/US-23 and I-275



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 20. Clinton/Eaton Counties I-96 Corridor total user delay cost

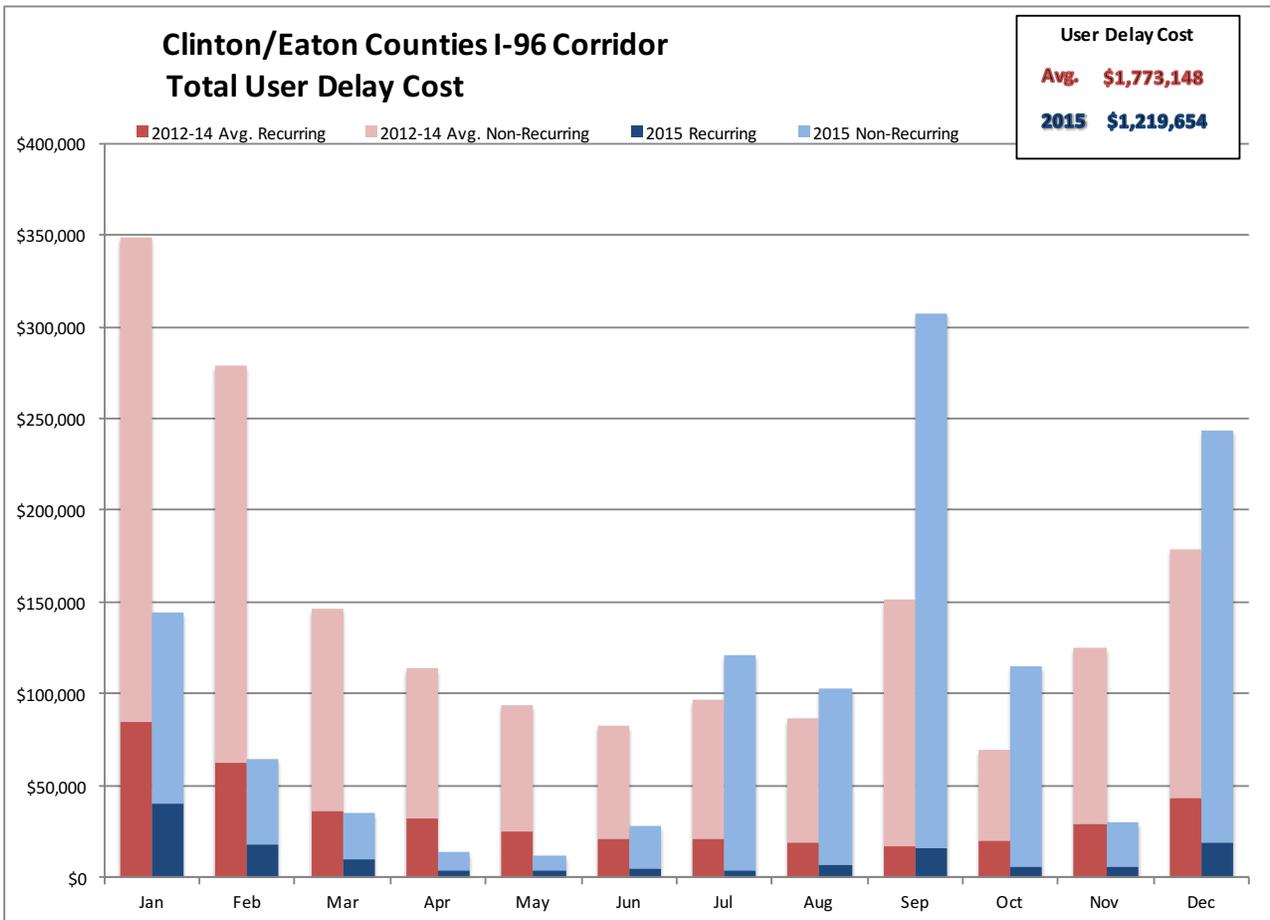
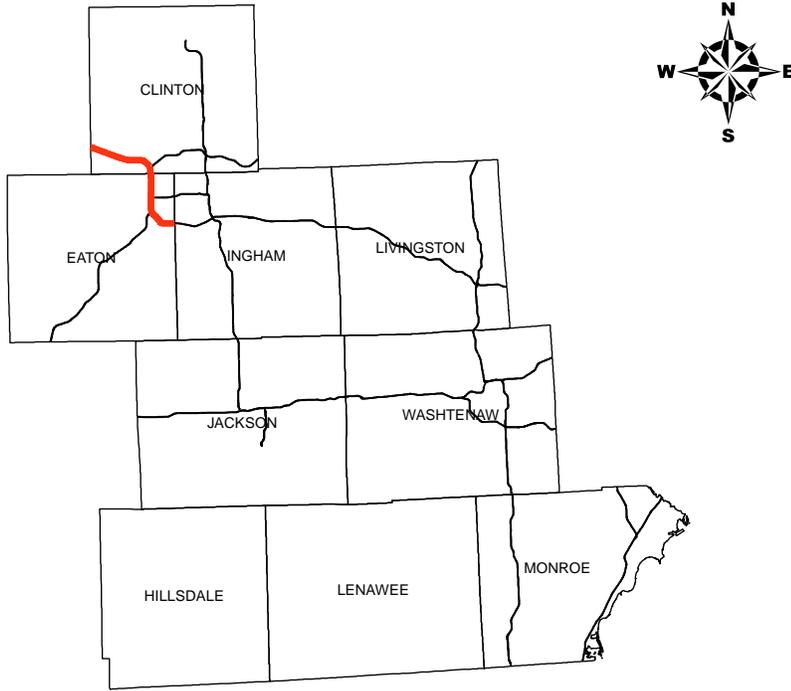


Figure 21. Ingham County I-96 Corridor total user delay cost

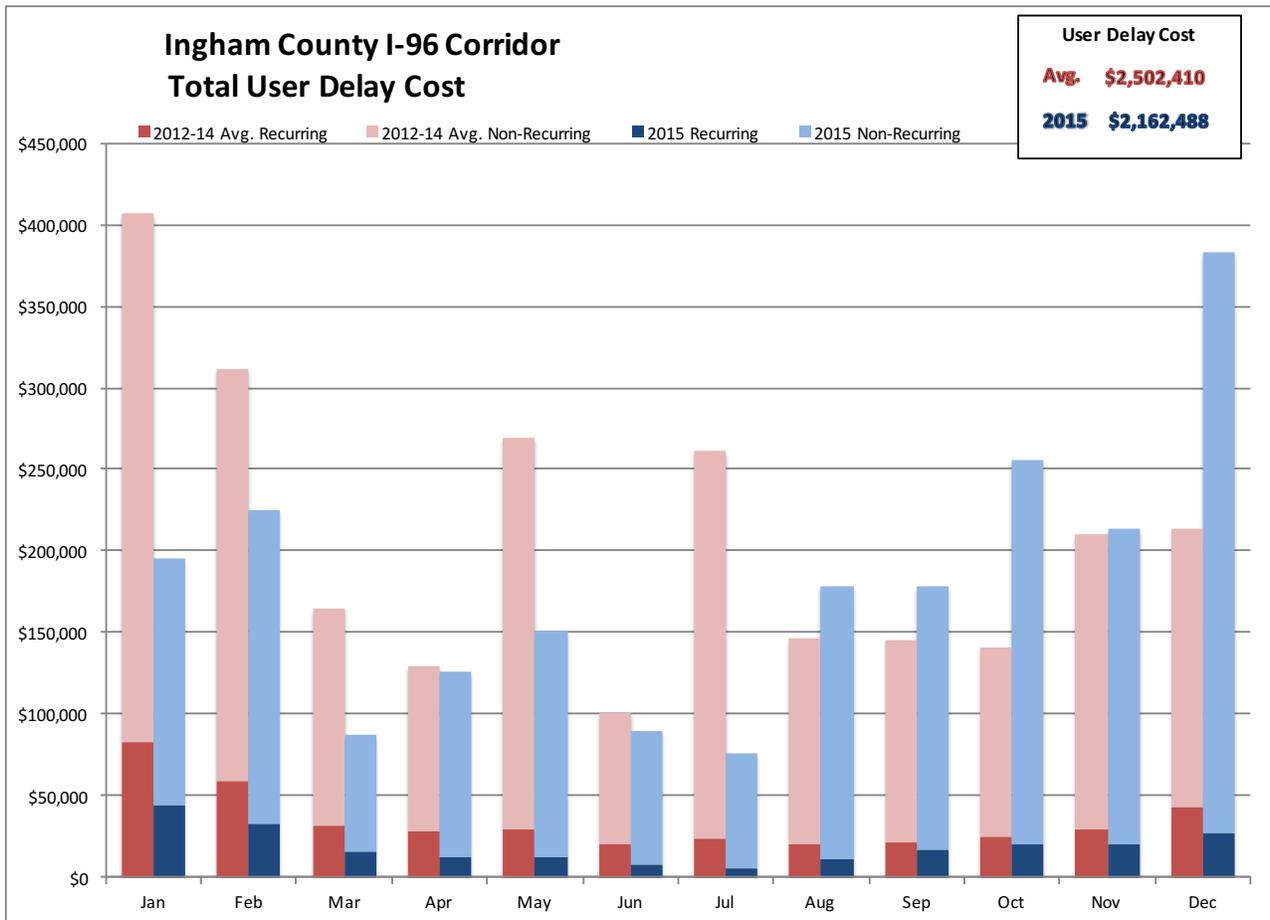
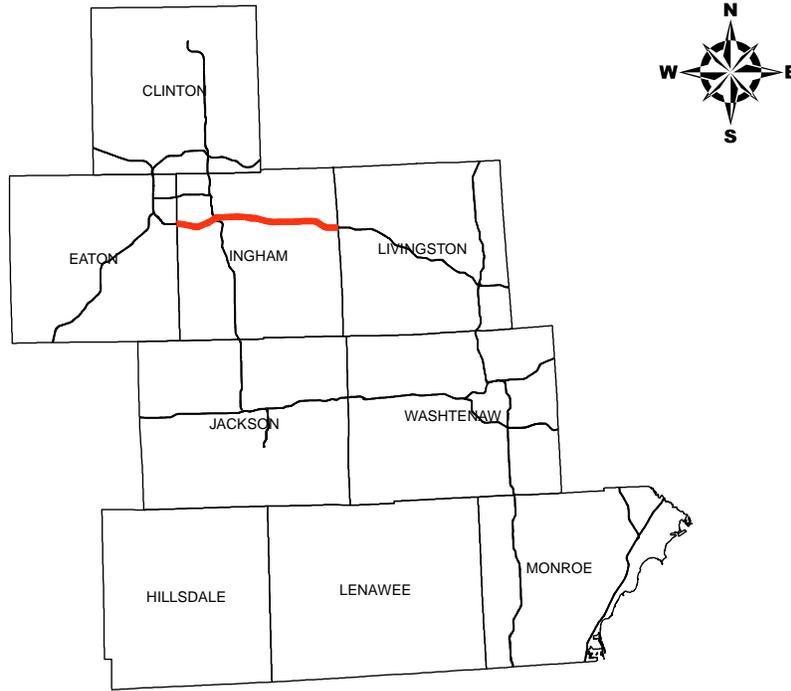


Figure 22. Livingston County I-96 Corridor total user delay cost

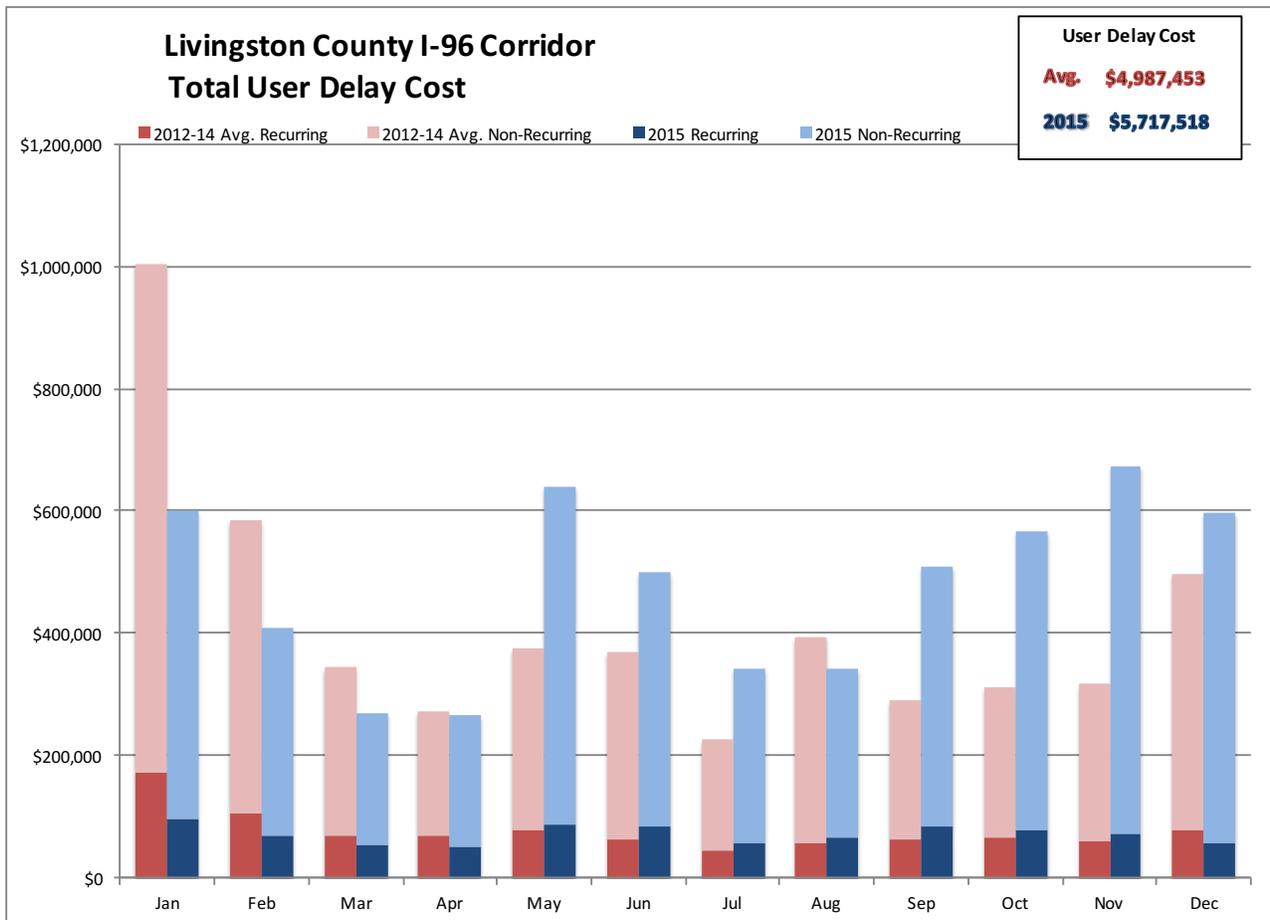
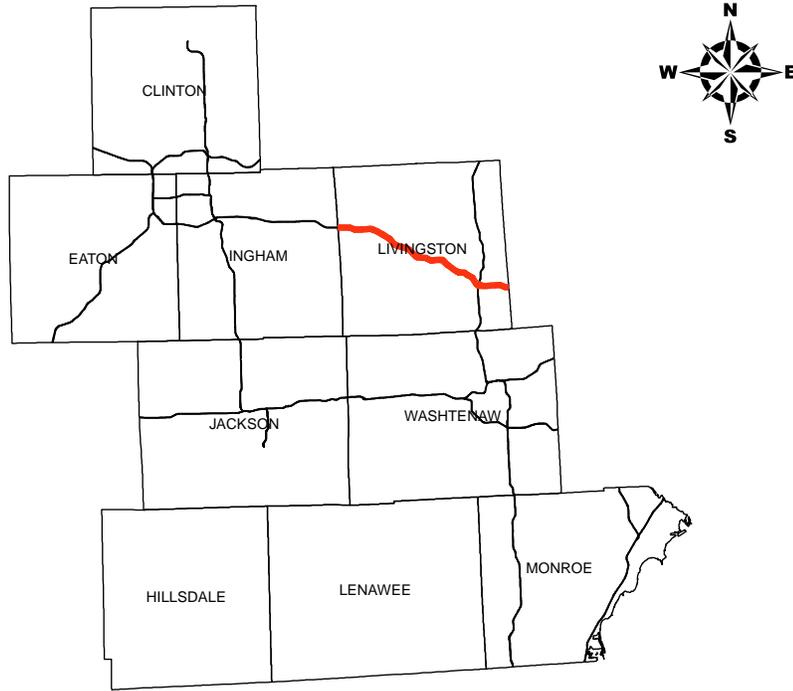


Figure 23. University Region I-96 eastbound

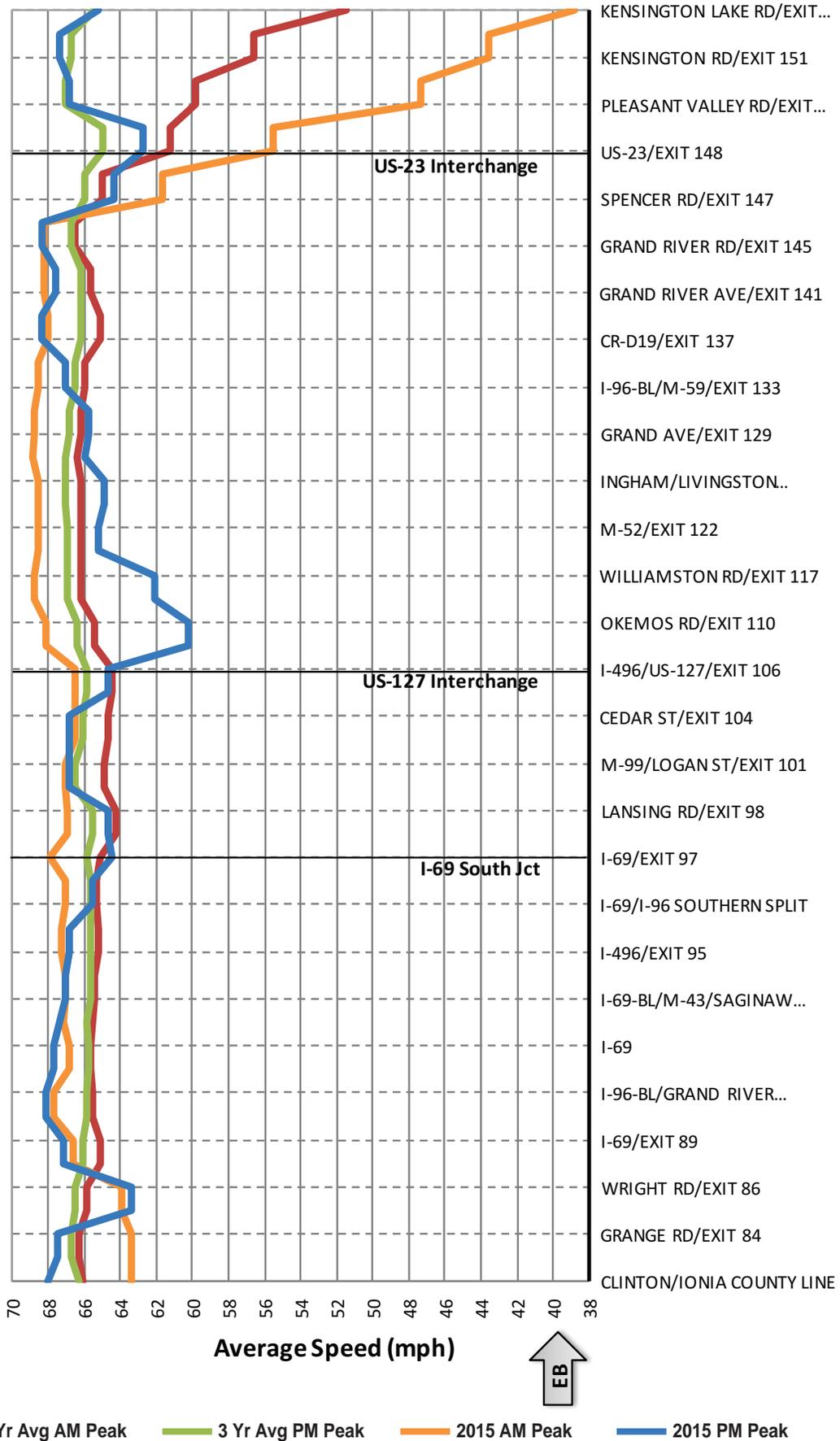
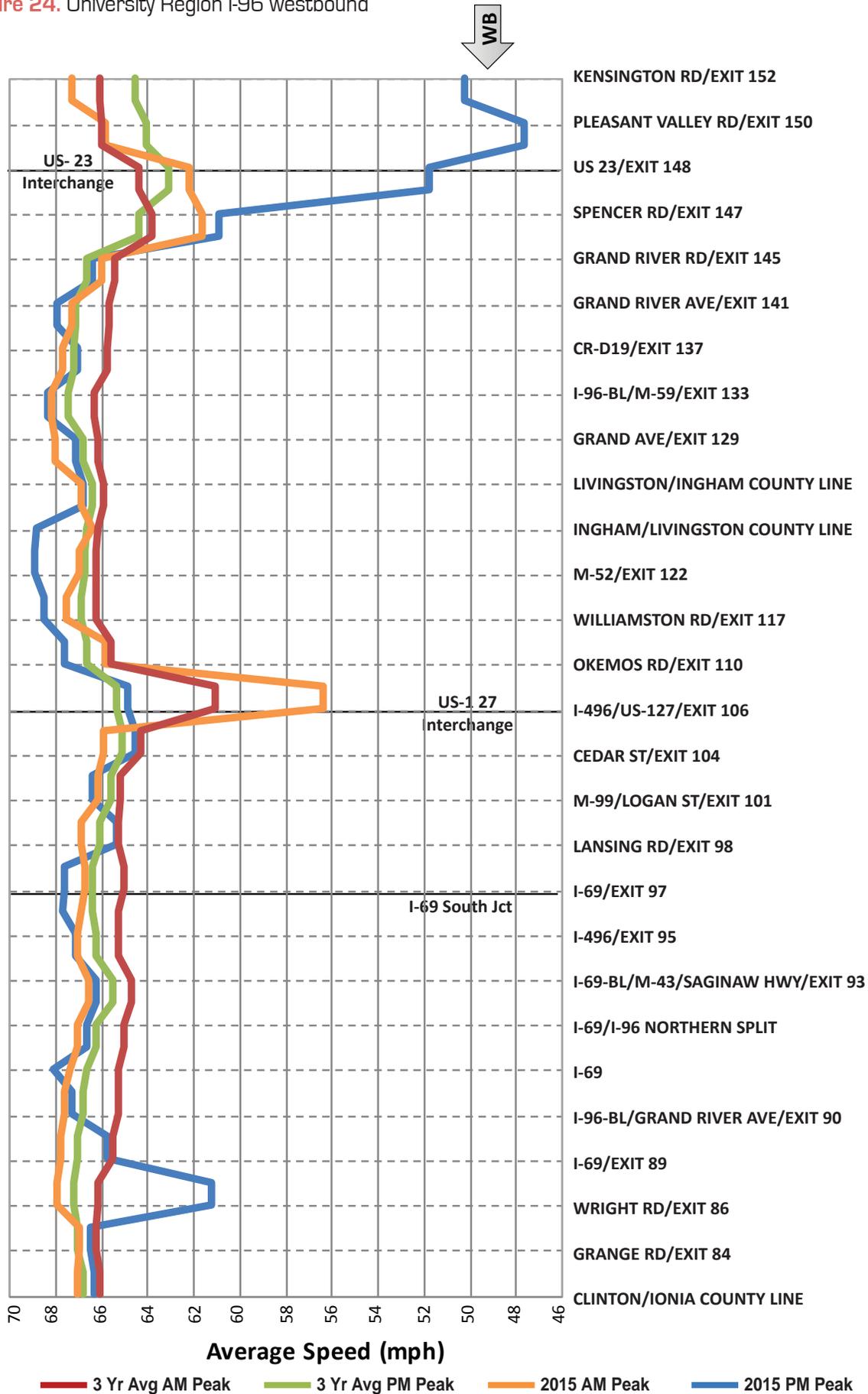


Figure 24. University Region I-96 westbound



INTERSTATE

96

Travel Time Reliability

Figure 25. Travel time reliability: I-96

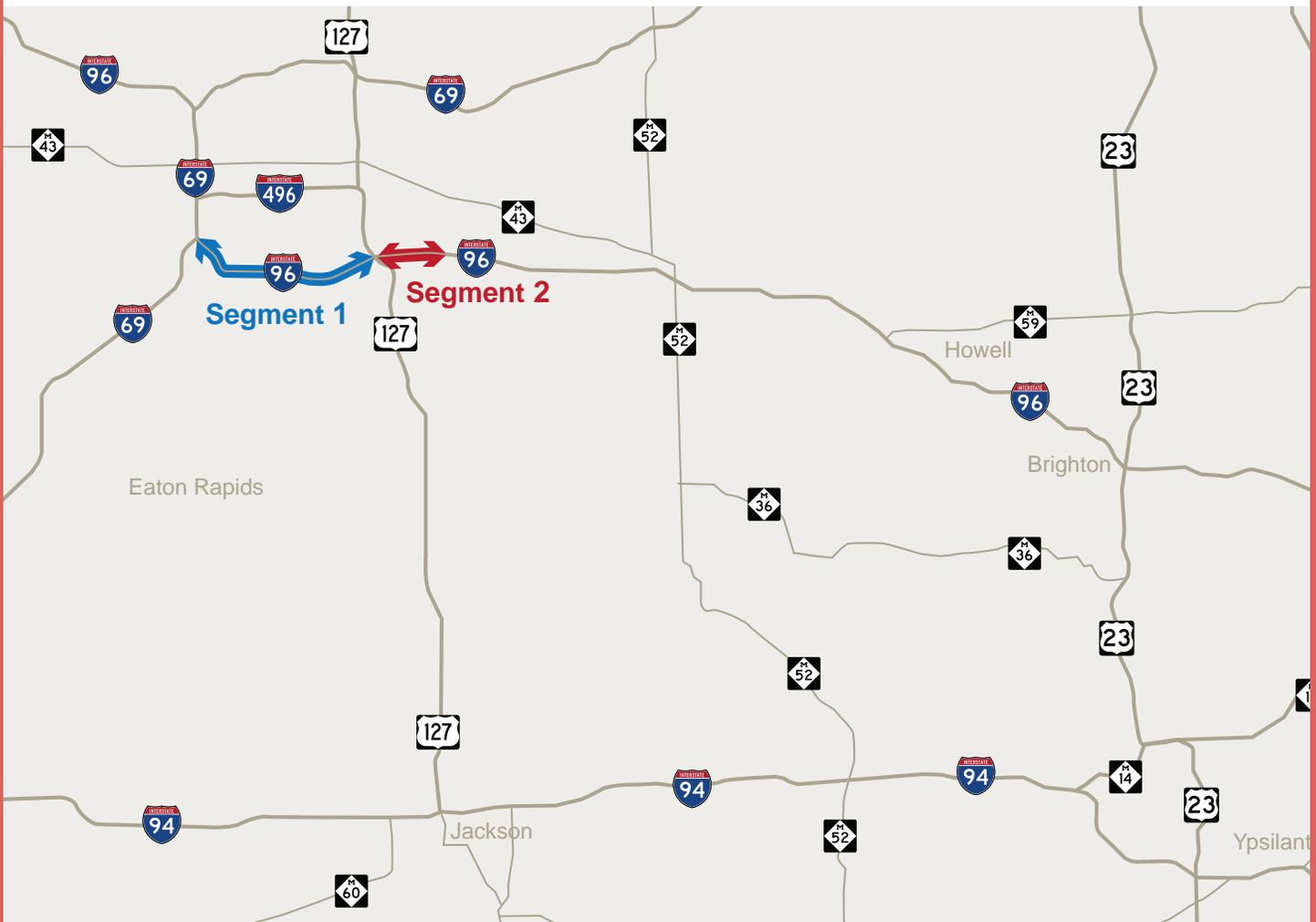


Figure 26. Segment 1- I-96 between I-69 and I-496/US-127

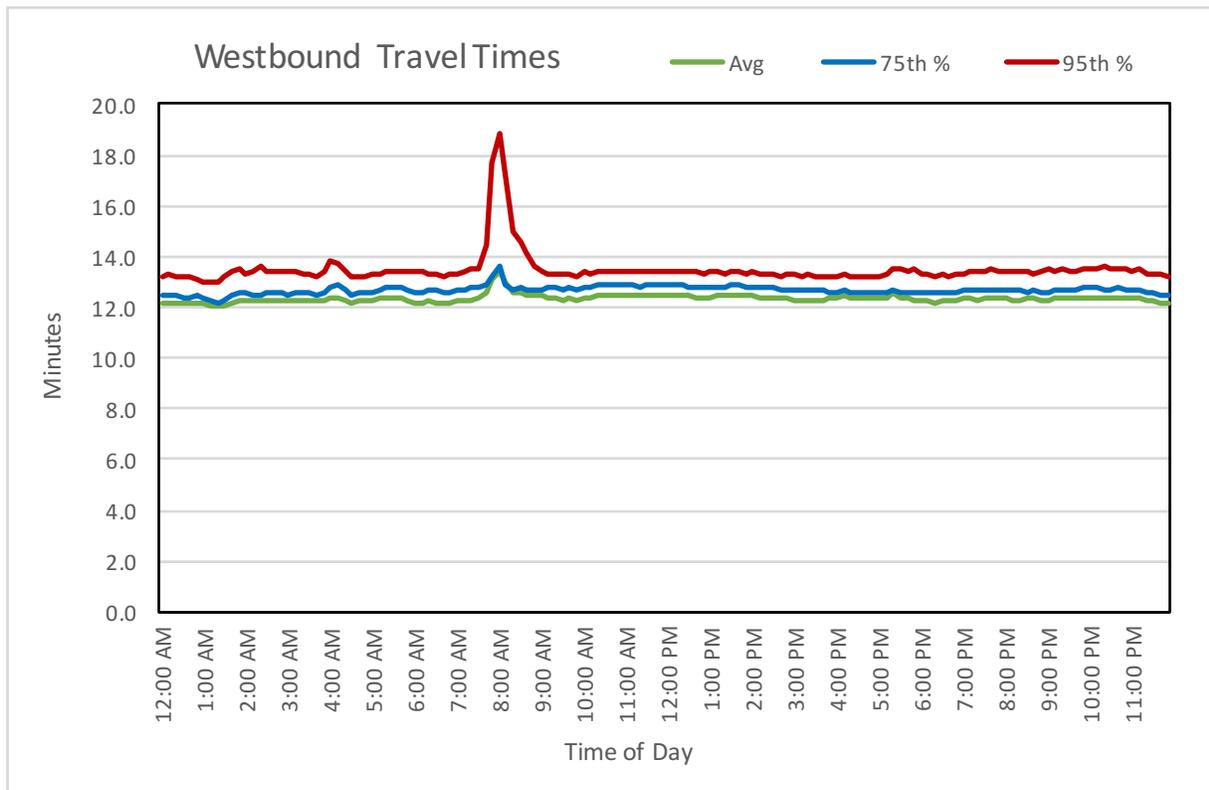
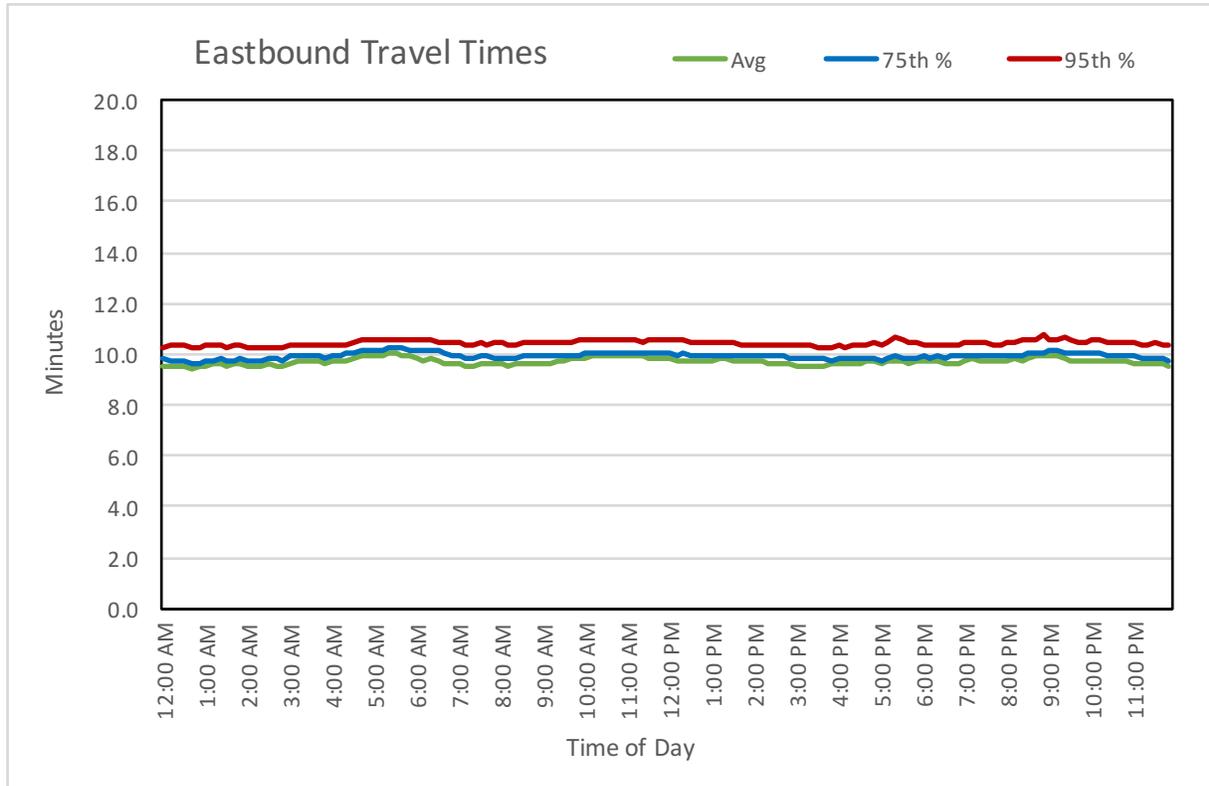
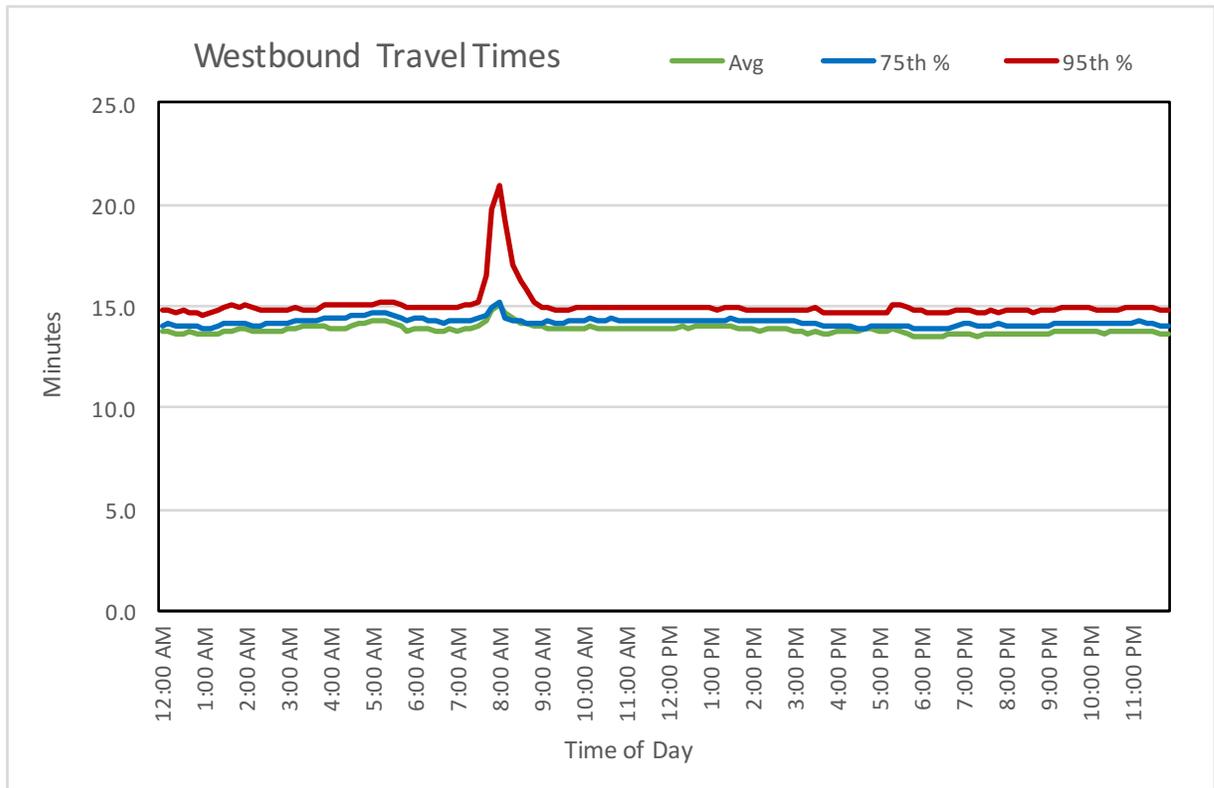
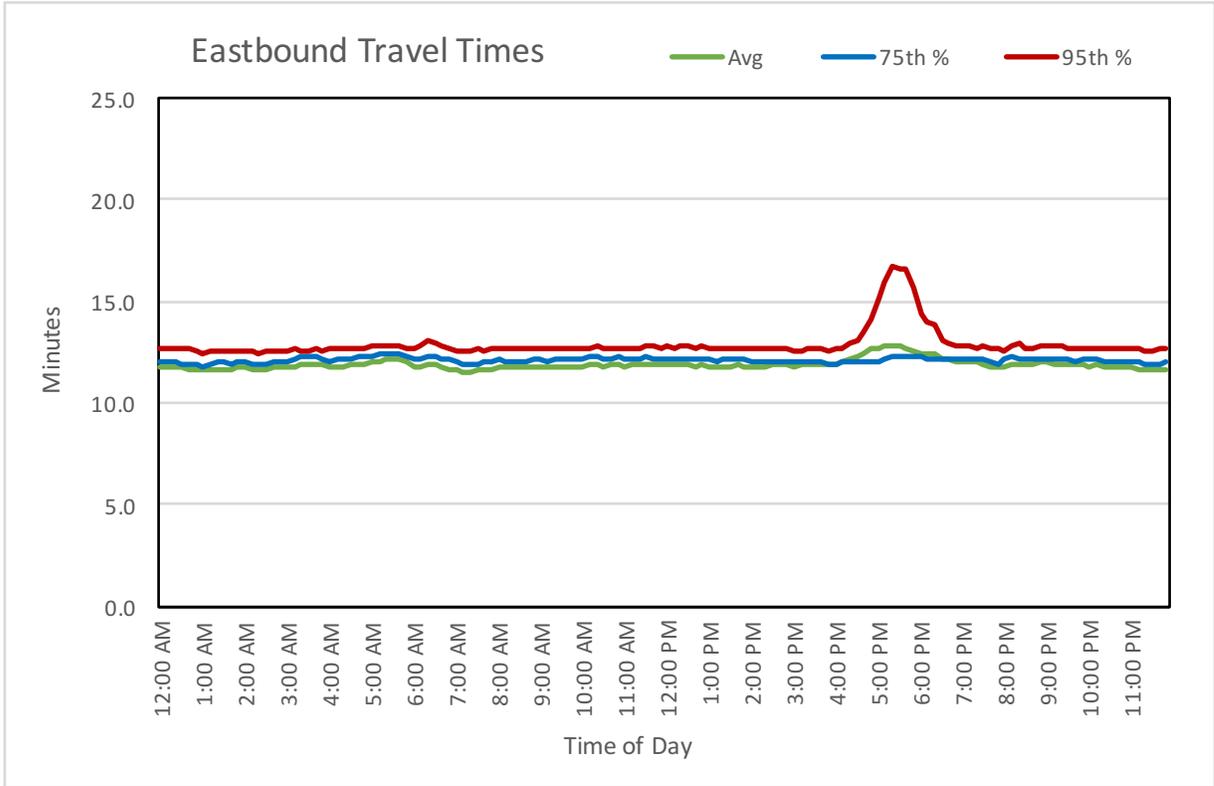


Figure 27. Segment 2- I-96 between I-496/US-127 and Williamston Rd



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 28. Monroe County I-275 Corridor total user delay cost

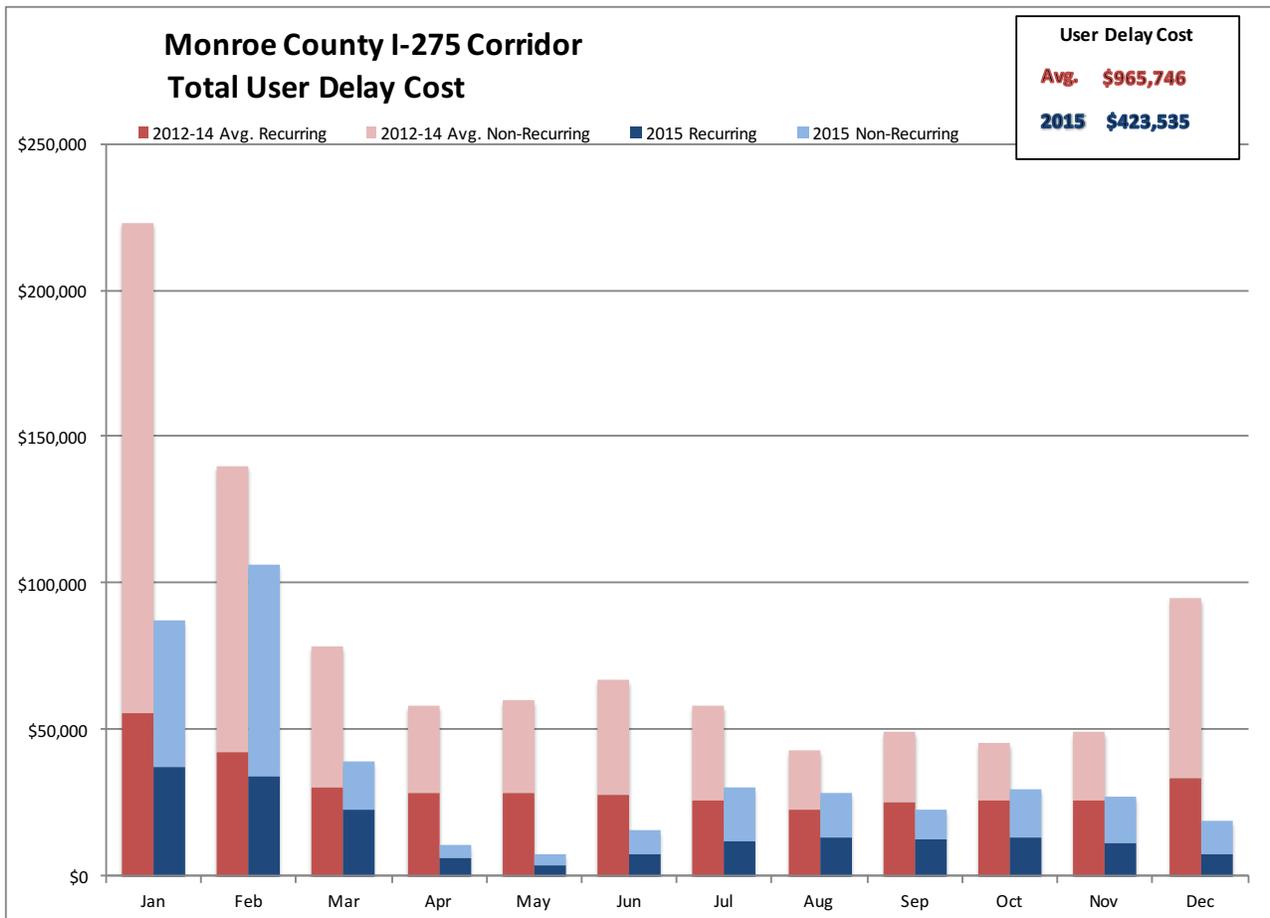
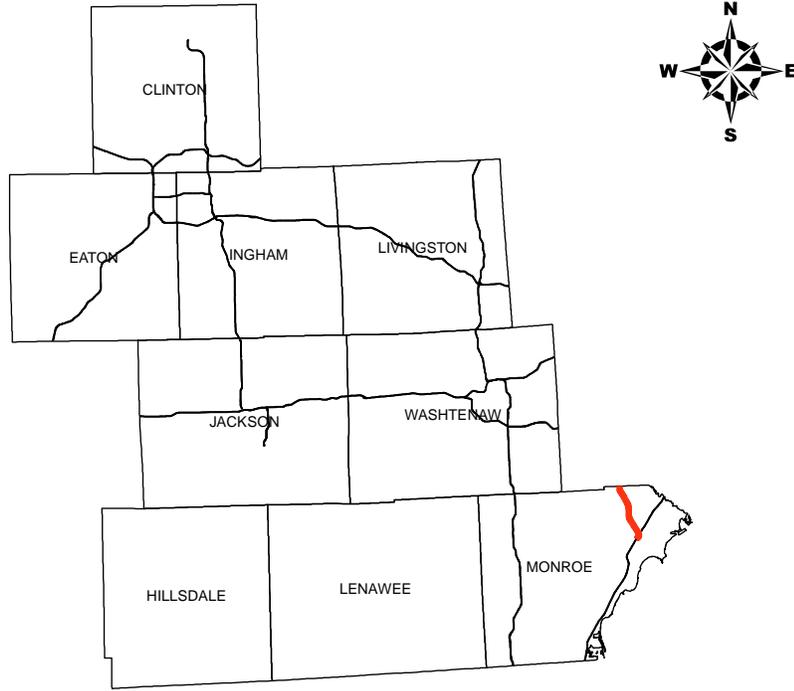


Figure 29. University Region I-275 northbound

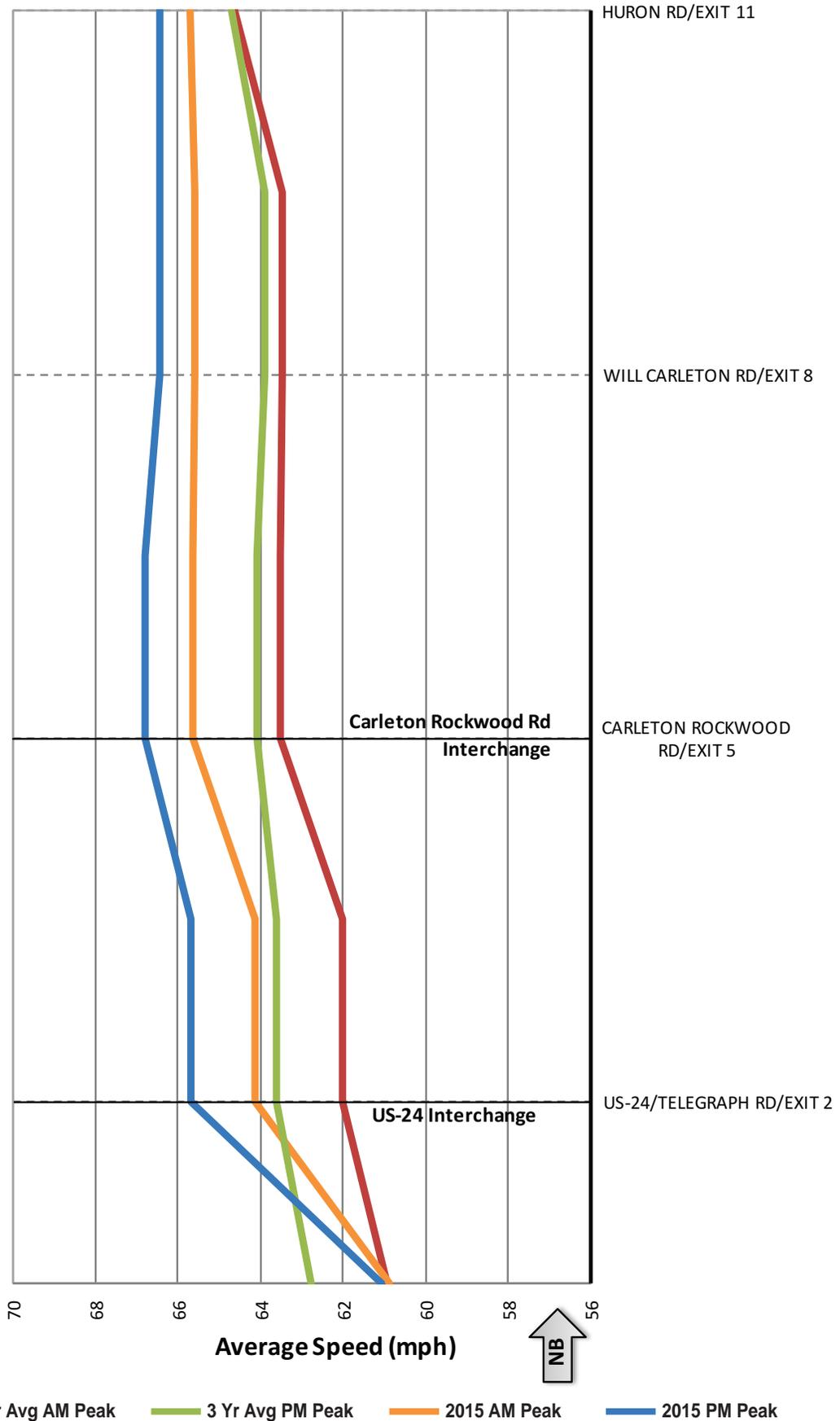
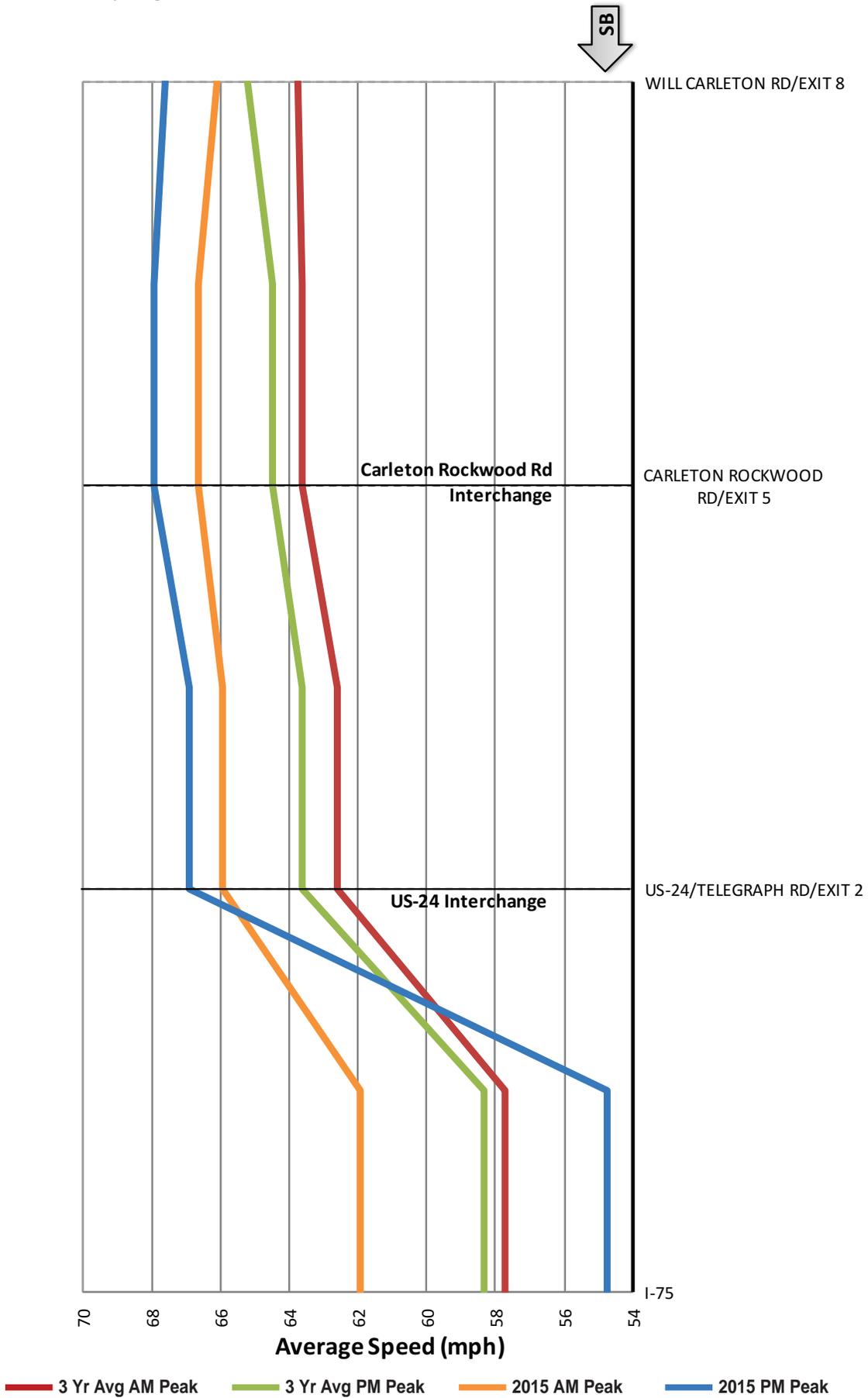


Figure 30. University Region I-275 southbound



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 31. Eaton/Ingham Counties I-496 Corridor total user delay cost

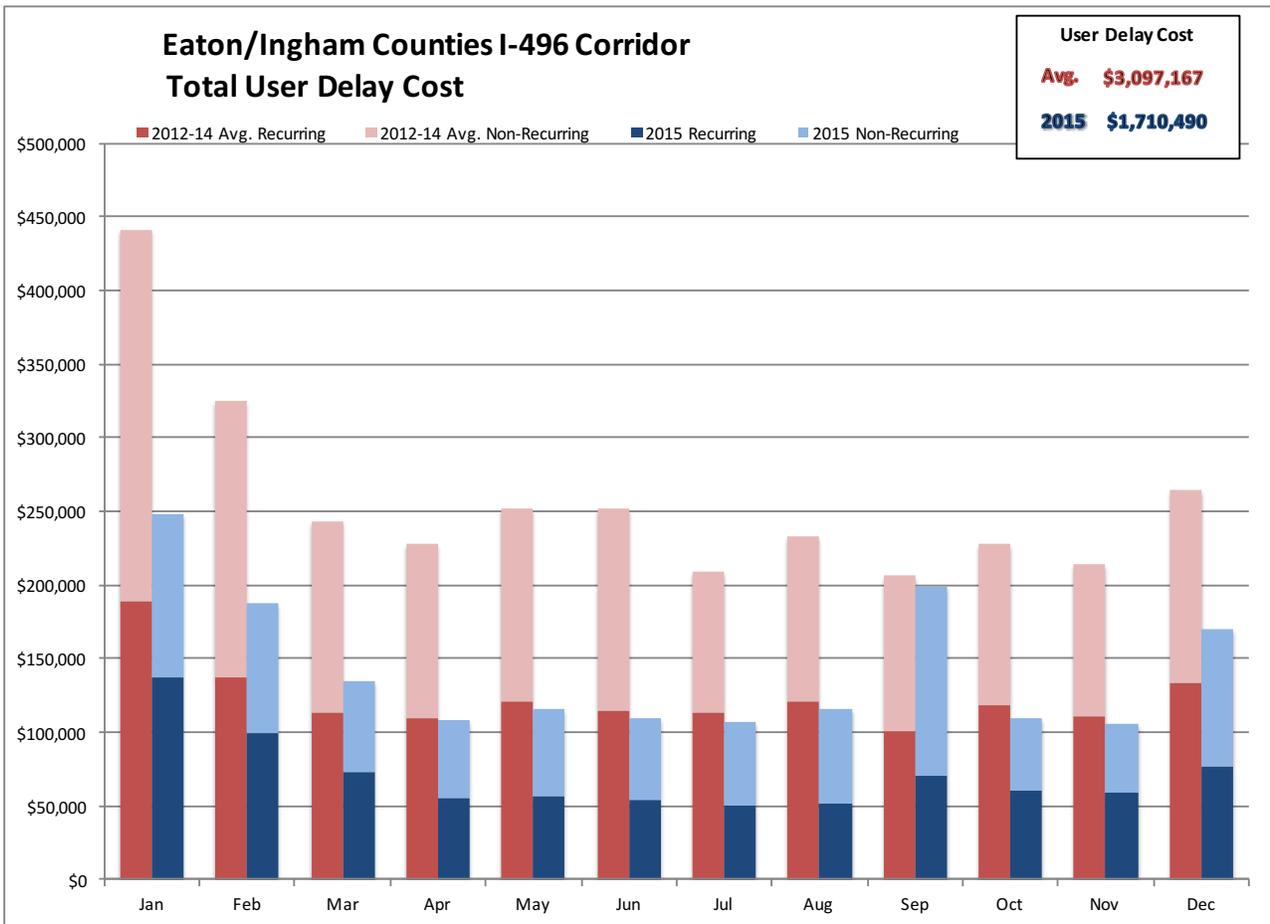
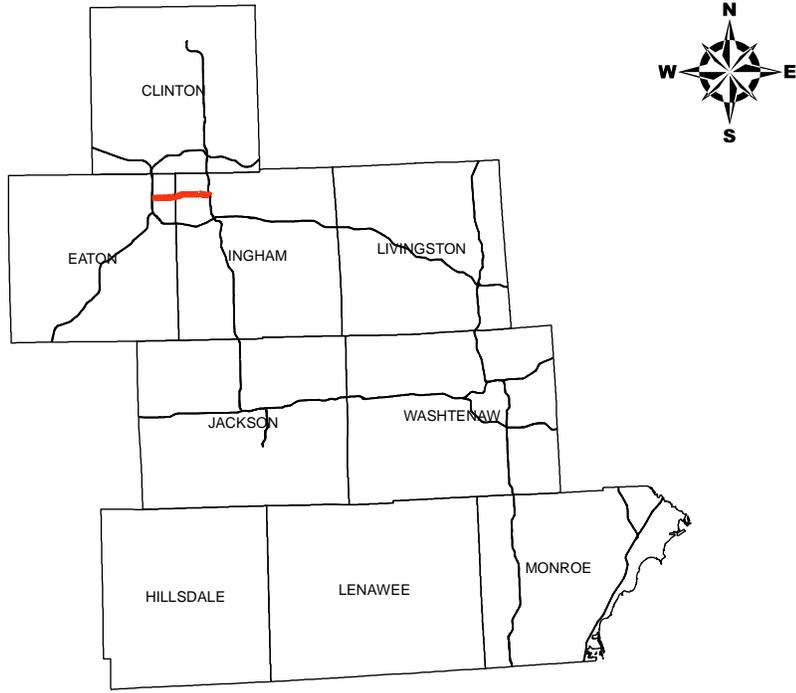


Figure 32. University Region I-496 eastbound

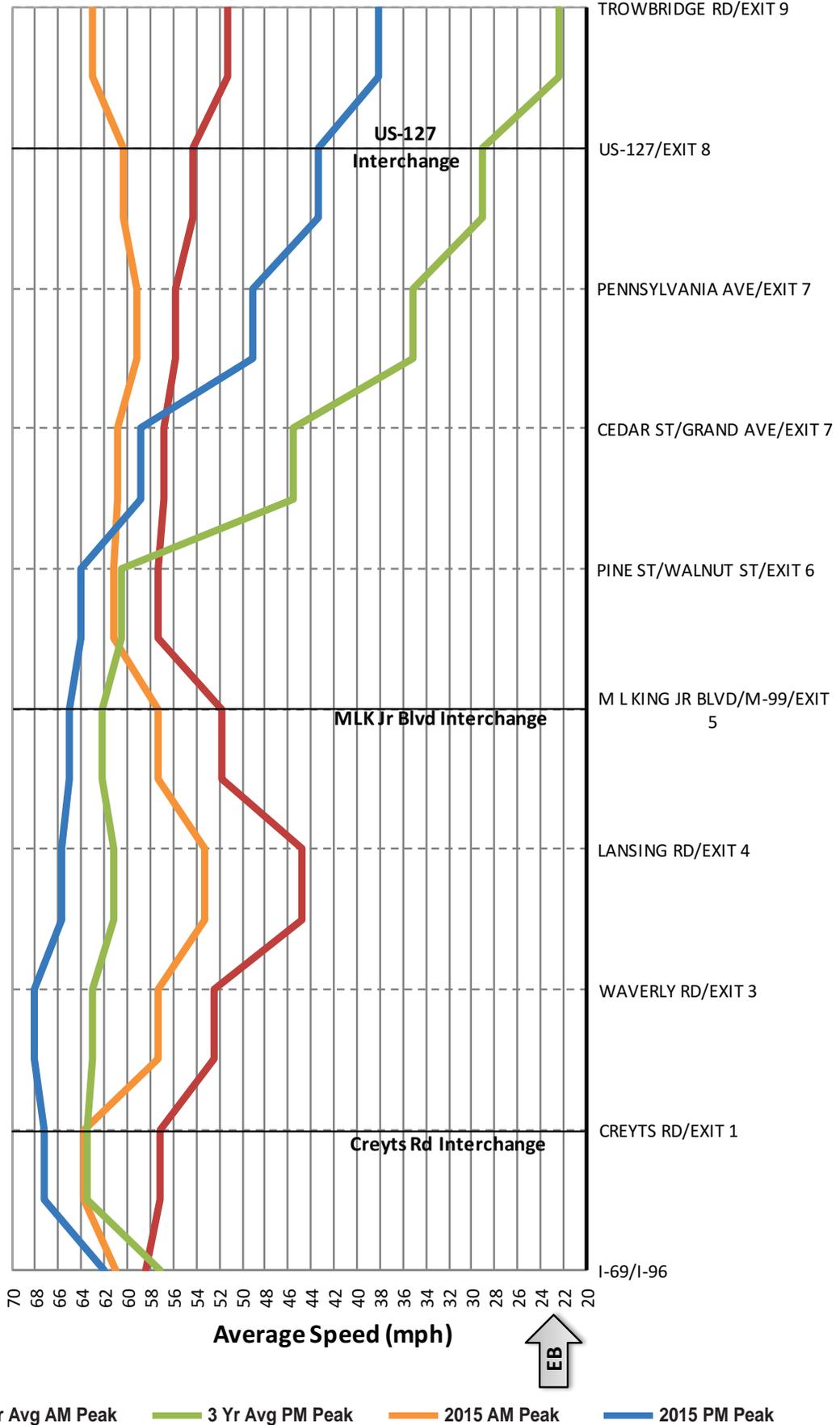
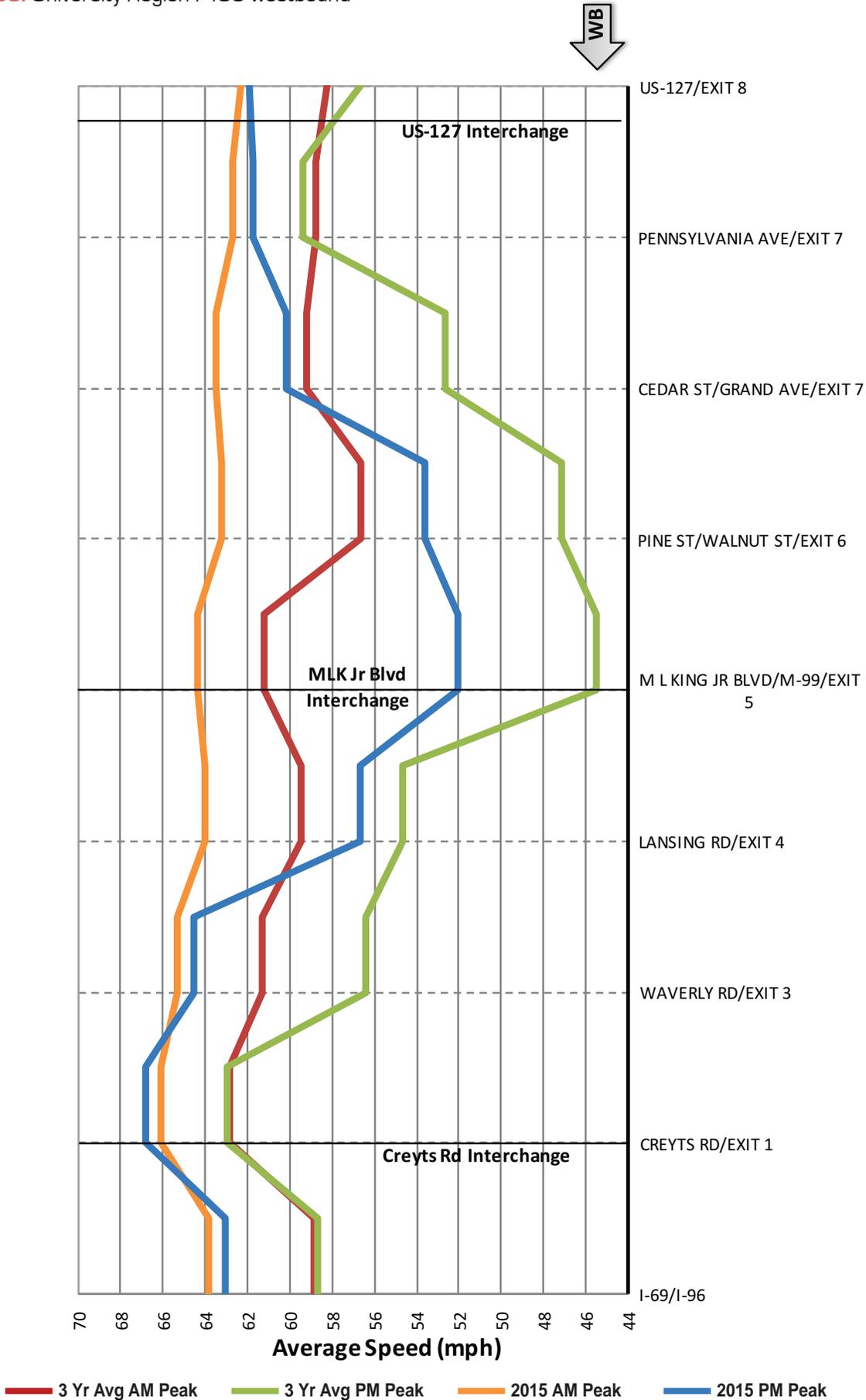


Figure 33. University Region I-496 westbound



Travel Time Reliability

Figure 34. Travel time reliability: I-496

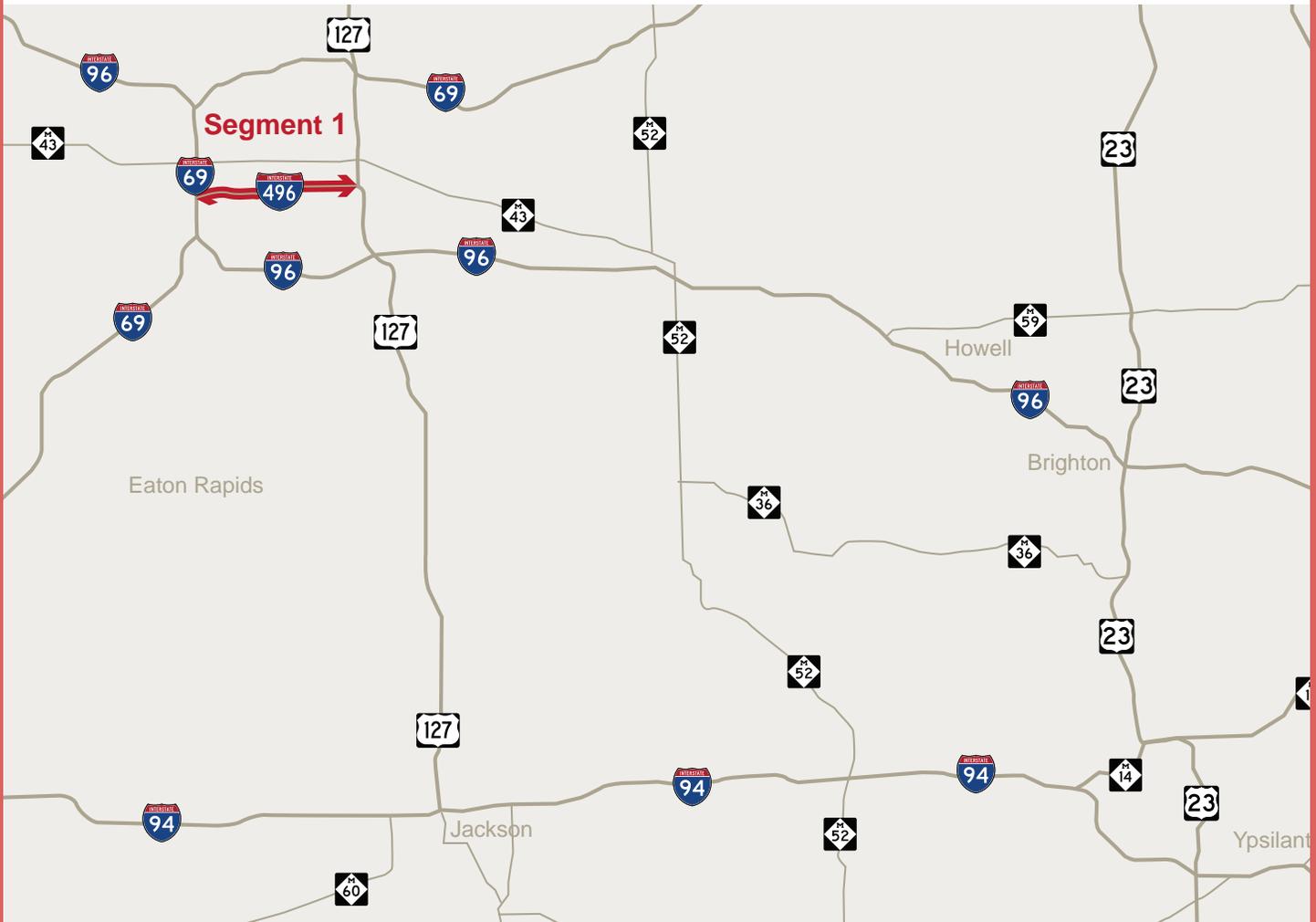
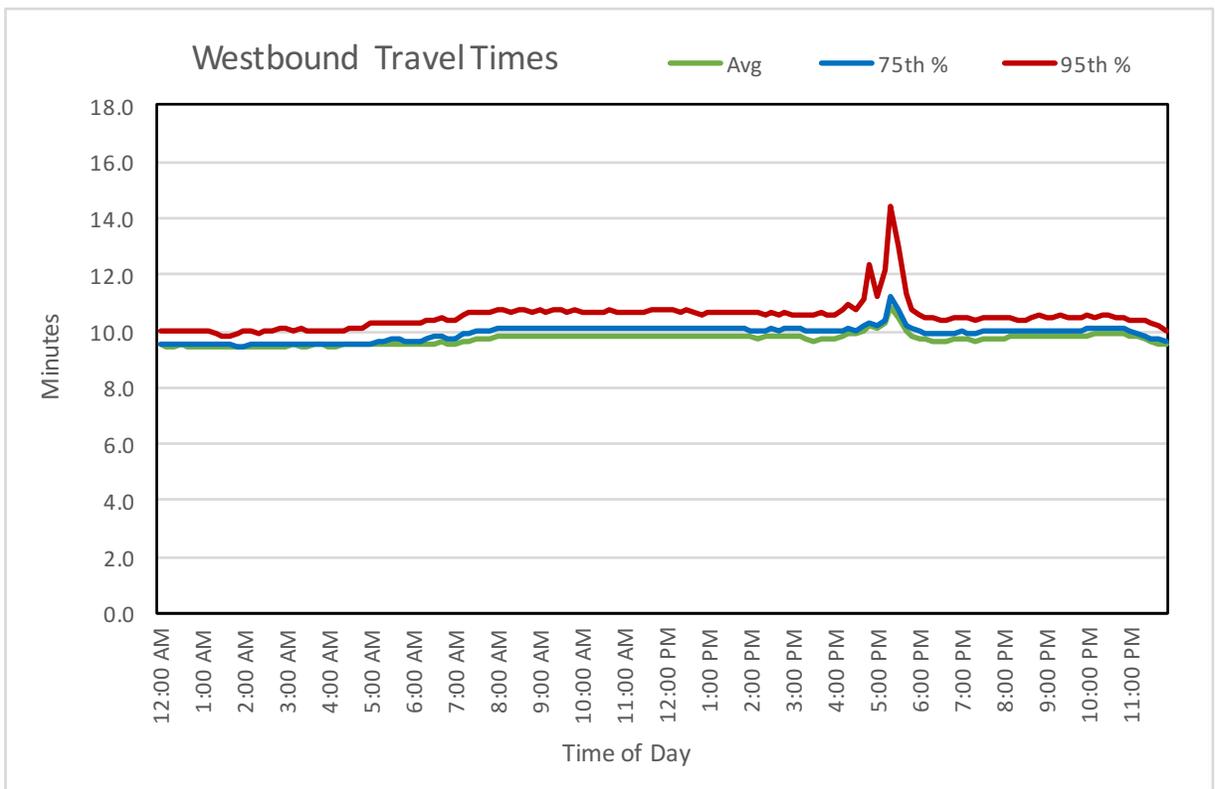
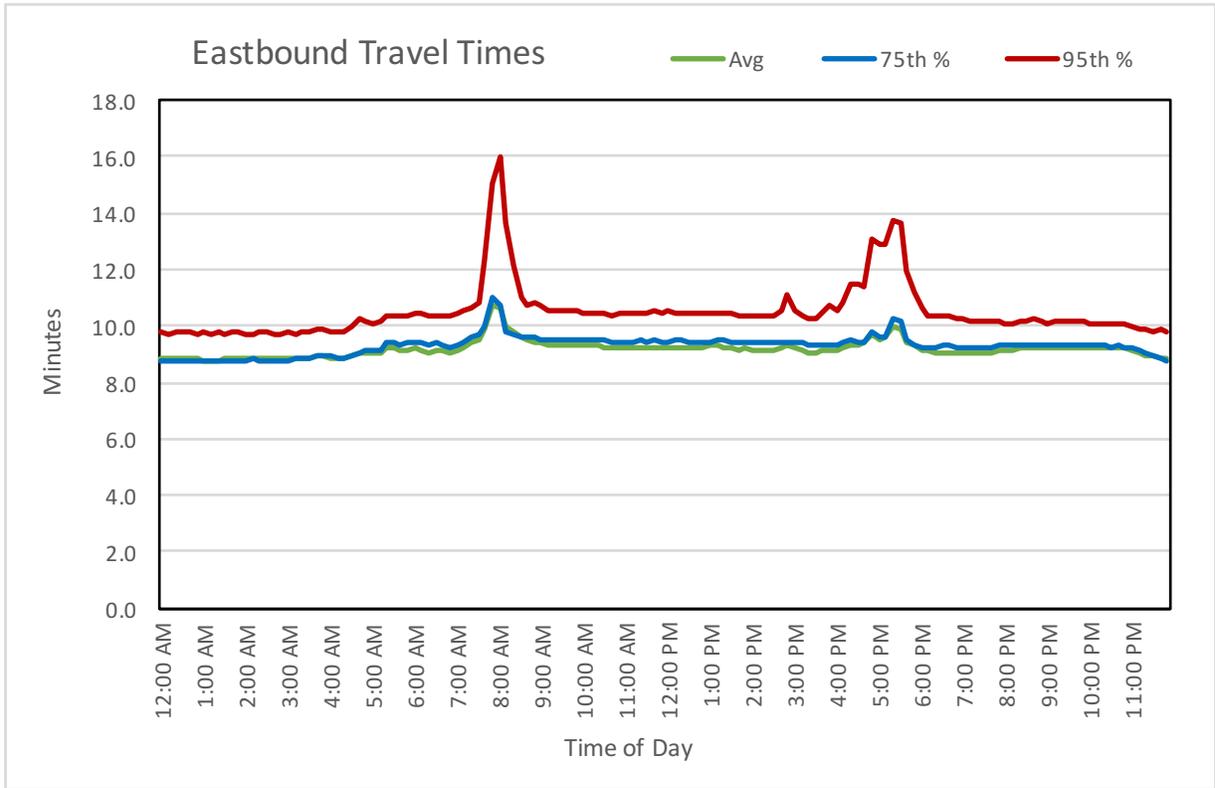


Figure 35. Segment 1- I-496 between US-127 and I-69/I-96



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 36. Washtenaw County M-14 Corridor total user cost delay

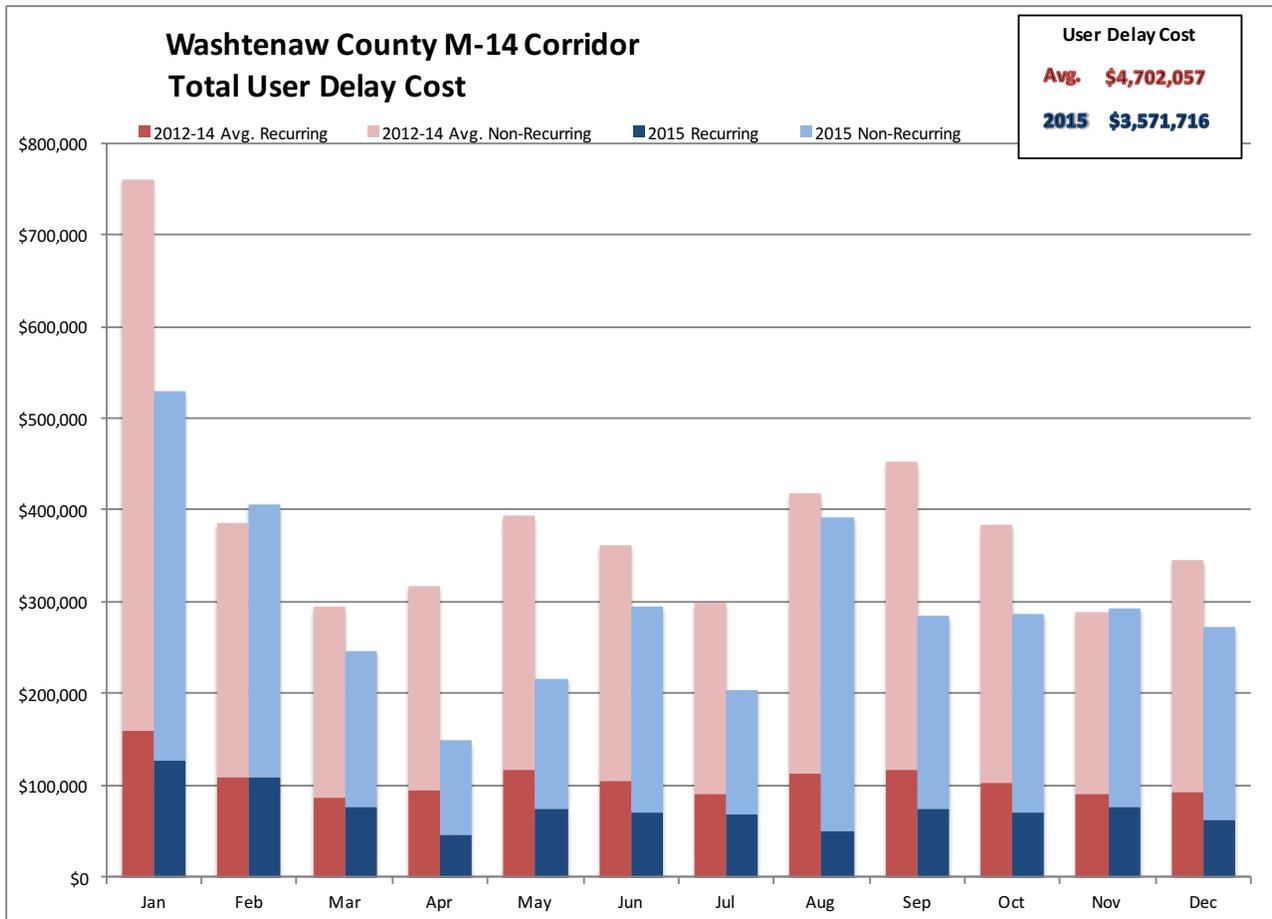
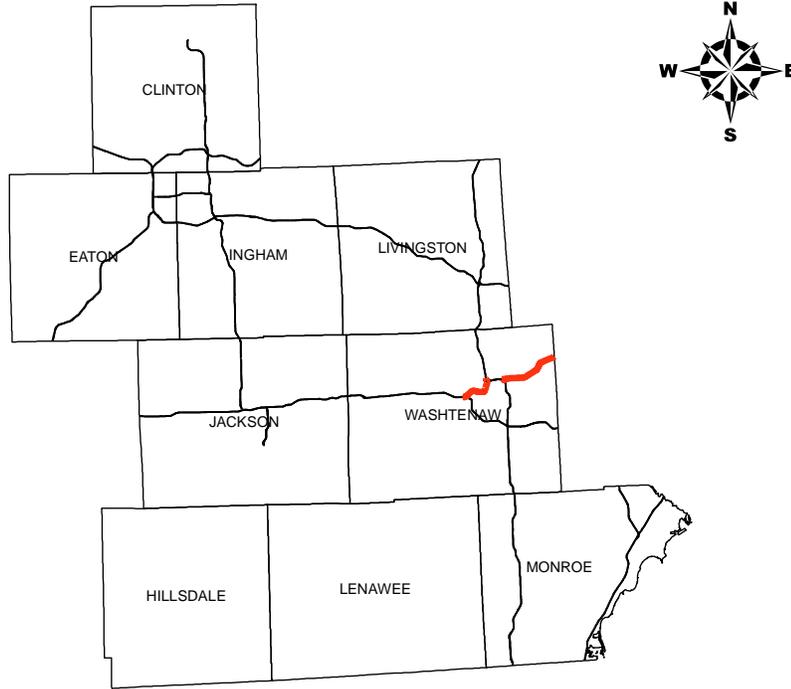


Figure 37. University Region M-14 eastbound

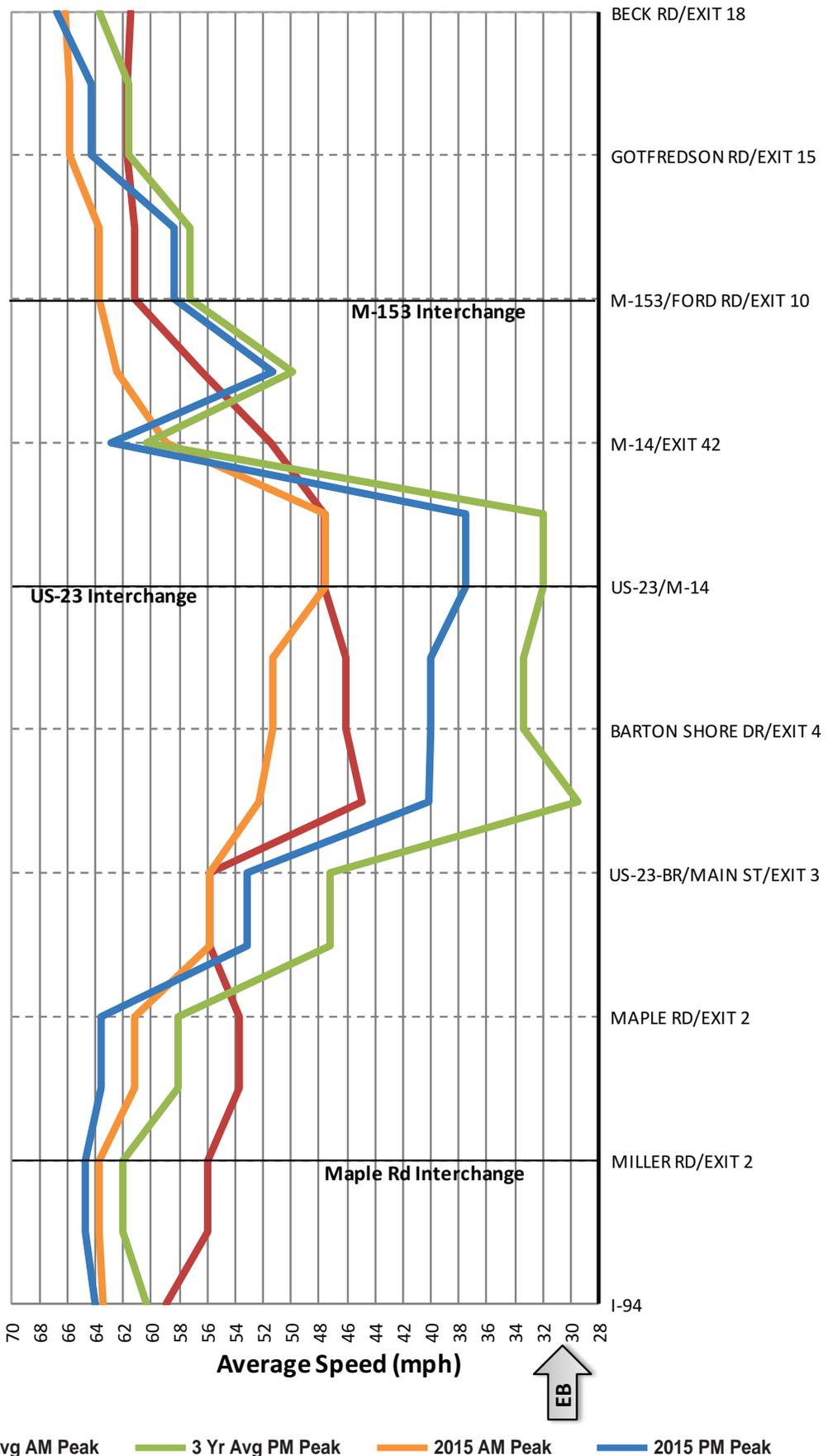
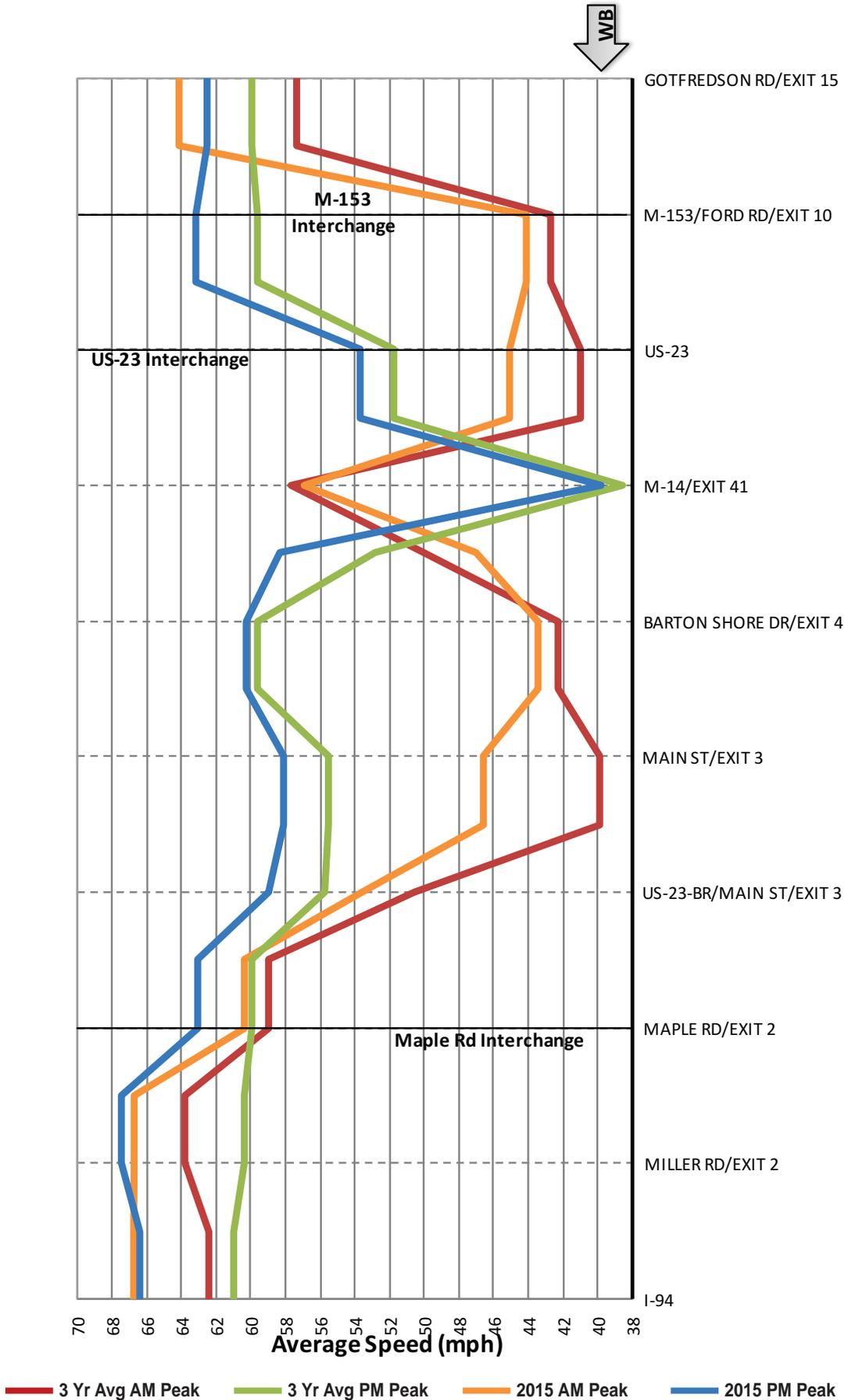


Figure 38. University Region M-14 westbound



Travel Time Reliability

Figure 39. Travel time reliability: M-14



Figure 40. Segment 1- M-14 between I-94 and US-23/M-14

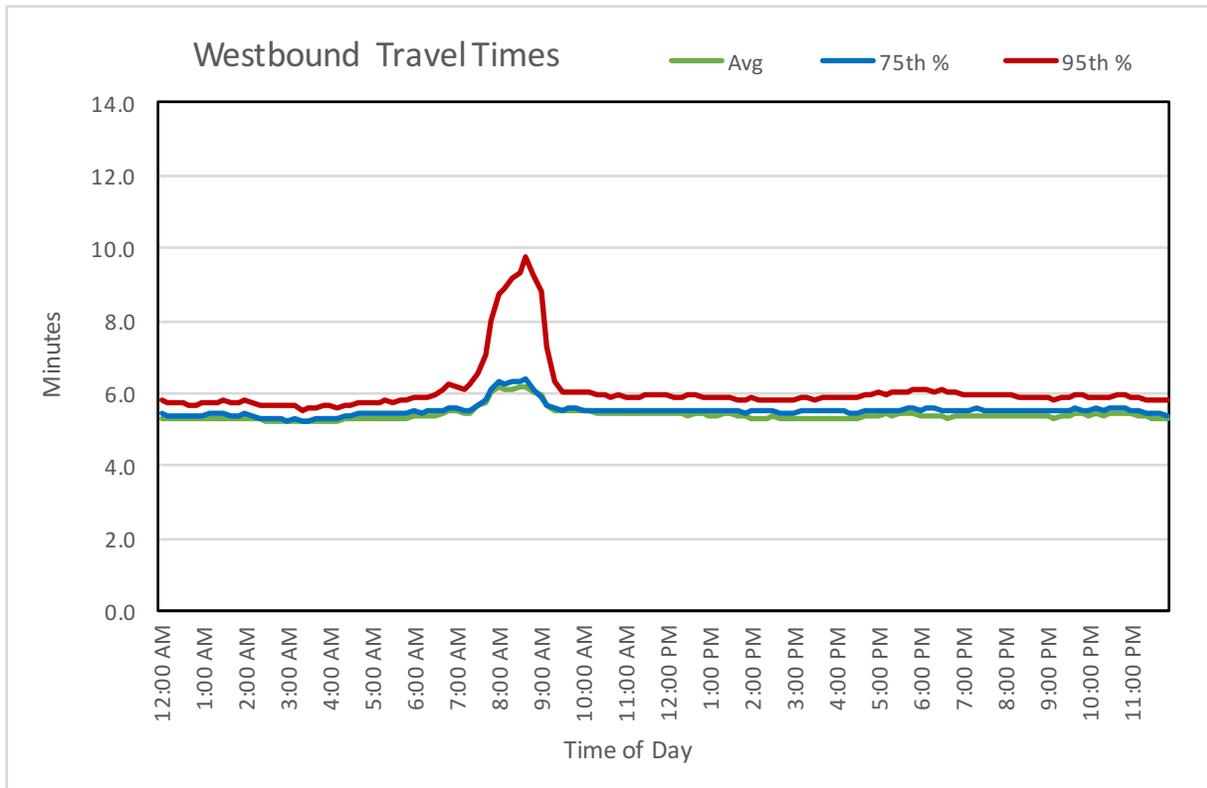
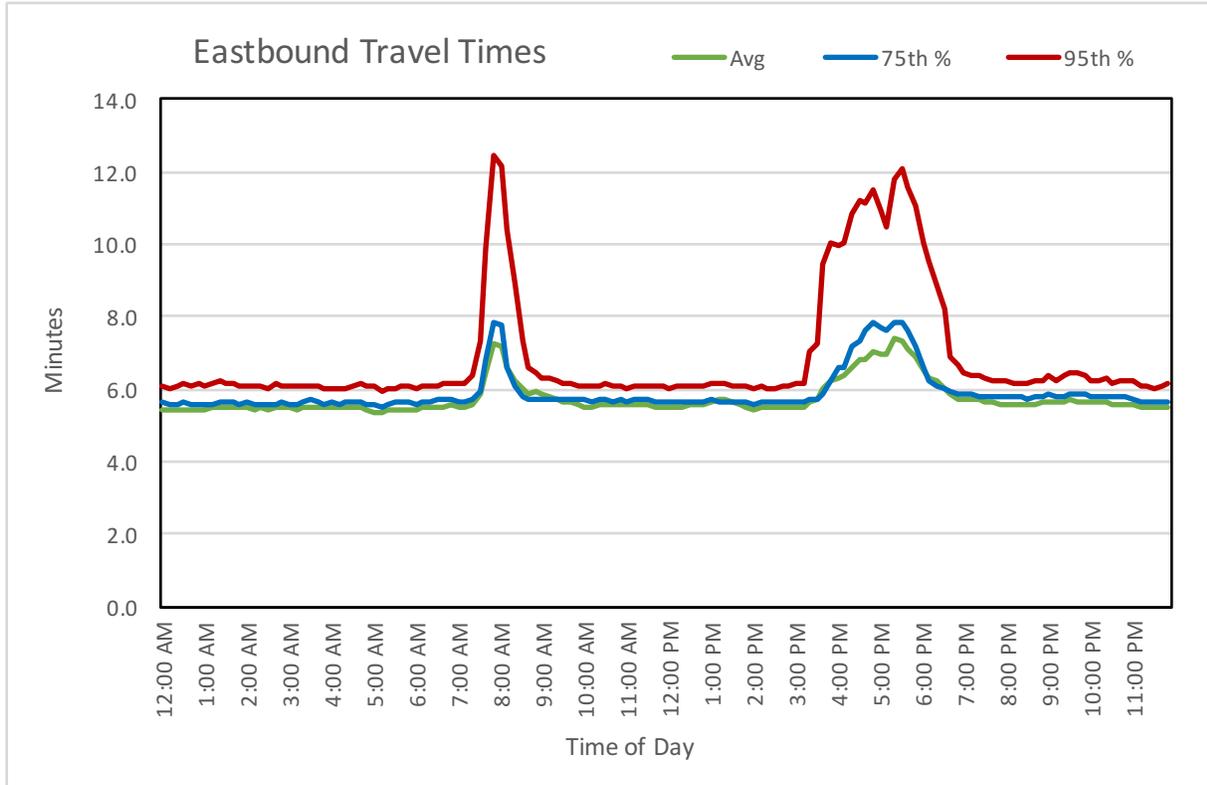
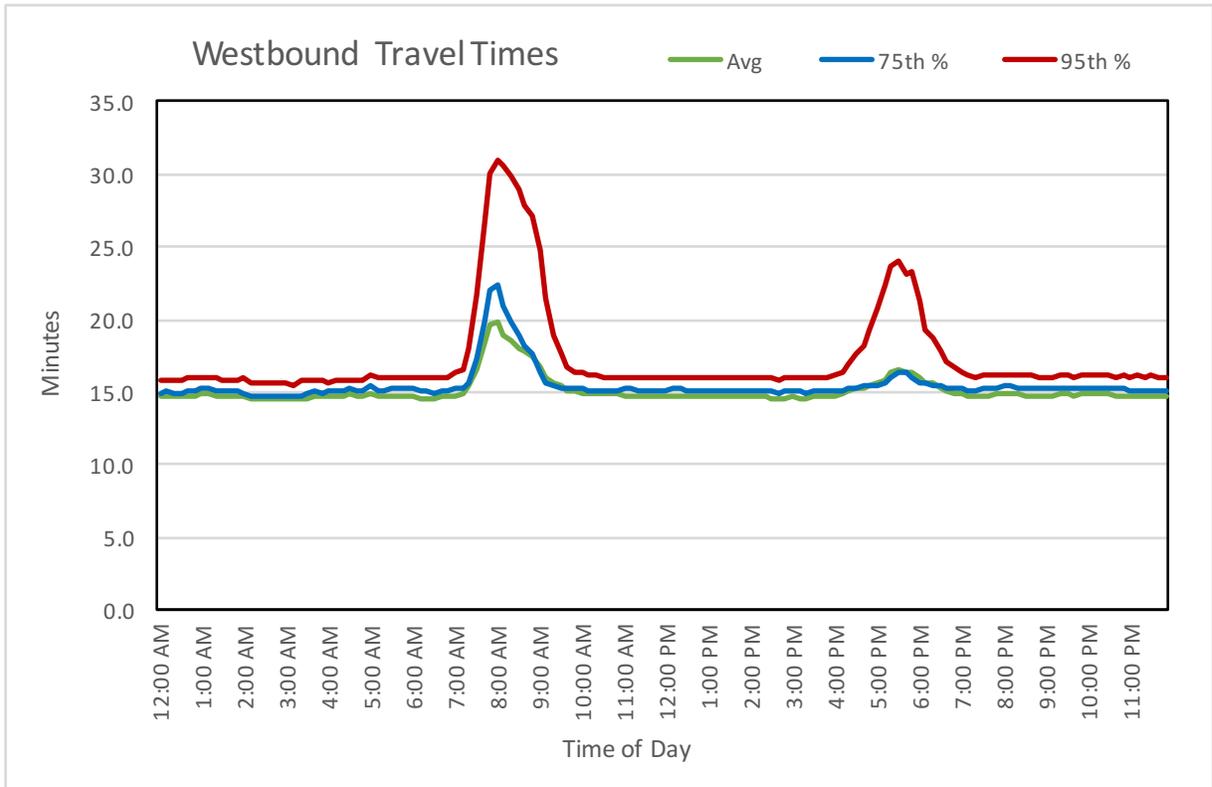
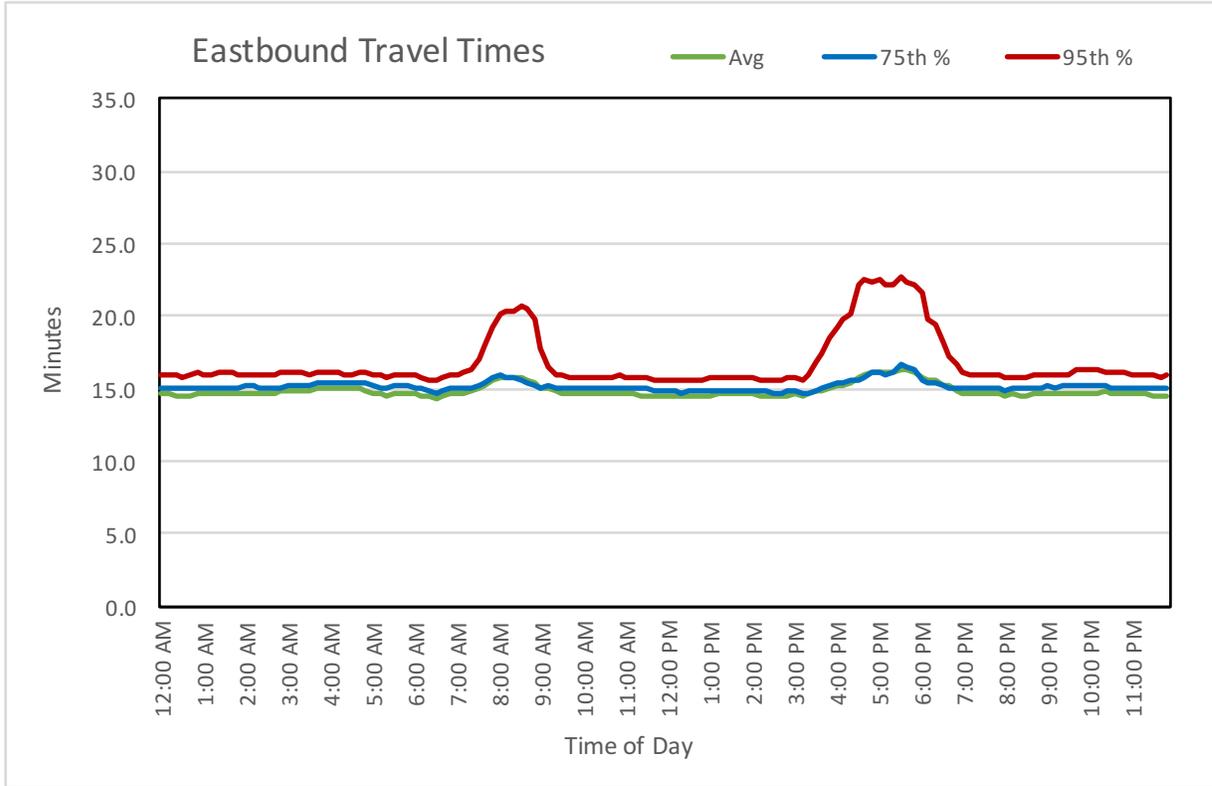


Figure 41. Segment 2- M-14 between US-23 and I-275



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 42. Monroe County US-23 Corridor total user cost delay

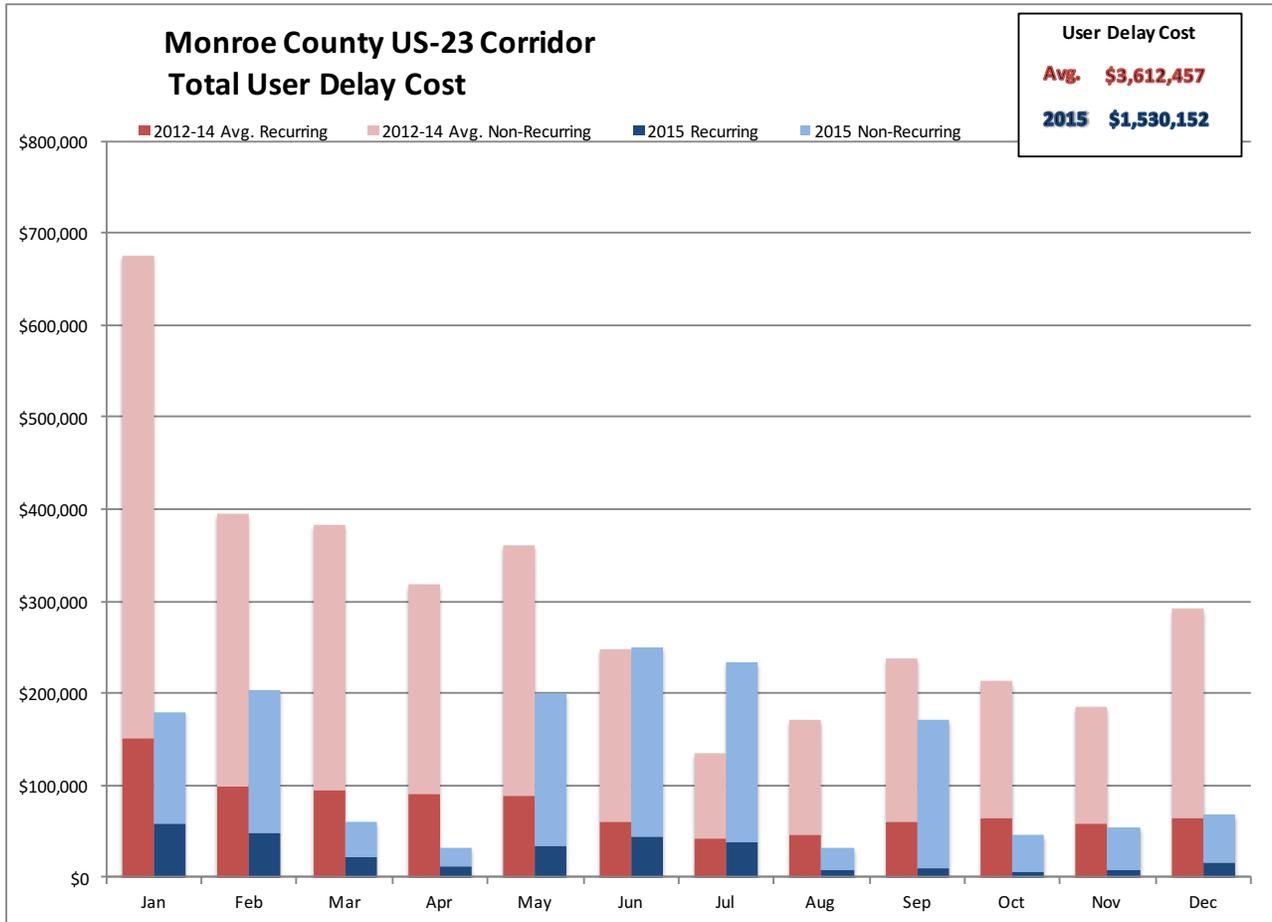
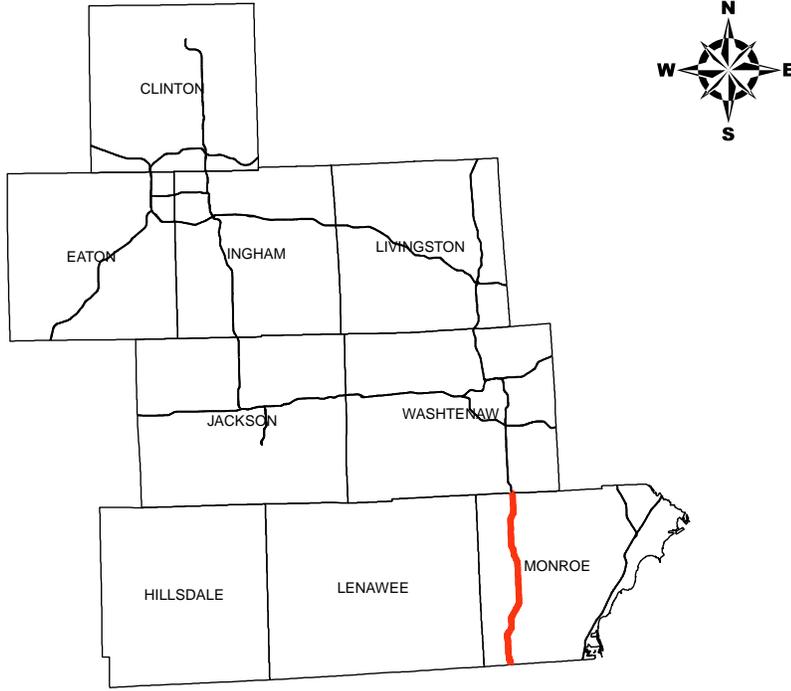


Figure 43. Washtenaw County US-23 Corridor total user cost delay

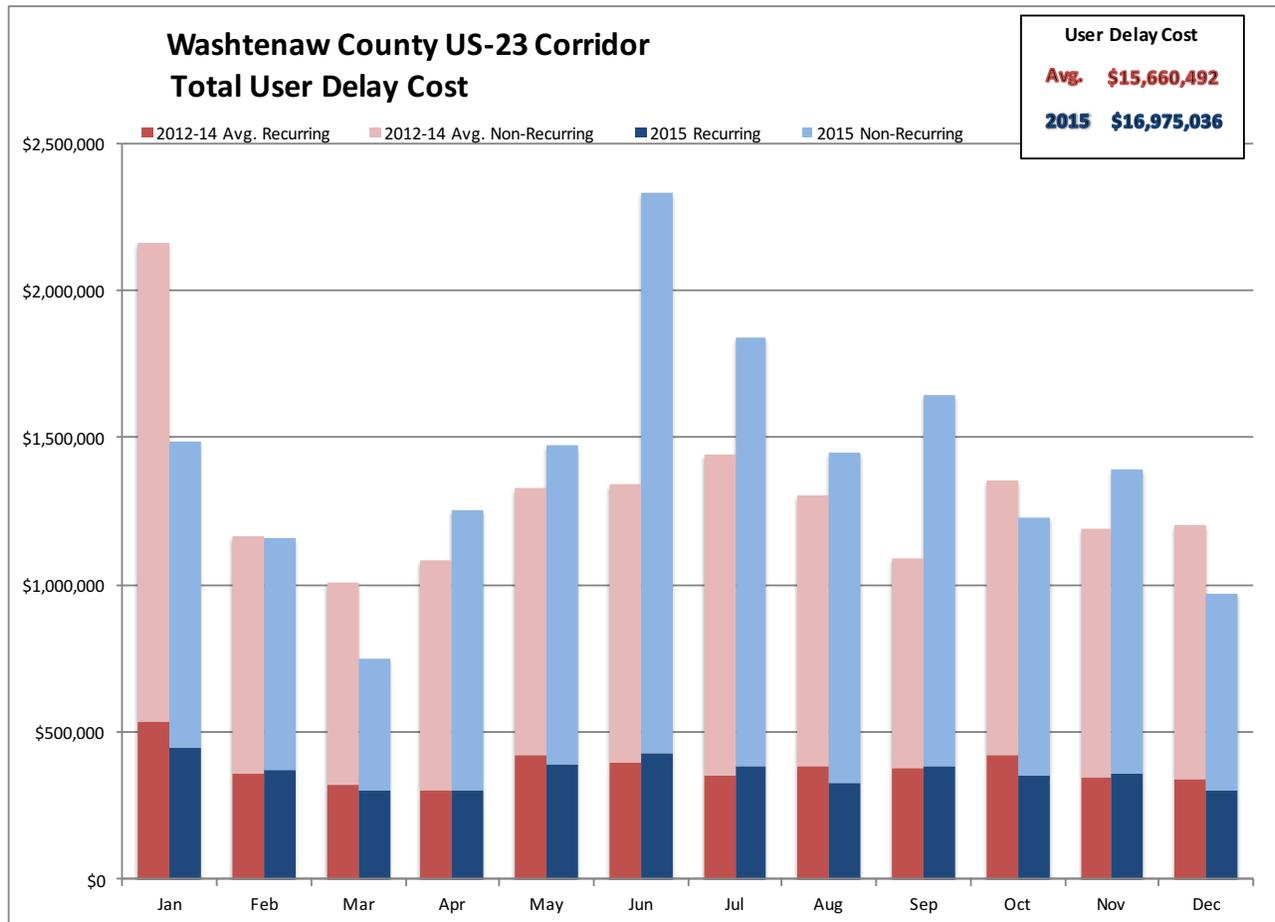
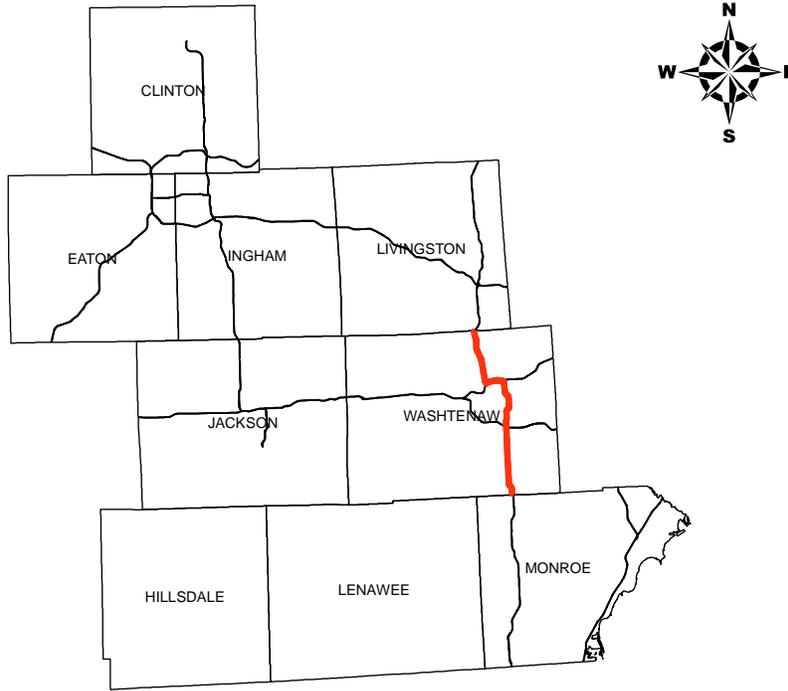


Figure 44. Livingston County US-23 Corridor total user cost delay

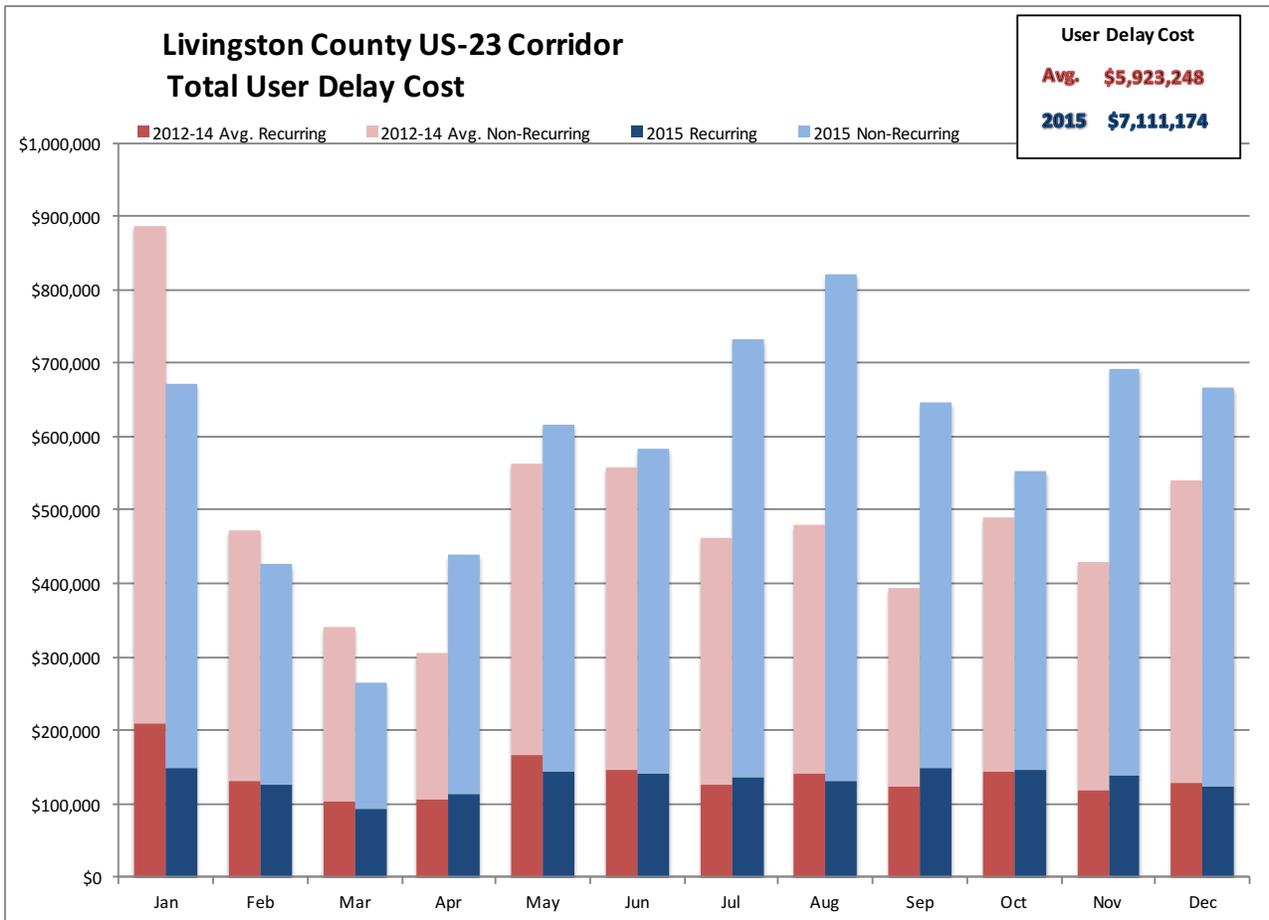
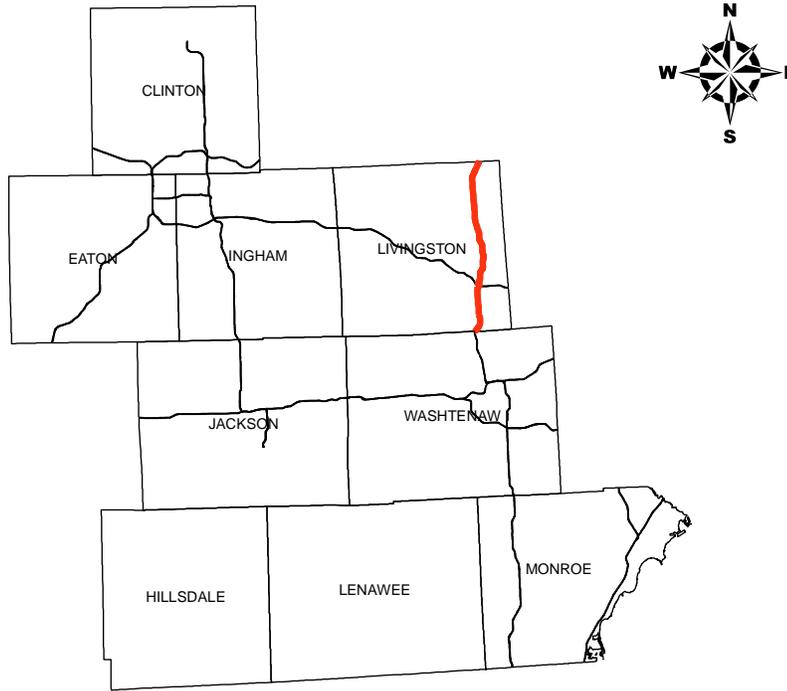


Figure 45. University Region US-23 northbound

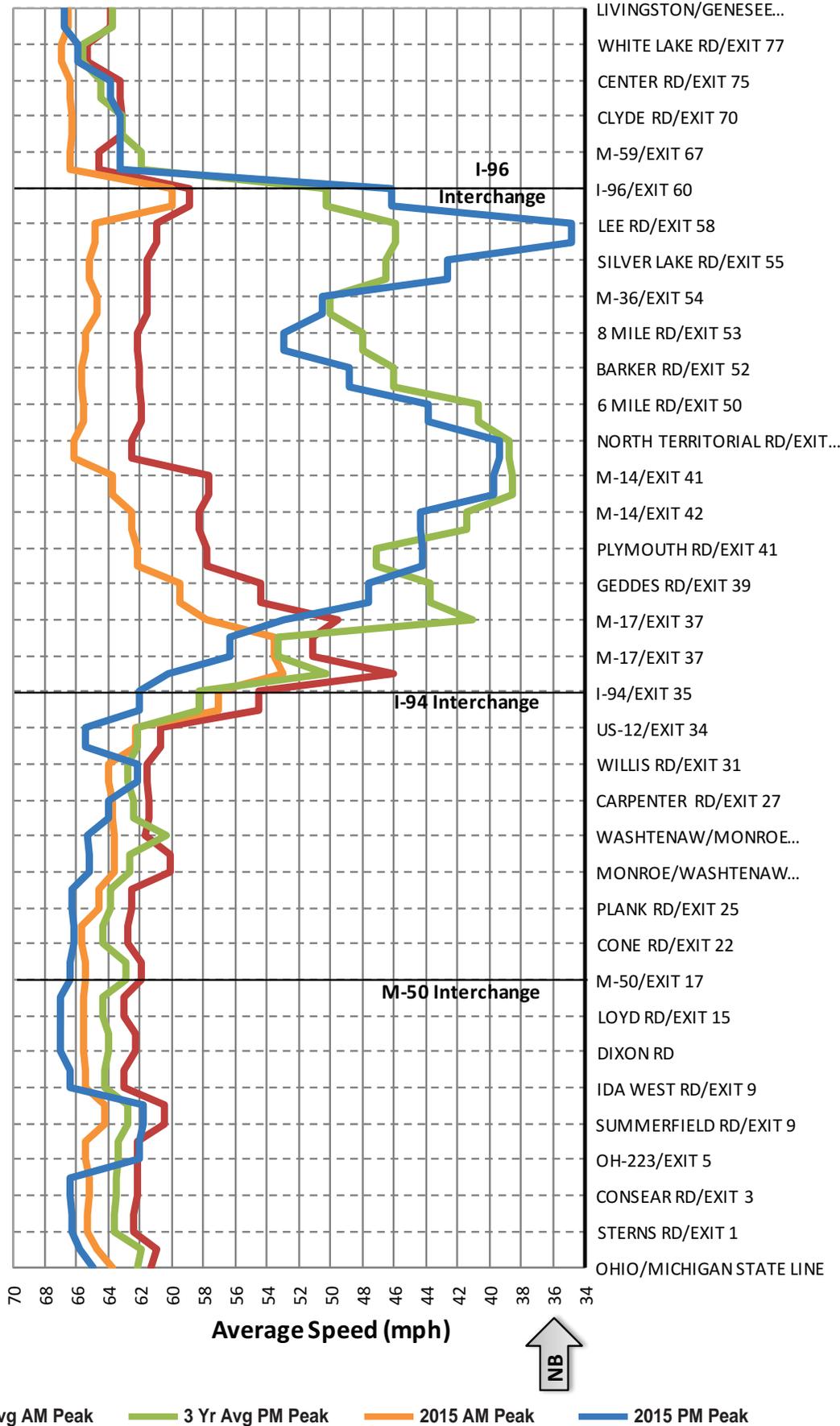
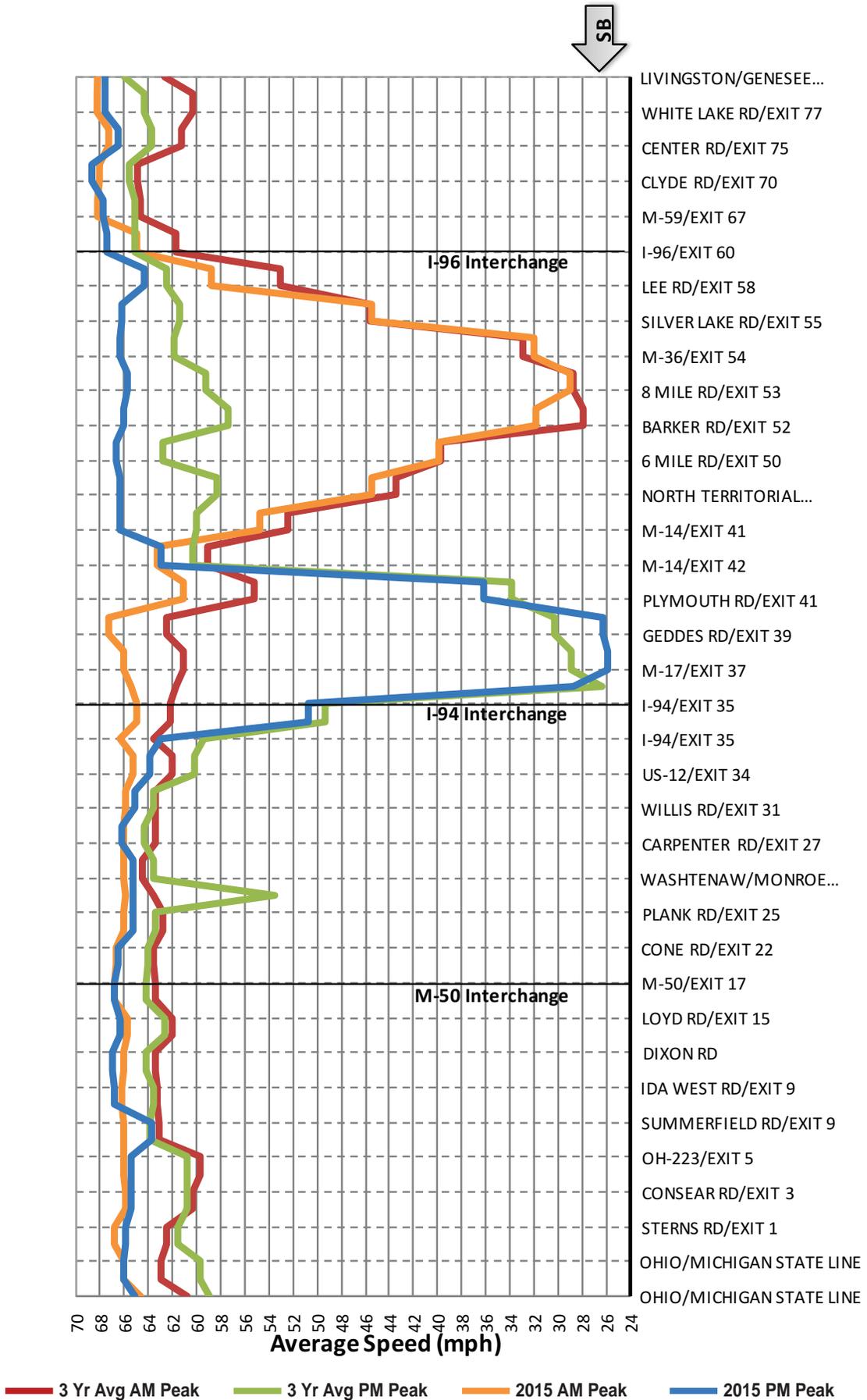


Figure 46. University Region US-23 southbound



Travel Time Reliability

Figure 47. Travel time reliability: US-23

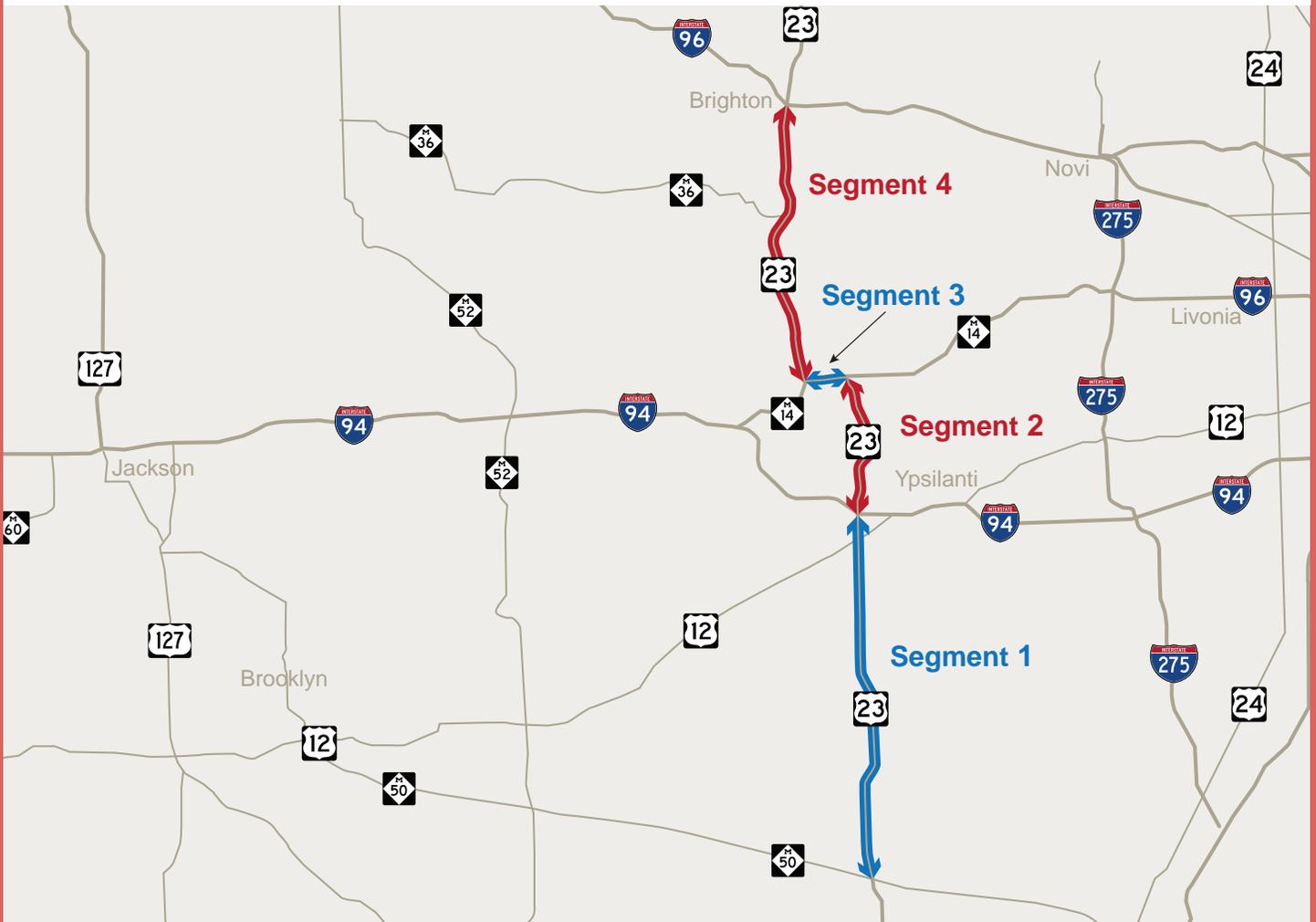


Figure 48. Segment 1- US-23 between M-50 and I-94

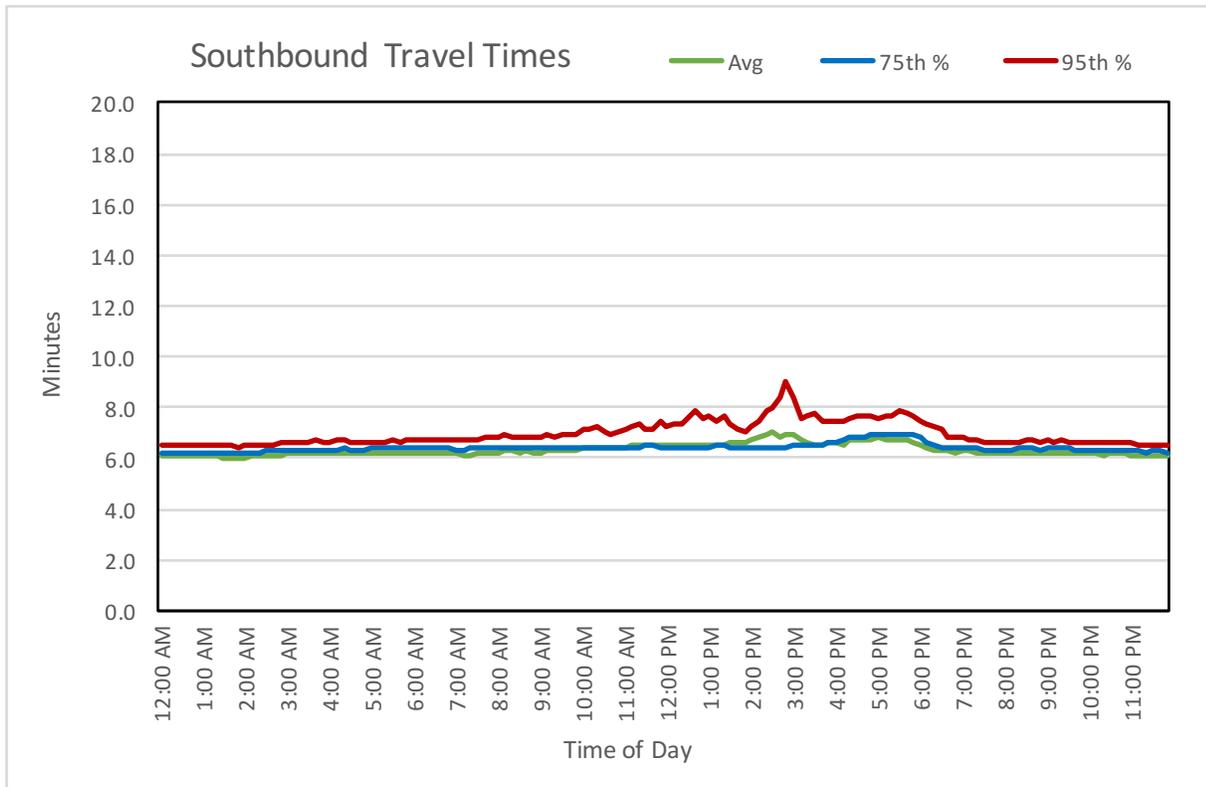
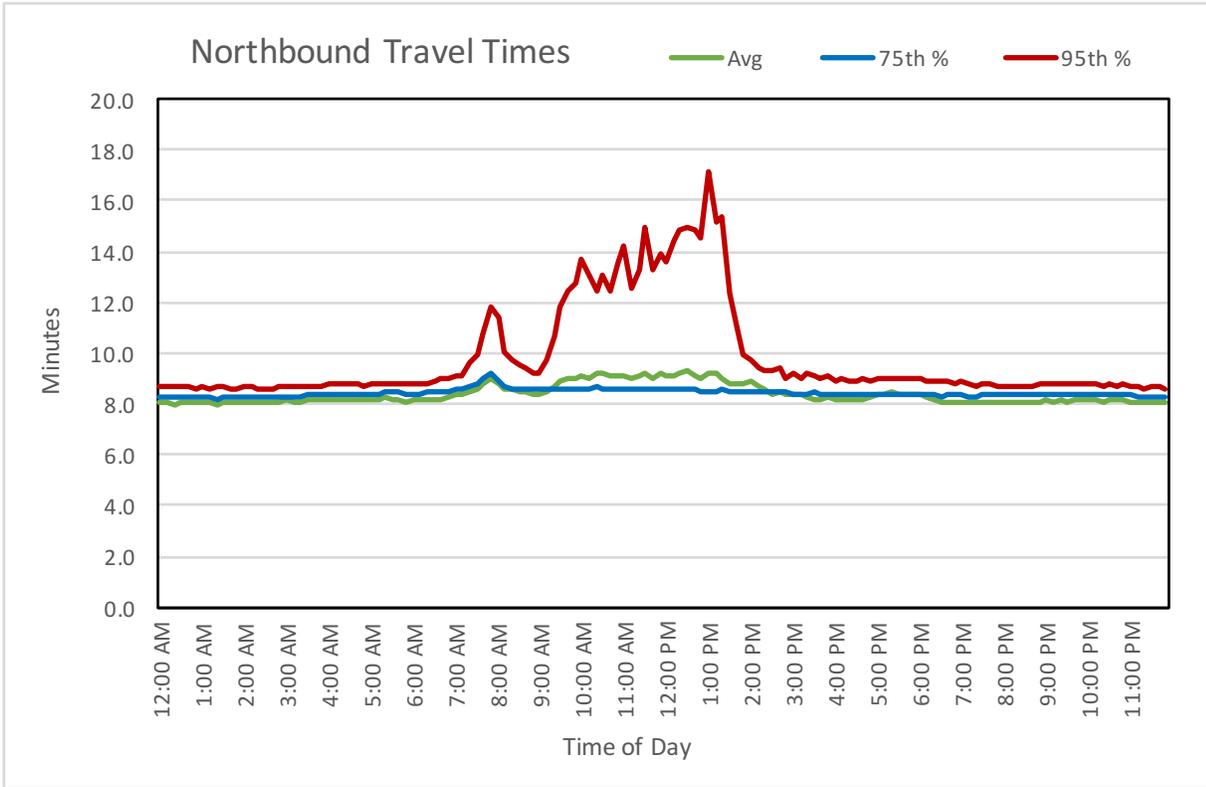


Figure 49. Segment 2- US-23 between I-94 and M-14

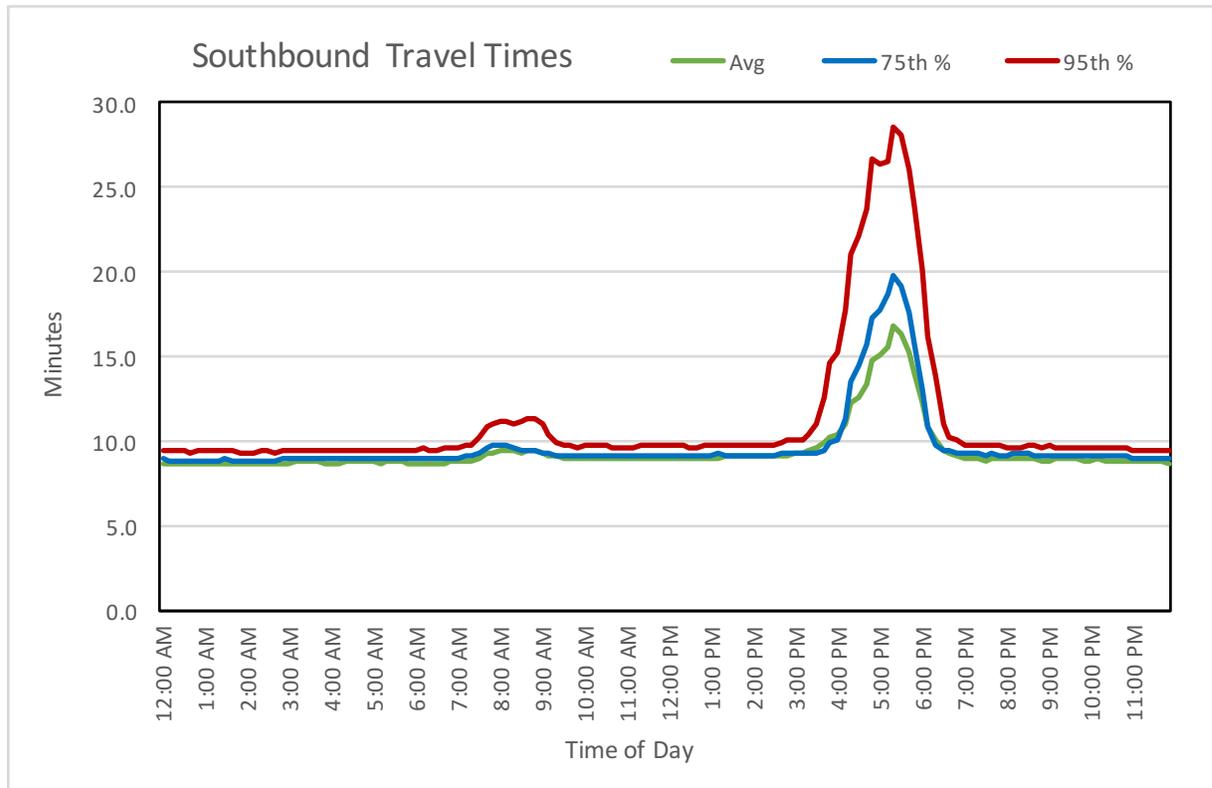
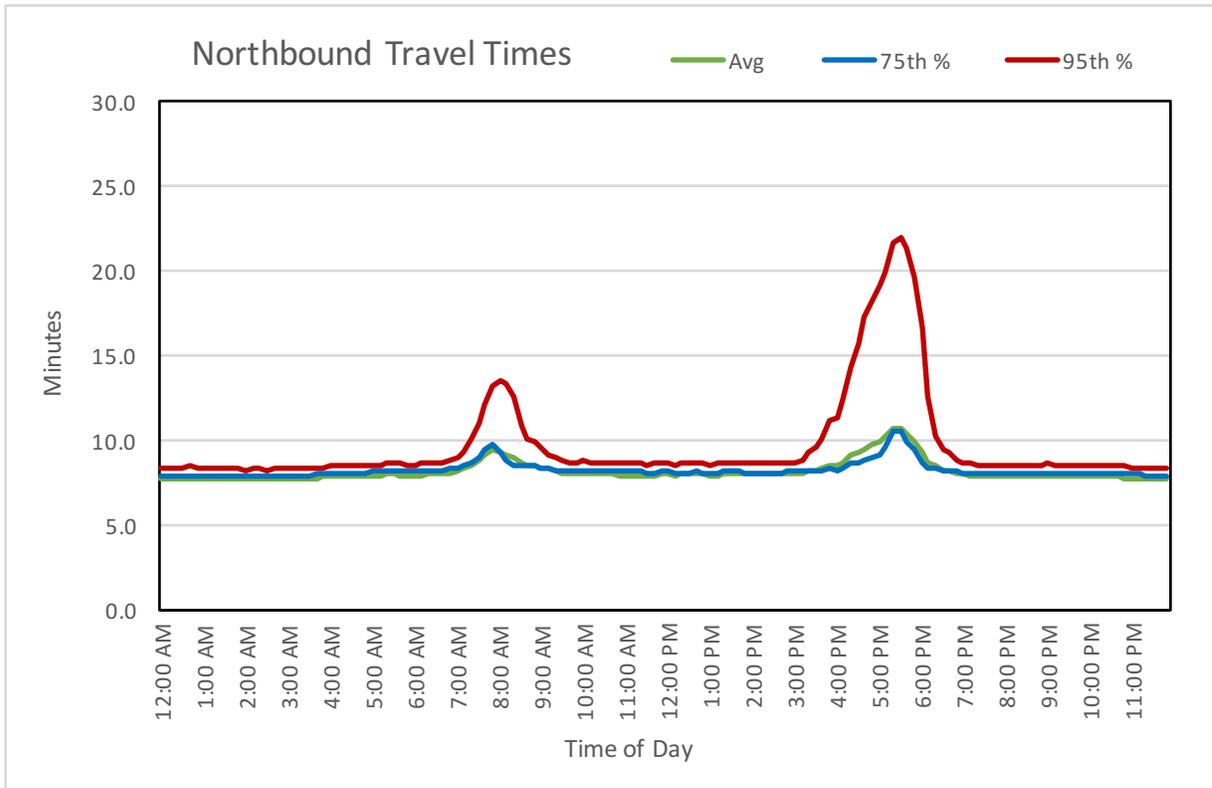


Figure 50. Segment 3- US-23 between M-14/Exit 42 and M-14/Exit 41

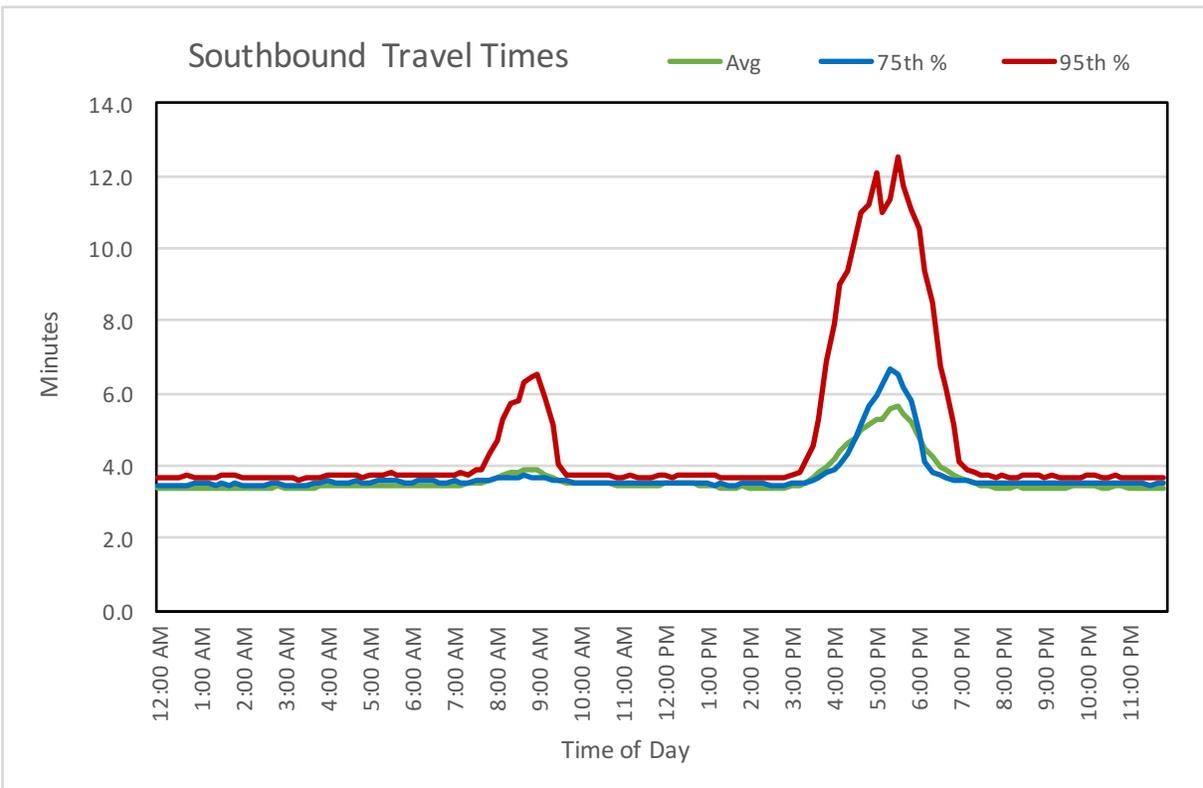
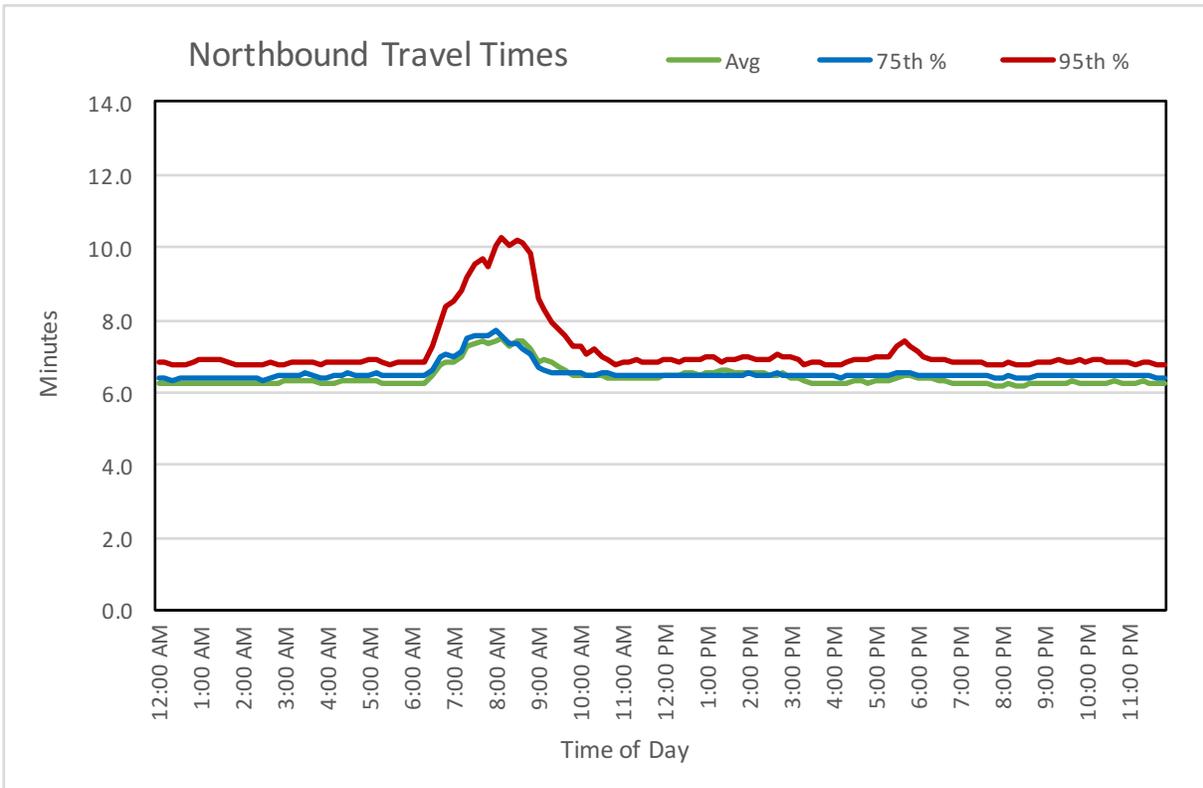
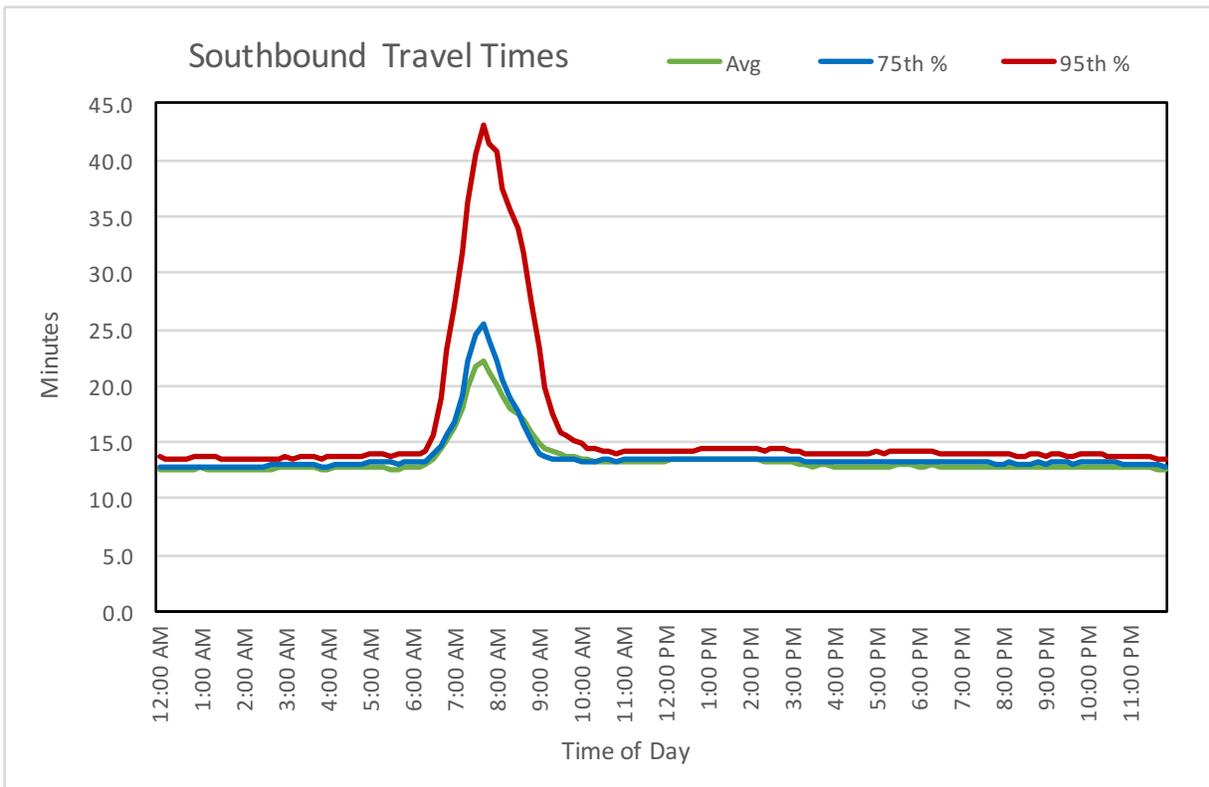
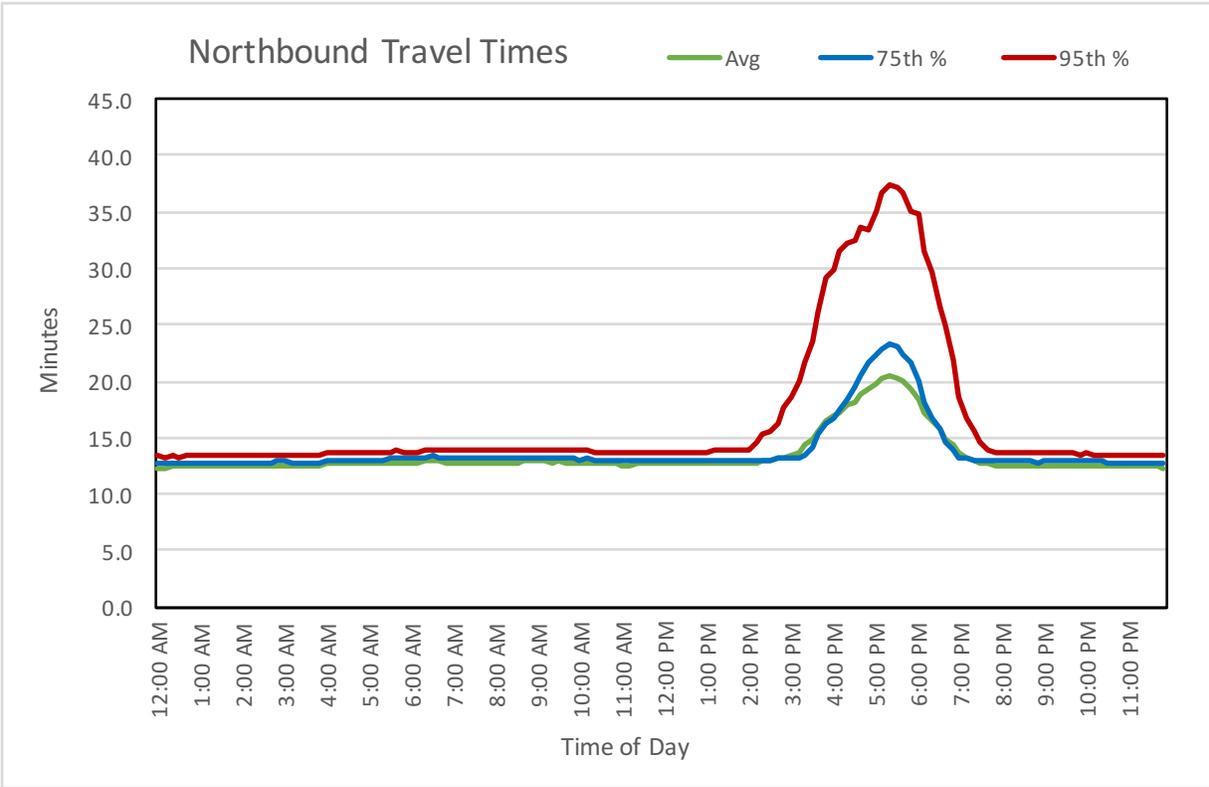


Figure 51. Segment 4- US-23 between I-96 and M-14



Corridor



Interstate 69: Eaton and Clinton



Interstate 75: Monroe



Interstate 94: Jackson and Washtenaw



Interstate 96: Clinton, Eaton, Ingham, and Livingston



Interstate 275: Monroe



Interstate 496: Eaton and Ingham



Michigan 14: Washtenaw



US-23: Monroe, Washtenaw, and Livingston



US-127: Jackson, Ingham, and Clinton

Figure 52. Jackson County US-127 Corridor total user cost delay

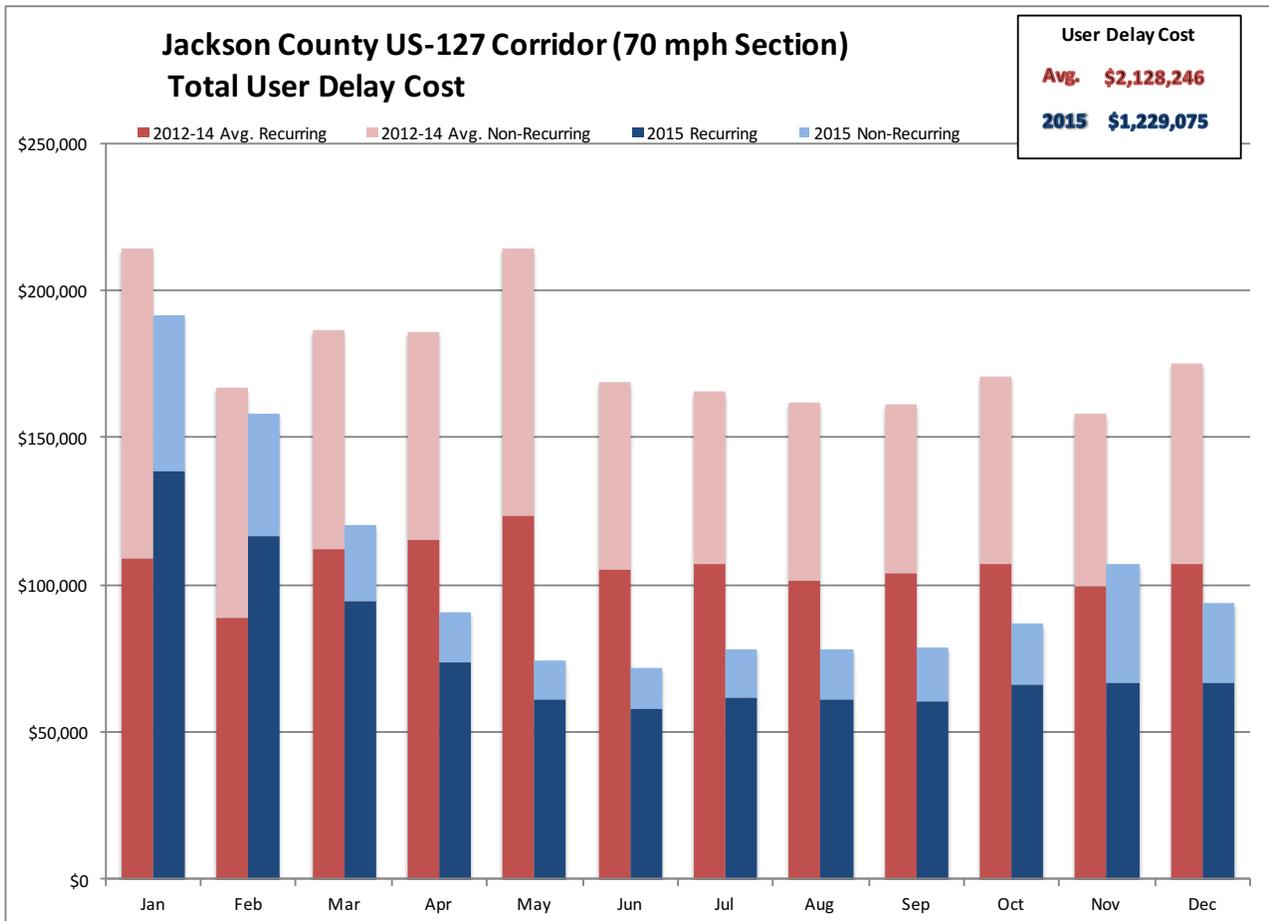
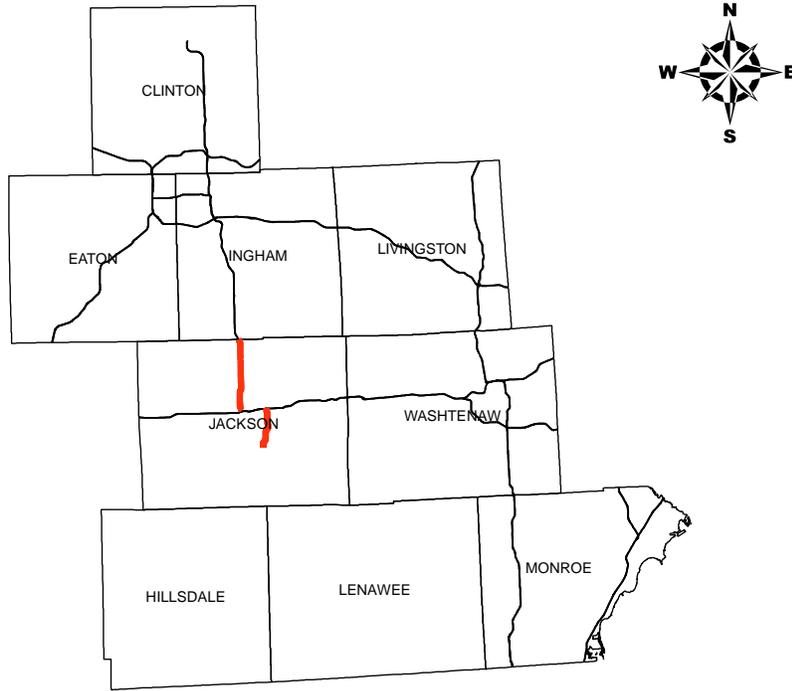


Figure 53. Ingham County US-127 Corridor total user cost delay

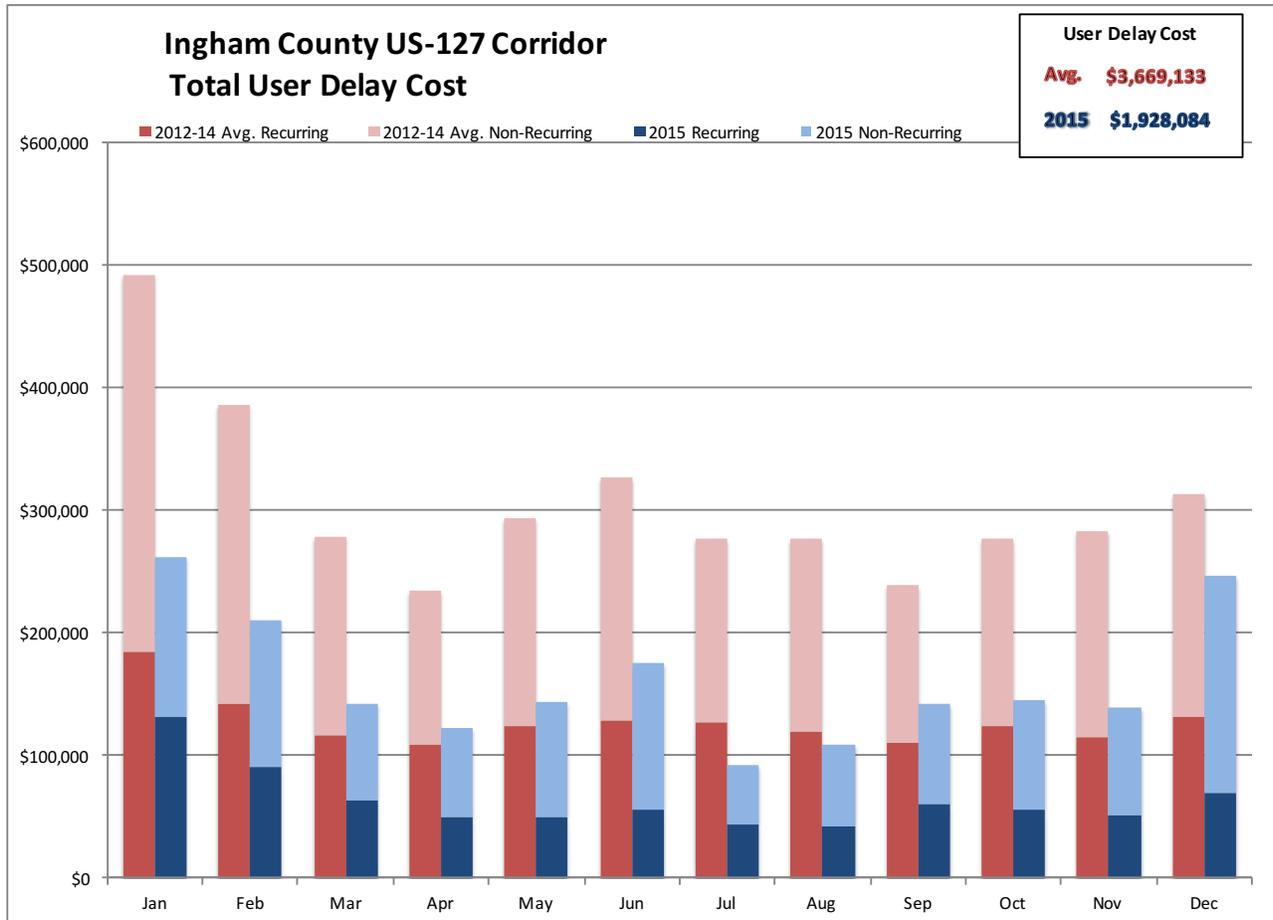
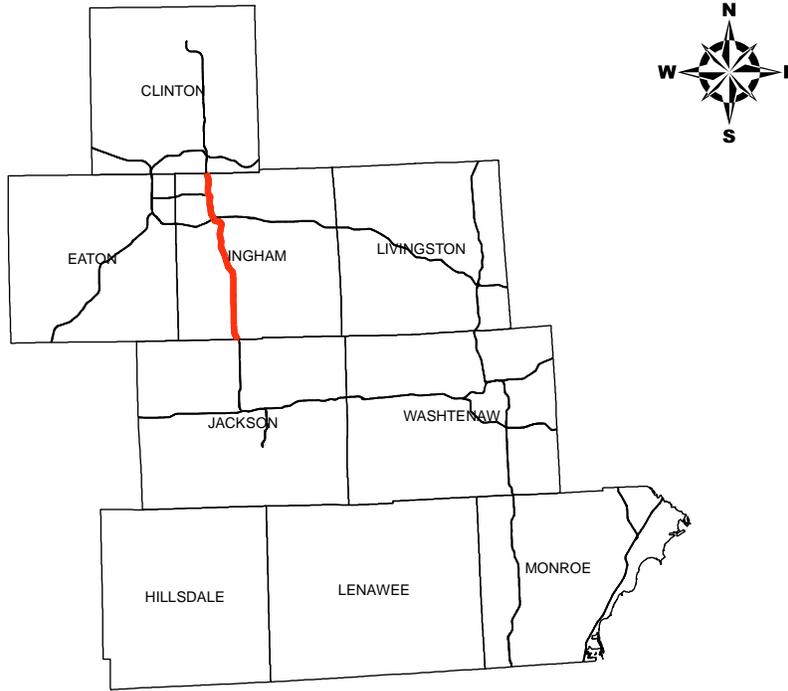


Figure 54. Clinton County US-127 Corridor total user cost delay

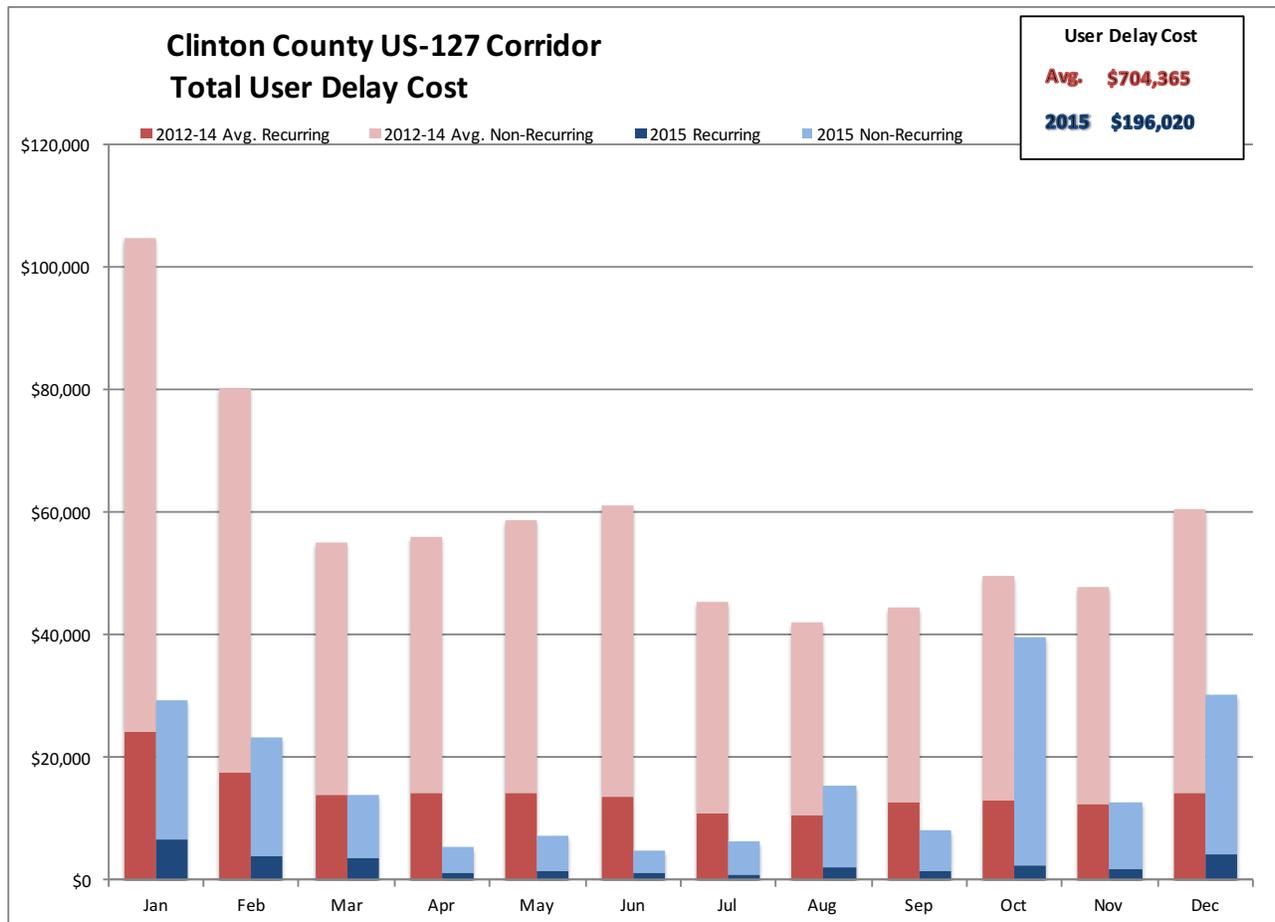
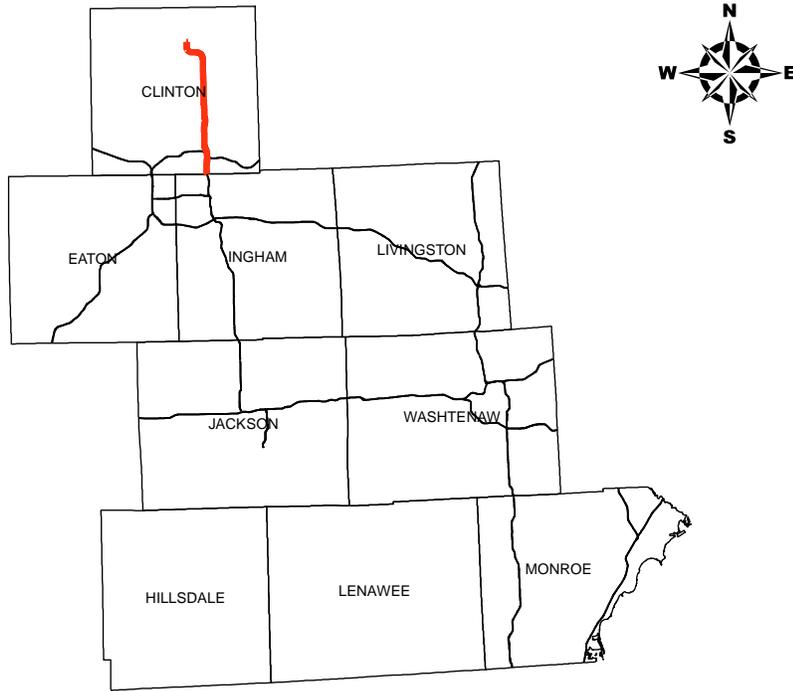


Figure 55. University Region US-127 northbound

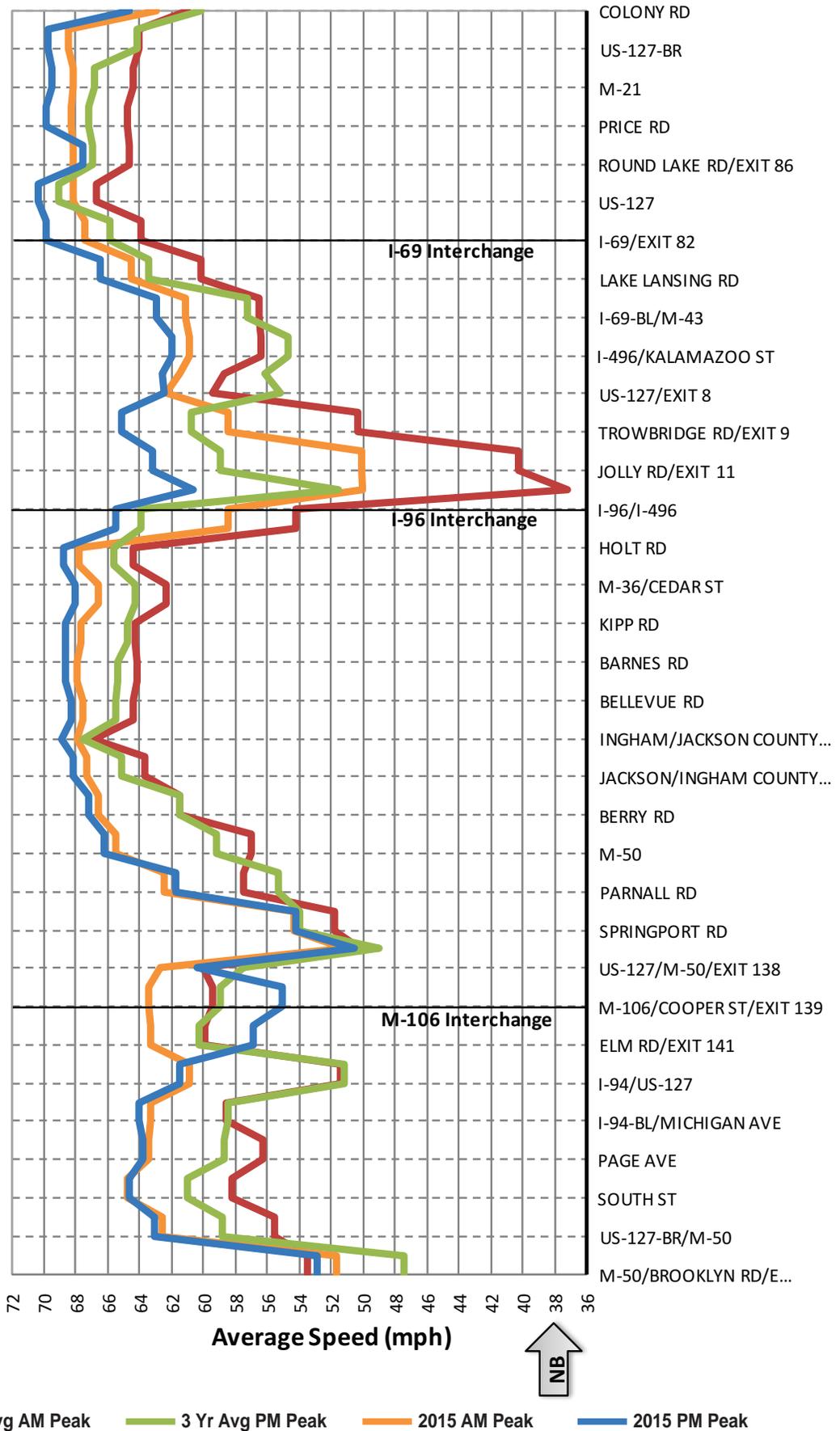
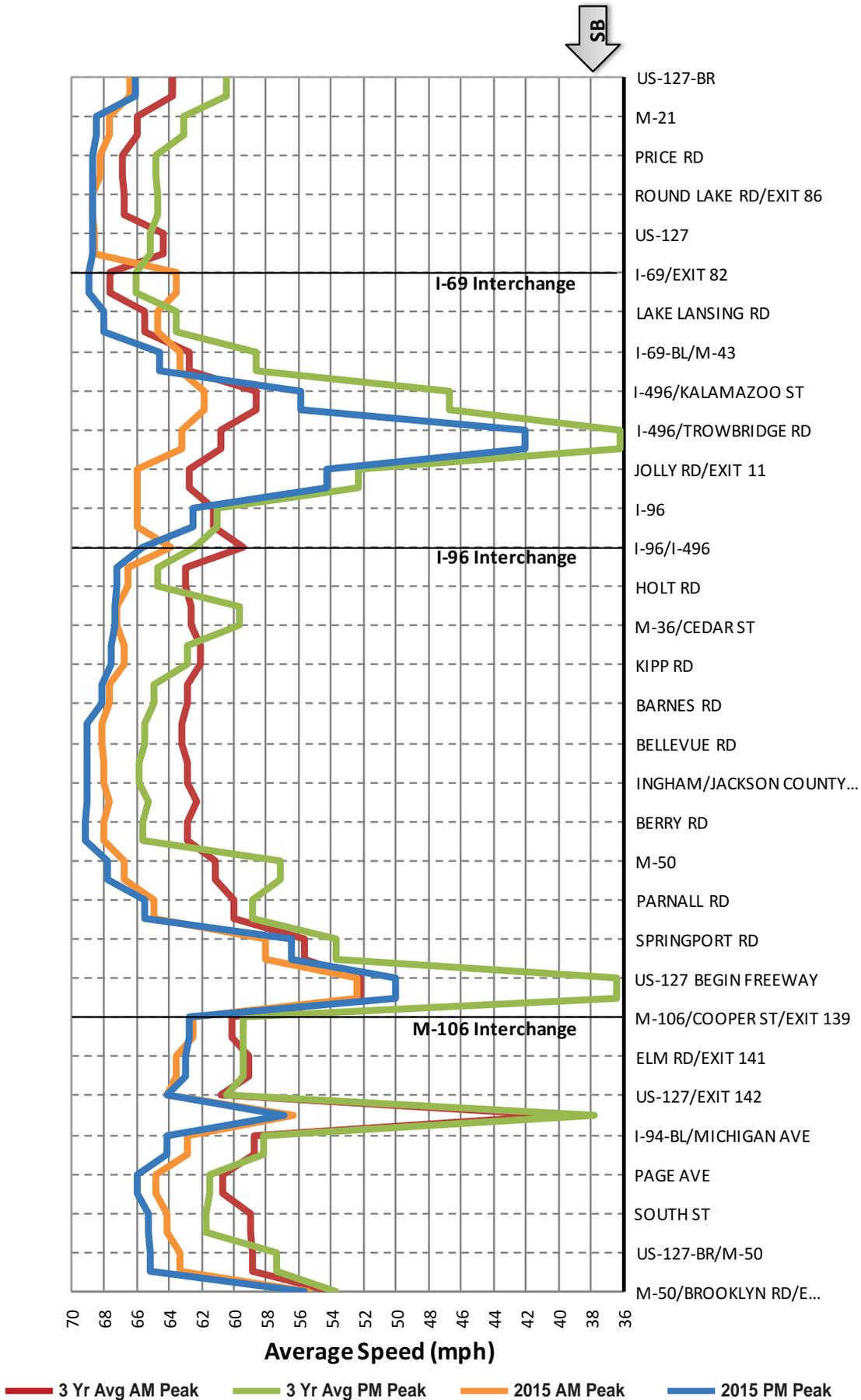


Figure 56. University Region US-127 southbound



Travel Time Reliability

Figure 57. Travel time reliability: US-127

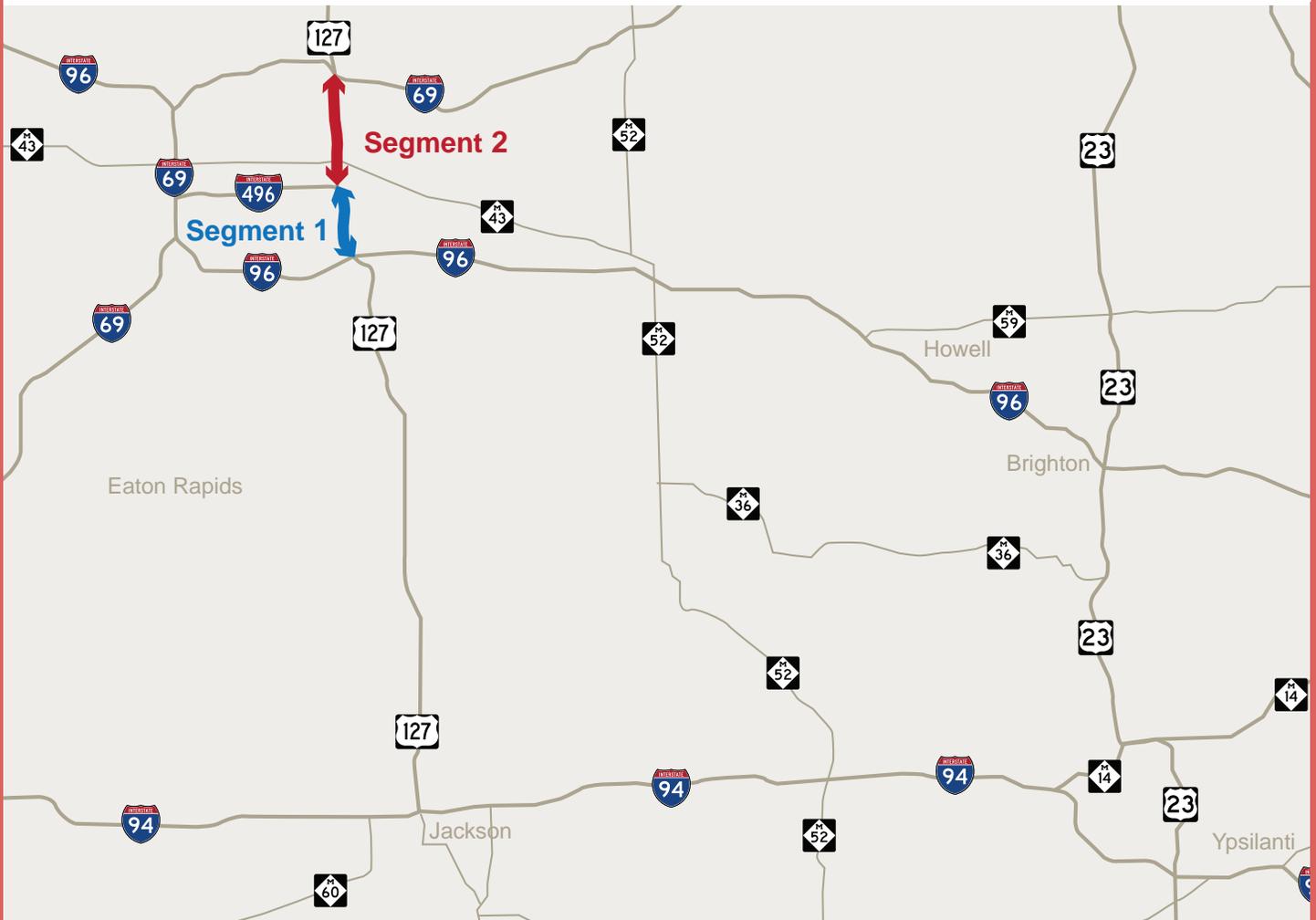


Figure 58. Segment 1- US-127 between I-96 and I-496

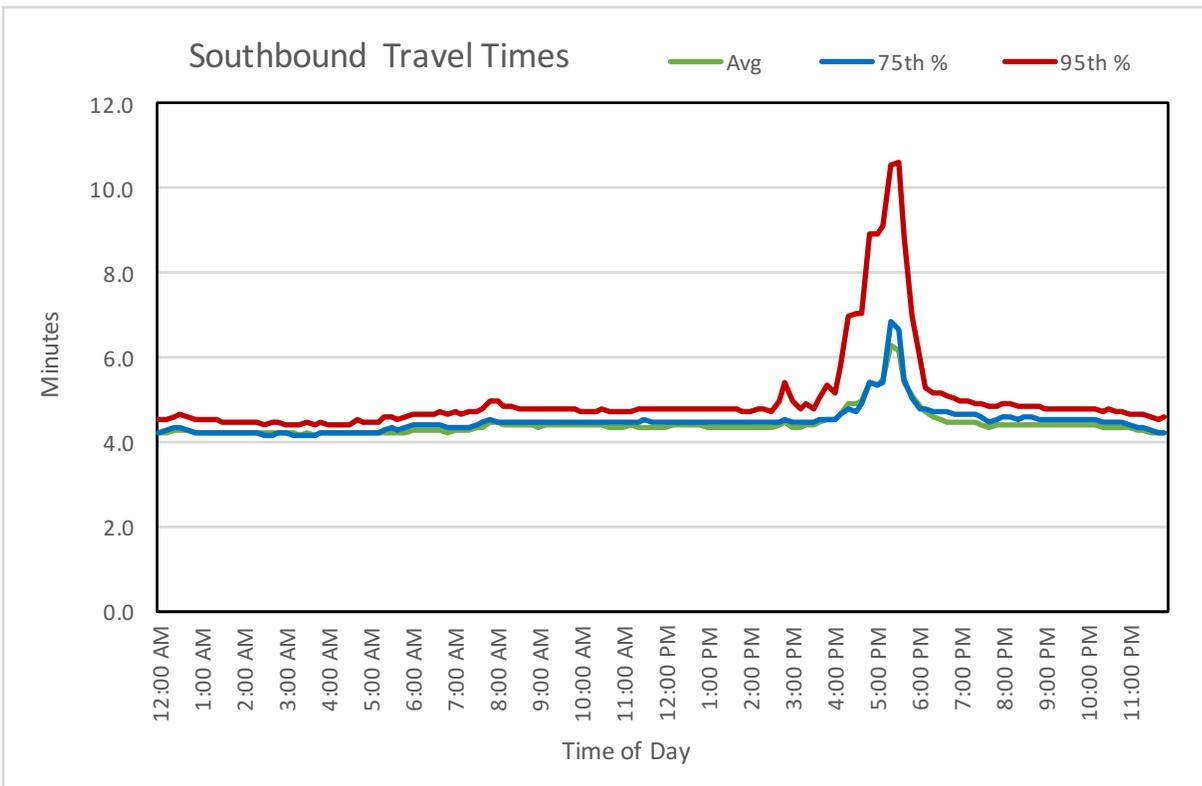
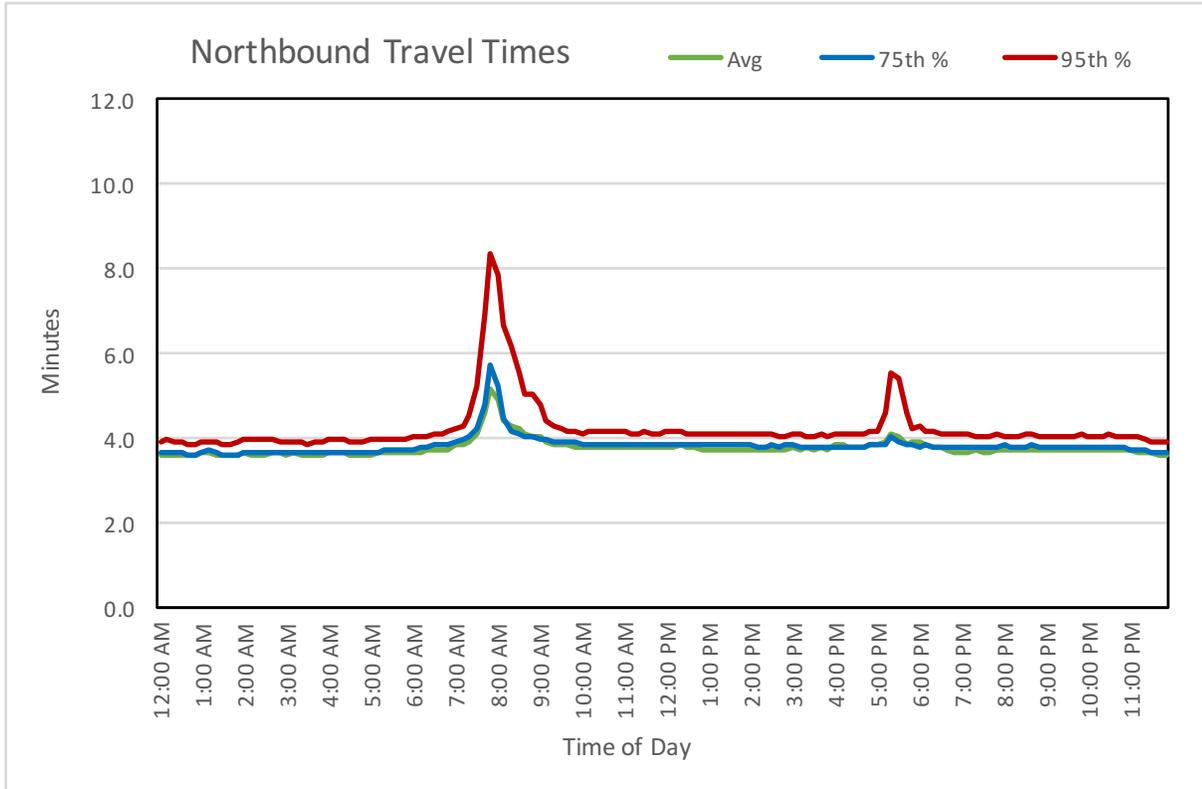
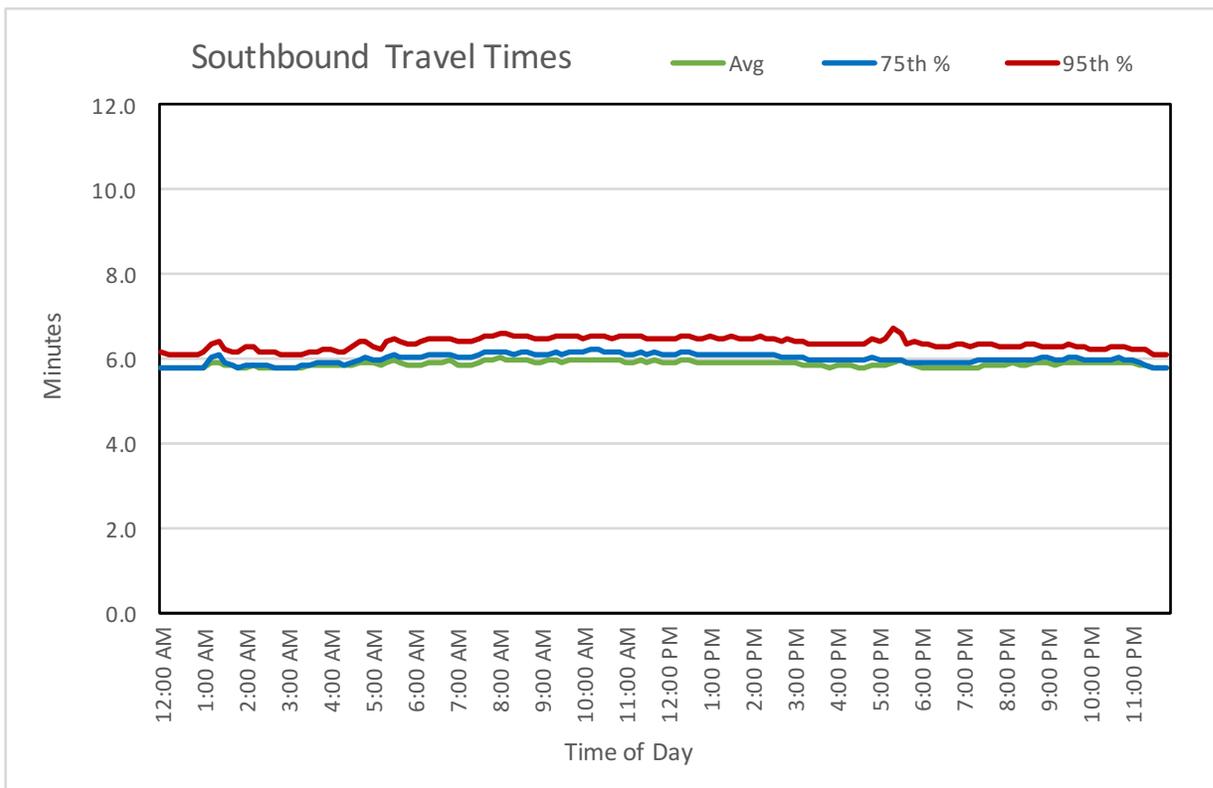
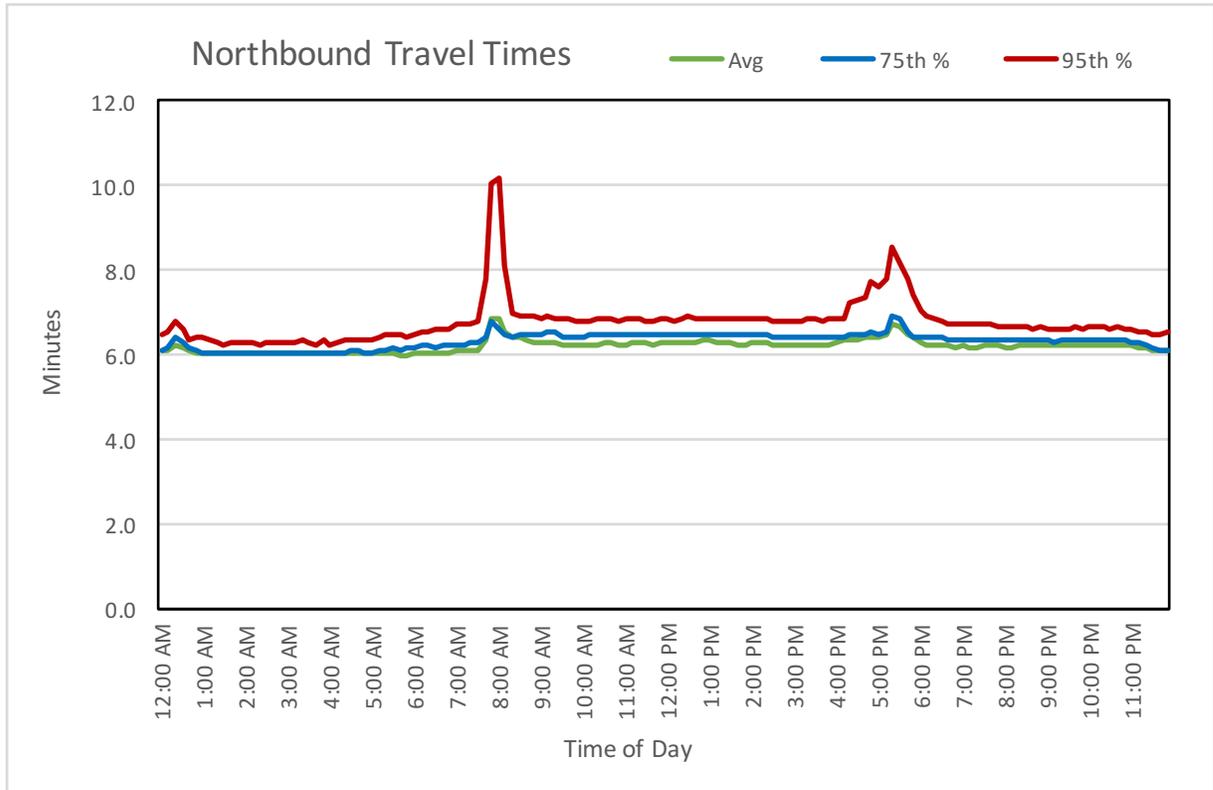


Figure 59. Segment 2- US-127 between I-496/Trowbridge Rd and I-69





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