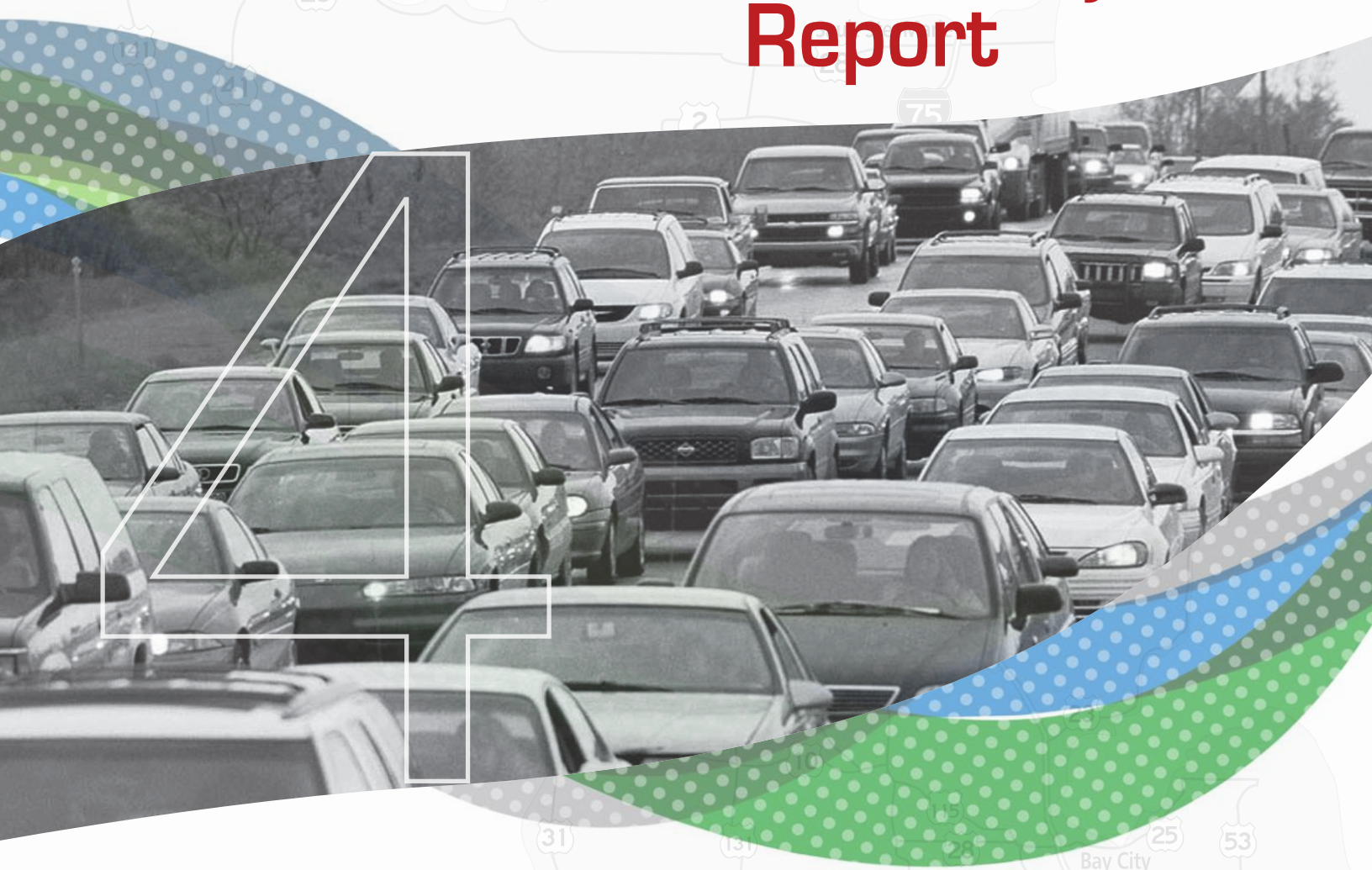
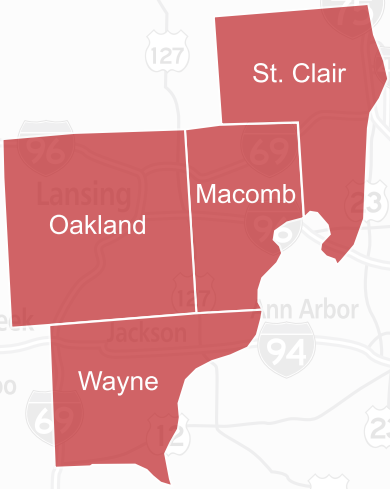
MDOT
Michigan Department of Transportation

# 2014 Congestion & Mobility Report



## Chapter 4
# METRO REGION SUMMARY



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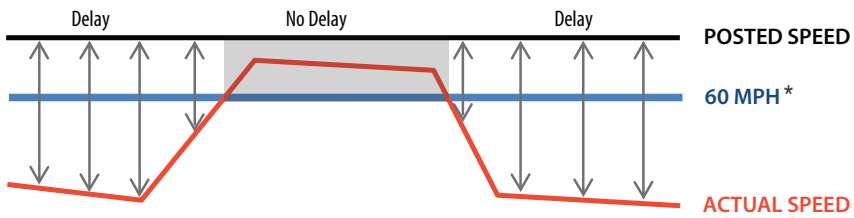
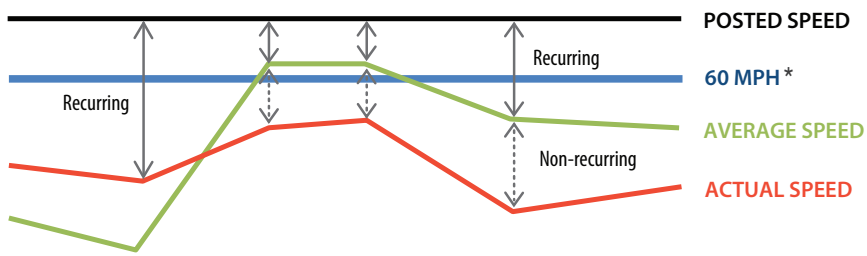
# Performance Measures Definitions




**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.



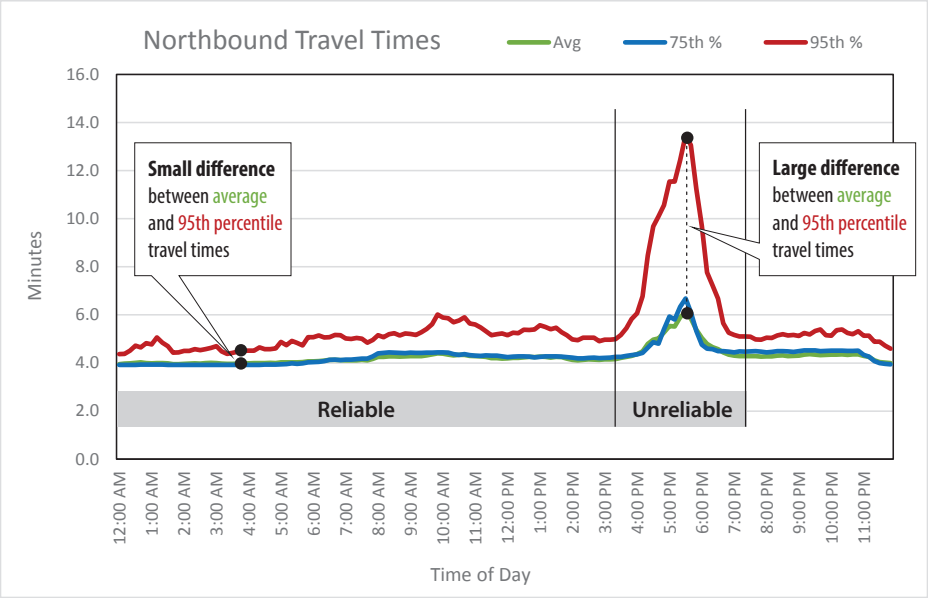

**User Delay Cost >** User Delay Costs (UDC) is calculated by multiplying delay x hourly volume per hourly user cost. Delay is calculated by taking the difference between actual speeds when they fall below 60 mph and the posted speed limit. Hourly volumes are derived from Average Daily Traffic (ADT) 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). A TMC is a standard for delivering real-time traffic information. They vary from tenths of a mile long to several miles long.

**Weighted Congestion >** Number of congestion hours multiplied by the segment length. Congestion along longer segments will get more consideration than congestion along shorter segments.

*** 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.** 2014 Metro Region user delay cost per mile

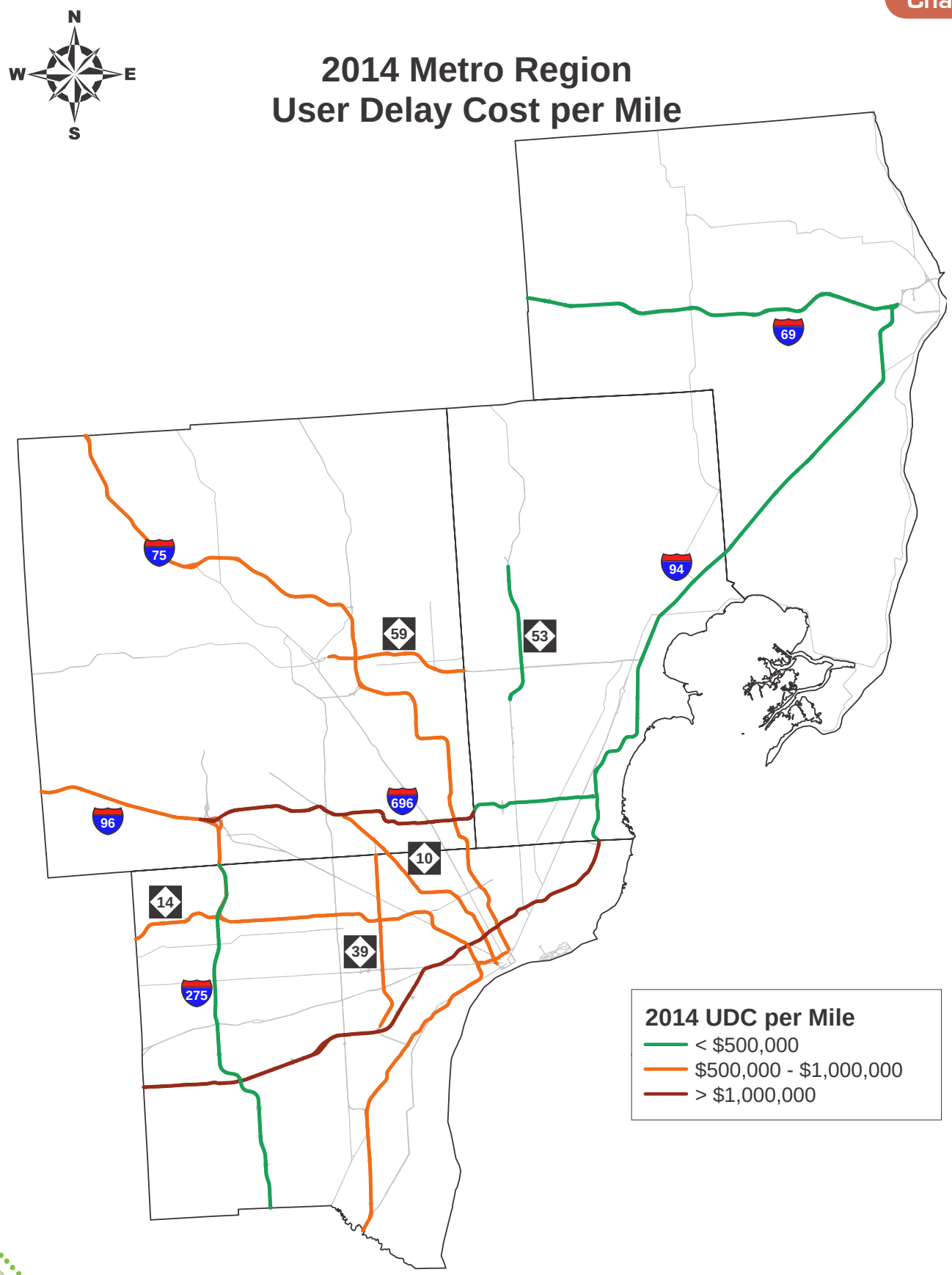


**Figure 2.** 2014 Metro Region congestion hours northbound/eastbound

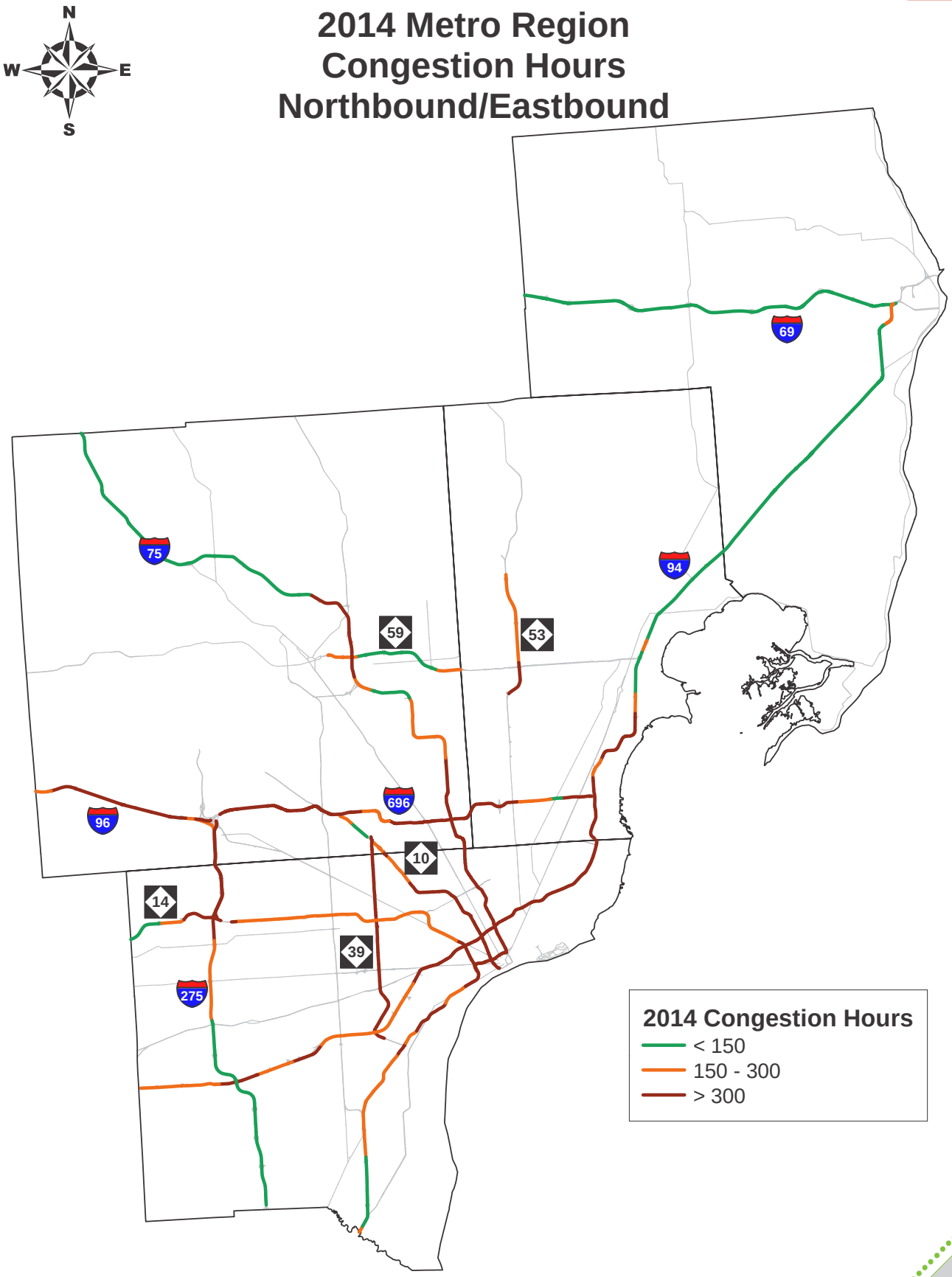


**Figure 3.** 2014 Metro Region congestion hours southbound/westbound

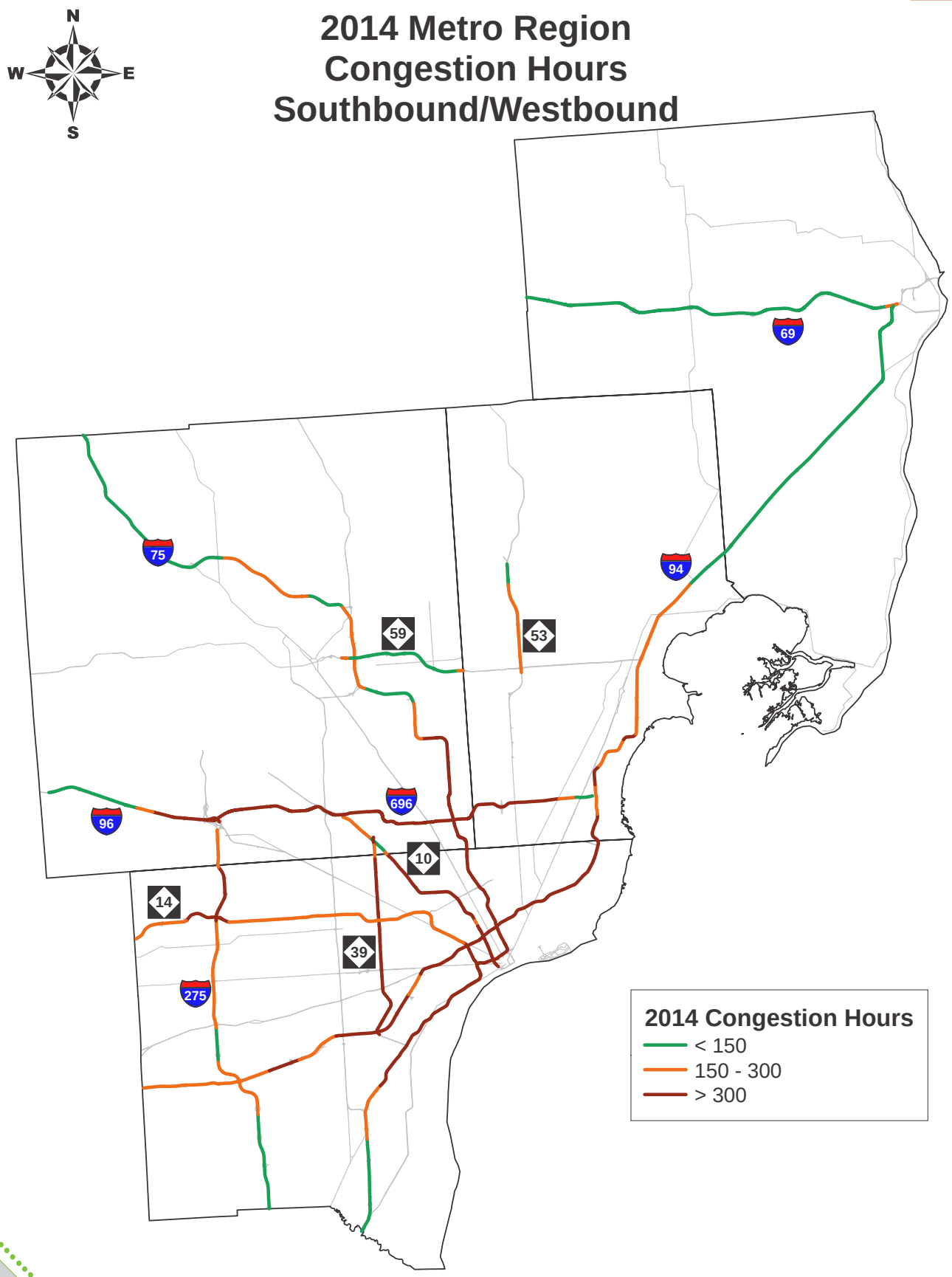


**Figure 4.** Metro Region UDC Data 2014

| | 2012-2013 Average | |
|---|---|---|
| Rank | UDC Per Mile | Location (Route, County) |
| 1 | $1,507,735 | I-696 Oakland Co. |
| 2 | $1,281,421 | I-75 Detroit TSC |
| 3 | $718,832 | M-10 Oakland Co. |
| 4 | $713,755 | I-94 Detroit TSC |
| 5 | $707,826 | I-96 plus Local Detroit TSC |
| 6 | $584,227 | M-10 Detroit TSC |
| 7 | $561,689 | M-39 Detroit TSC |
| 8 | $508,705 | I-96 Oakland Co. |
| 9 | $503,836 | I-96 Taylor TSC |
| 10 | $477,985 | M-59 Oakland Co. |
| 11 | $455,691 | I-75 Oakland Co. |
| 12 | $340,555 | M-53 Macomb Co. |
| 13 | $338,517 | I-94 Taylor TSC |
| 14 | $323,088 | I-275 Wayne Co. |
| 15 | $318,055 | I-75 Taylor TSC |
| 16 | $284,720 | I-94 Macomb Co. |
| 17 | $283,208 | I-696 Macomb Co. |
| 18 | $251,362 | M-14 Taylor TSC |
| 19 | $47,524 | I-94 St. Clair Co. |
| 20 | $23,712 | I-69 St. Clair Co. |

| | 2014 | |
|---|---|---|
| Rank | UDC Per Mile | Location (Route, County) |
| 1 | $2,540,192 | I-696 Oakland Co. |
| 2 | $2,064,698 | I-75 Detroit TSC |
| 3 | $1,117,046 | I-94 Detroit TSC |
| 4 | $987,893 | M-10 Oakland Co. |
| 5 | $910,574 | I-96 plus Local Detroit TSC |
| 6 | $801,167 | I-96 Taylor TSC |
| 7 | $773,604 | M-10 Detroit TSC |
| 8 | $769,212 | M-39 Detroit TSC |
| 9 | $729,967 | I-96 Oakland Co. |
| 10 | $618,192 | M-59 Oakland Co. |
| 11 | $607,481 | I-75 Oakland Co. |
| 12 | $563,674 | M-14 Taylor TSC |
| 13 | $534,901 | I-94 Taylor TSC |
| 14 | $367,290 | I-75 Taylor TSC |
| 15 | $344,593 | I-696 Macomb Co. |
| 16 | $297,706 | M-53 Macomb Co. |
| 17 | $281,609 | I-275 Wayne Co. |
| 18 | $279,282 | I-94 Macomb Co. |
| 19 | $41,361 | I-94 St. Clair Co. |
| 20 | $24,145 | I-69 St. Clair Co. |

| | 2012-2013 Average | |
|---|---|---|
| Rank | Total UDC | Location (Route, County) |
| 1 | $41,923,576 | I-75 Oakland Co. |
| 2 | $30,154,710 | I-696 Oakland Co. |
| 3 | $27,605,196 | I-96 plus Local Detroit TSC |
| 4 | $23,065,579 | I-75 Detroit TSC |
| 5 | $22,840,168 | I-94 Detroit TSC |
| 6 | $17,652,627 | I-94 Macomb Co. |
| 7 | $17,372,282 | I-96 Oakland Co. |
| 8 | $15,727,301 | M-39 Detroit TSC |
| 9 | $15,233,275 | I-94 Taylor TSC |
| 10 | $14,538,973 | I-275 Wayne Co. |
| 11 | $13,027,560 | I-696 Macomb Co. |
| 12 | $11,633,582 | I-96 Taylor TSC |
| 13 | $11,100,322 | M-10 Detroit TSC |
| 14 | $10,177,767 | I-75 Taylor TSC |
| 15 | $9,081,709 | M-59 Oakland Co. |
| 16 | $7,907,153 | M-10 Oakland Co. |
| 17 | $6,470,536 | M-53 Macomb Co. |
| 18 | $3,770,434 | M-14 Taylor TSC |
| 19 | $2,186,127 | I-94 St. Clair Co. |
| 20 | $1,493,840 | I-69 St. Clair Co. |
| Total = | **$302,962,716** | |

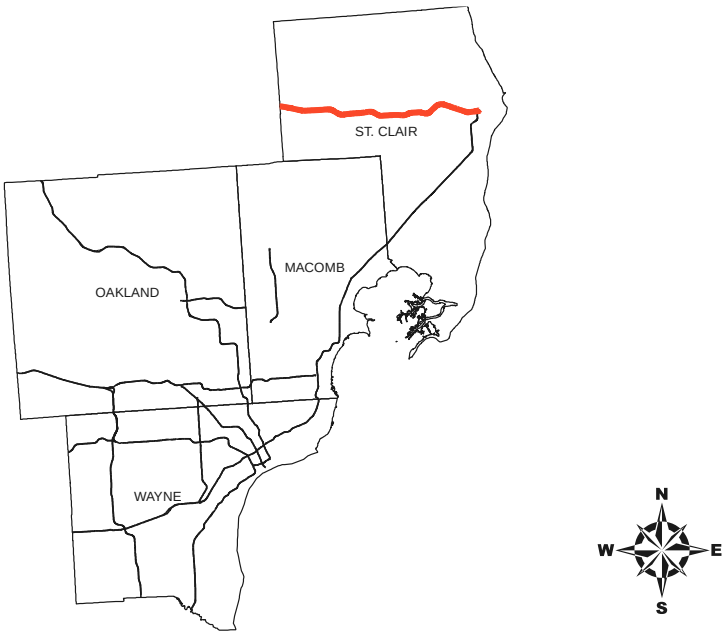
| | 2014 | |
|---|---|---|
| Rank | Total UDC | Location (Route, County) |
| 1 | $55,888,275 | I-75 Oakland Co. |
| 2 | $50,803,834 | I-696 Oakland Co. |
| 3 | $37,164,561 | I-75 Detroit TSC |
| 4 | $35,745,456 | I-94 Detroit TSC |
| 5 | $35,512,385 | I-96 plus Local Detroit TSC |
| 6 | $24,928,383 | I-96 Oakland Co. |
| 7 | $24,070,535 | I-94 Taylor TSC |
| 8 | $21,537,930 | M-39 Detroit TSC |
| 9 | $18,498,940 | I-96 Taylor TSC |
| 10 | $17,315,514 | I-94 Macomb Co. |
| 11 | $15,851,276 | I-696 Macomb Co. |
| 12 | $14,698,471 | M-10 Detroit TSC |
| 13 | $12,672,418 | I-275 Wayne Co. |
| 14 | $11,753,272 | I-75 Taylor TSC |
| 15 | $11,745,652 | M-59 Oakland Co. |
| 16 | $10,866,825 | M-10 Oakland Co. |
| 17 | $8,455,106 | M-14 Taylor TSC |
| 18 | $5,656,408 | M-53 Macomb Co. |
| 19 | $1,902,607 | I-94 St. Clair Co. |
| 20 | $1,521,137 | I-69 St. Clair Co. |
| **Total =** | **$416,588,984** | |

Chapter 4

# Corridor

- Interstate 69: **St. Clair**
- Interstate 75: **Taylor, Detroit 55mph, Detroit 70mph, and Oakland**
- Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**
- Interstate 96: **Oakland, Taylor, and Detroit Plus Local**
- Interstate 275: **Wayne**
- Interstate 696: **Oakland and Macomb**
- Michigan 10: **Detroit 55mph and Oakland**
- Michigan 14: **Taylor**
- Michigan 39: **Detroit 55mph**
- Michigan 53: **Macomb**
- Michigan 59: **Oakland**

**Figure 5.** St. Clair County I-69 Corridor total user delay cost



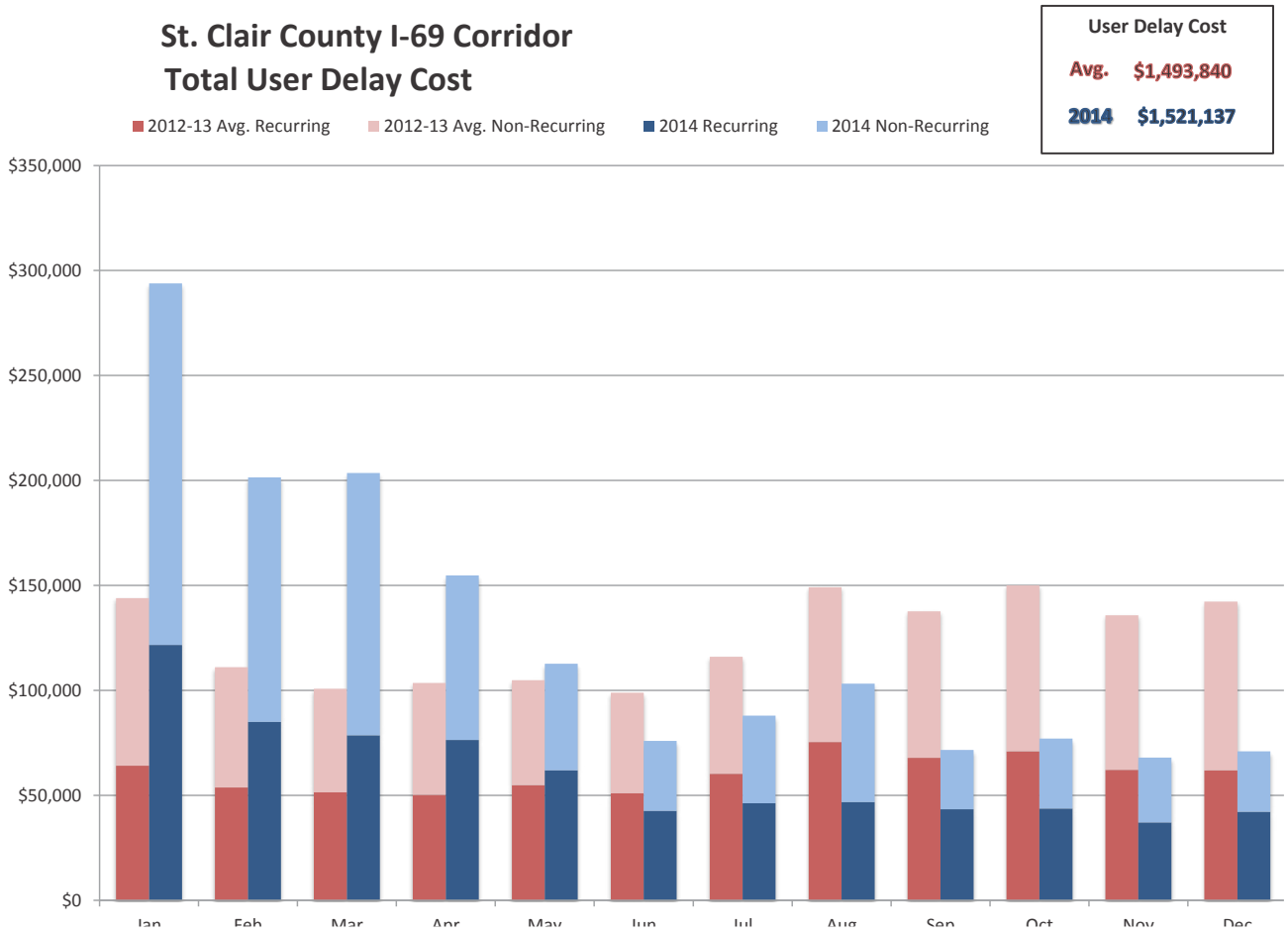



Figure 6. Metro Region I-69 eastbound

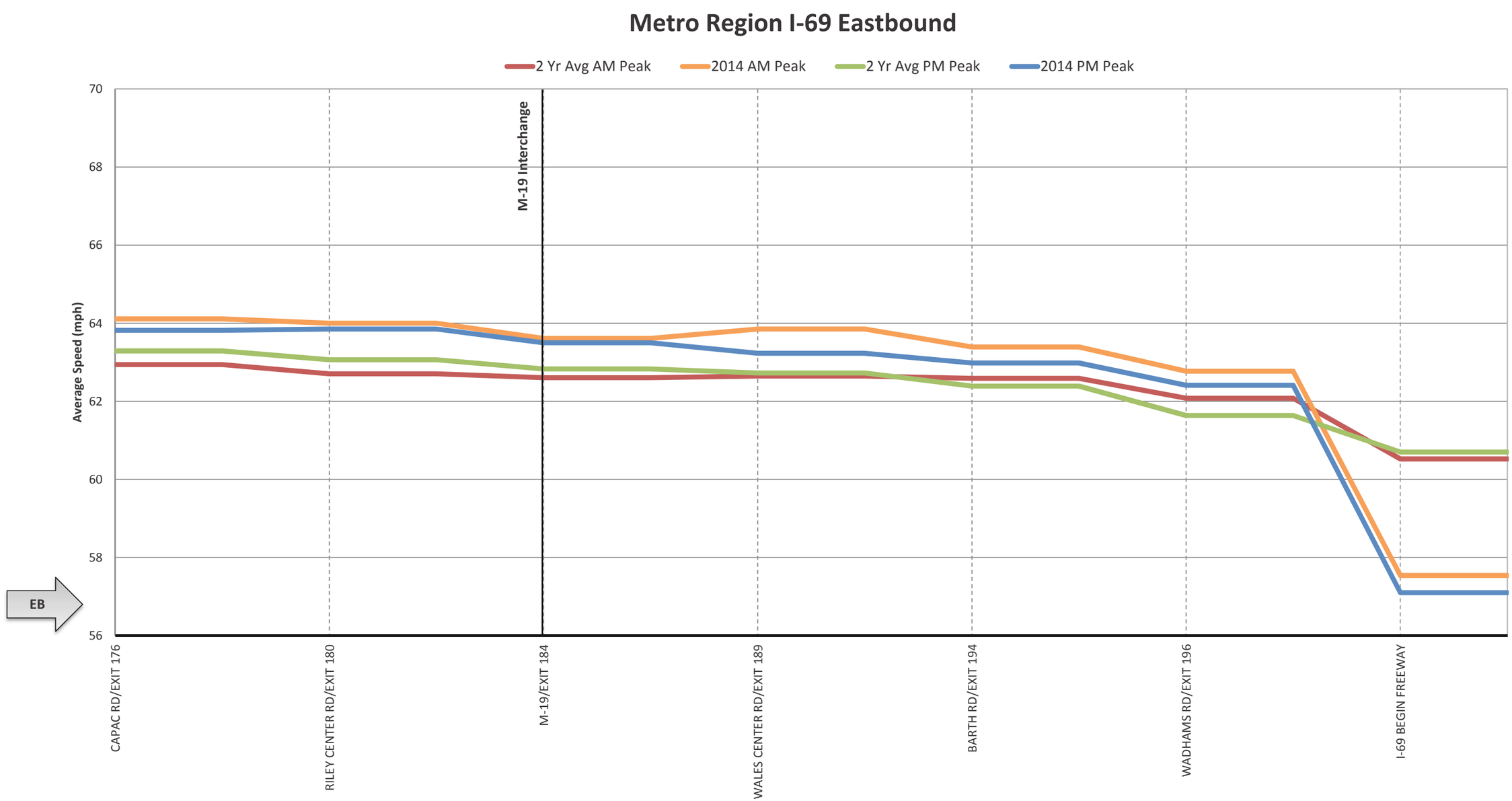
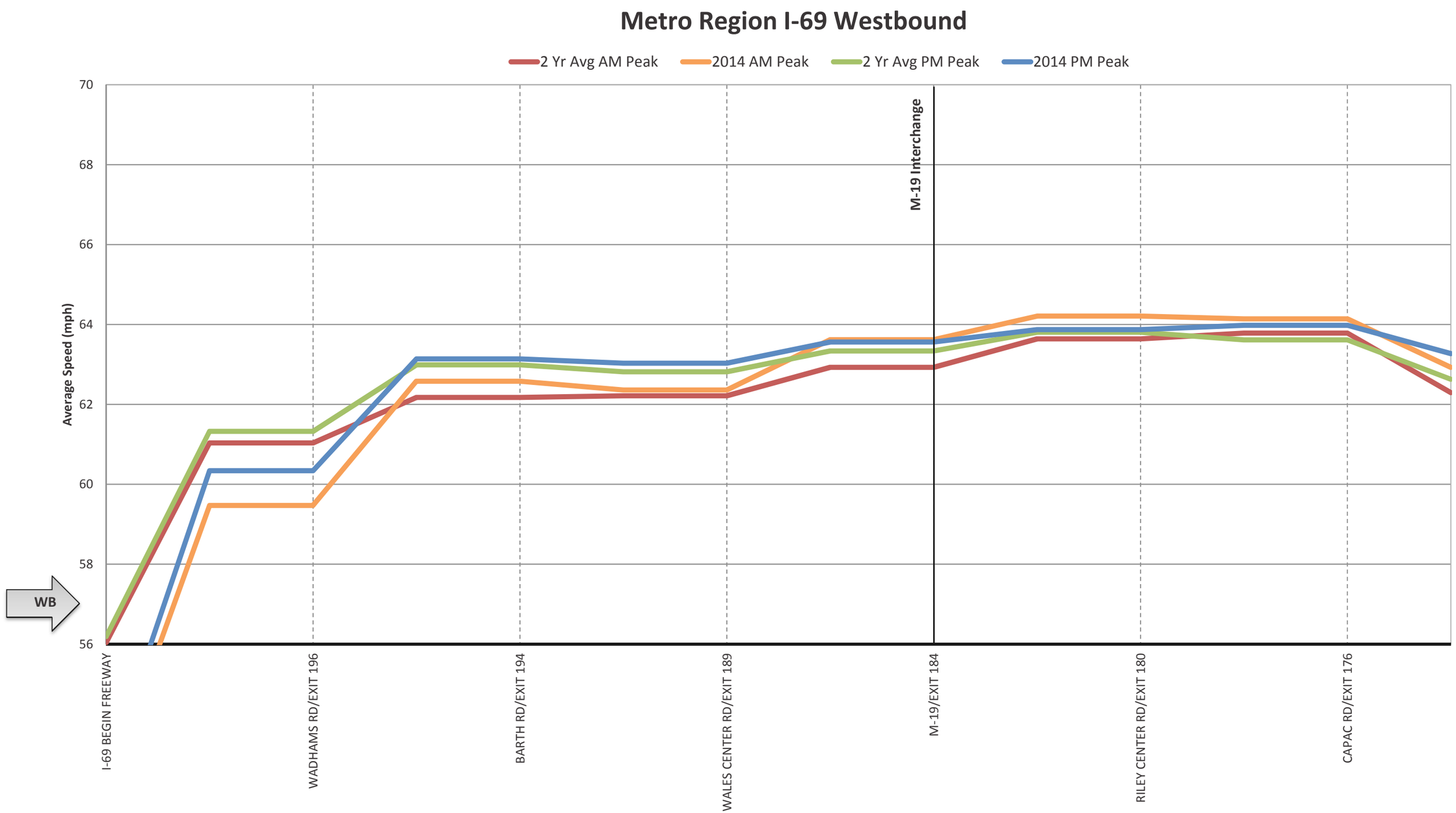


Figure 7. Metro Region I-69 westbound



Chapter 4

# Corridor

Interstate 69: **St. Clair**

Interstate 75: **Taylor, Detroit 70mph, and Oakland**

Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

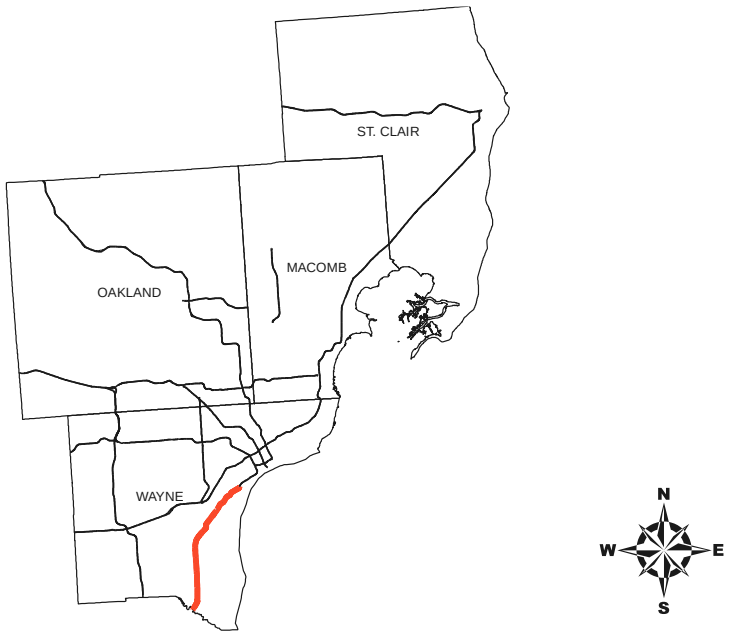
Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 8.** Taylor TSC I-75 Corridor total user delay cost



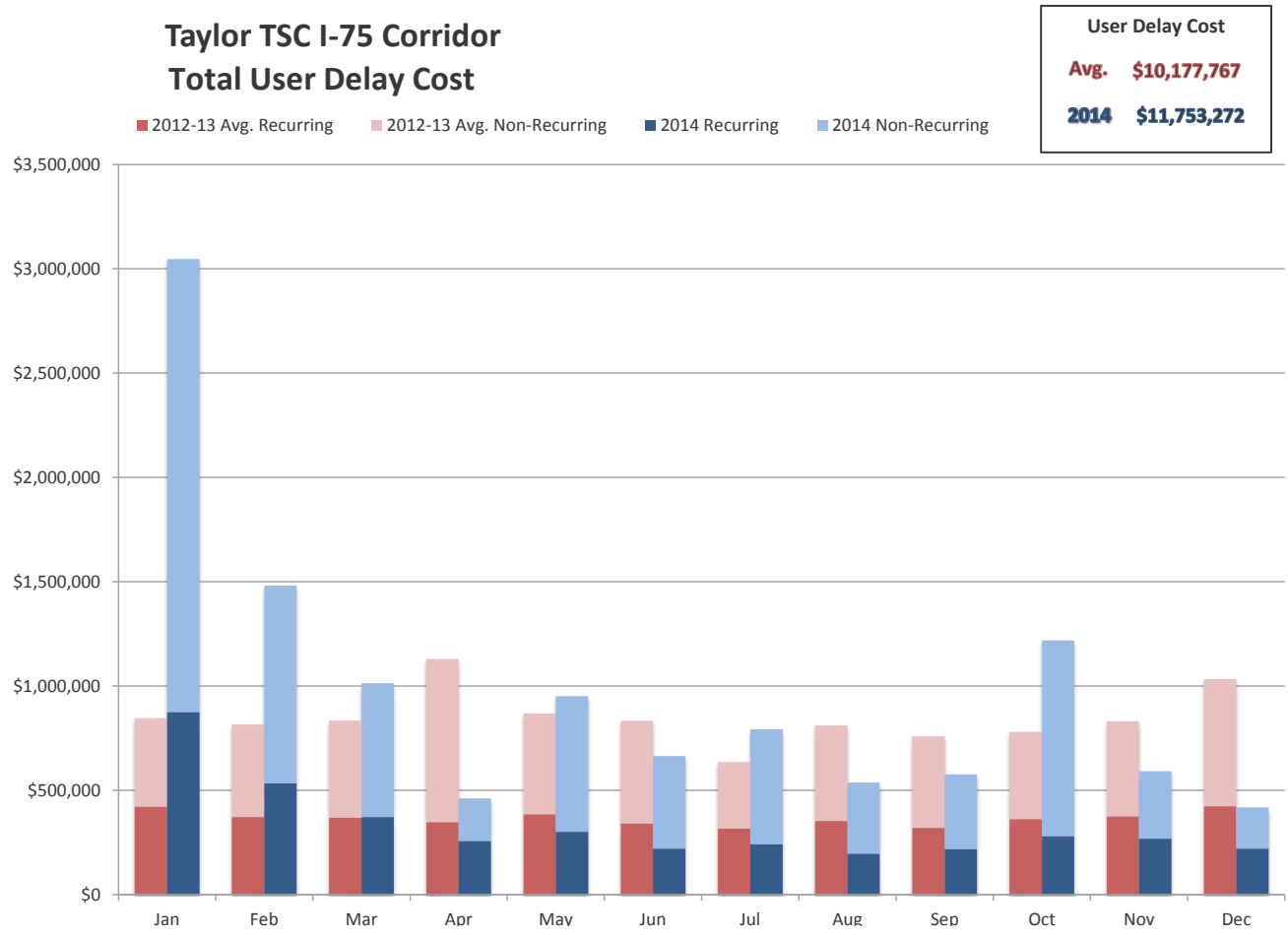
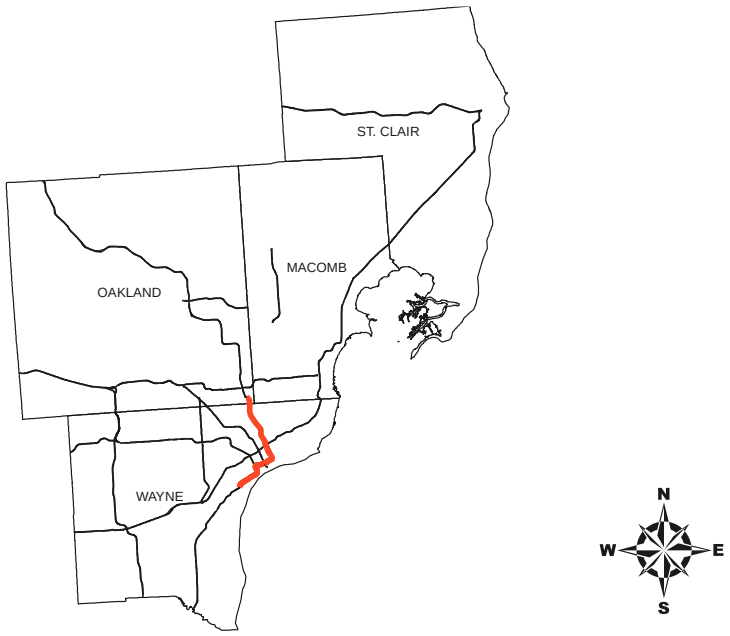



**Figure 9.** Detroit TSC I-75 Corridor (55mph section) total user delay cost



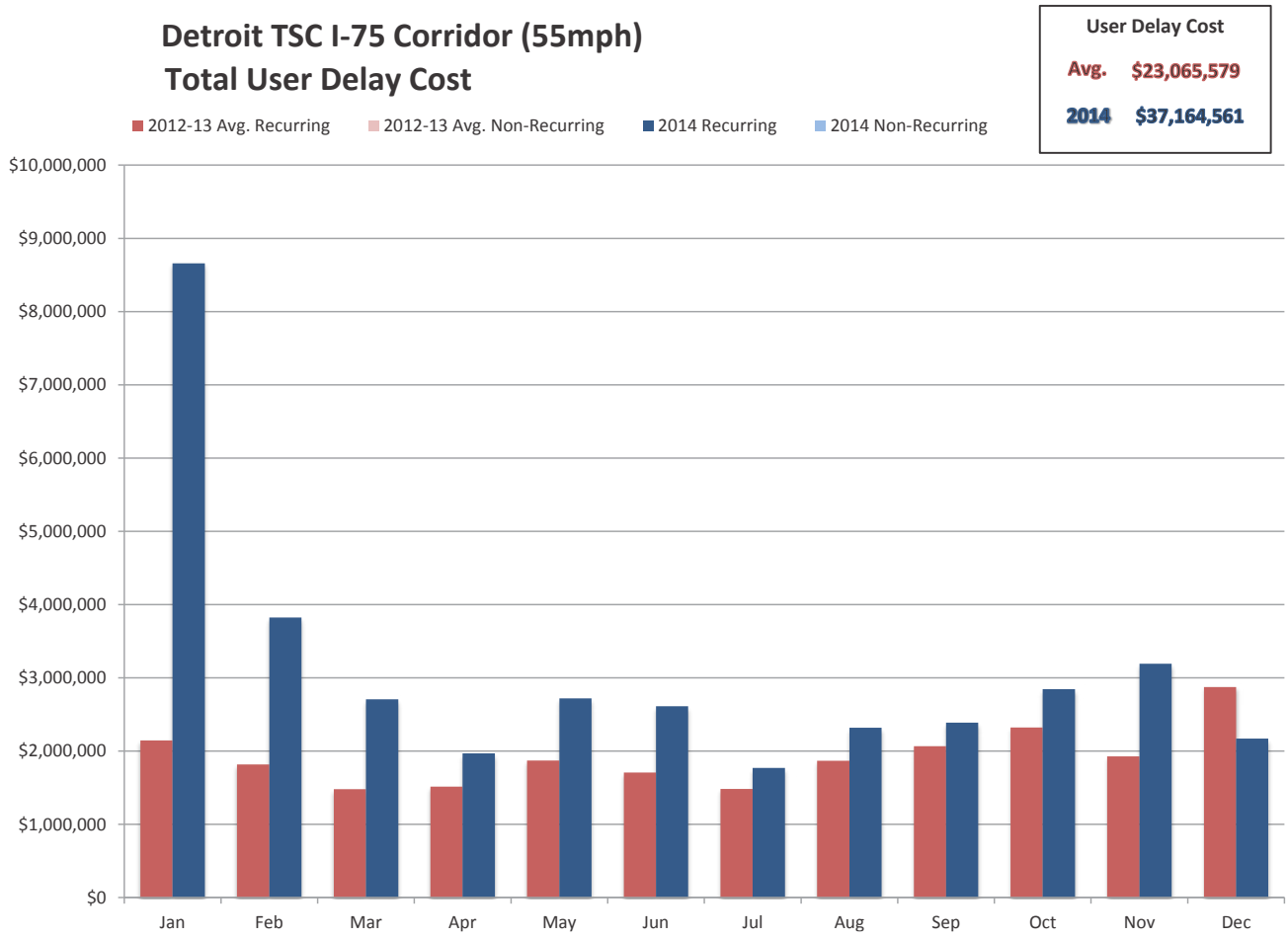
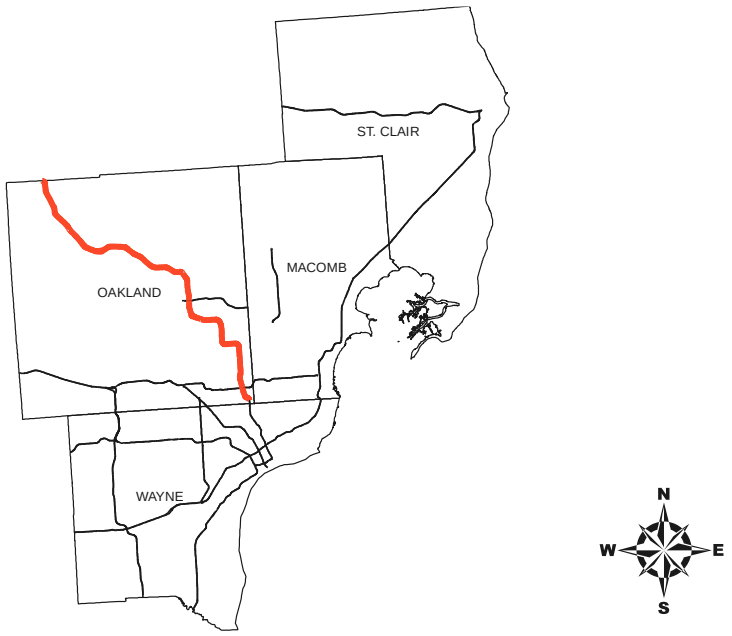



**Figure 10.** Oakland County I-75 Corridor total user delay cost



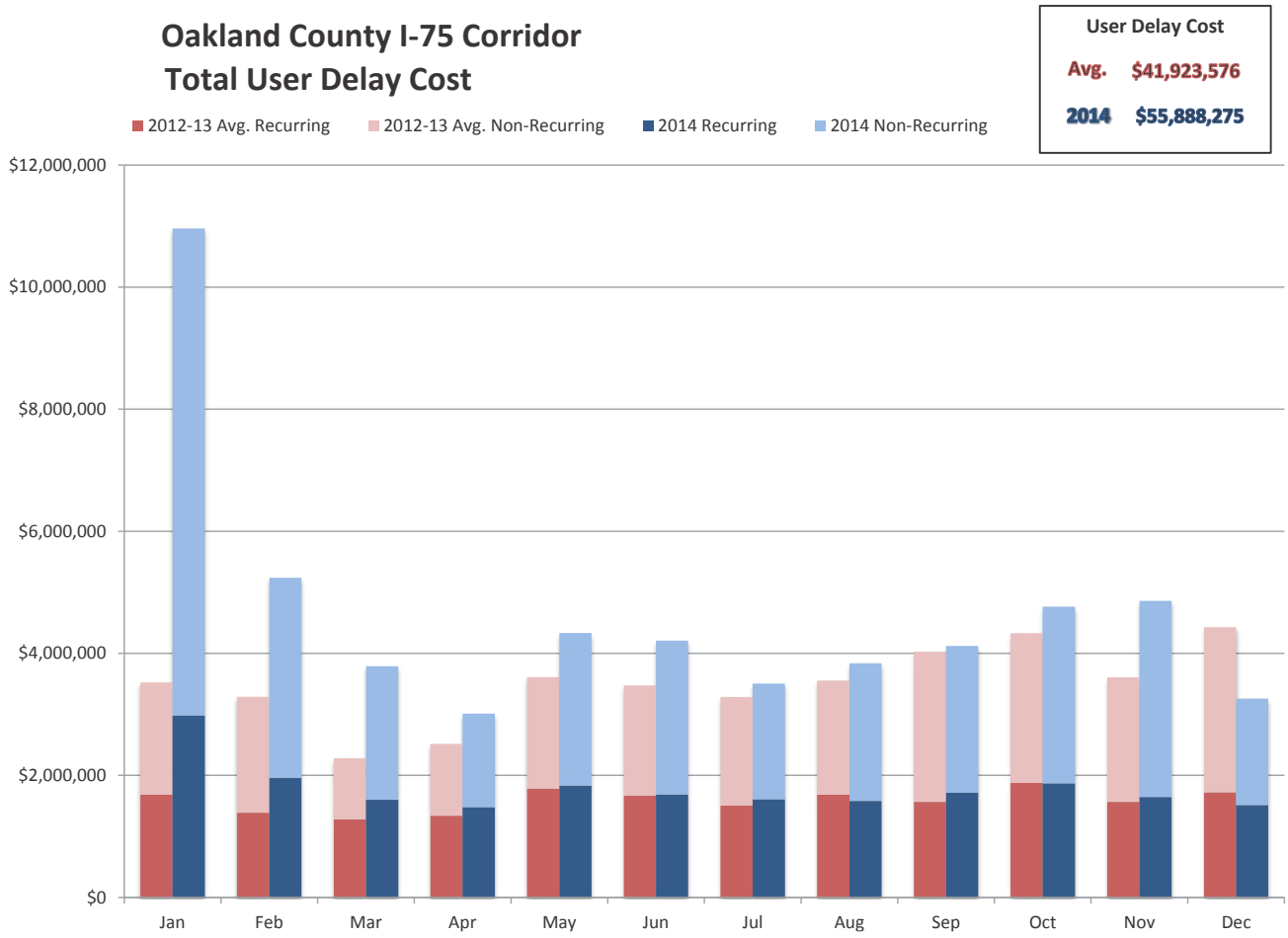



Figure 11. Metro Region I-75 northbound

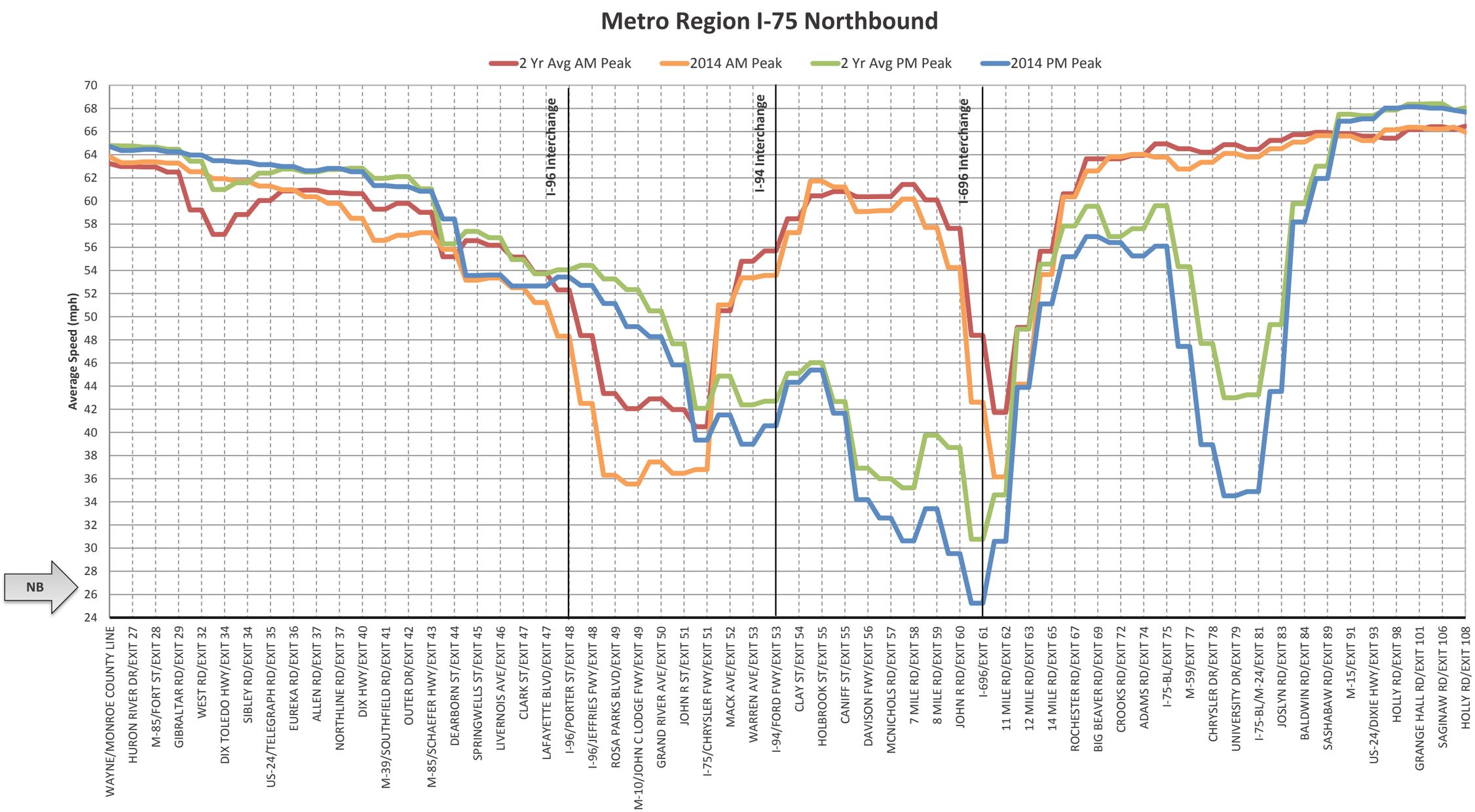
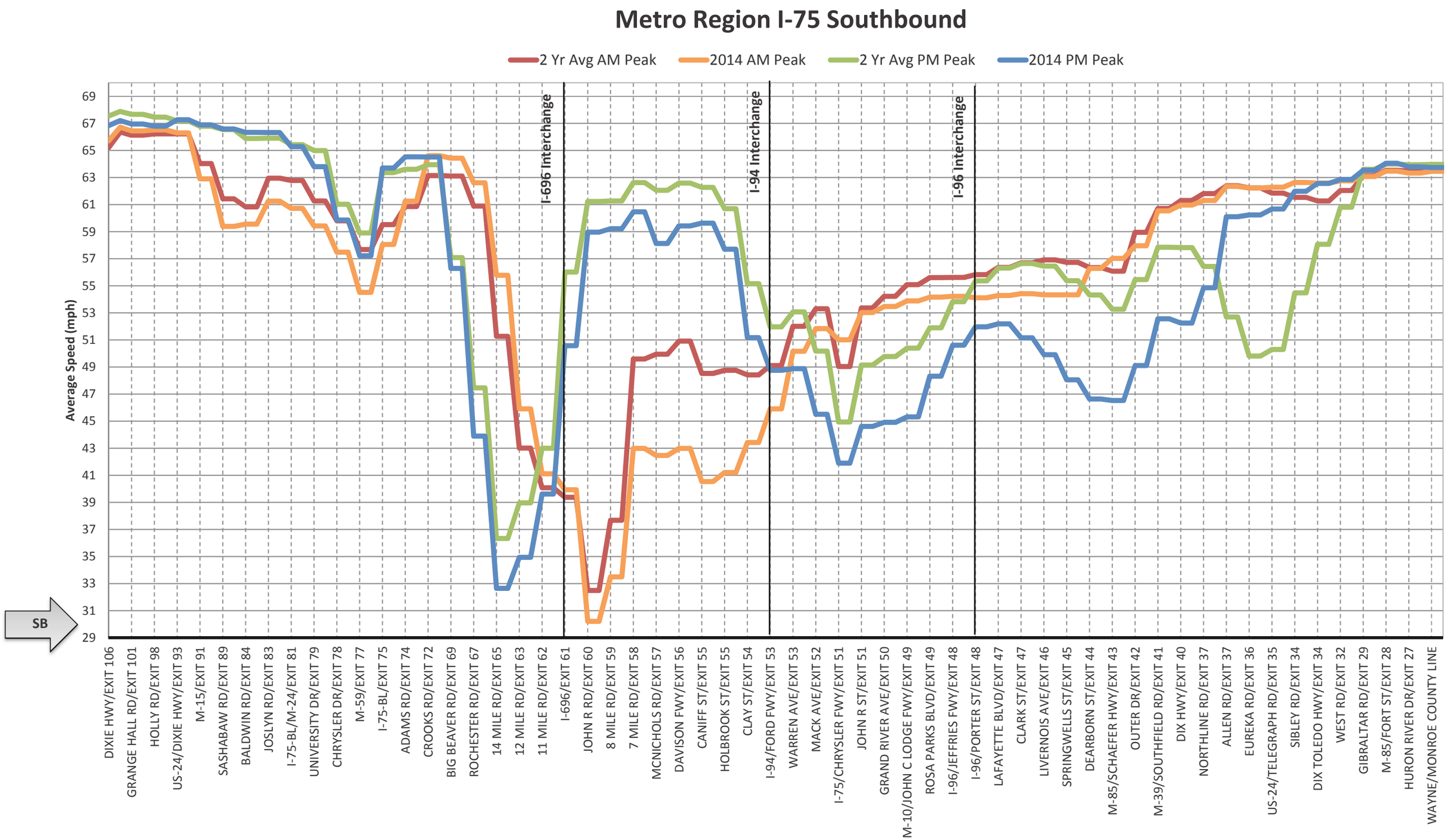


Figure 12. Metro Region I-75 southbound



# Travel Time Reliability

**Figure 13.** Travel time reliability I-75

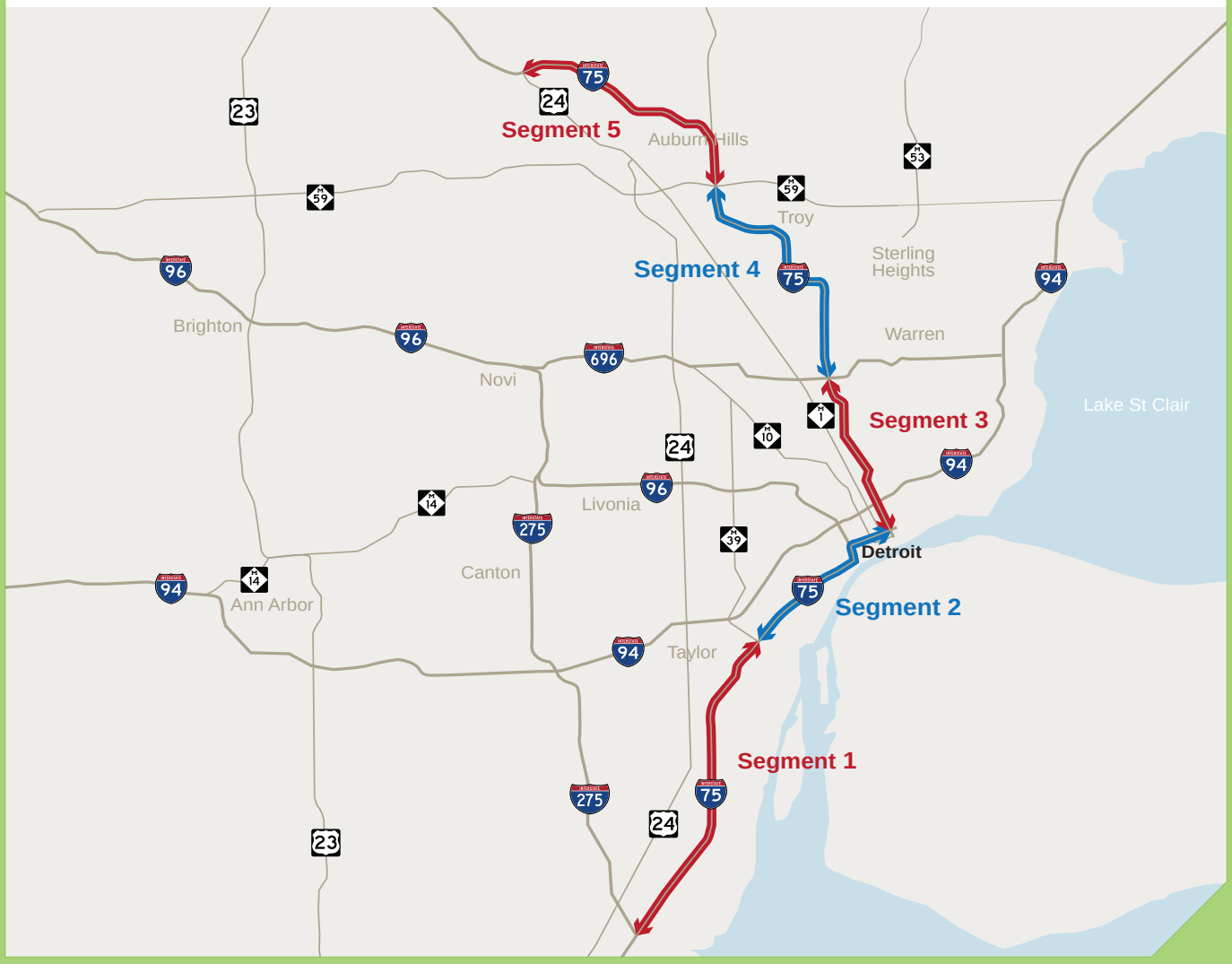
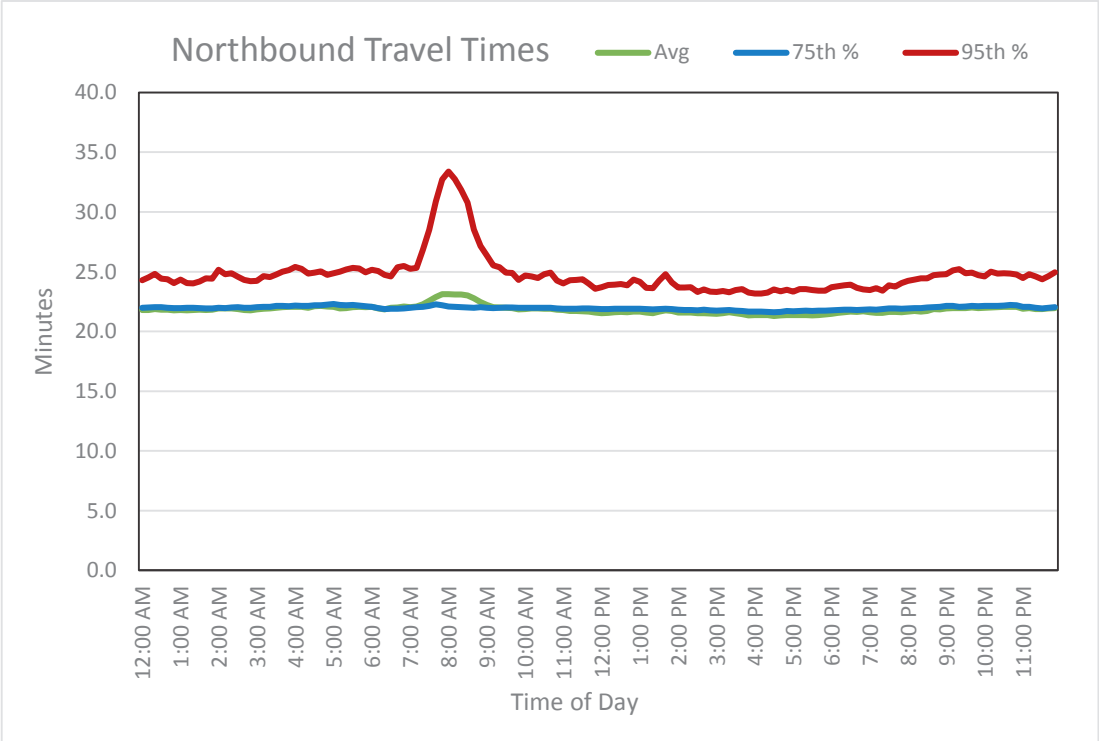


**Figure 14.** Segment 1- I-75 between I-275 and M-39/Southfield Rd

Segment 1

Travel time (minutes) for I-75 between I-275/Exit 20 and M-39/Southfield Rd/Exit 41



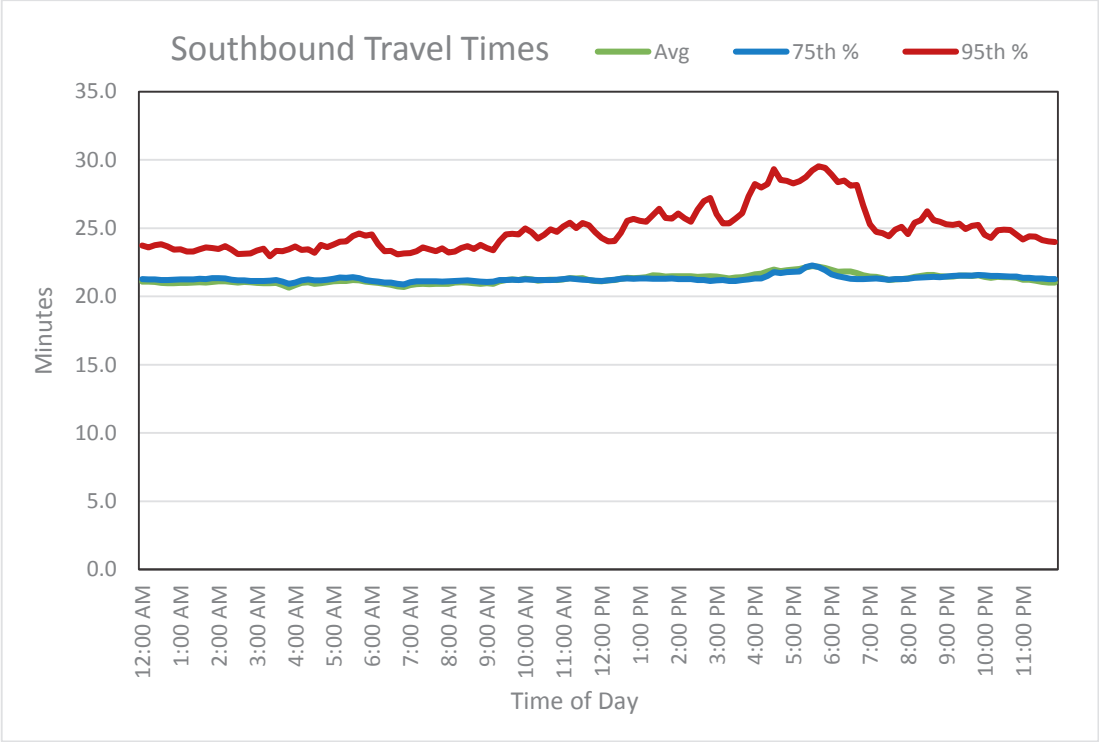
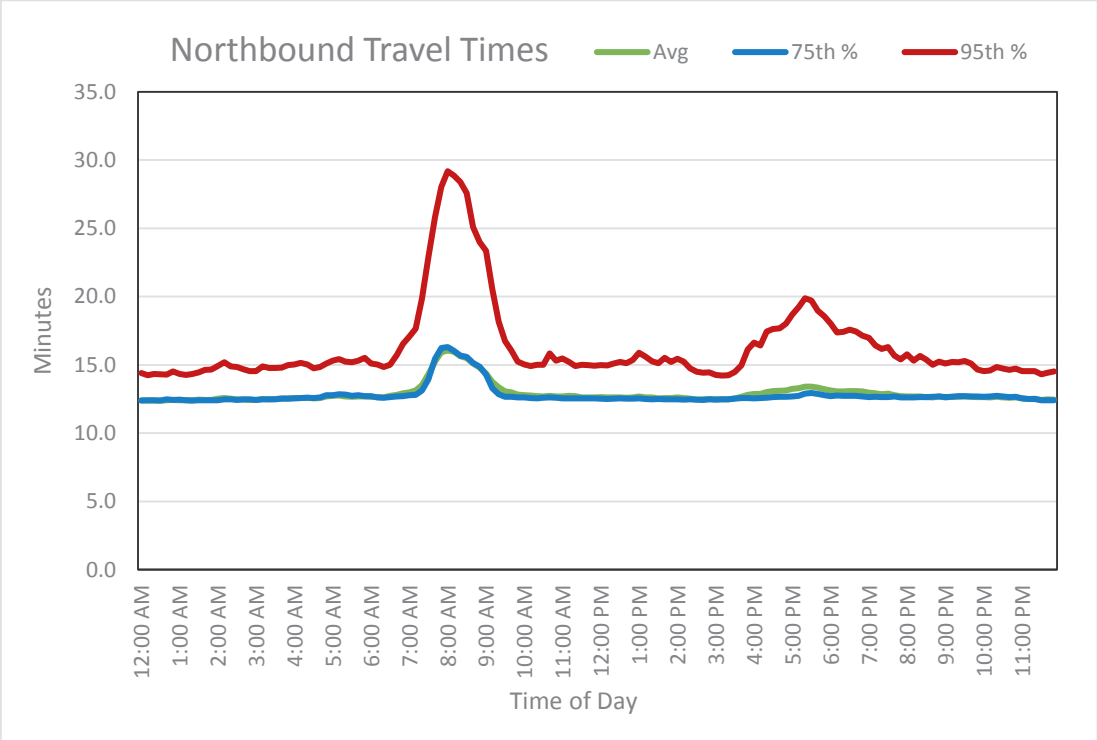



**Figure 15.** Segment 2- I-75 between M-39/Southfield Rd and I-75/Chrysler Fwy

## Segment 2

### Travel time (minutes) for I-75 between M-39/Southfield Rd/Exit 41 and I-75/Chrysler Fwy/Exit 51



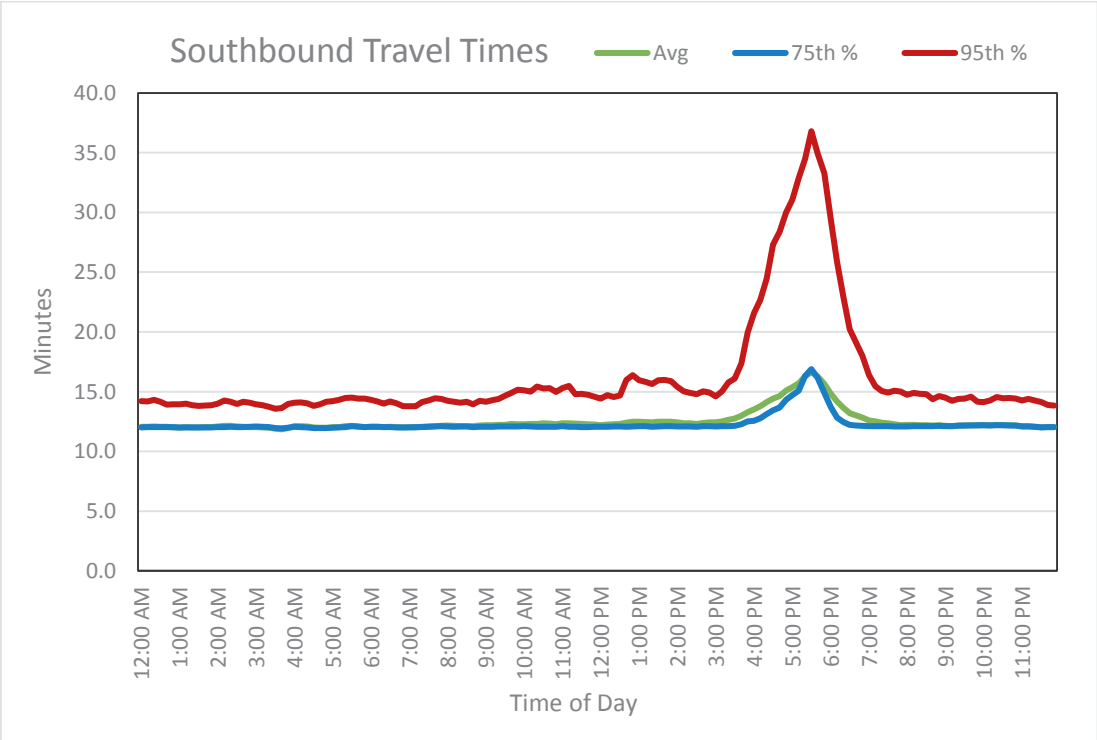
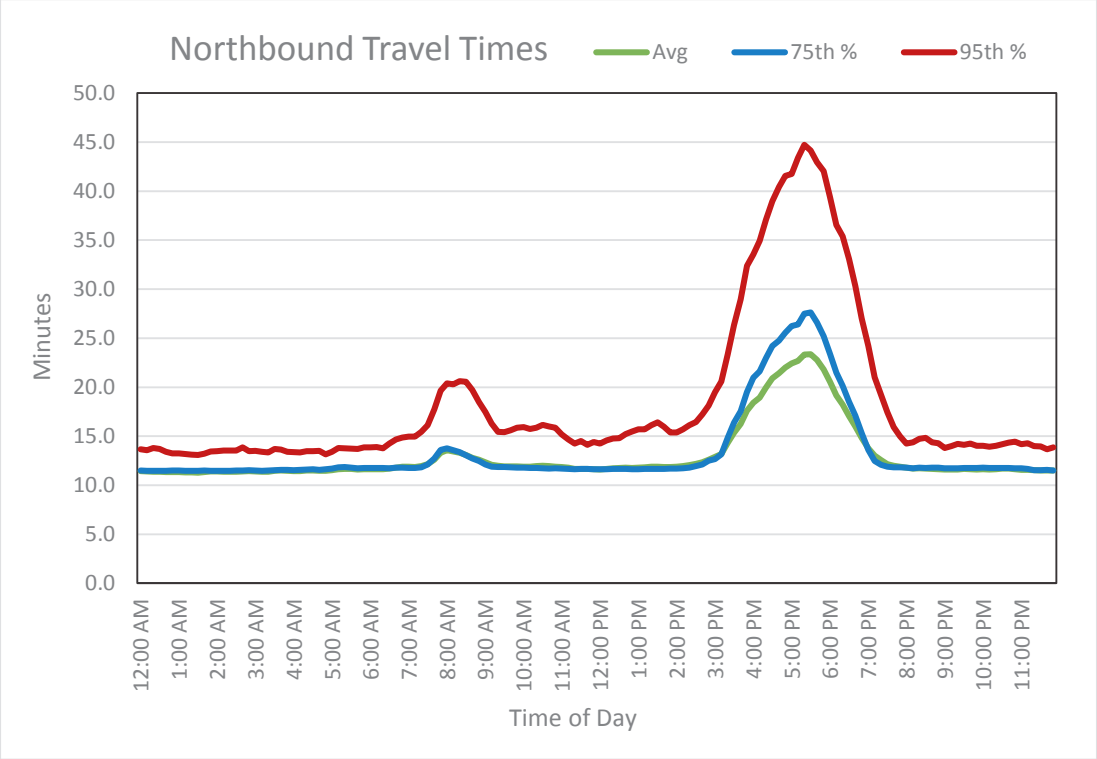



**Figure 16.** Segment 3- I-75 between I-696 and I-75/Chrysler Fwy

## Segment 3

Travel time (minutes) for I-75 between I-696/Exit 61 and I-75/Chrysler Fwy/Exit 51



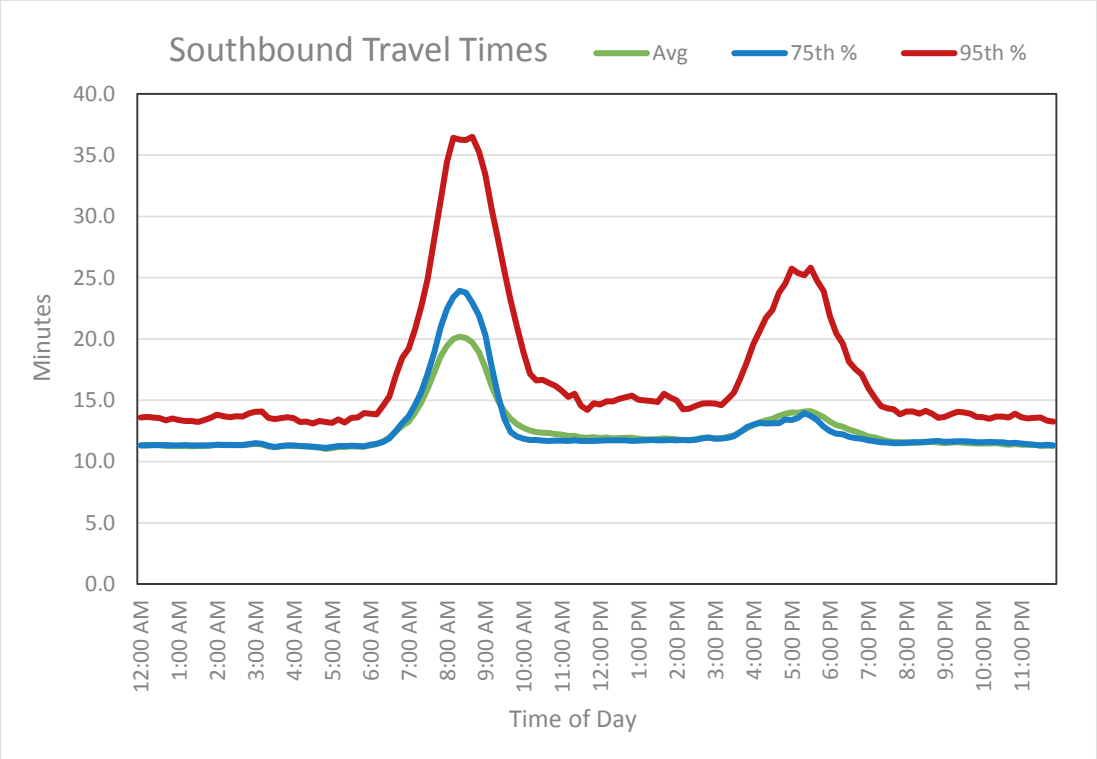
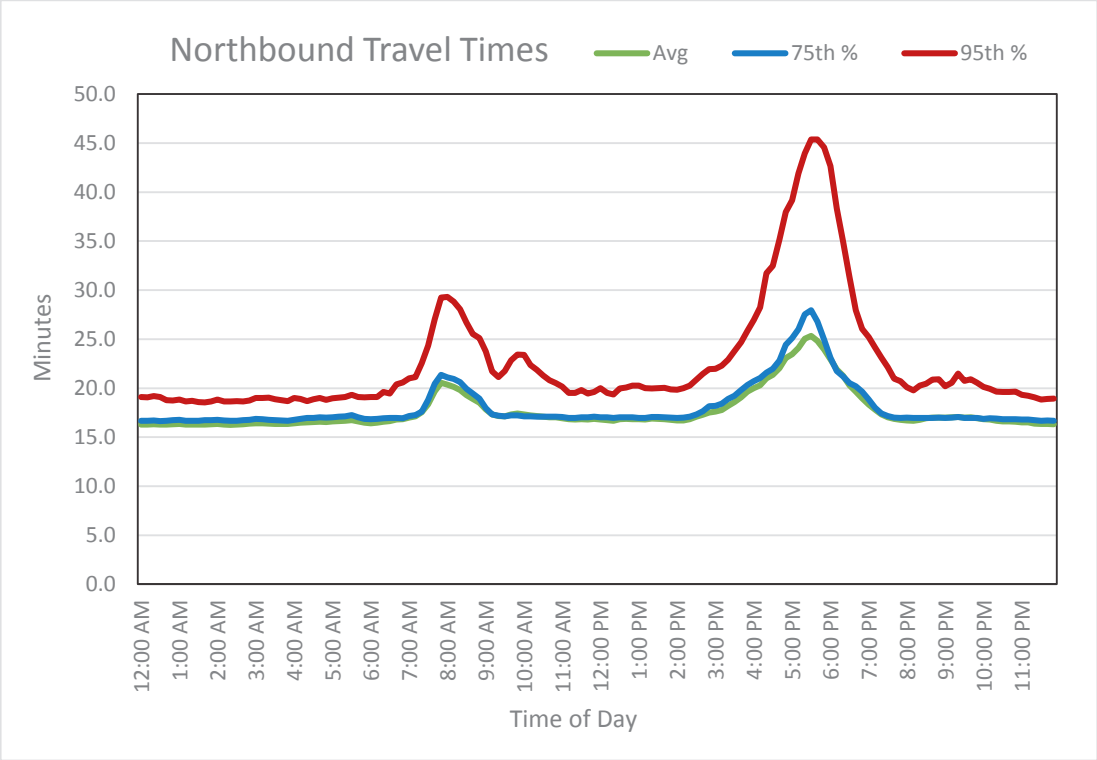



**Figure 17.** Segment 4- I-75 between I-696 and M-59

## Segment 4

### Travel time (minutes) for I-75 between I-696/Exit 61 and M-59/Exit 77



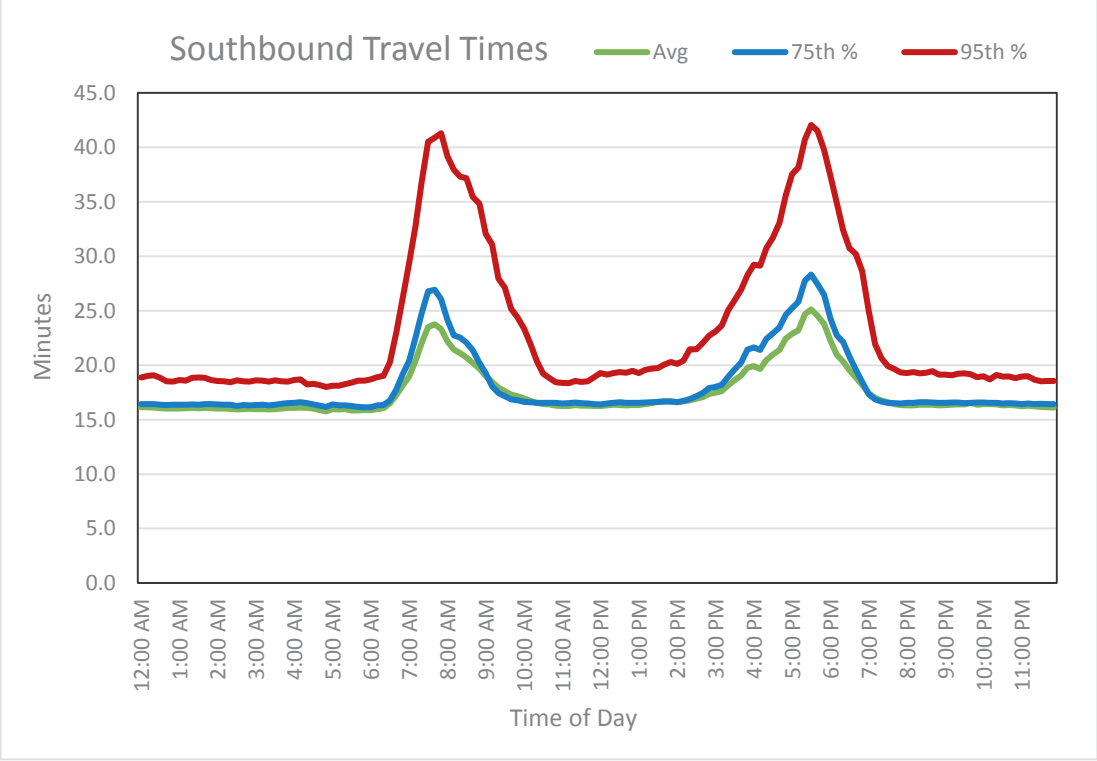
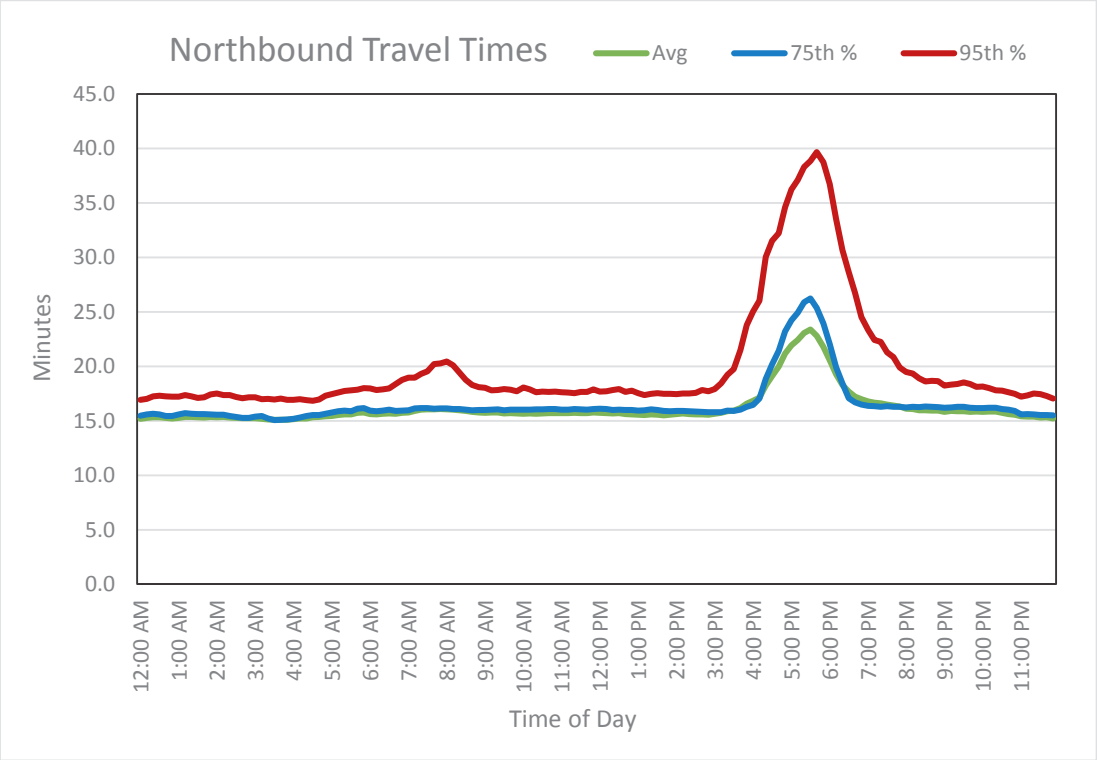
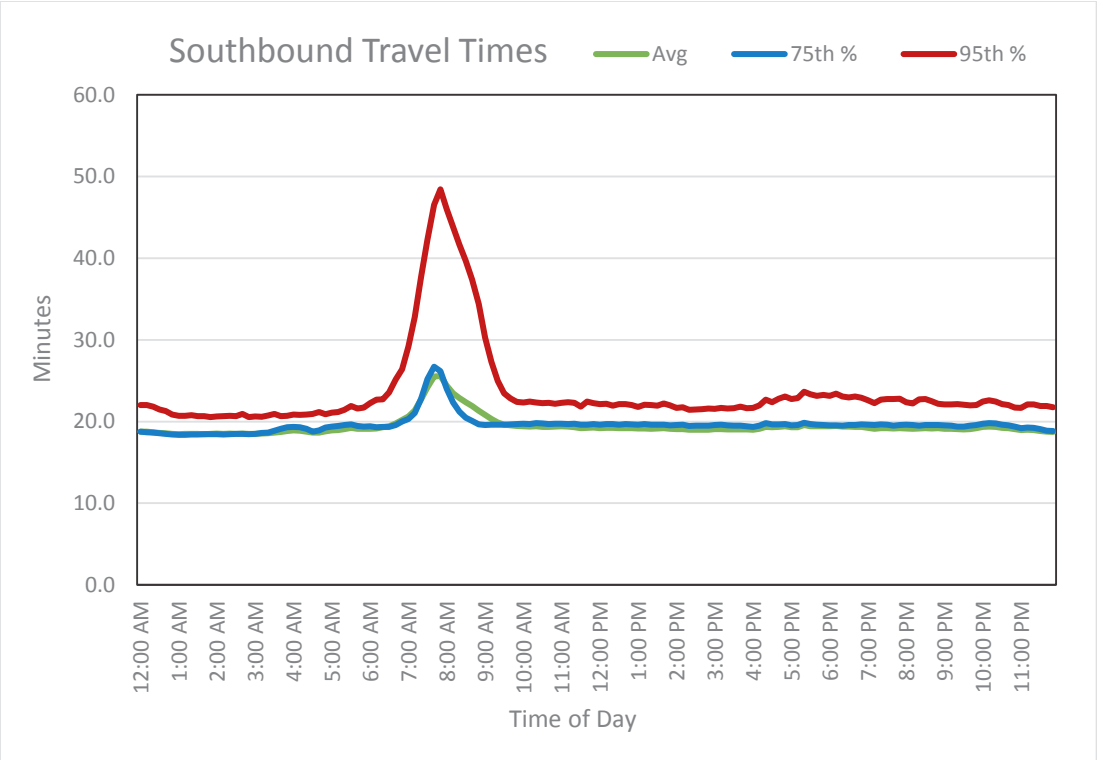



**Figure 18.** Segment 5- I-75 between US-24/Dixie Hwy and M-59

## Segment 5

### Travel time (minutes) for I-75 between US-24/Dixie Hwy/Exit 93 and M-59/Exit 77



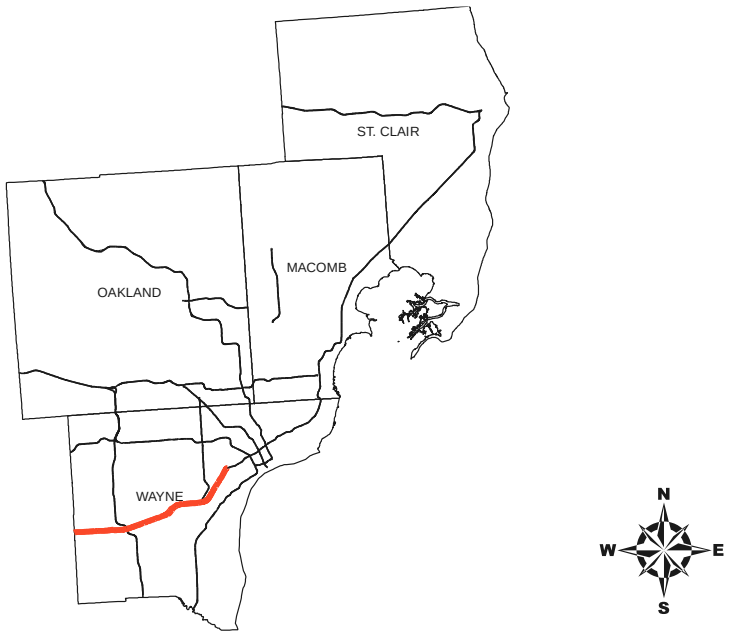



Chapter 4

# Corridor

- Interstate 69: **St. Clair**
- Interstate 75: **Taylor, Detroit 55mph, Detroit 70mph, and Oakland**
- Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**
- Interstate 96: **Oakland, Taylor, and Detroit Plus Local**
- Interstate 275: **Wayne**
- Interstate 696: **Oakland and Macomb**
- Michigan 10: **Detroit 55mph and Oakland**
- Michigan 14: **Taylor**
- Michigan 39: **Detroit 55mph**
- Michigan 53: **Macomb**
- Michigan 59: **Oakland**

**Figure 19.** Taylor TSC I-94 Corridor total user delay cost



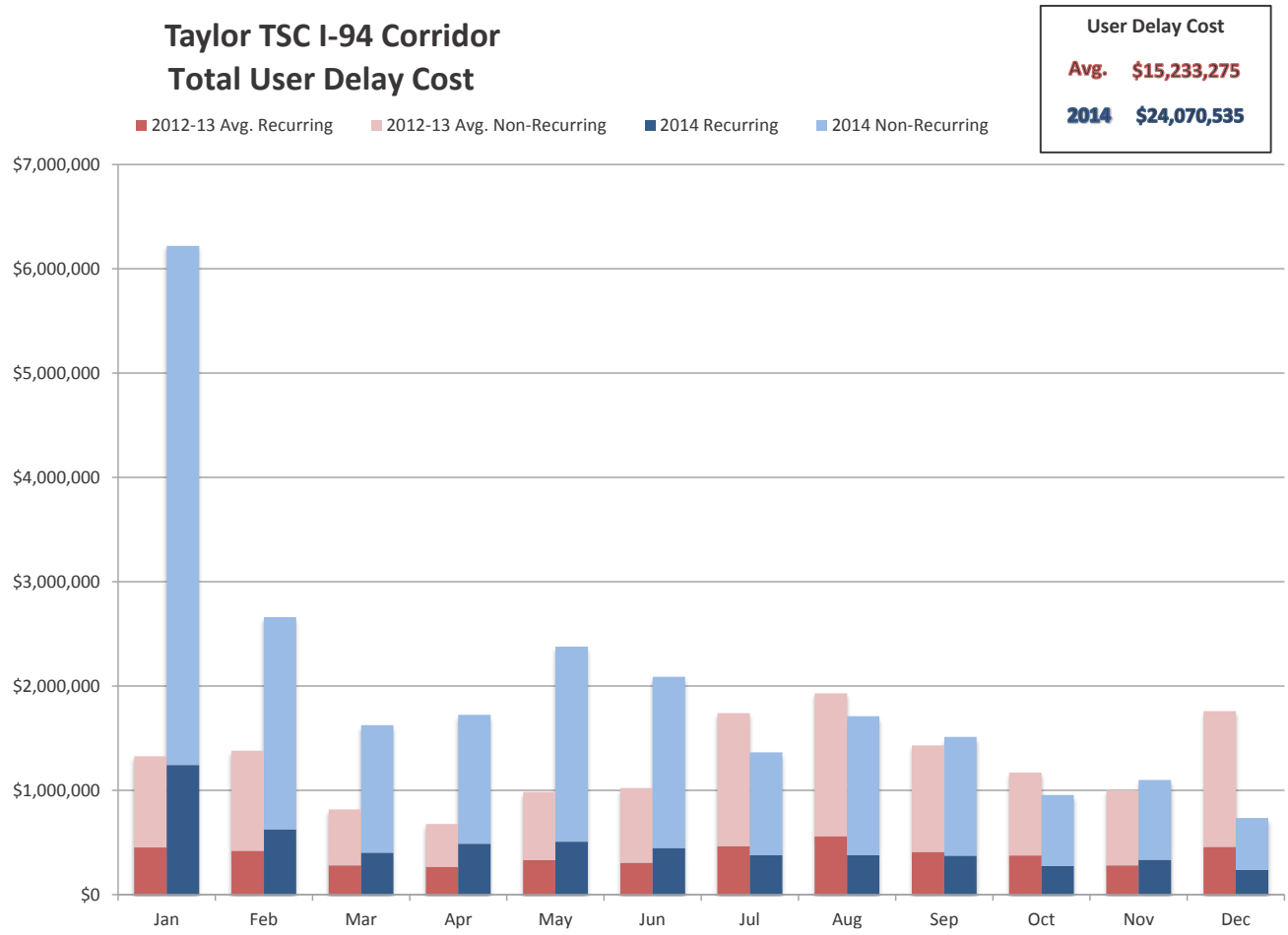
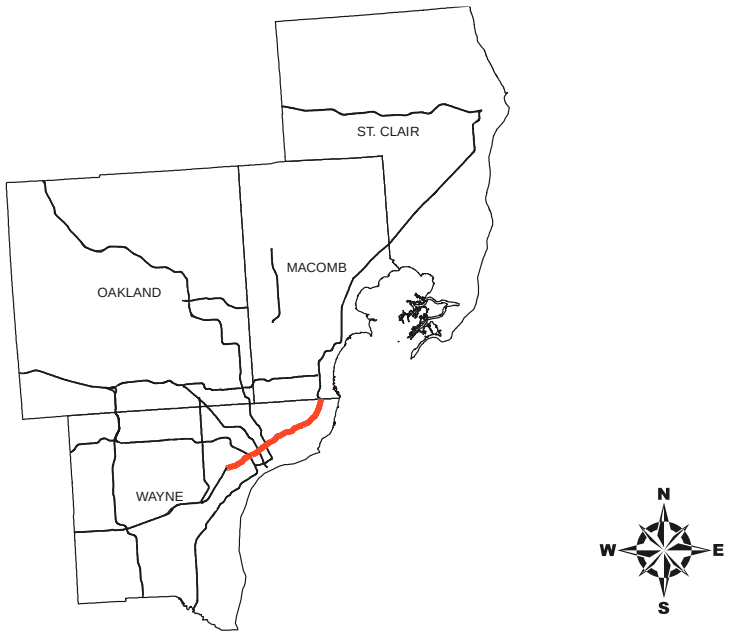



**Figure 20.** Detroit TSC I-94 Corridor (55mph section) total user delay cost



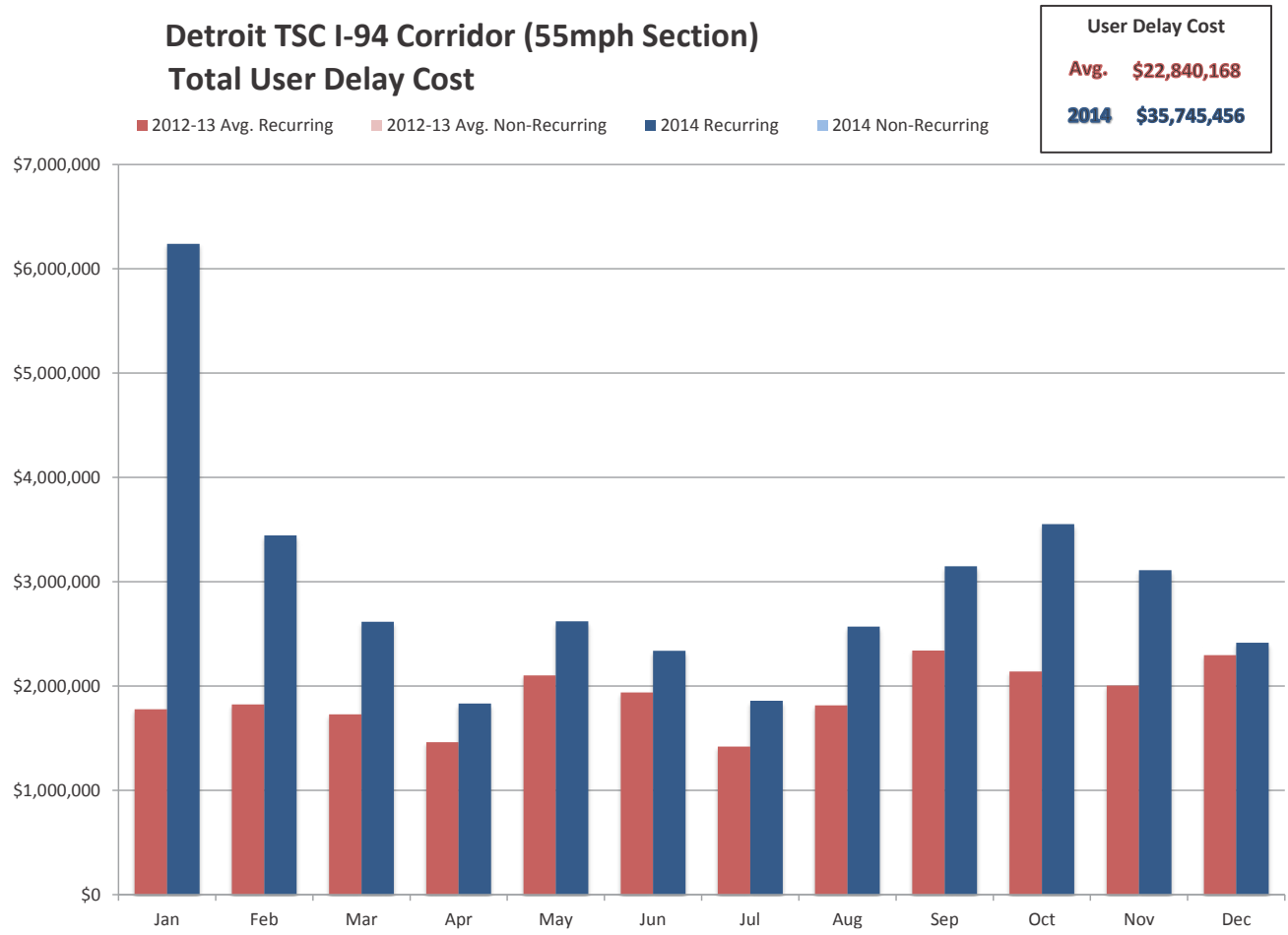
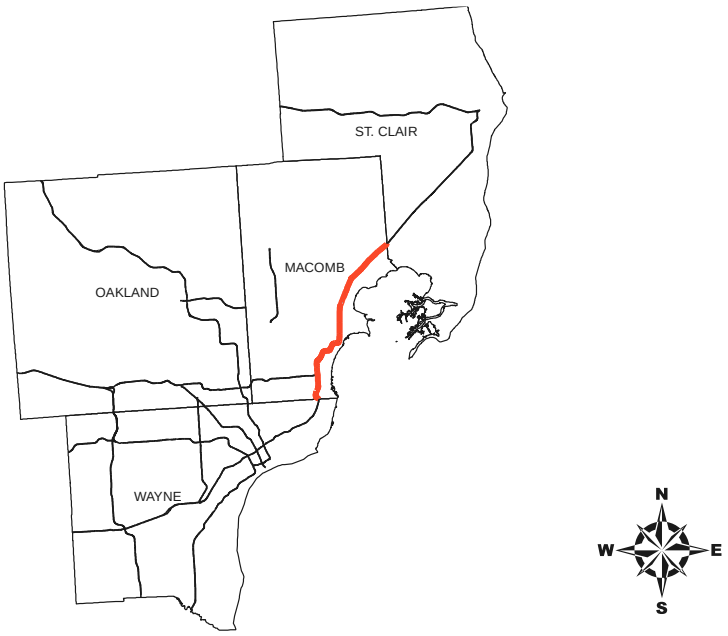



**Figure 21.** Macomb County I-94 Corridor total user delay cost



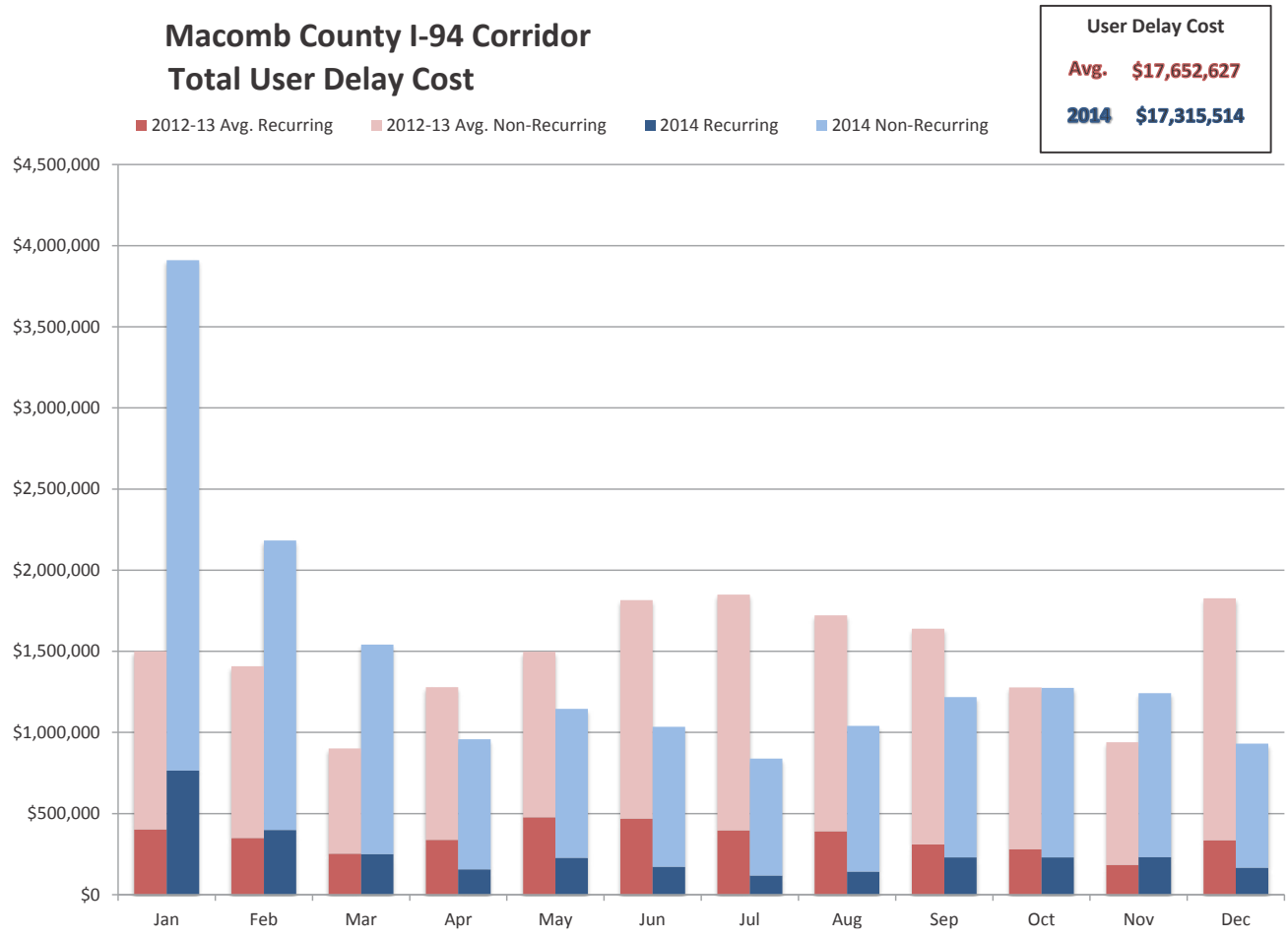



**Figure 22.** St. Clair County I-94 Corridor total user delay cost

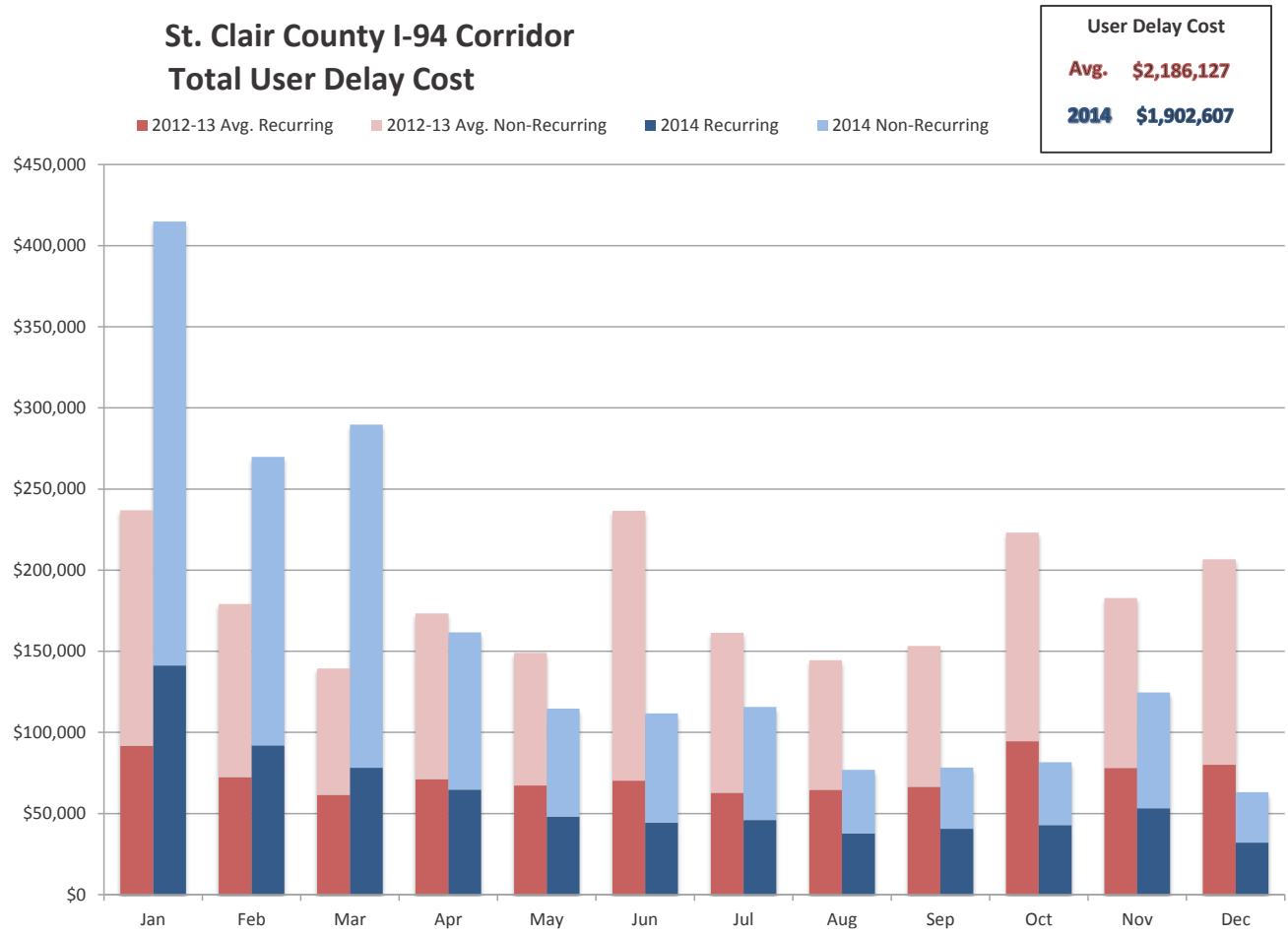


Figure 23. Metro Region I-94 eastbound

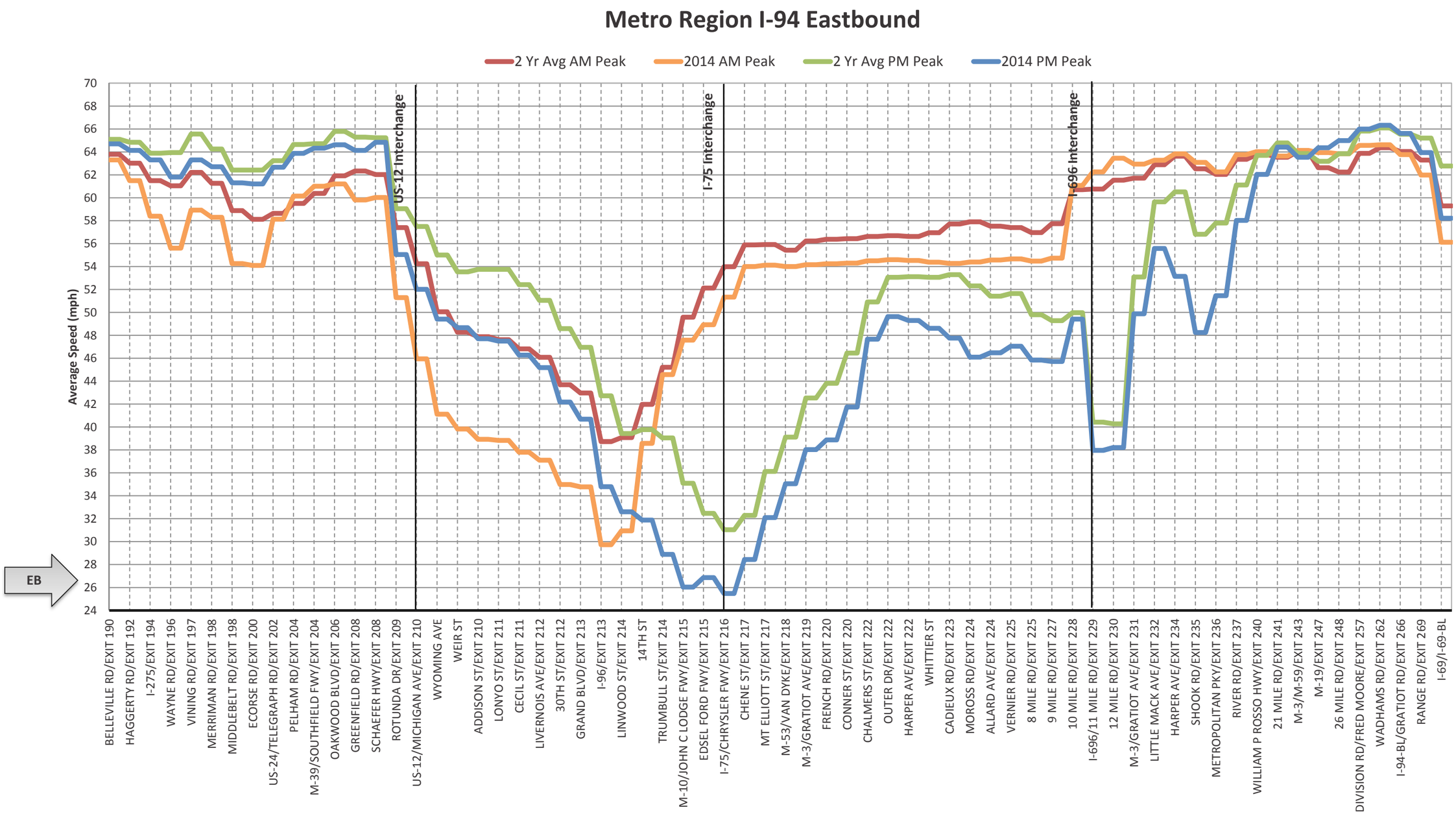
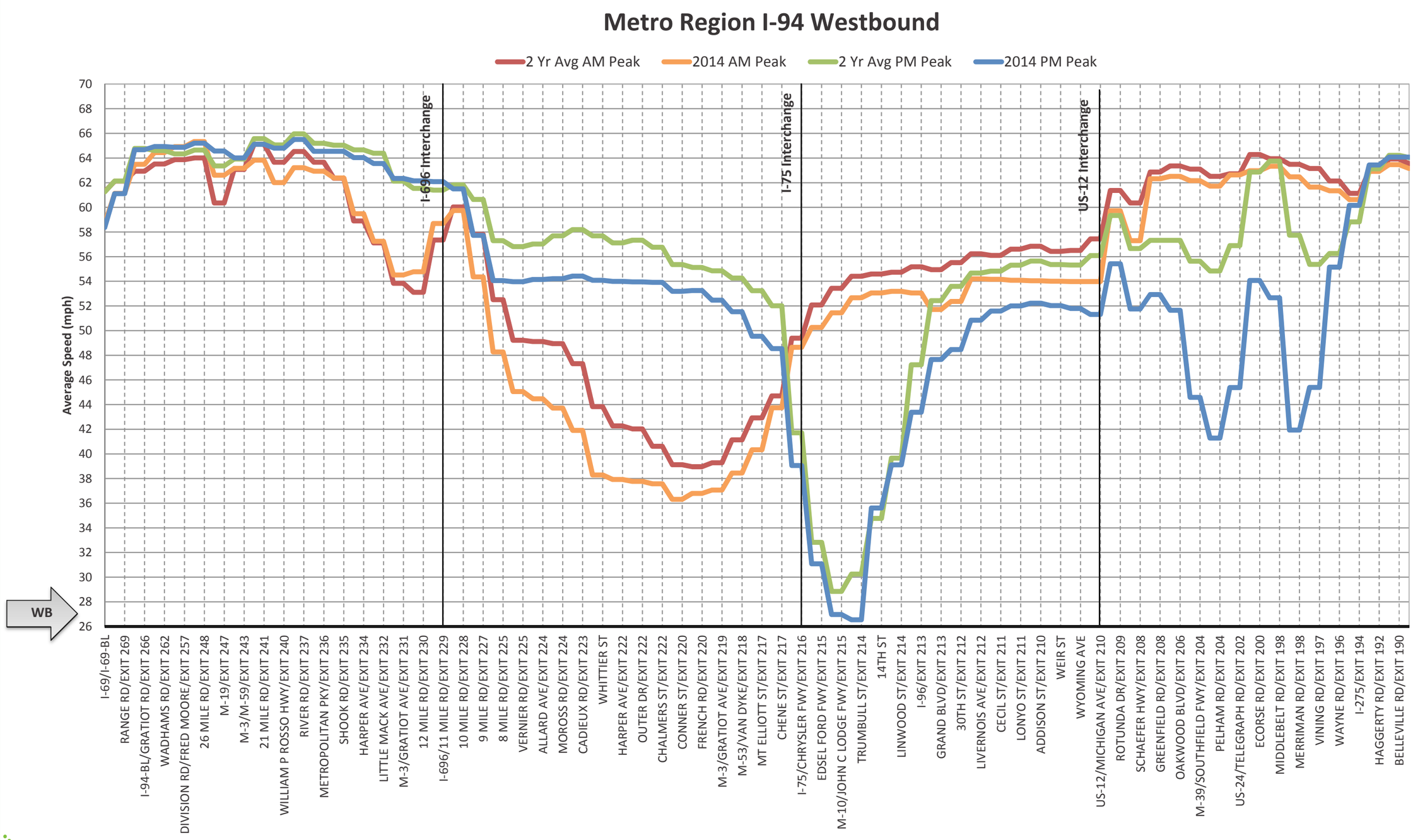


Figure 24. Metro Region I-94 westbound



# Travel Time Reliability

Figure 25. Travel time reliability I-94

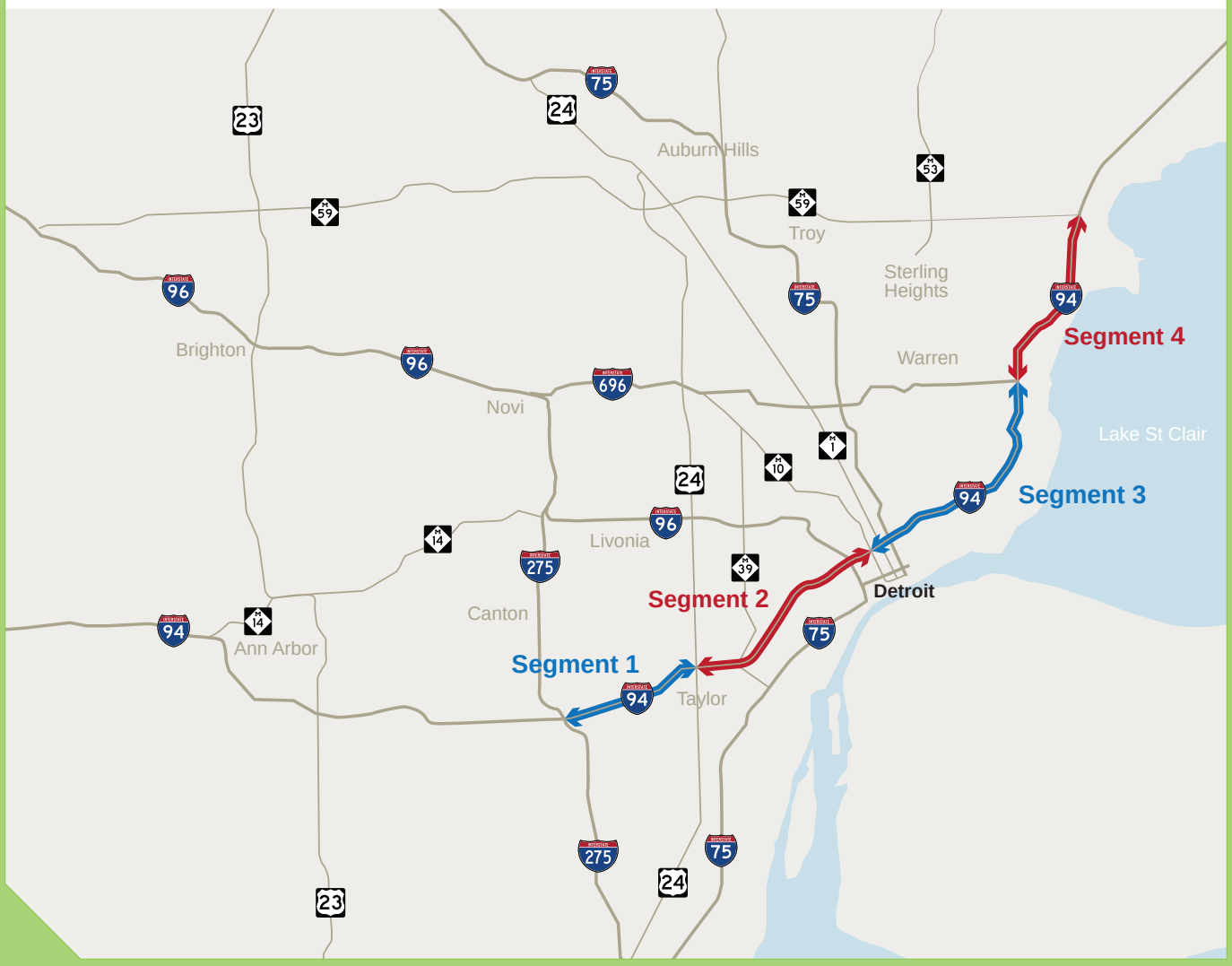
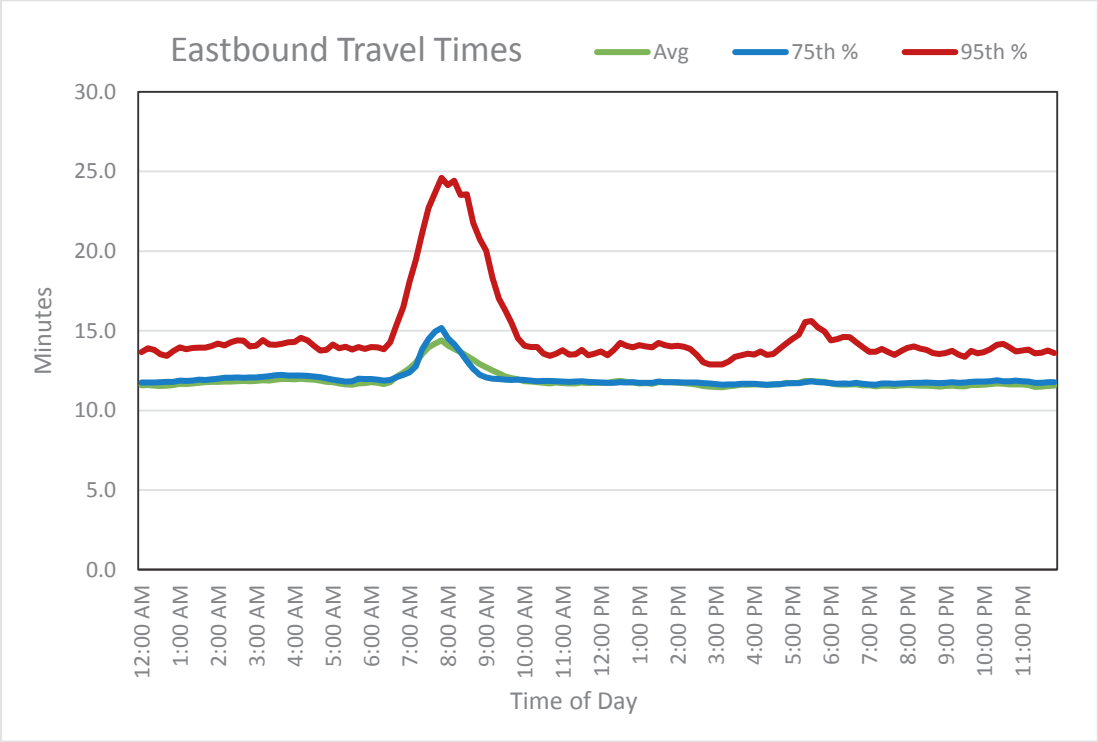


**Figure 26.** Segment 1- I-96 between I-275 and M-30/Southfield Fwy

Segment 1

Travel time (minutes) for I-94 between I-275/Exit 194 and M-39/Southfield Fwy/Exit 204



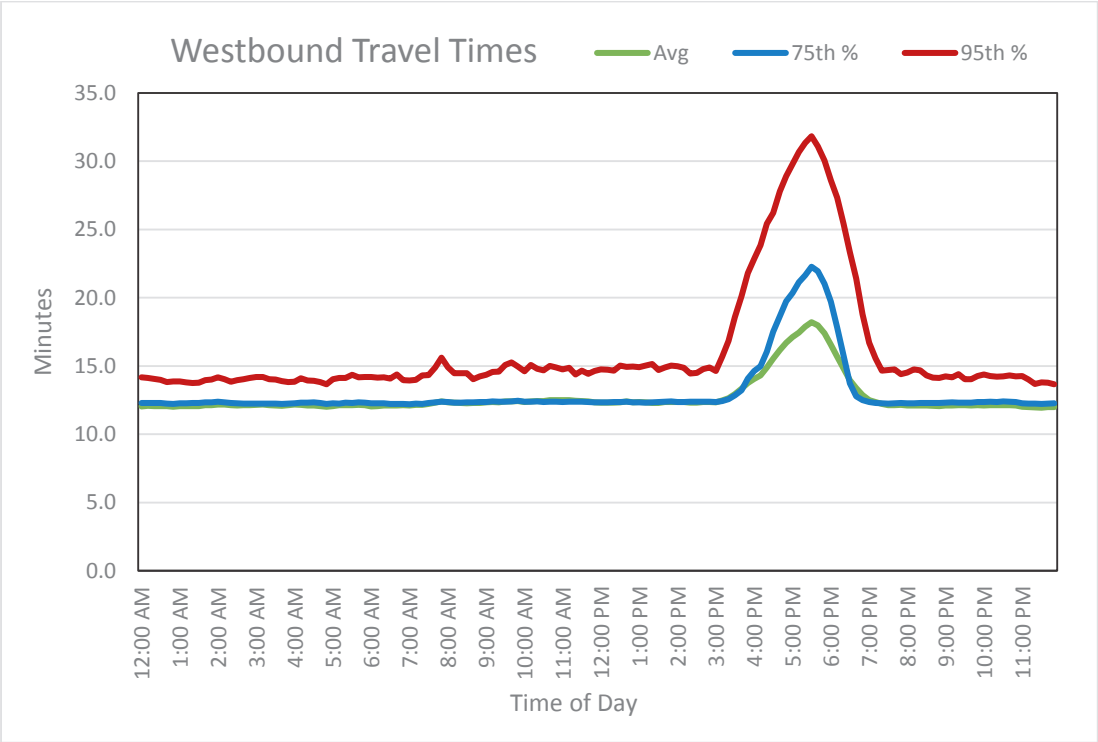
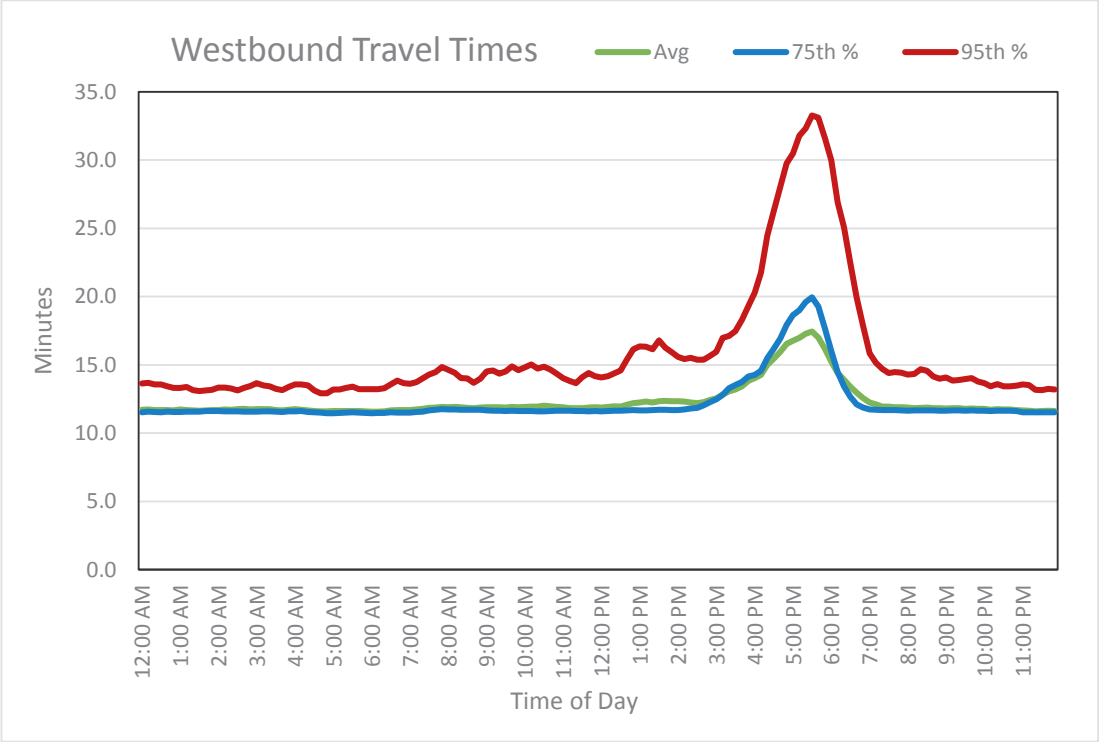



**Figure 27.** Segment 2- I-94 between M-39 and M-10/John C Lodge Fwy

## Segment 2

Travel time (minutes) for I-94 between M-39/Southfield Fwy/Exit 204 and M-10/John C Lodge Fwy/Exit 215



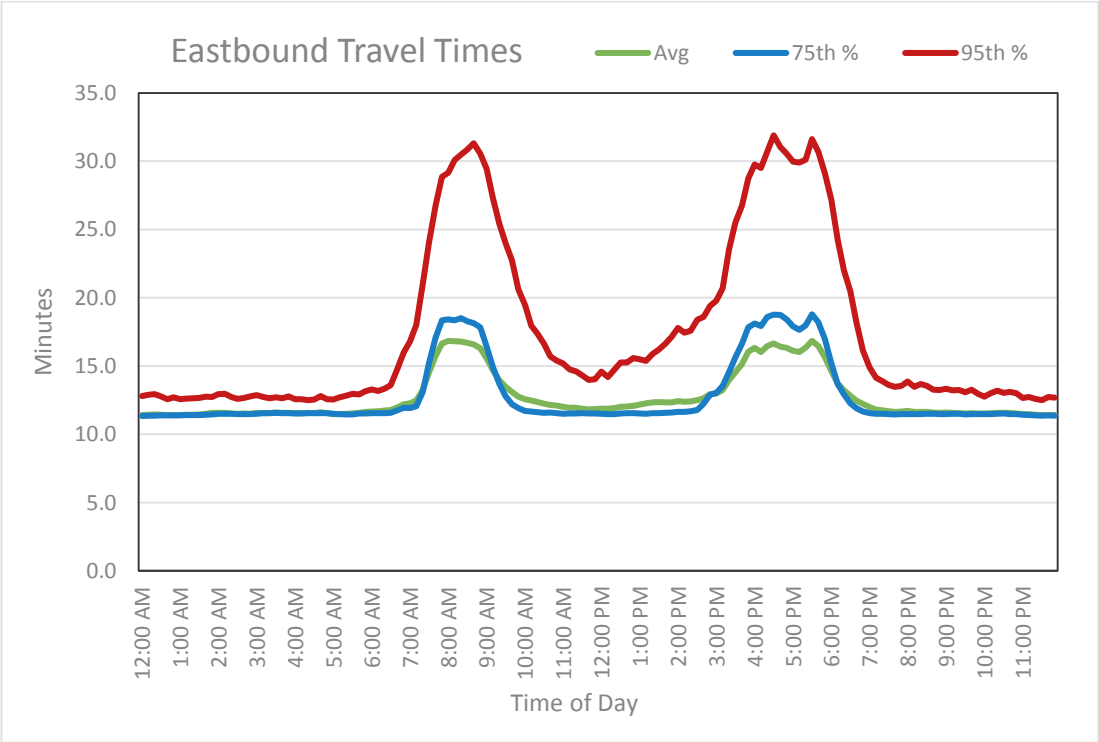
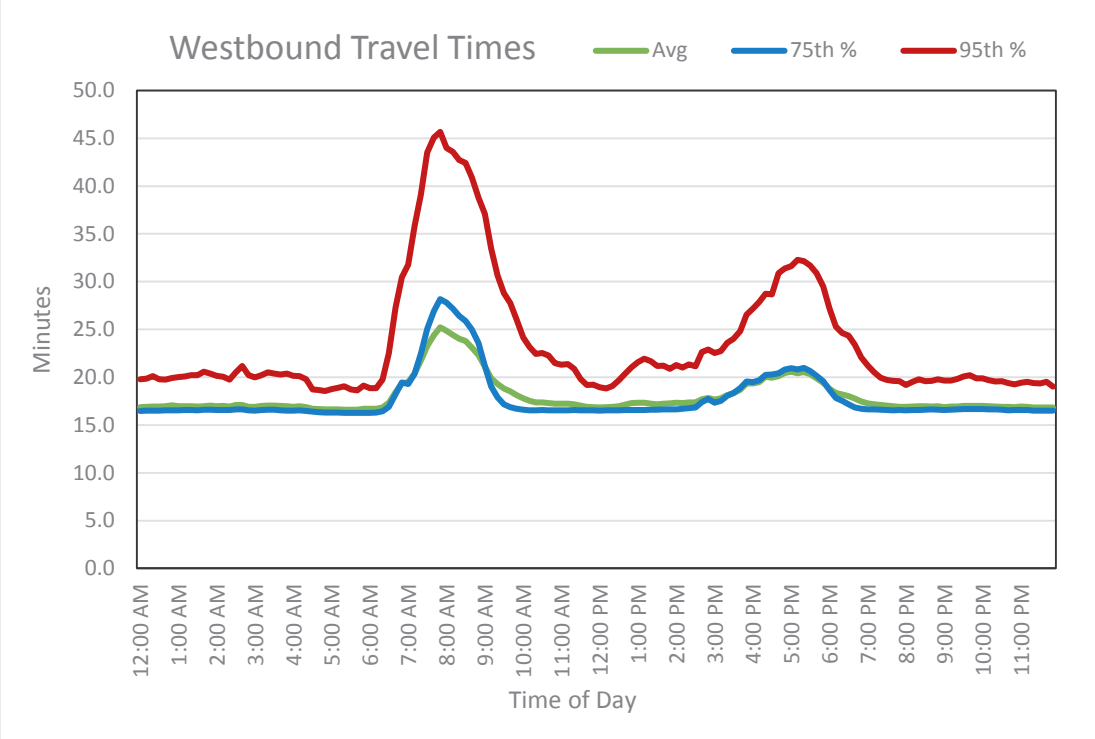



**Figure 28.** Segment 3- I-96 between I-696 and M-10/John C Lodge Fwy

Segment 3

Travel time (minutes) for I-94 between I-696/11 Mile Rd/Exit 229 and M-10/John C Lodge Fwy/Exit 215



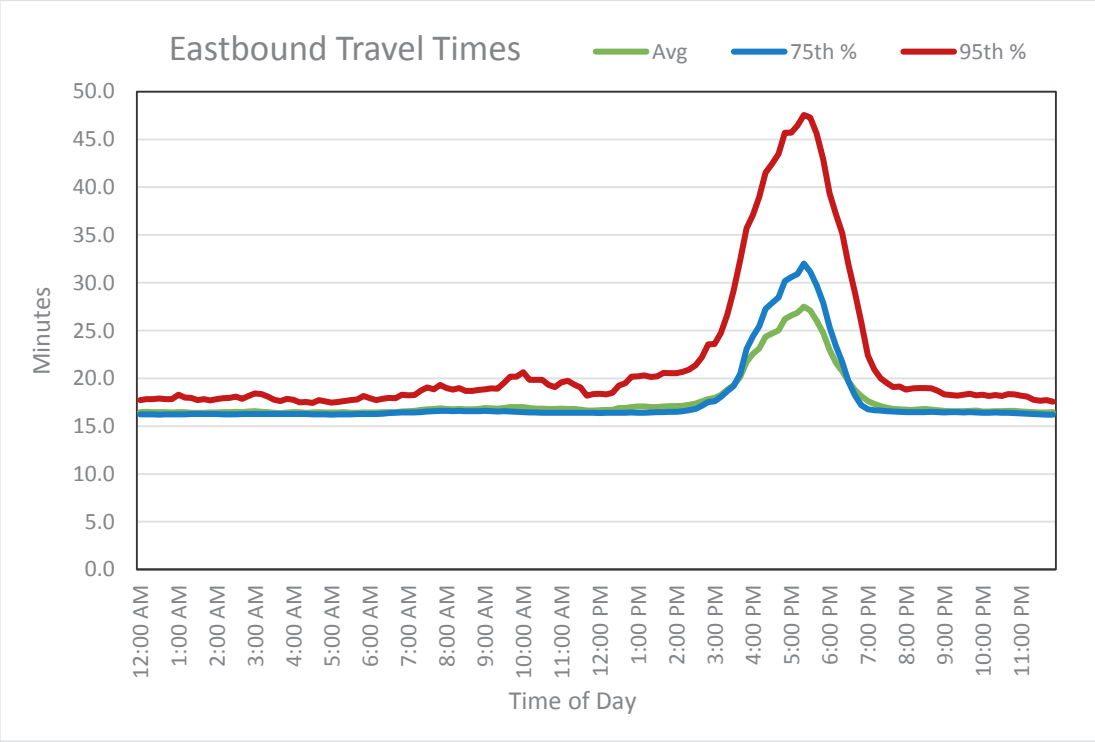
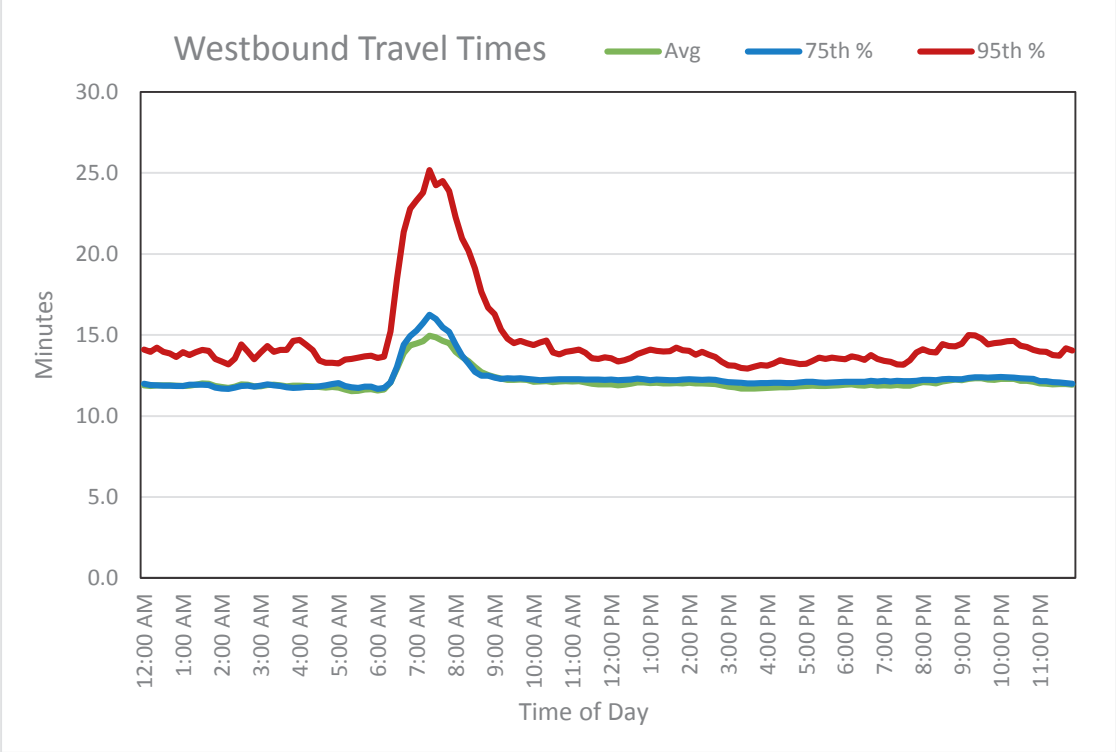
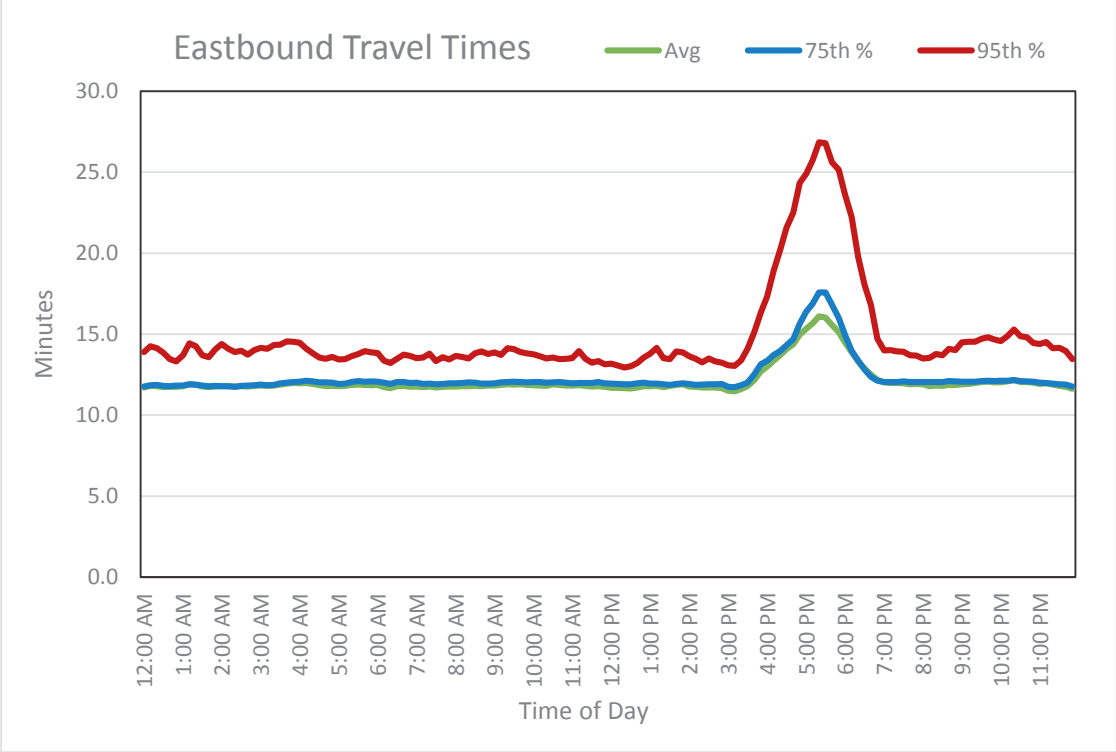



**Figure 29.** Segment 4- I-94 between I-696 and William P Rosso Hwy

## Segment 4

### Travel time (minutes) for I-94 between I-696/11 Mile Rd/Exit 229 and William P Rosso Hwy/Exit 240



Chapter 4

# Corridor


Interstate 69: **St. Clair**

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Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 30.** Oakland County I-96 Corridor total user delay cost

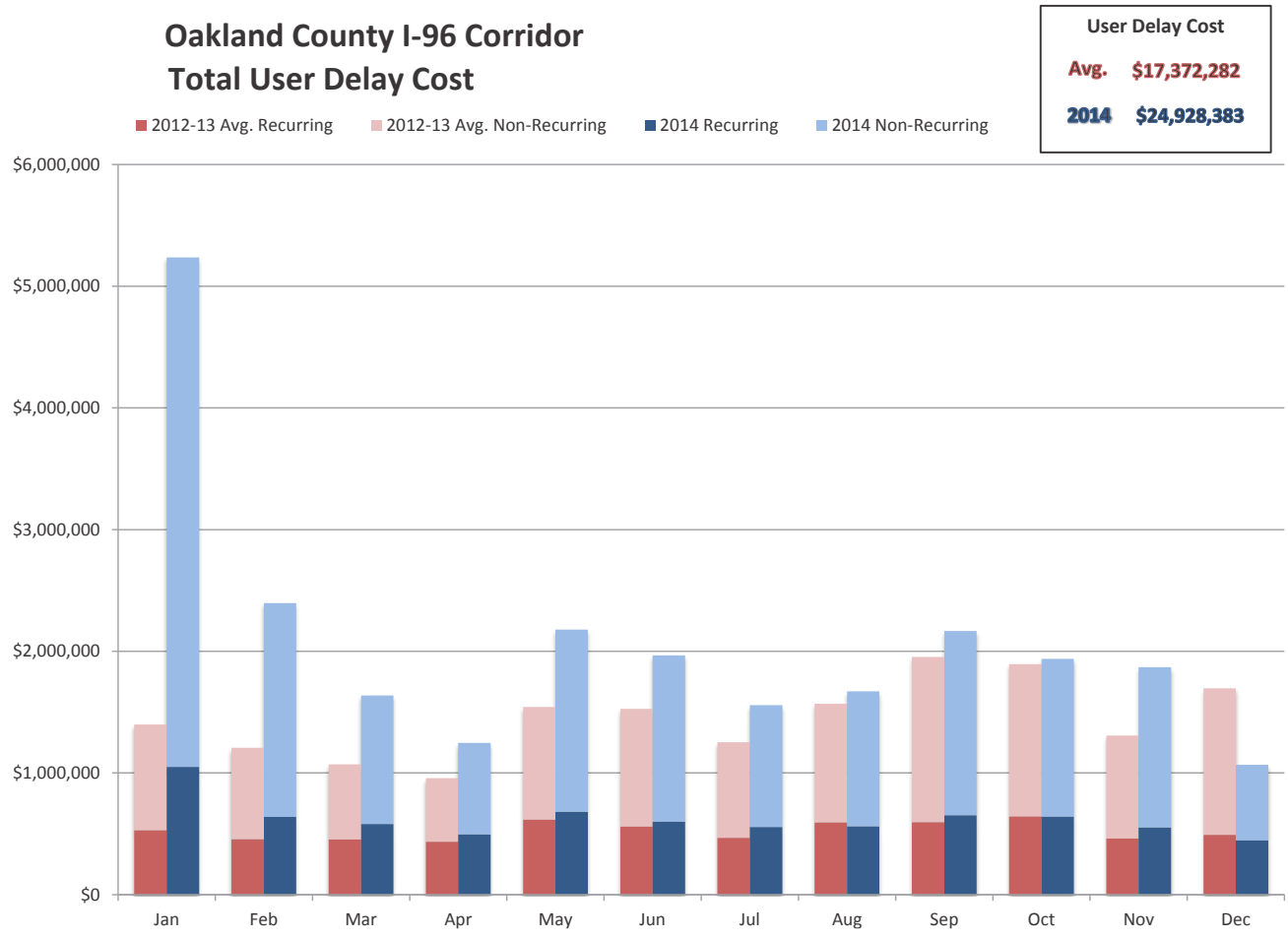


**Figure 31.** Taylor TSC I-96 Corridor total user delay cost

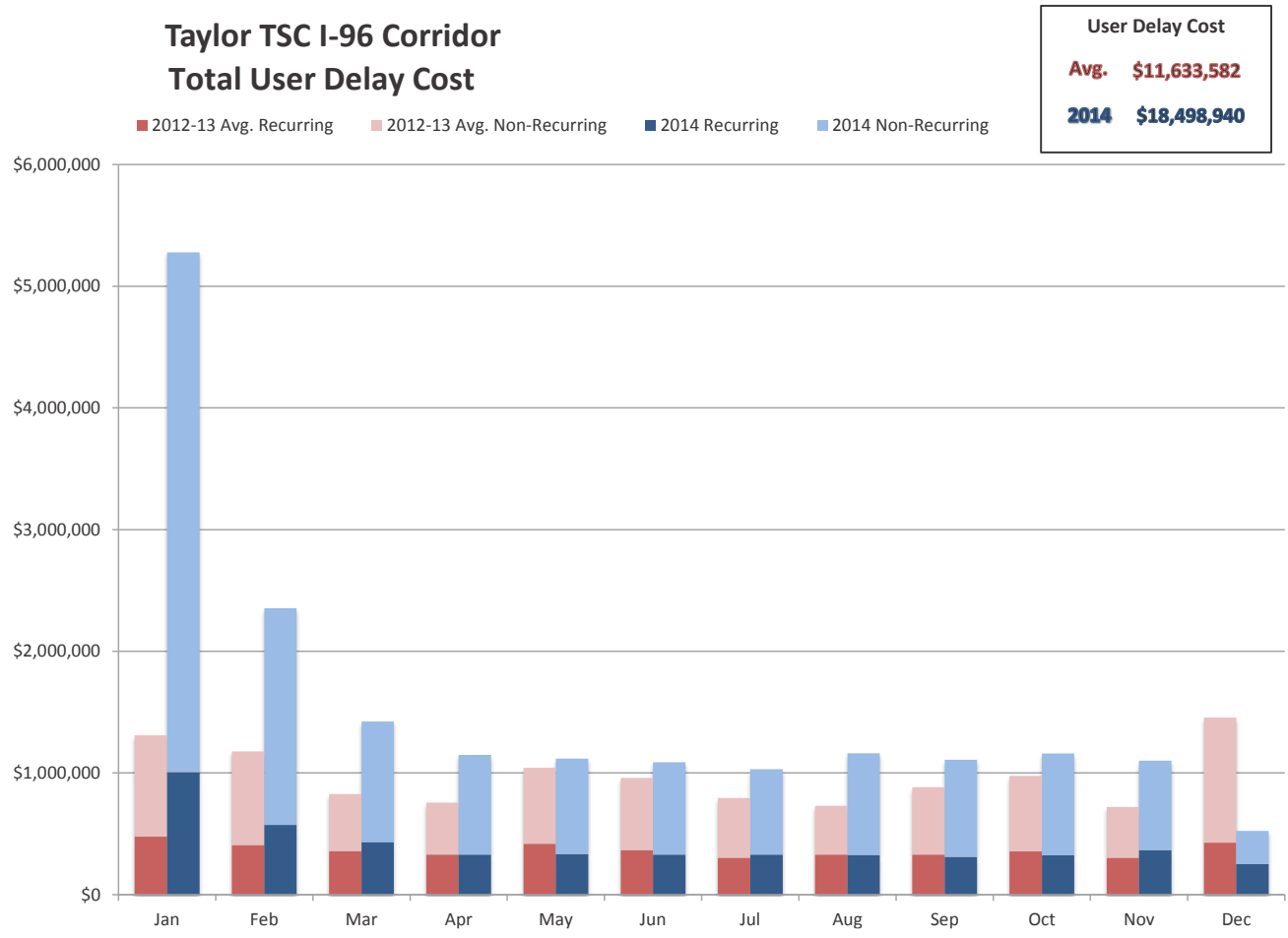


**Figure 32.** Detroit TSC I-96 Corridor total user delay cost

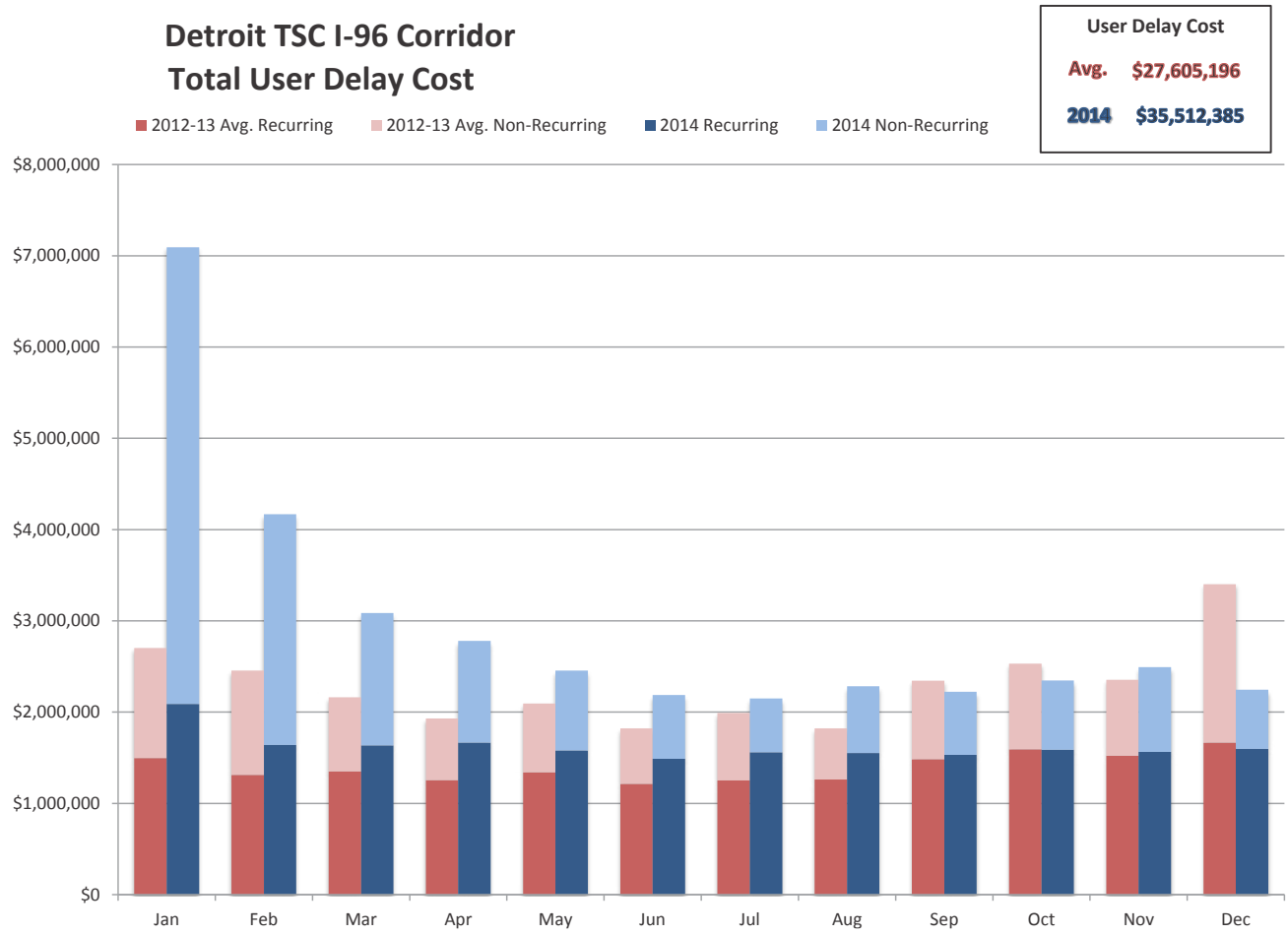


Figure 33. Metro Region I-96 eastbound

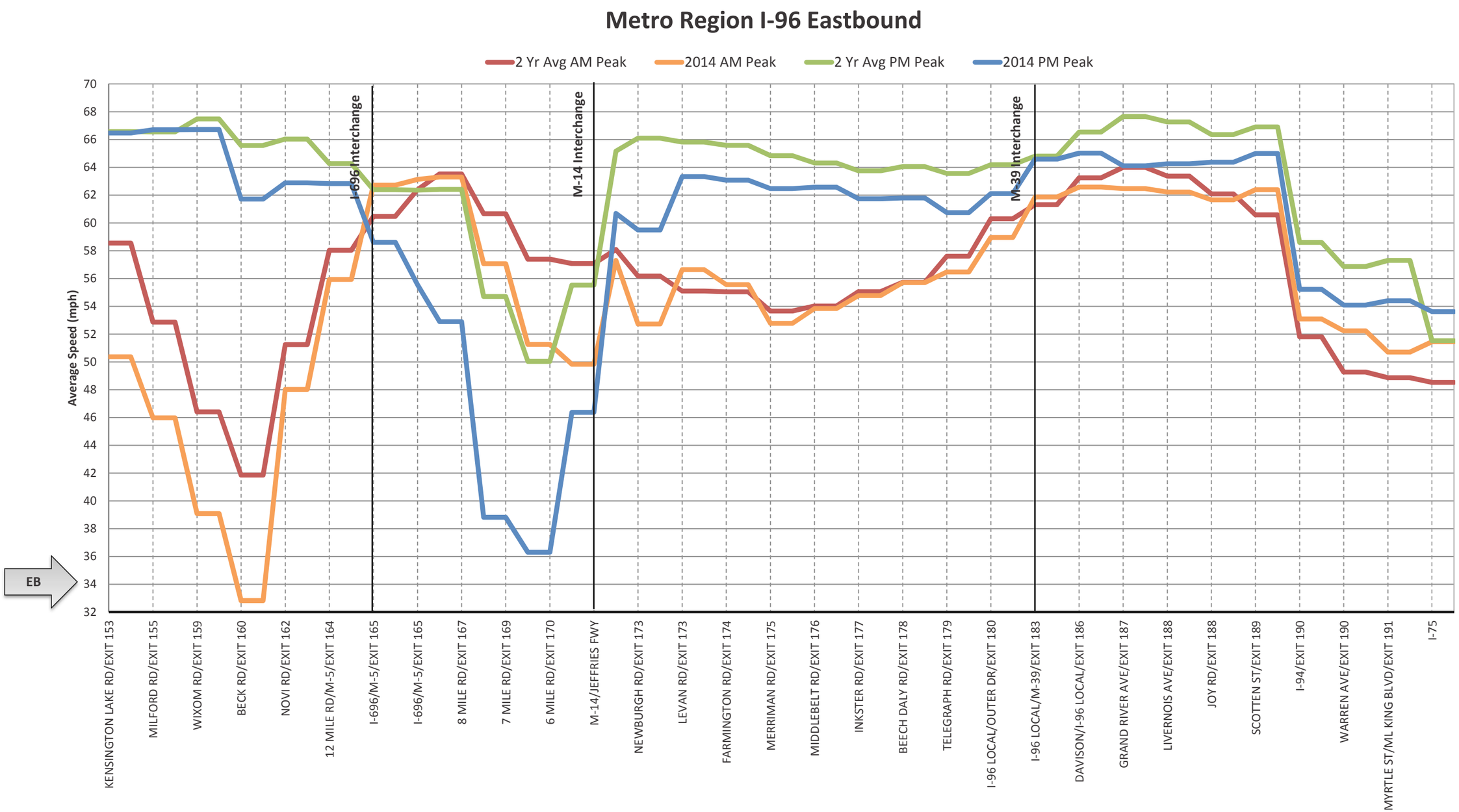


Figure 34. Metro Region I-96 westbound

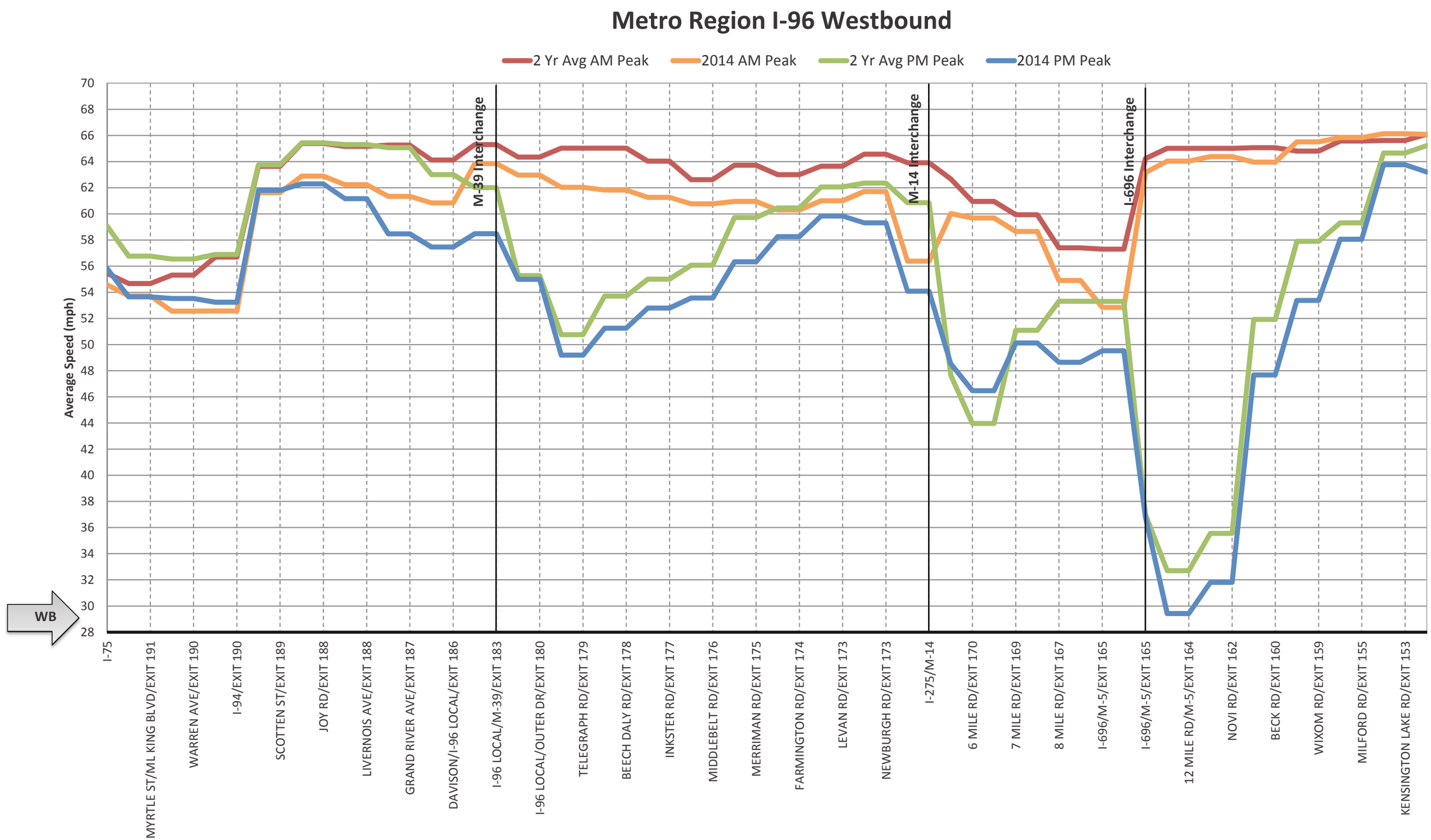


Figure 35. Metro Region I-96 local eastbound

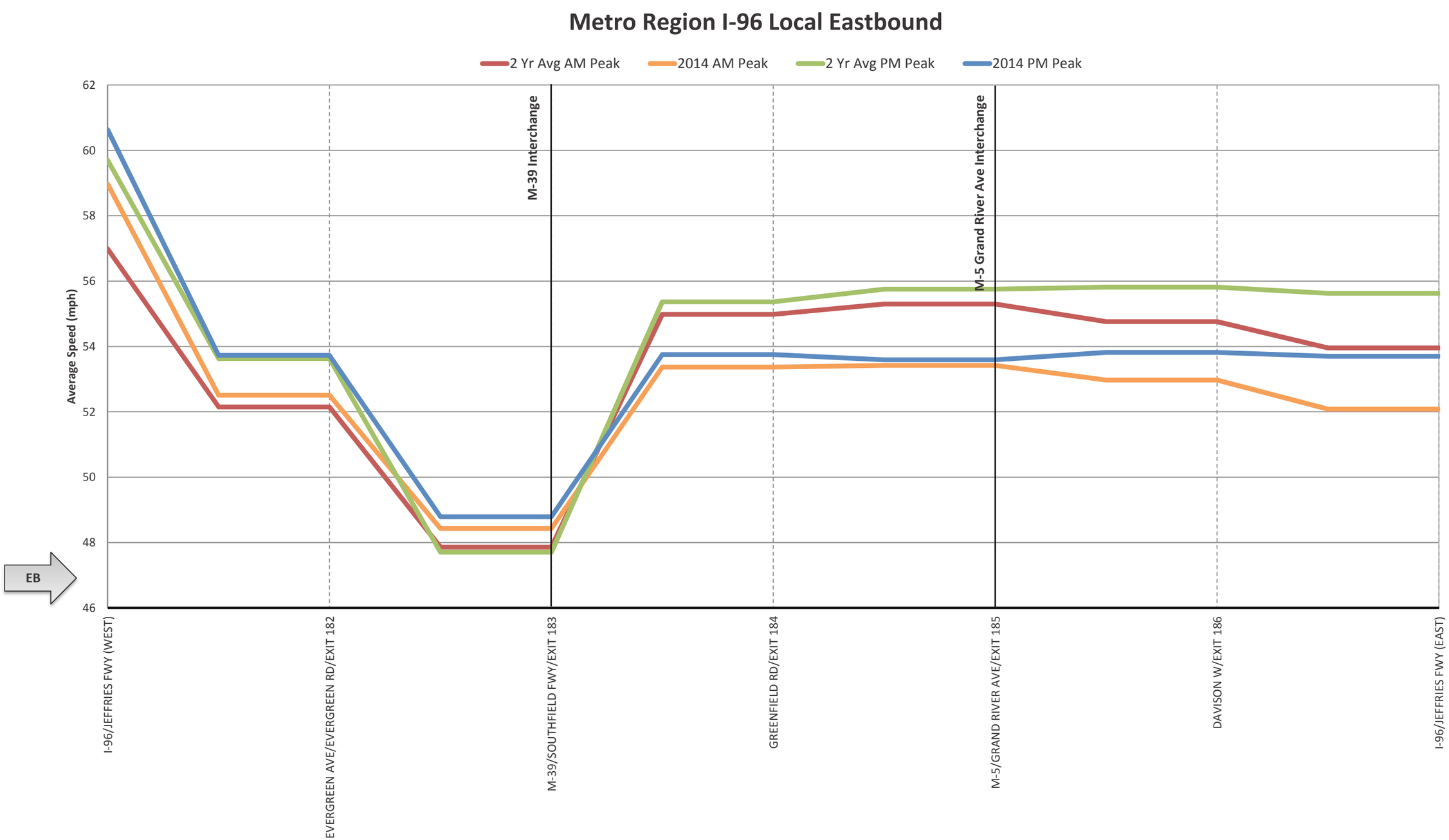
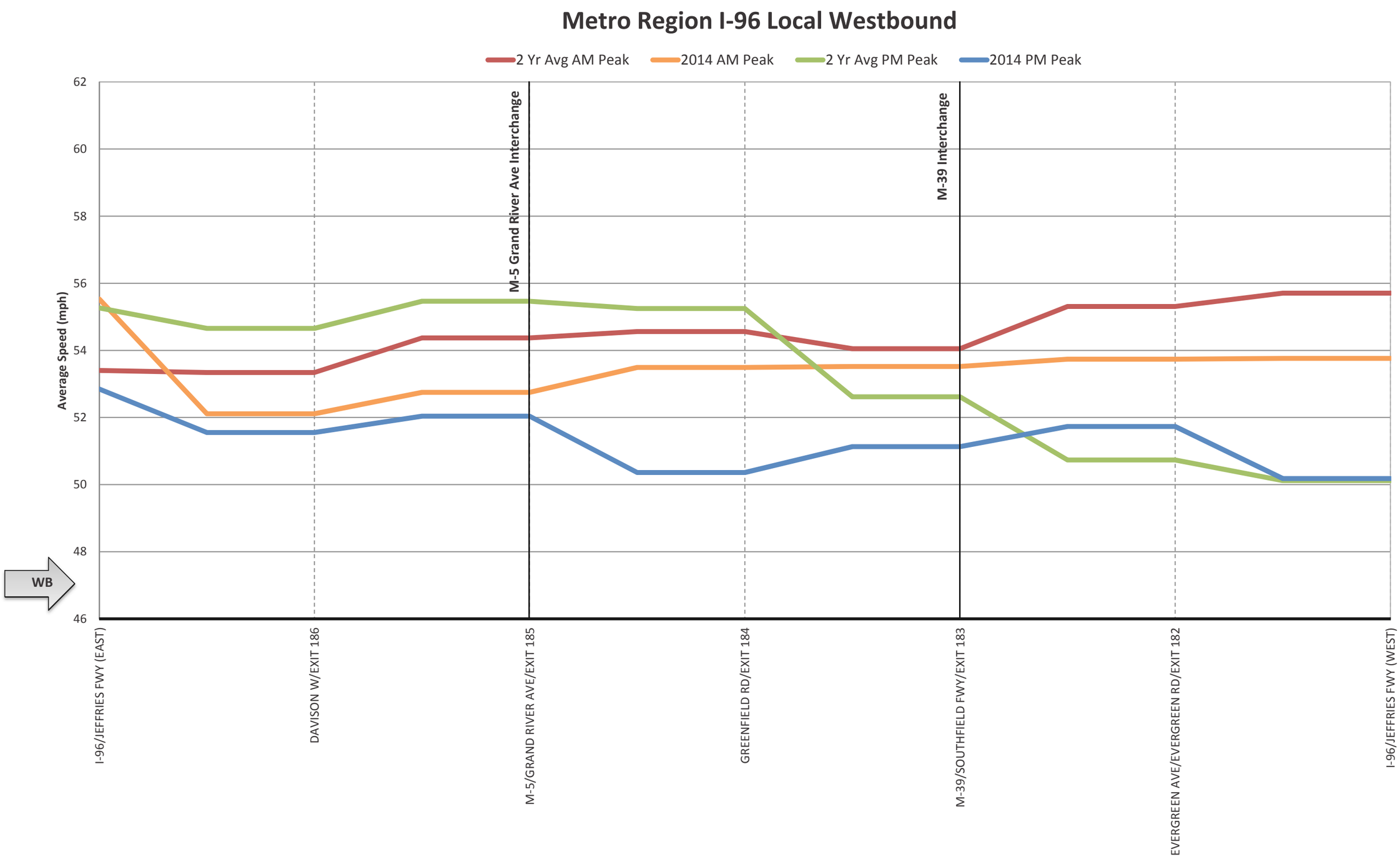


Figure 36. Metro Region I-96 local westbound



# Travel Time Reliability

Figure 37. Travel time reliability I-96

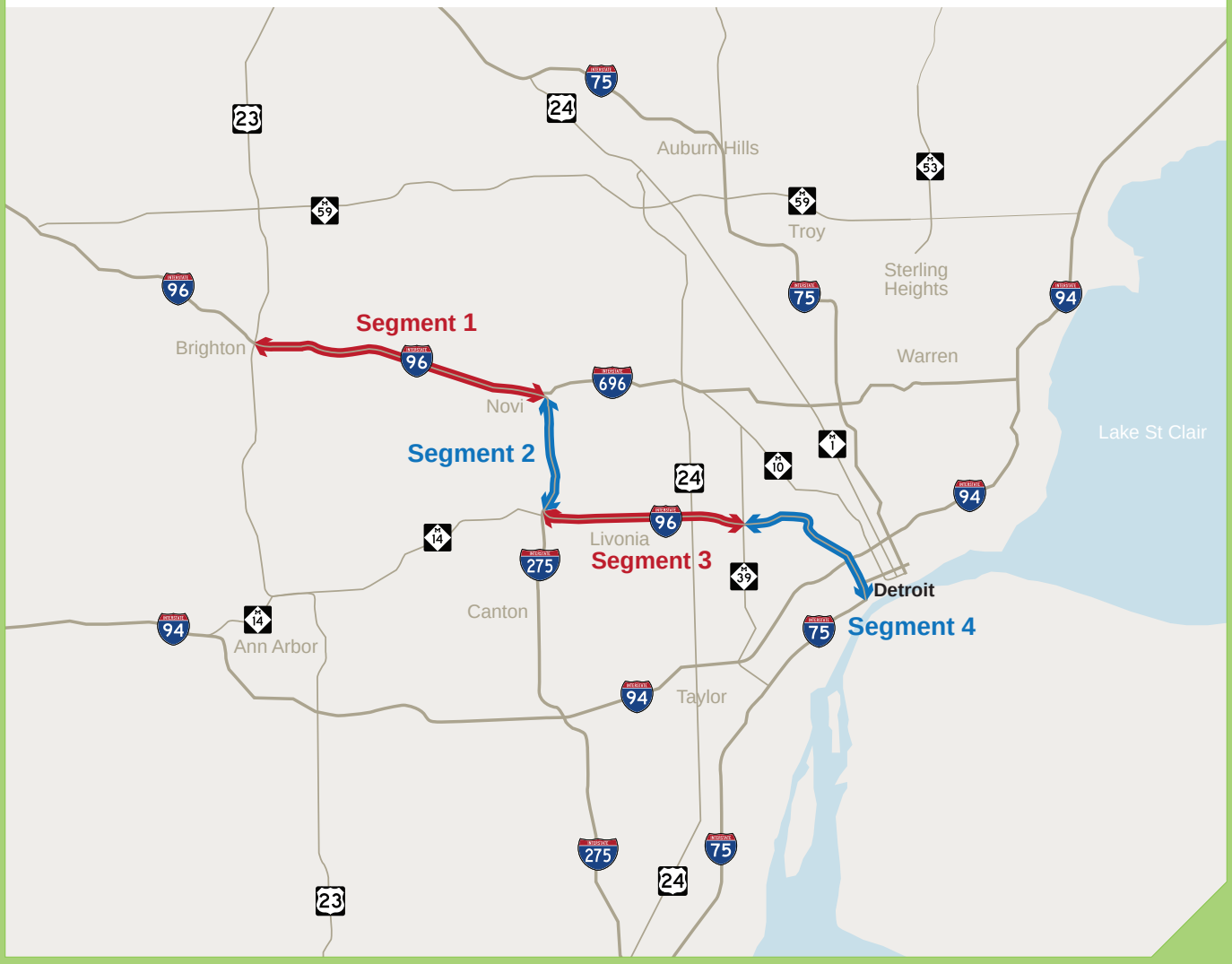
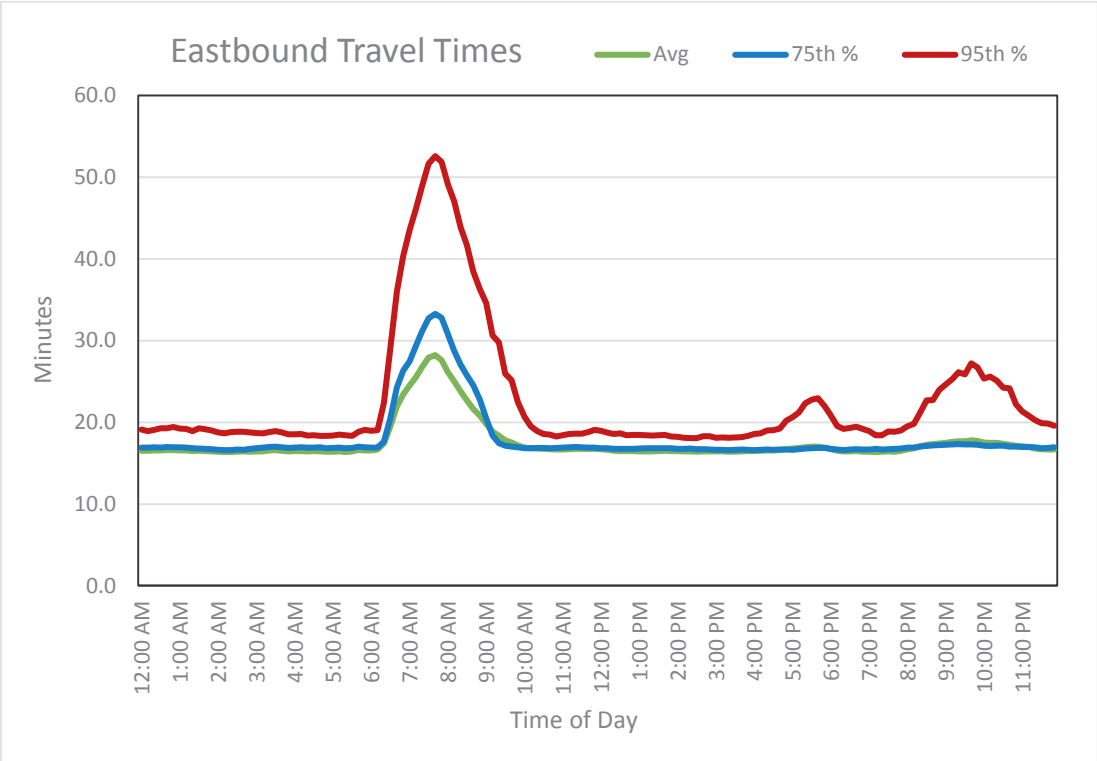


**Figure 38.** Segment 1- I-96 between US-23 and I-696/M-5

## Segment 1

Travel time (minutes) for I-96 between US-23/Exit 148 and I-696/M-5/Exit 165



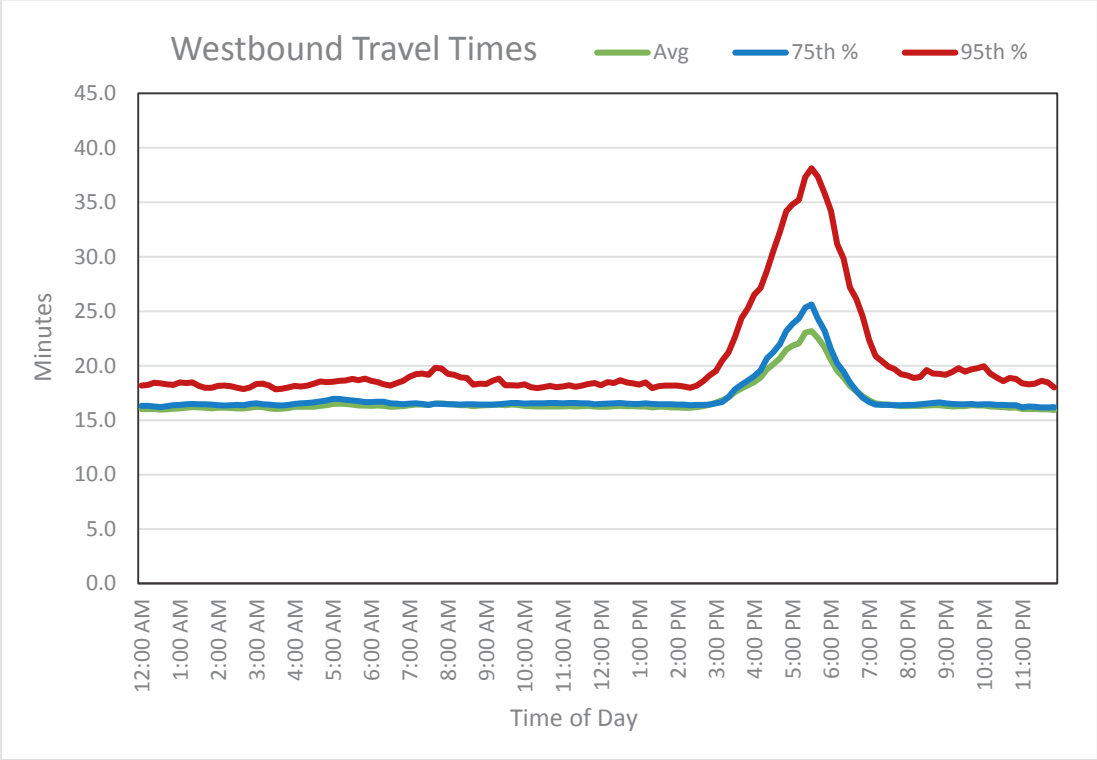
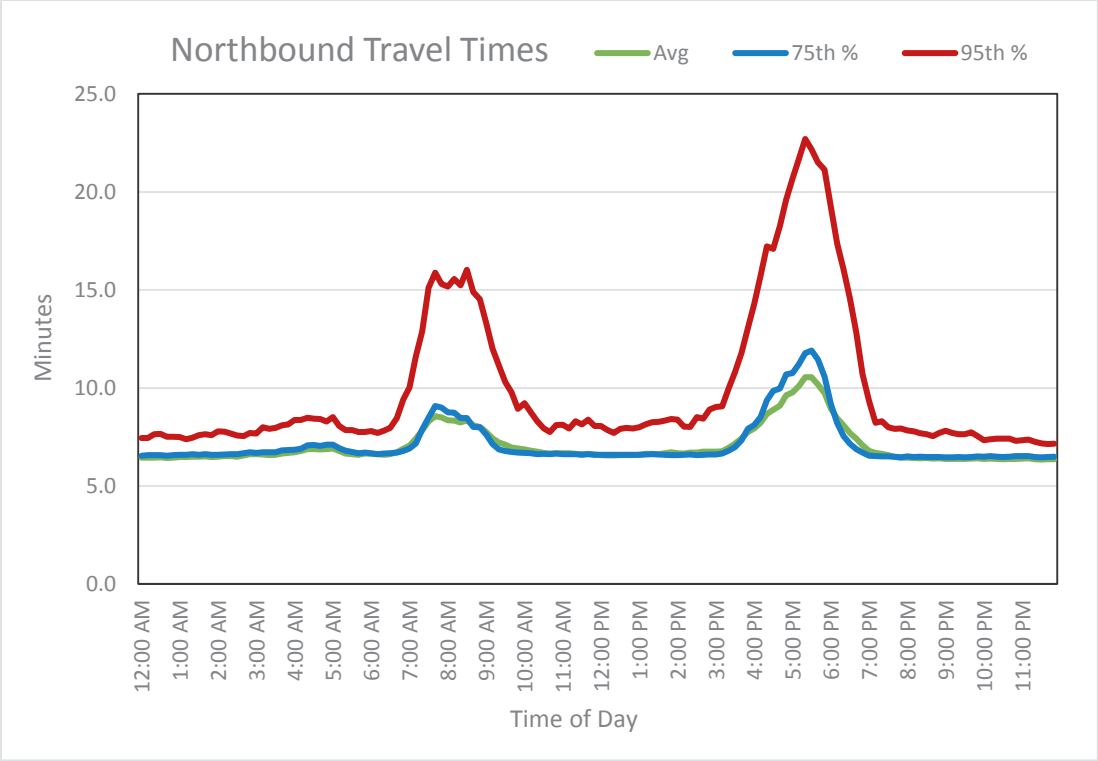



**Figure 39.** Segment 2- I-96/I-275

## Segment 2

Travel time (minutes) for I-96/I-275



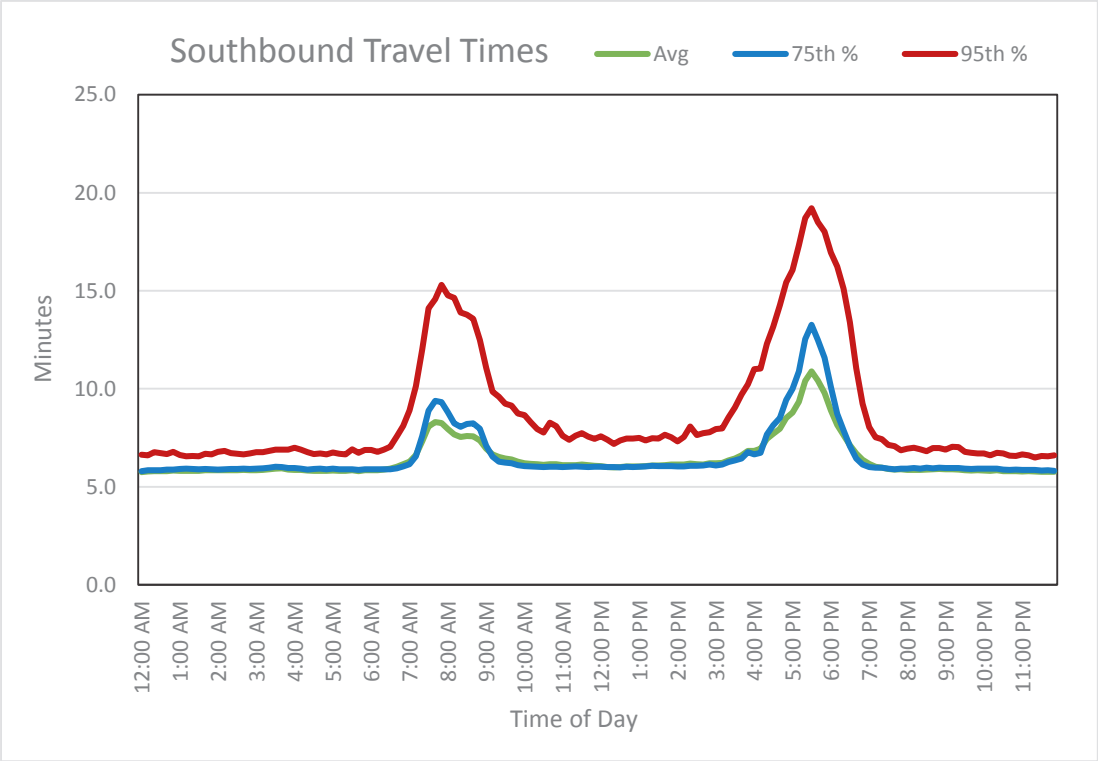
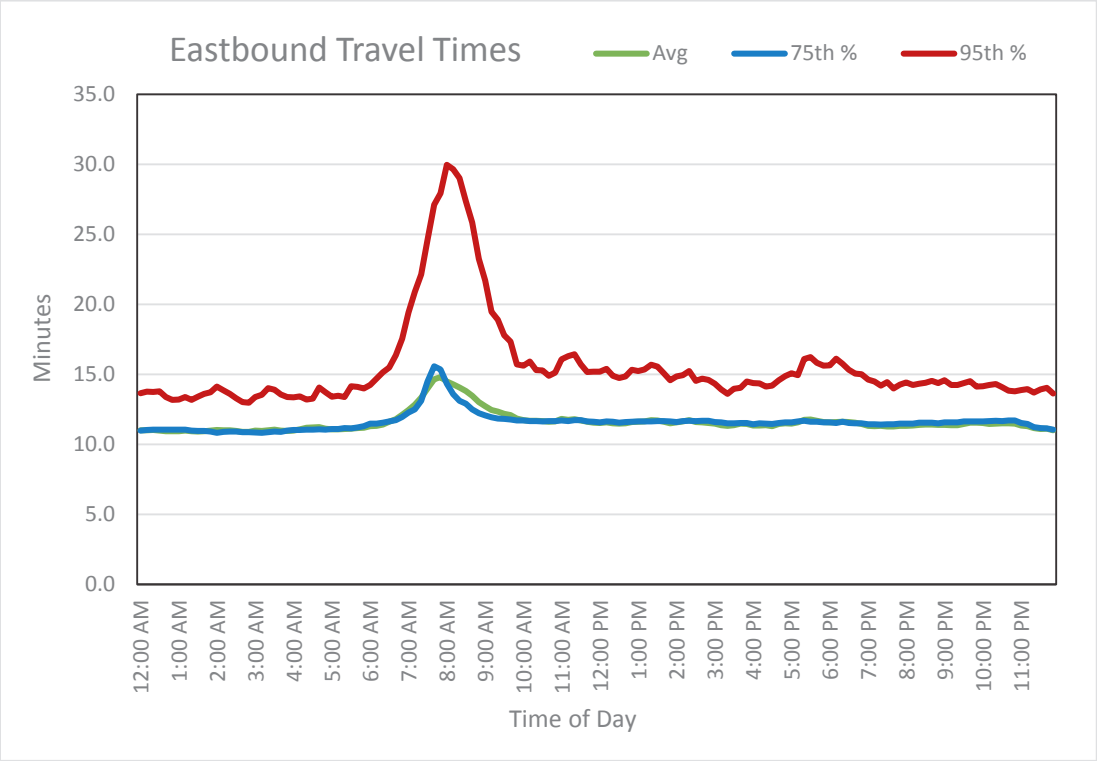



**Figure 40.** Segment 3- I96/Local/M-39 and I-275/M-14

## Segment 3

Travel time (minutes) for I-96 between I-96/Local/M-39/Exit 183 and I-275/M-14



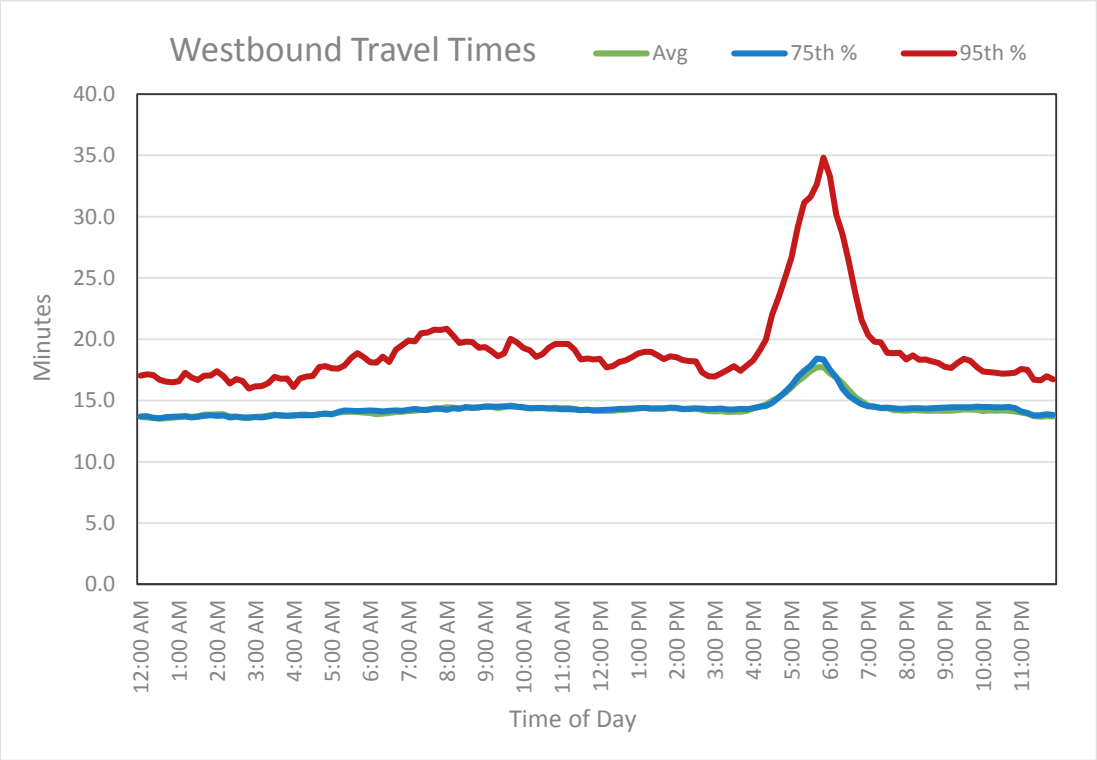
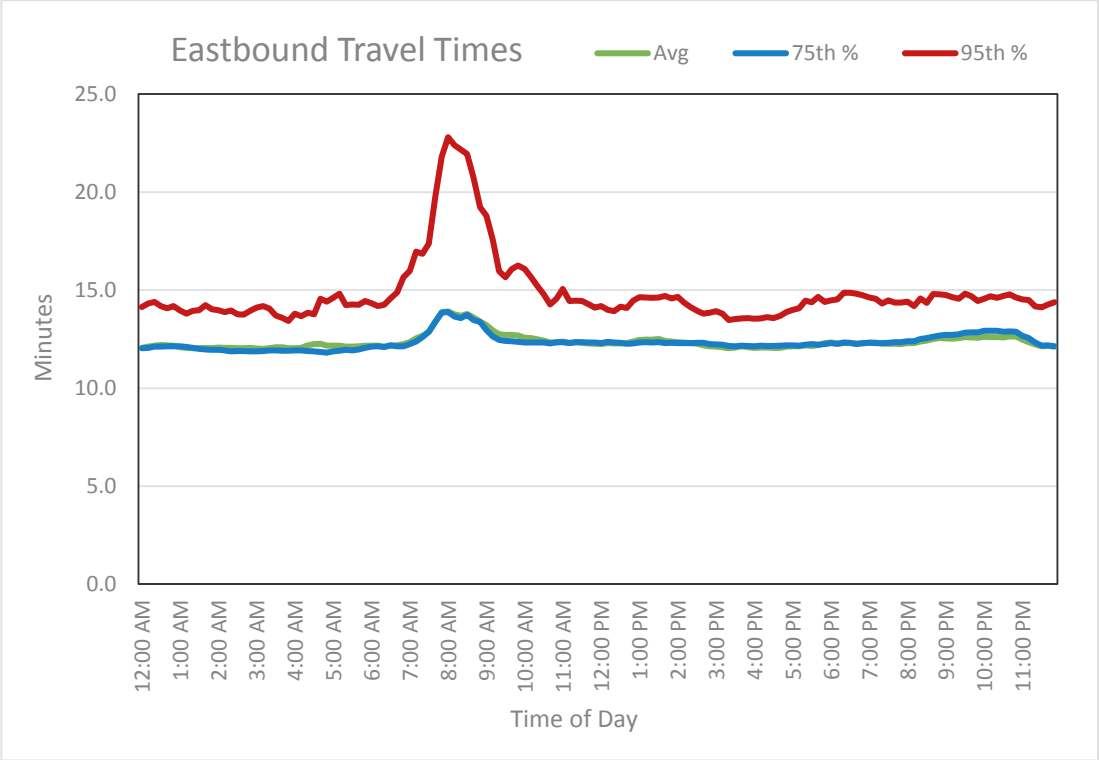
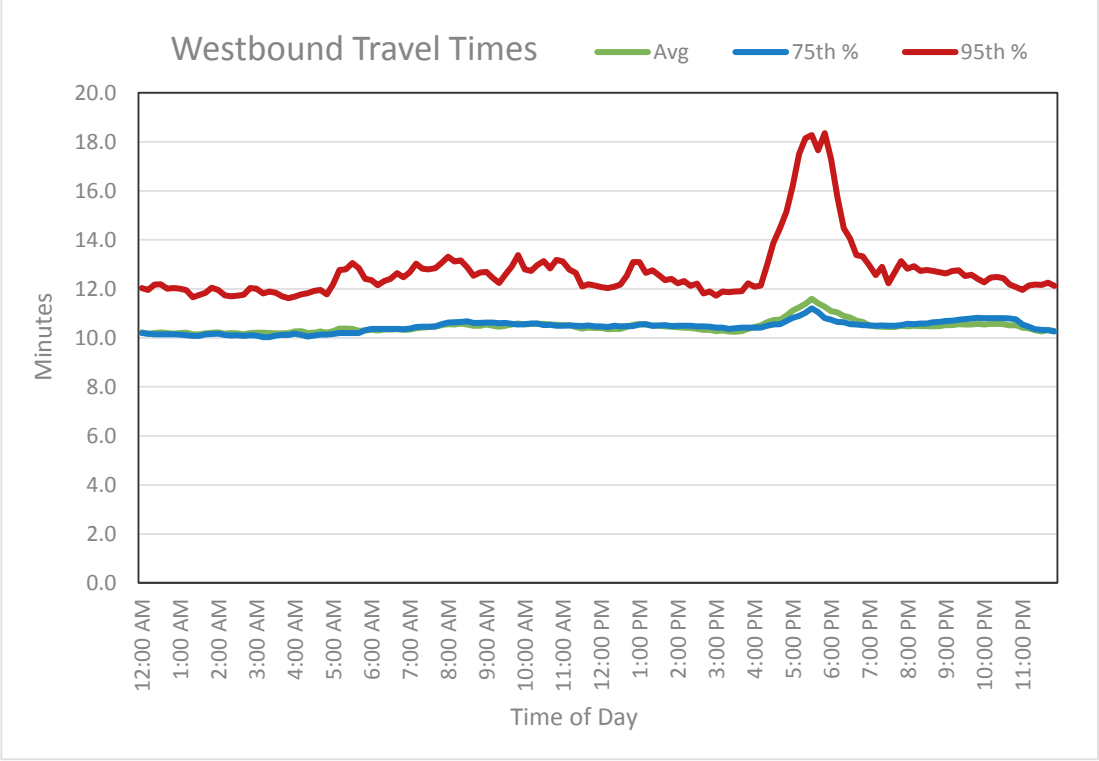



**Figure 41.** Segment 4- I-96 between I-75 and I-96/Local/M-39

## Segment 4

### Travel time (minutes) for I-96 between I-75 and I-96/Local/M-39/Exit 183



Chapter 4

# Corridor


Interstate 69: **St. Clair**

Interstate 75: **Taylor, Detroit 55mph, Detroit 70mph, and Oakland**

Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 42.** Taylor TSC I-275 Corridor total user delay cost

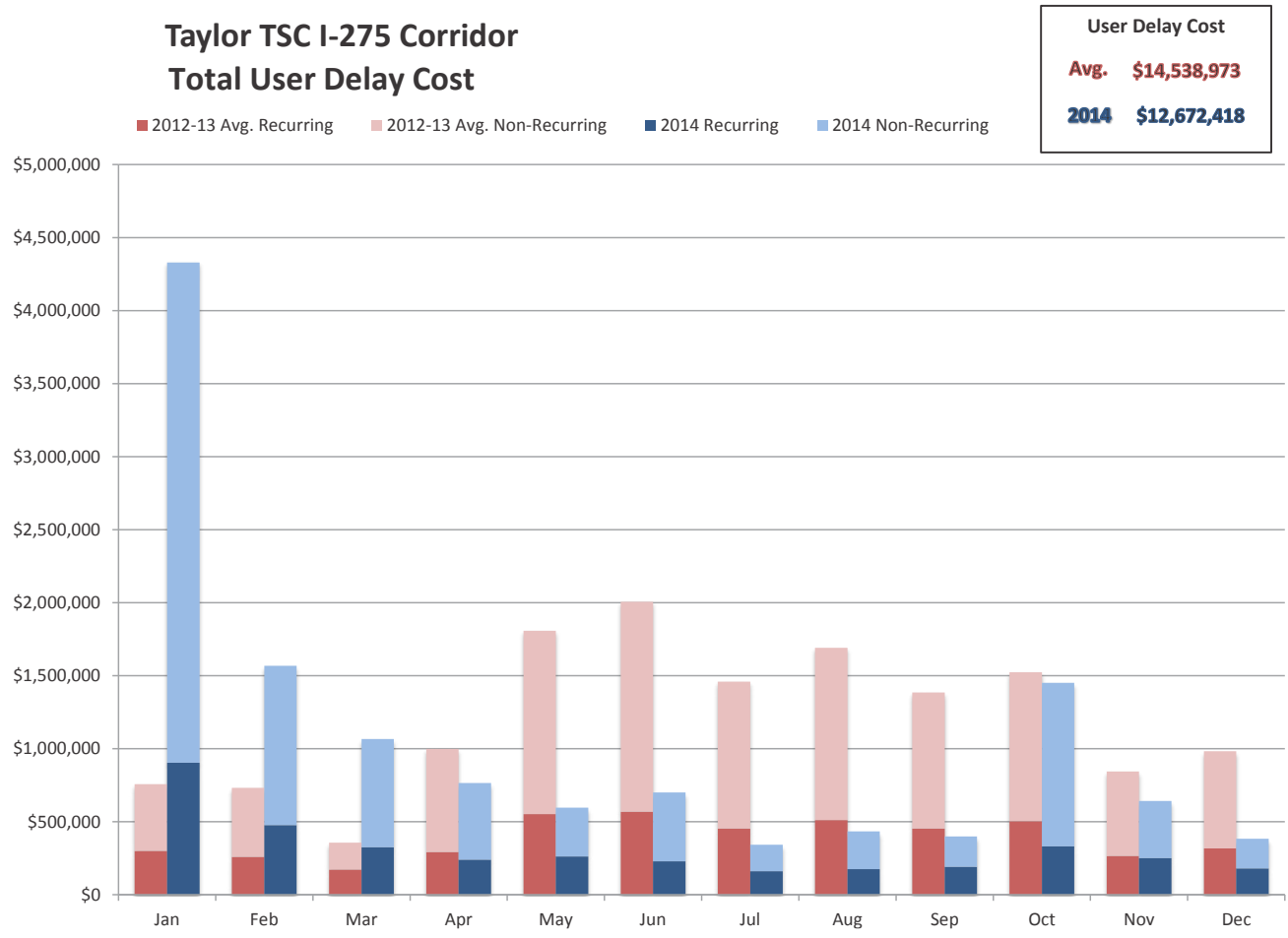


Figure 43. Metro Region I-275 northbound

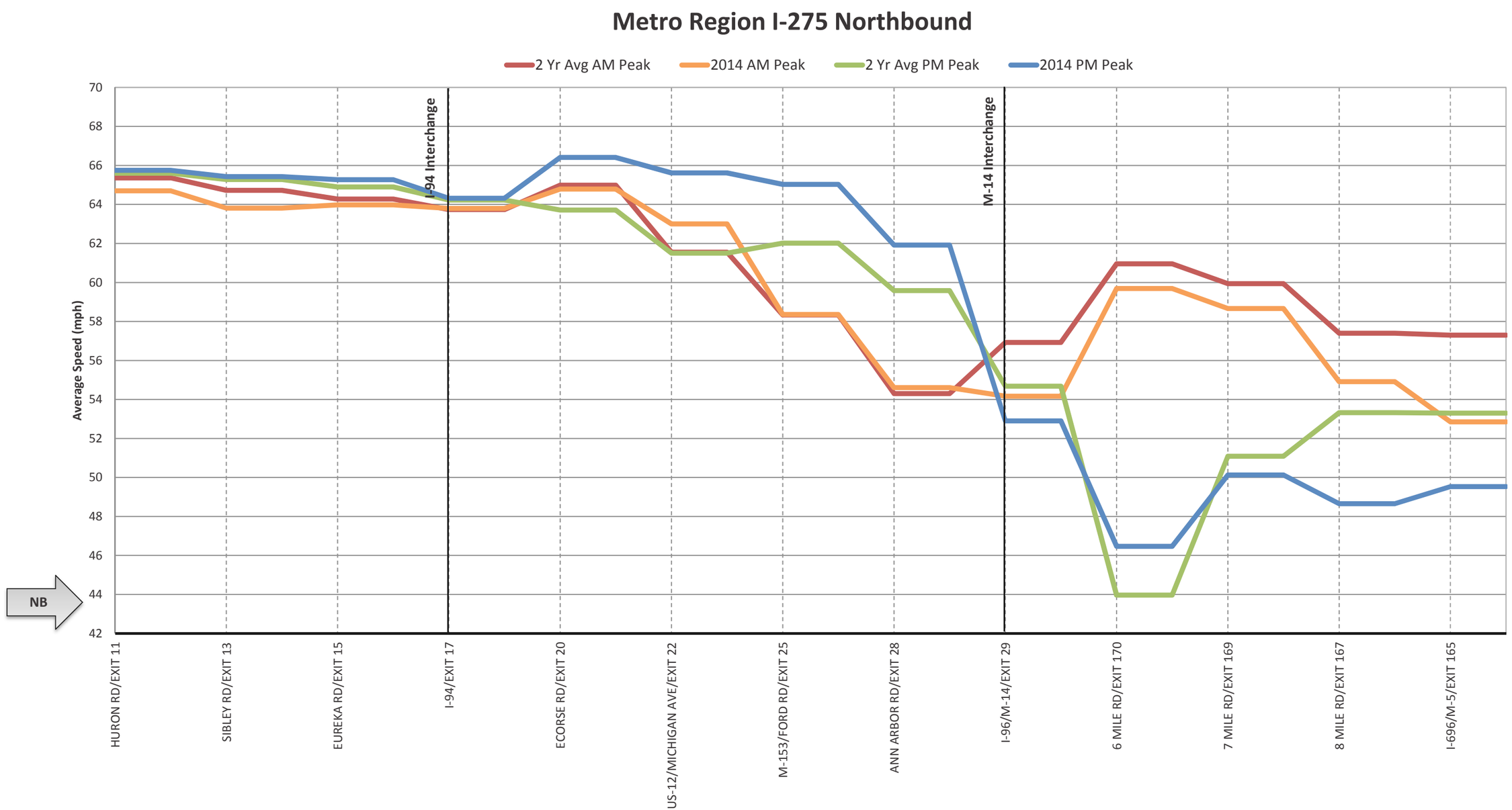
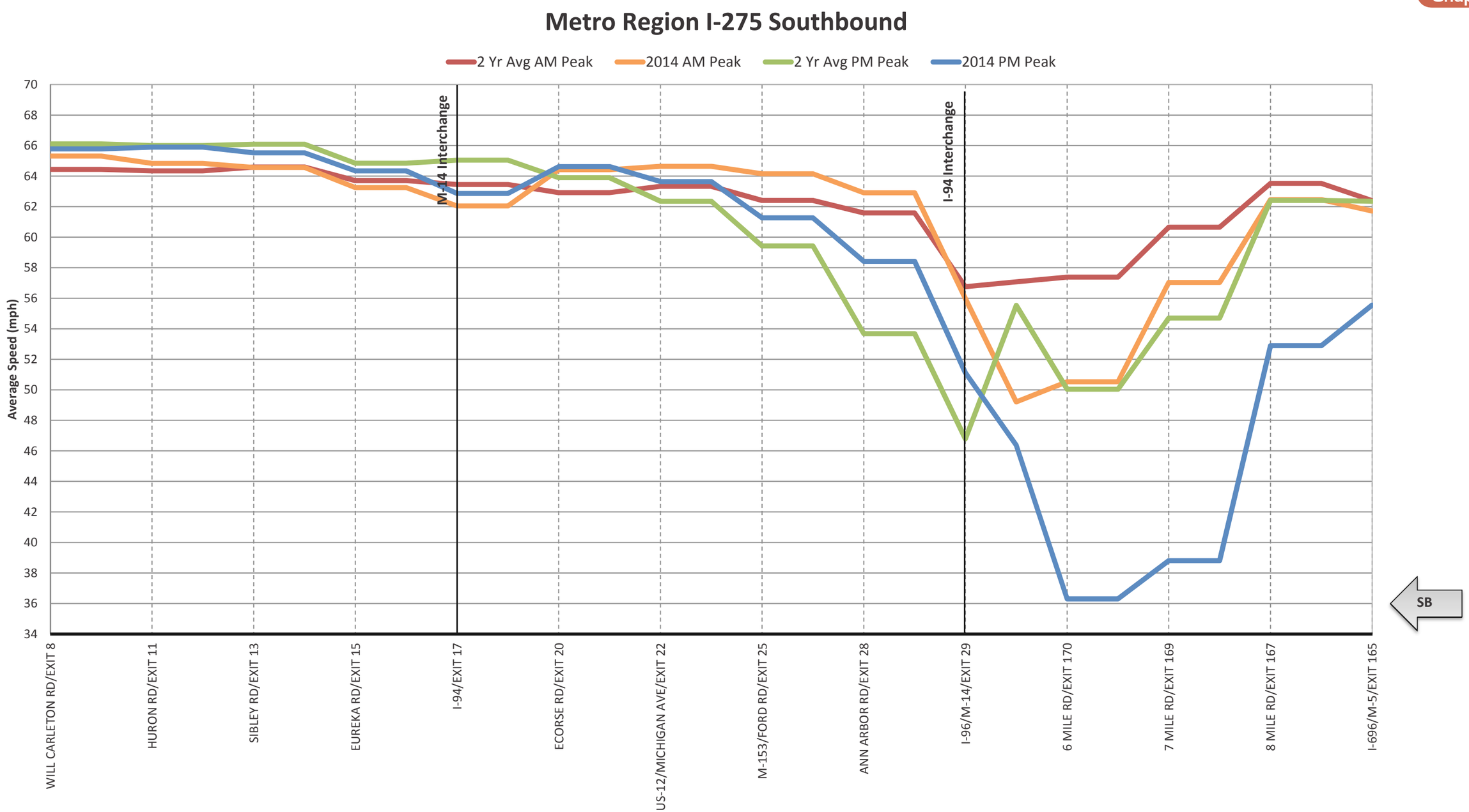


Figure 44. Metro Region I-275 southbound



# Travel Time Reliability

Figure 45. Travel time reliability I-275

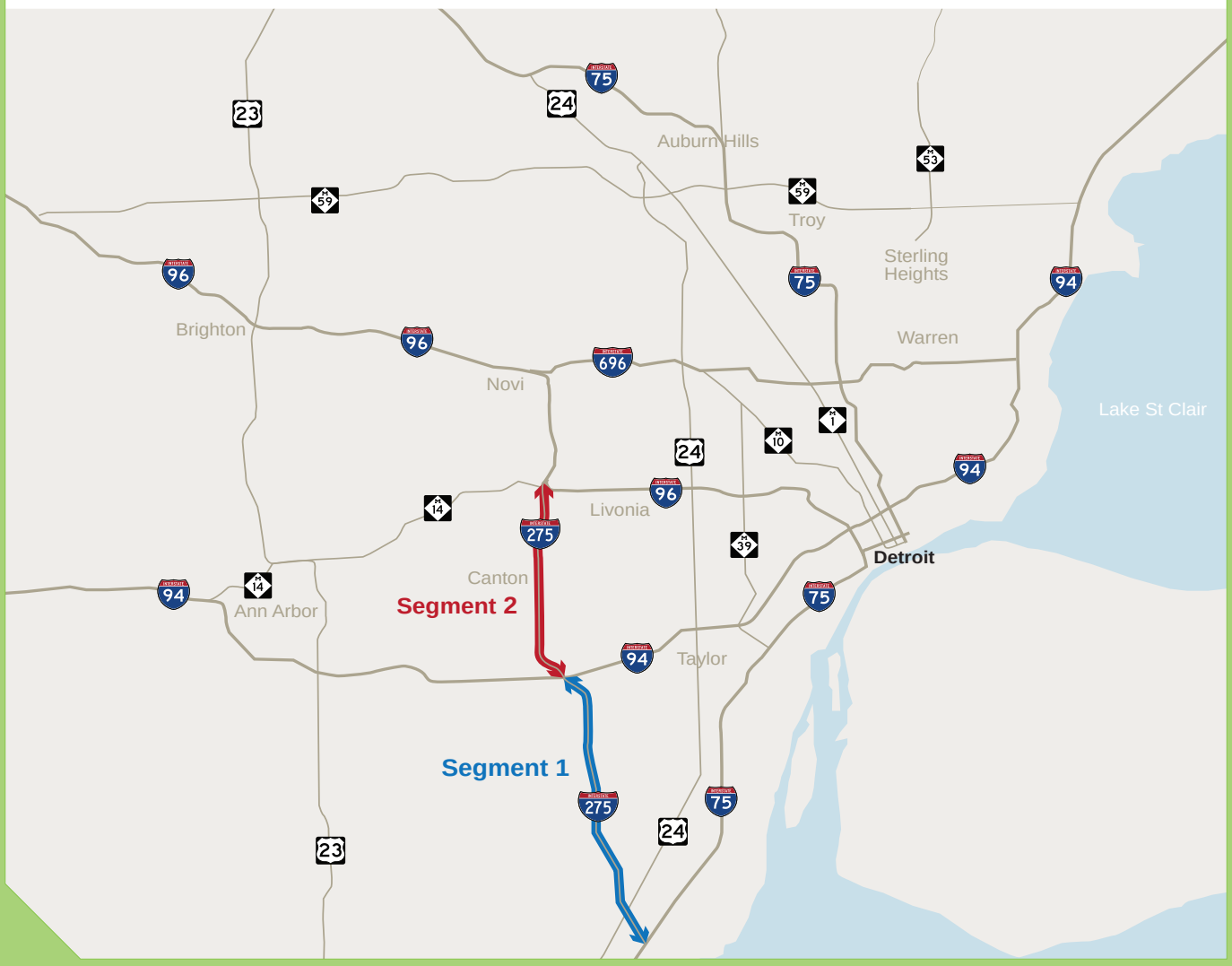
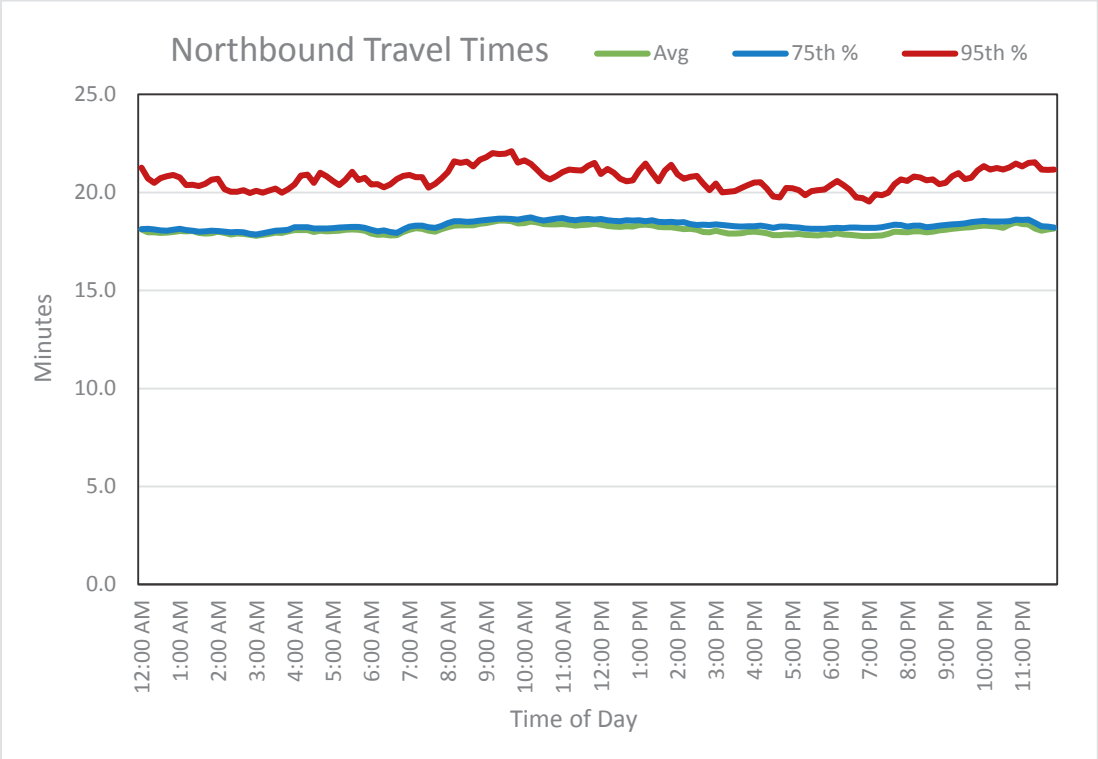


**Figure 46.** Segment 1- I-275 between I-75 and I-94

Segment 1

Travel time (minutes) for I-275 between I-75 and I-94/Exit 17



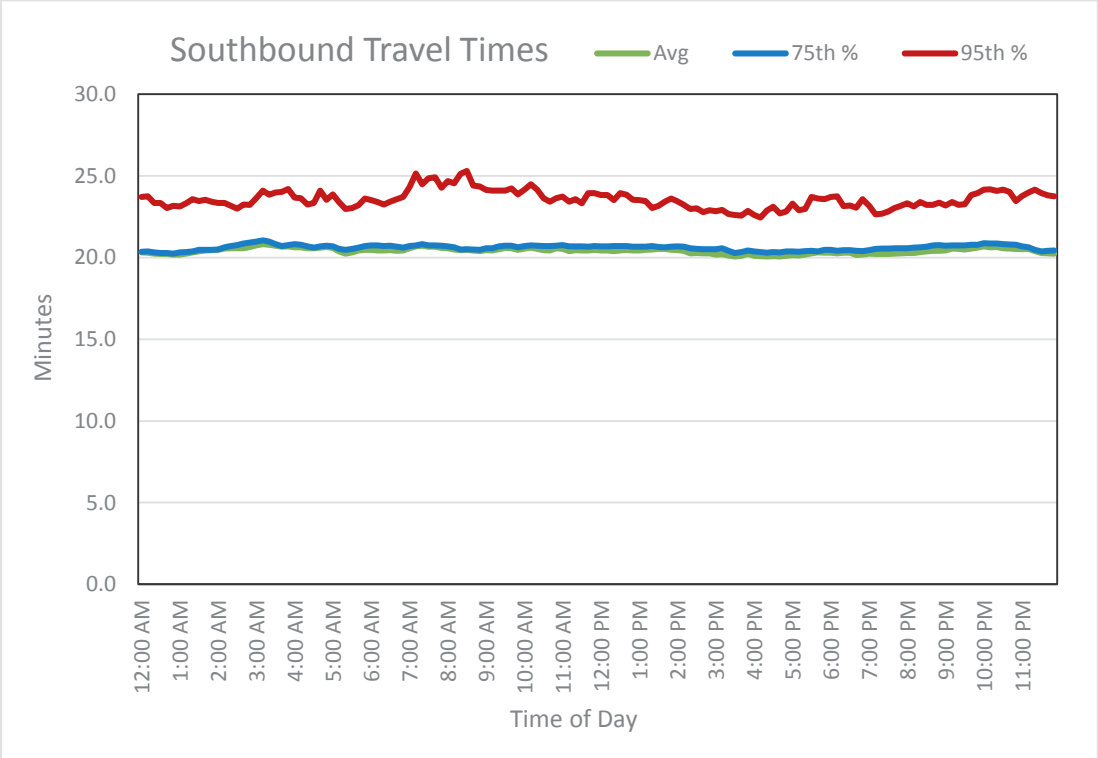
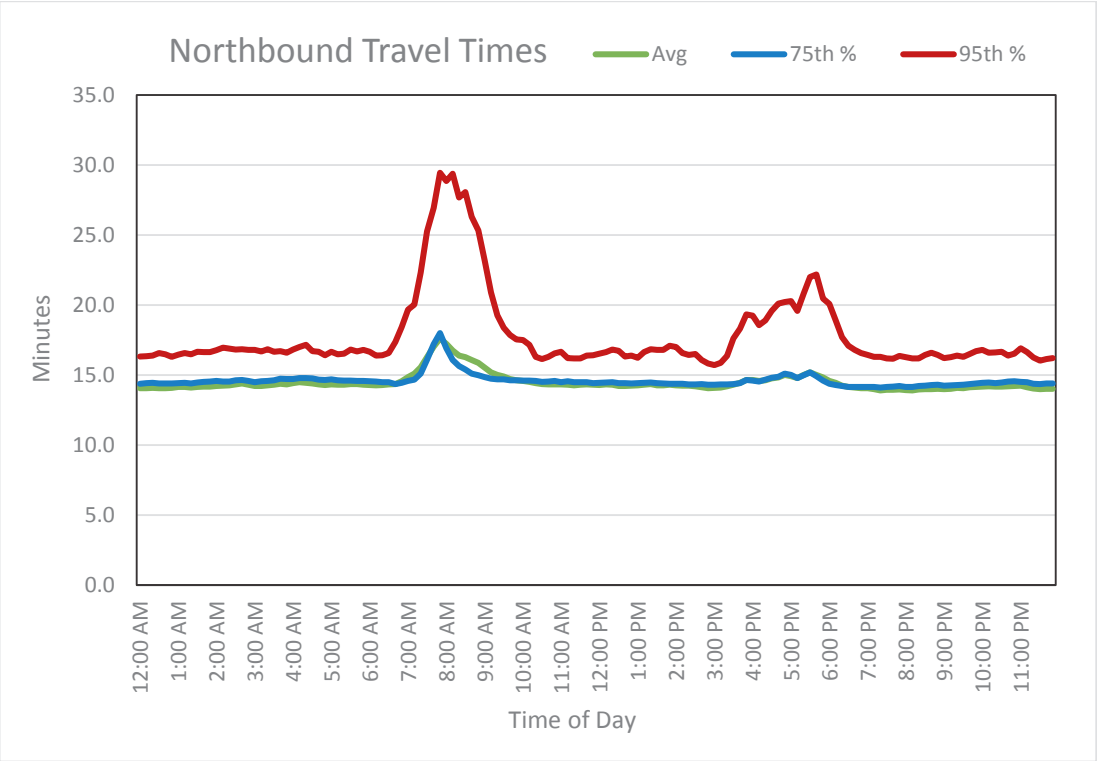
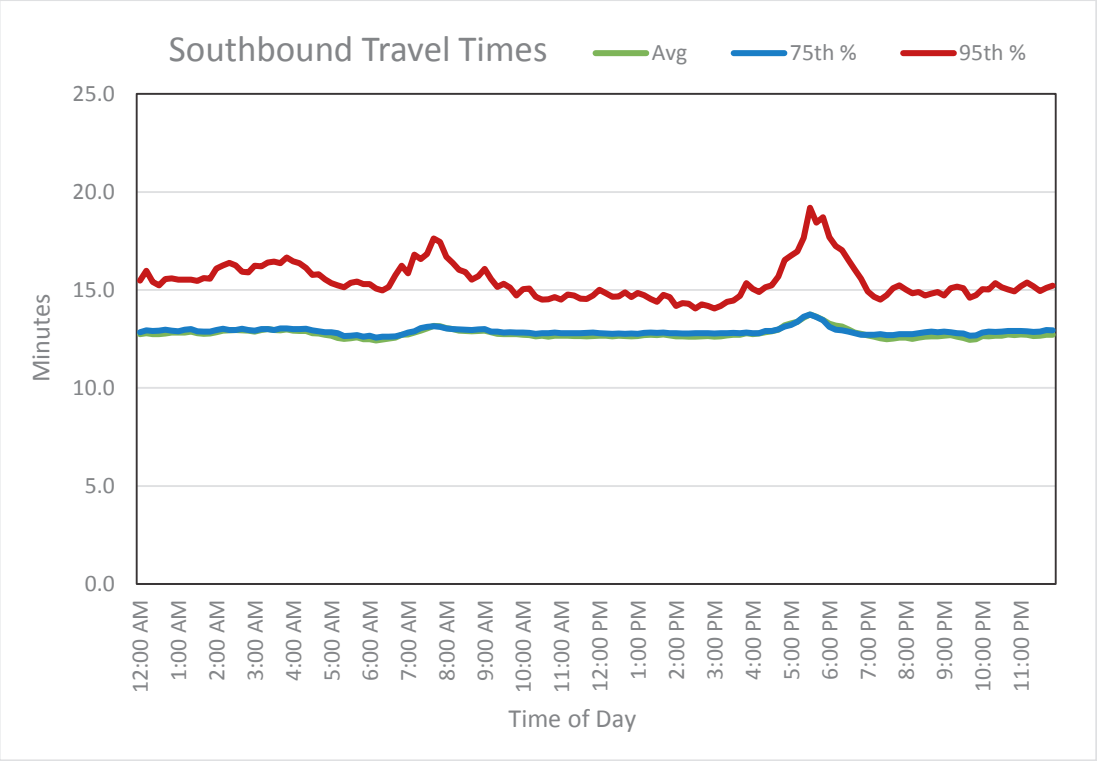



**Figure 47.** Segment 2- I-275 between I-94 and I-96/M-14

## Segment 2

### Travel time (minutes) for I-275 between I-94/Exit 1 and I-96/M-14/Exit 29



Chapter 4

# Corridor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Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

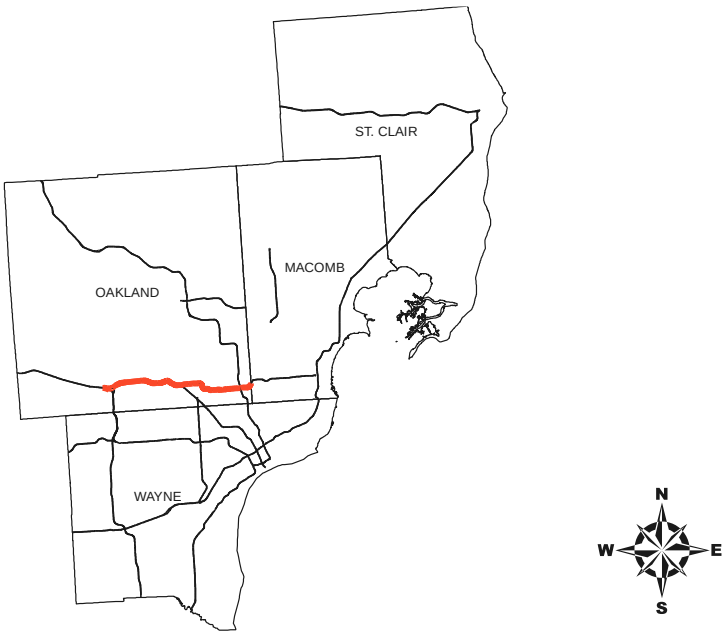
Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 48.** Oakland County I-696 Corridor total user delay cost



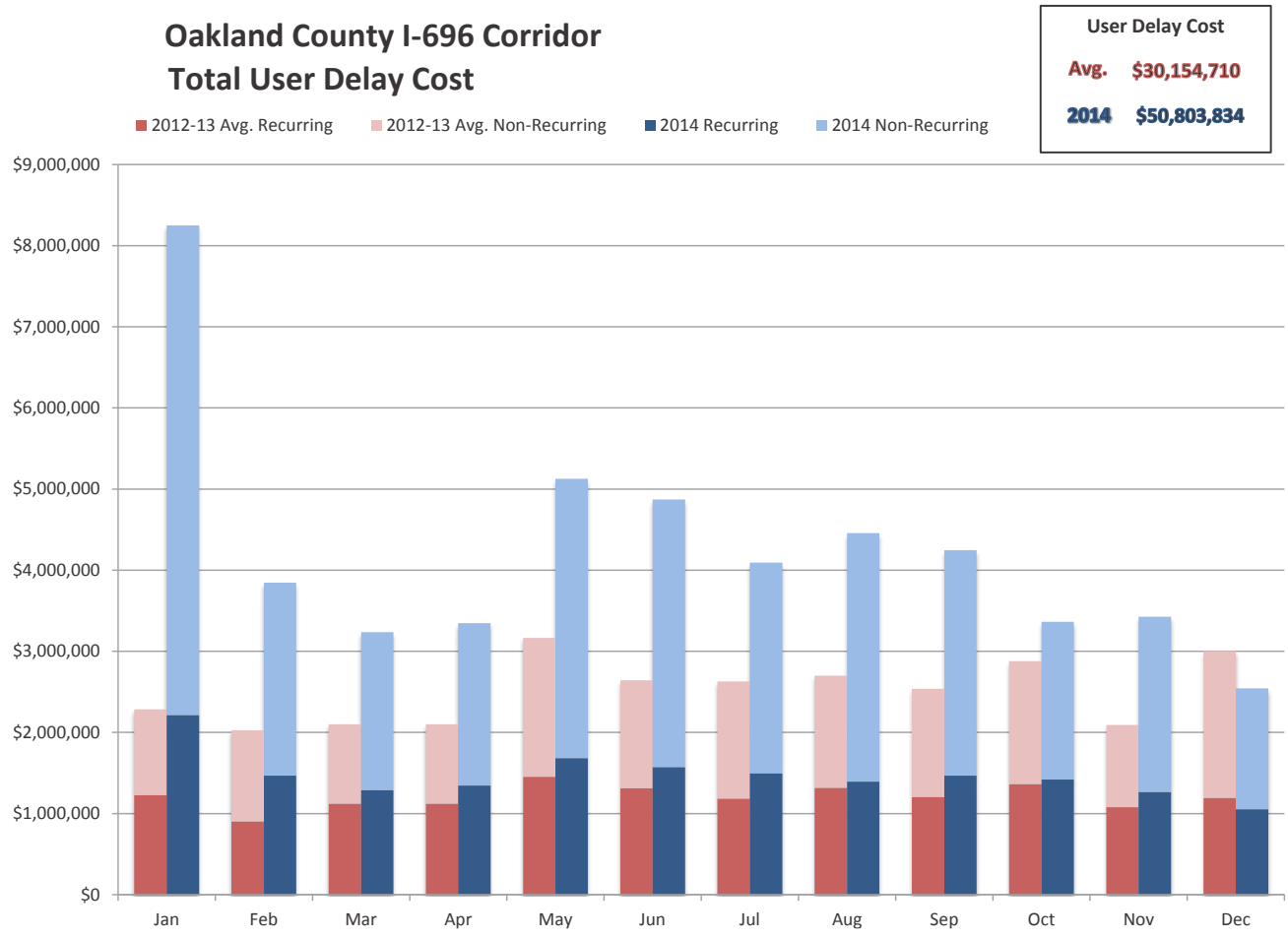



**Figure 49.** Macomb County I-696 Corridor total user delay cost

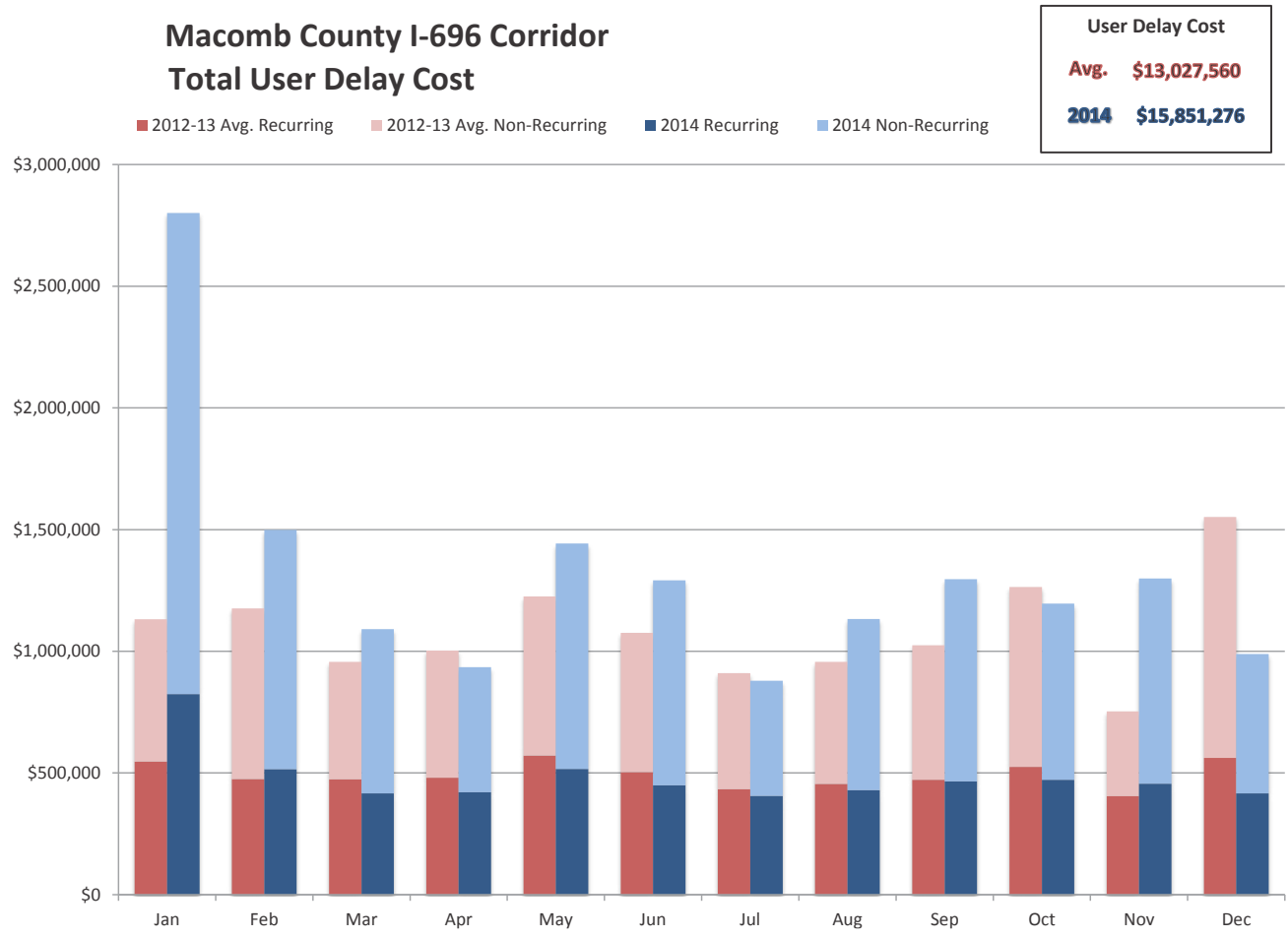


Figure 50. Metro Region I-696 eastbound

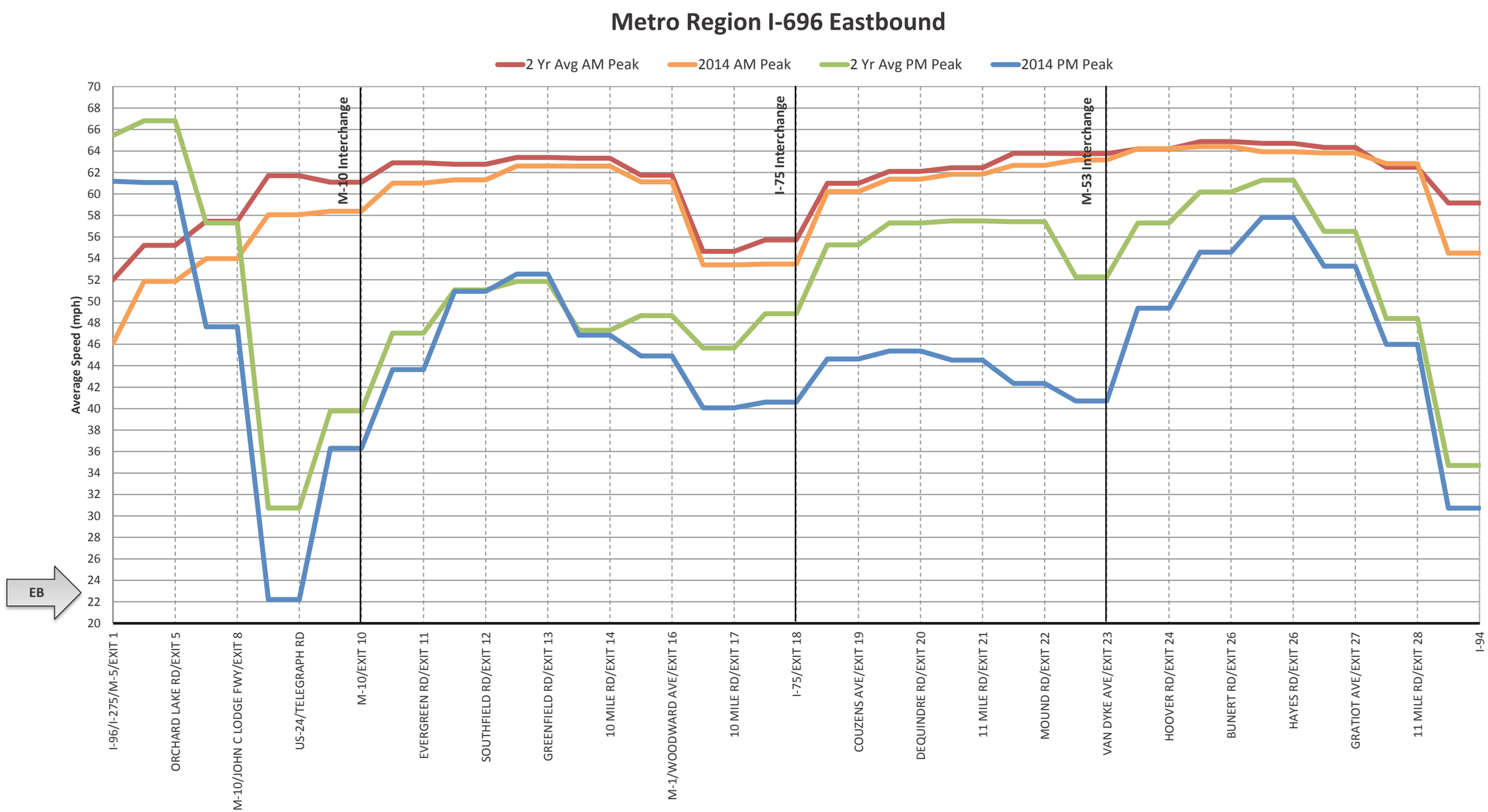
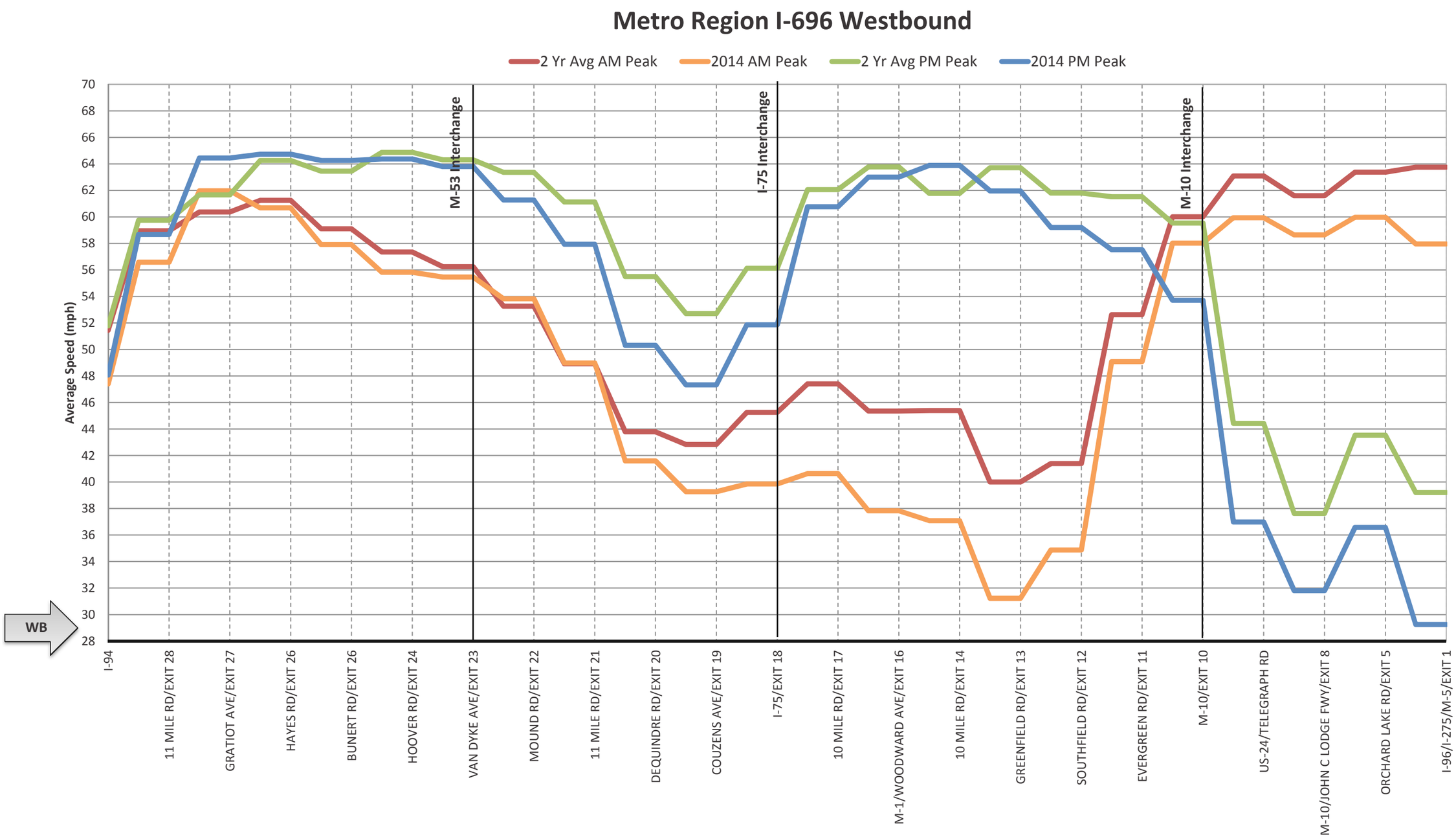


Figure 51. Metro Region I-696 westbound



# Travel Time Reliability

Figure 52. Travel time reliability I-696

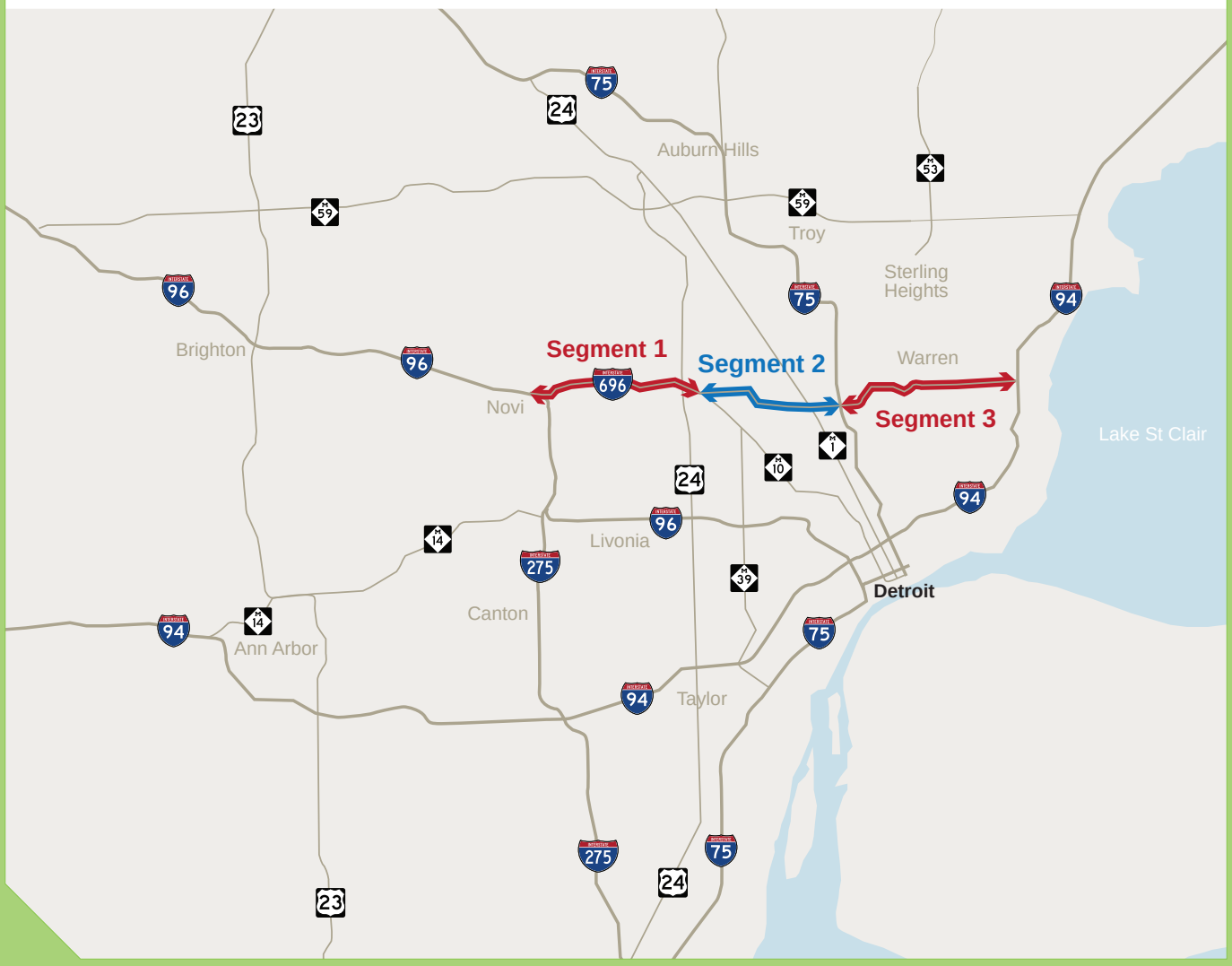
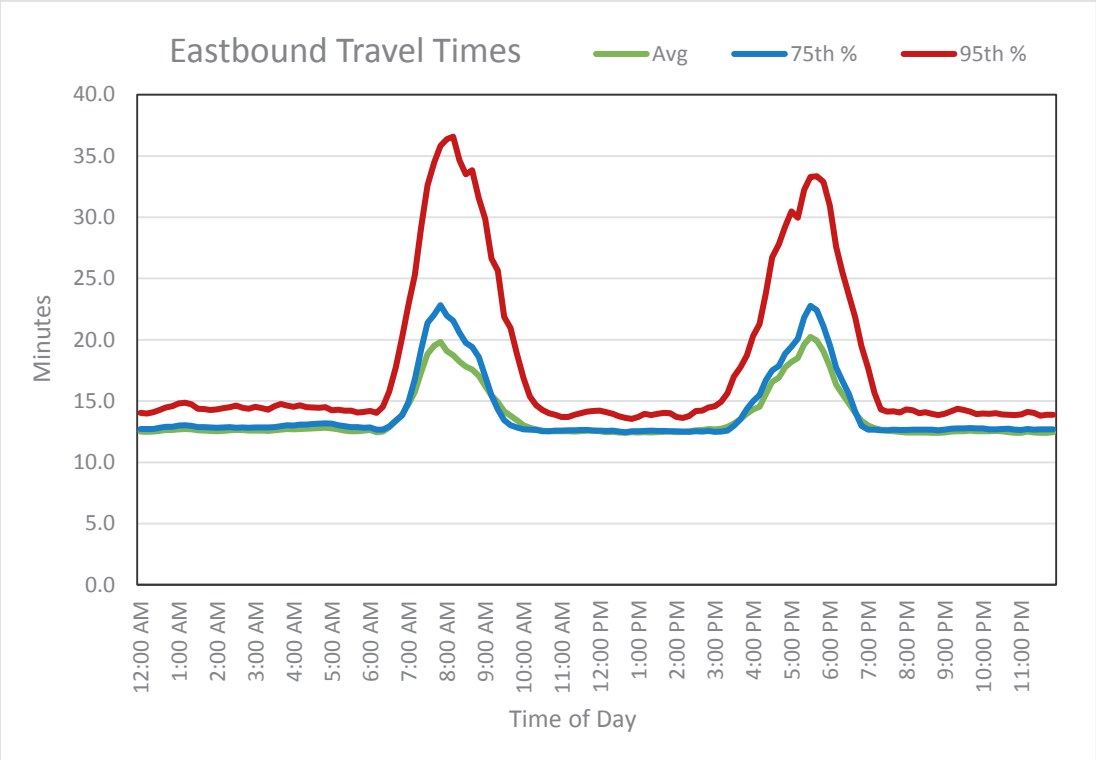


**Figure 53.** Segment 1- I-696 between M-10 and I-96/I-275/M-5

## Segment 1

### Travel time (minutes) for I-696 between M-10/Exit 10 and I-96/I-275/M-5/Exit 1



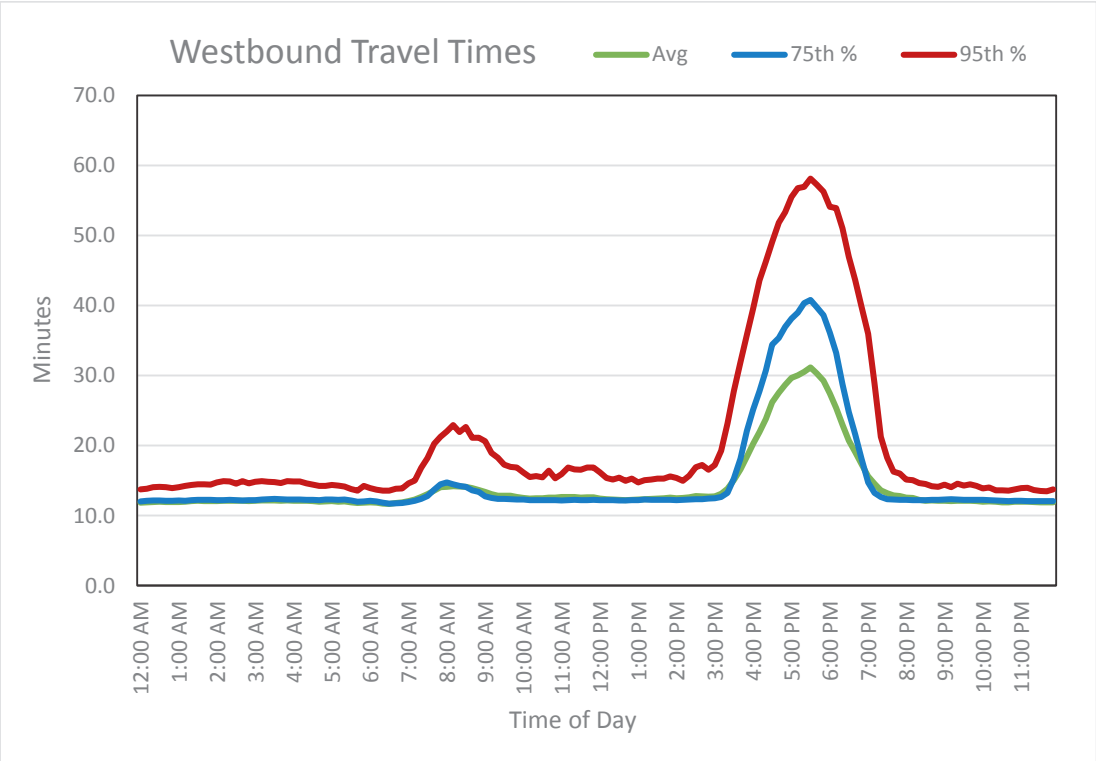
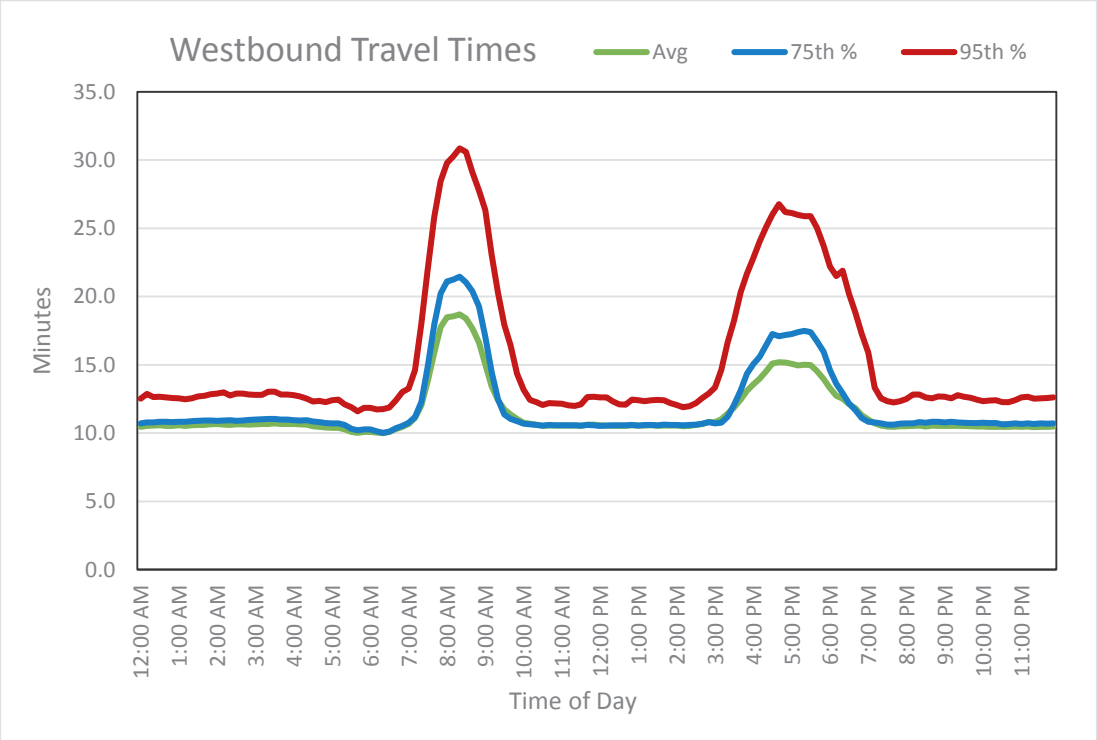



**Figure 54.** Segment 2- I-696 between M-10/John C Lodge Fwy and I-75

Segment 2

Travel time (minutes) for I-696 between M-10/John C Lodge Fwy/Exit 8 and I-75/Exit 18



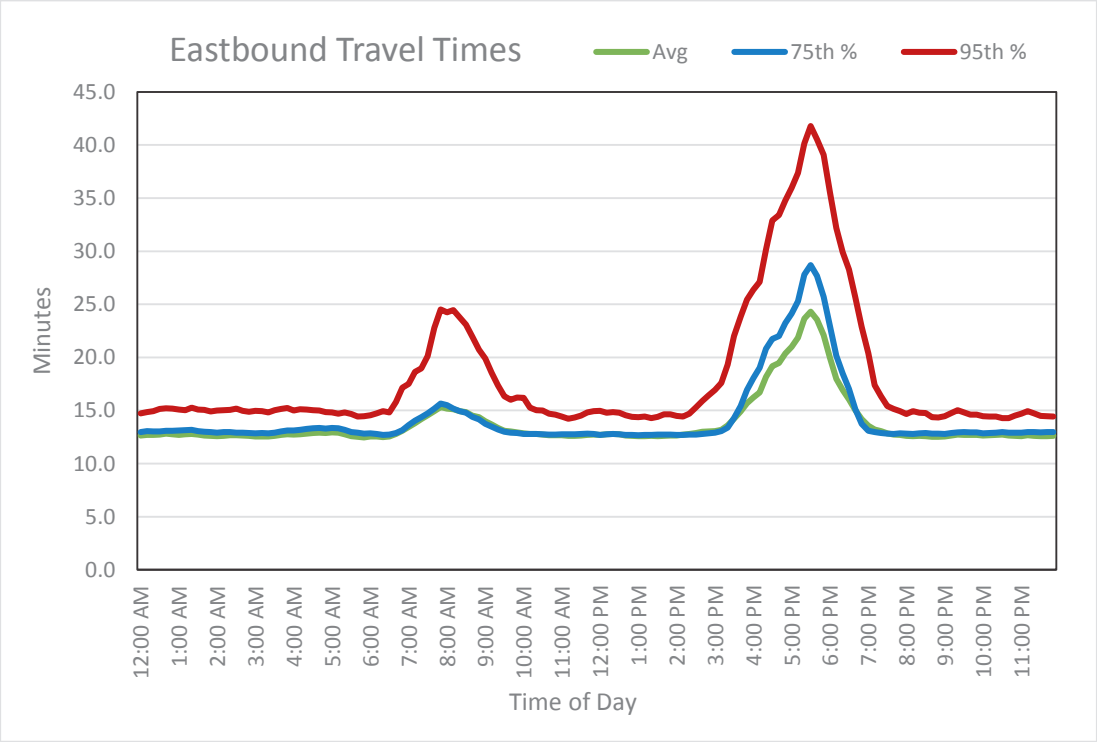
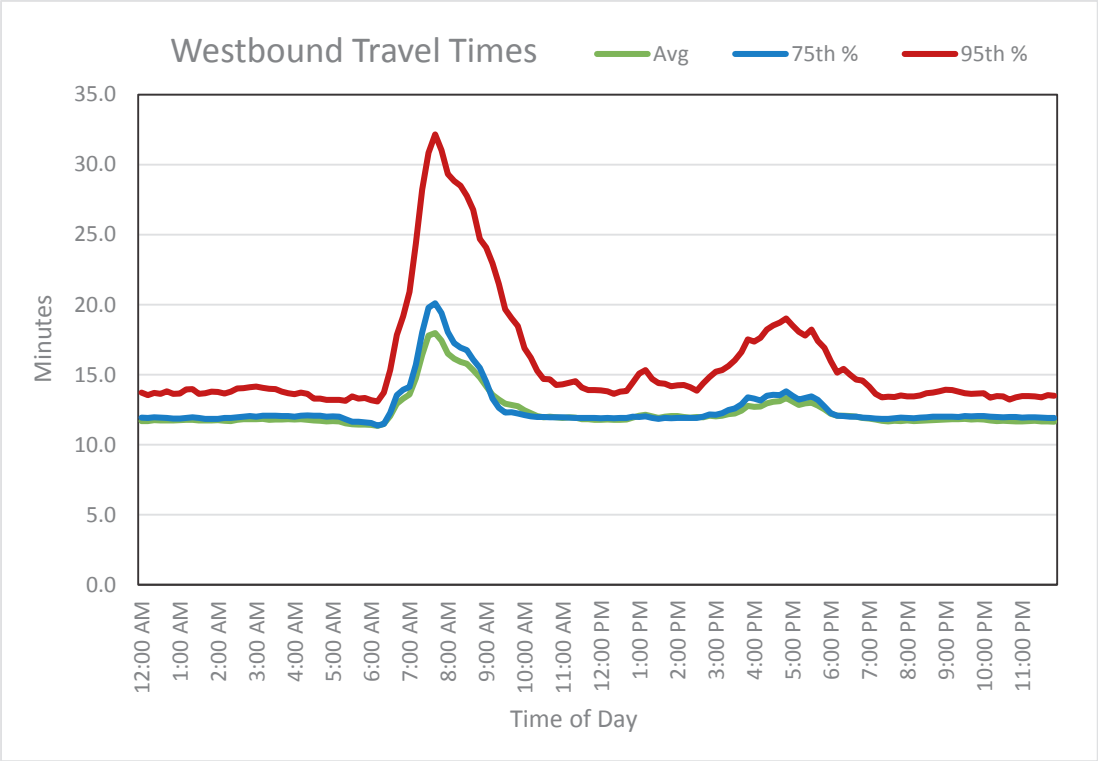
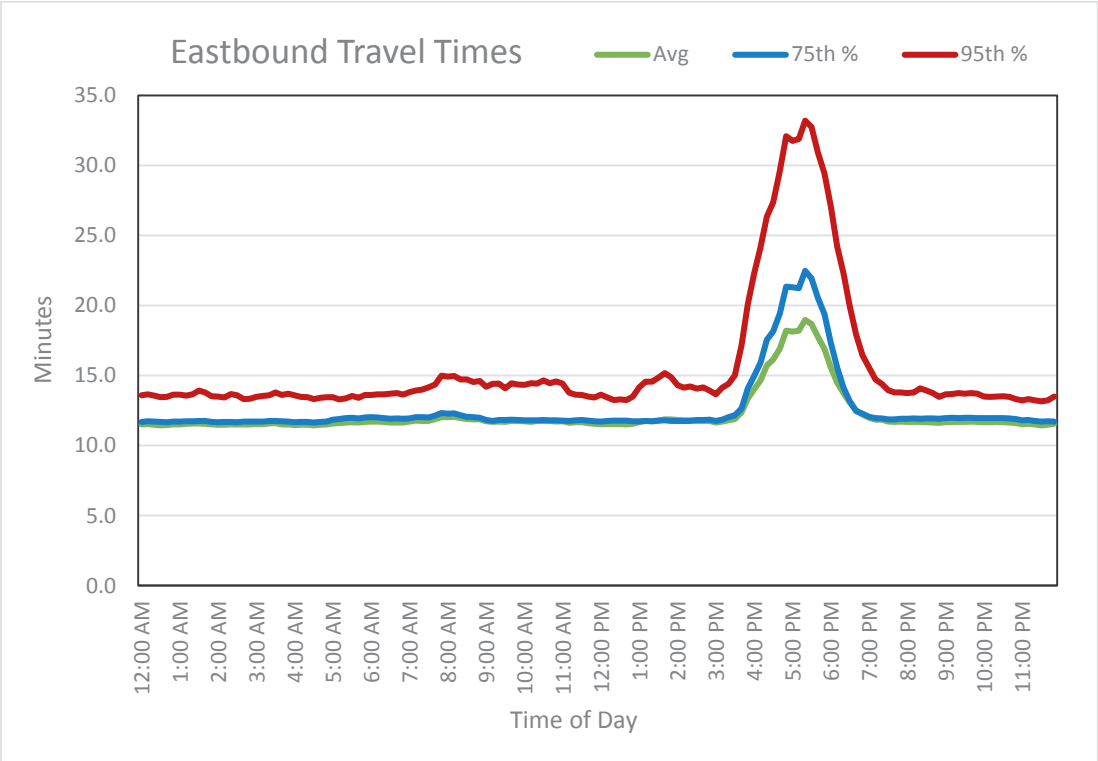



**Figure 55.** Segment 3- I-696 between I-94 and I-75

## Segment 3

### Travel time (minutes) for I-696 between I-94 and I-75/Exit 18



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Interstate 696: **Oakland and Macomb**

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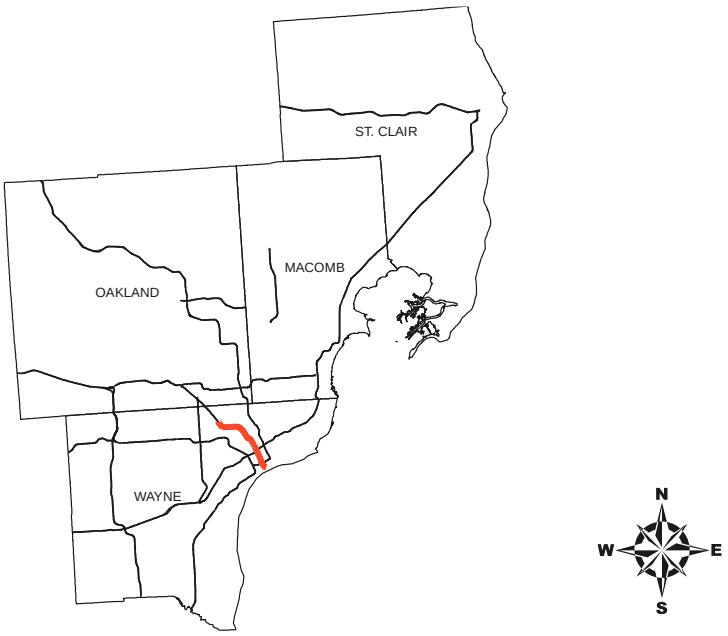
Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 56.** Detroit TSC M-10 Corridor (55mph Section) total user delay cost



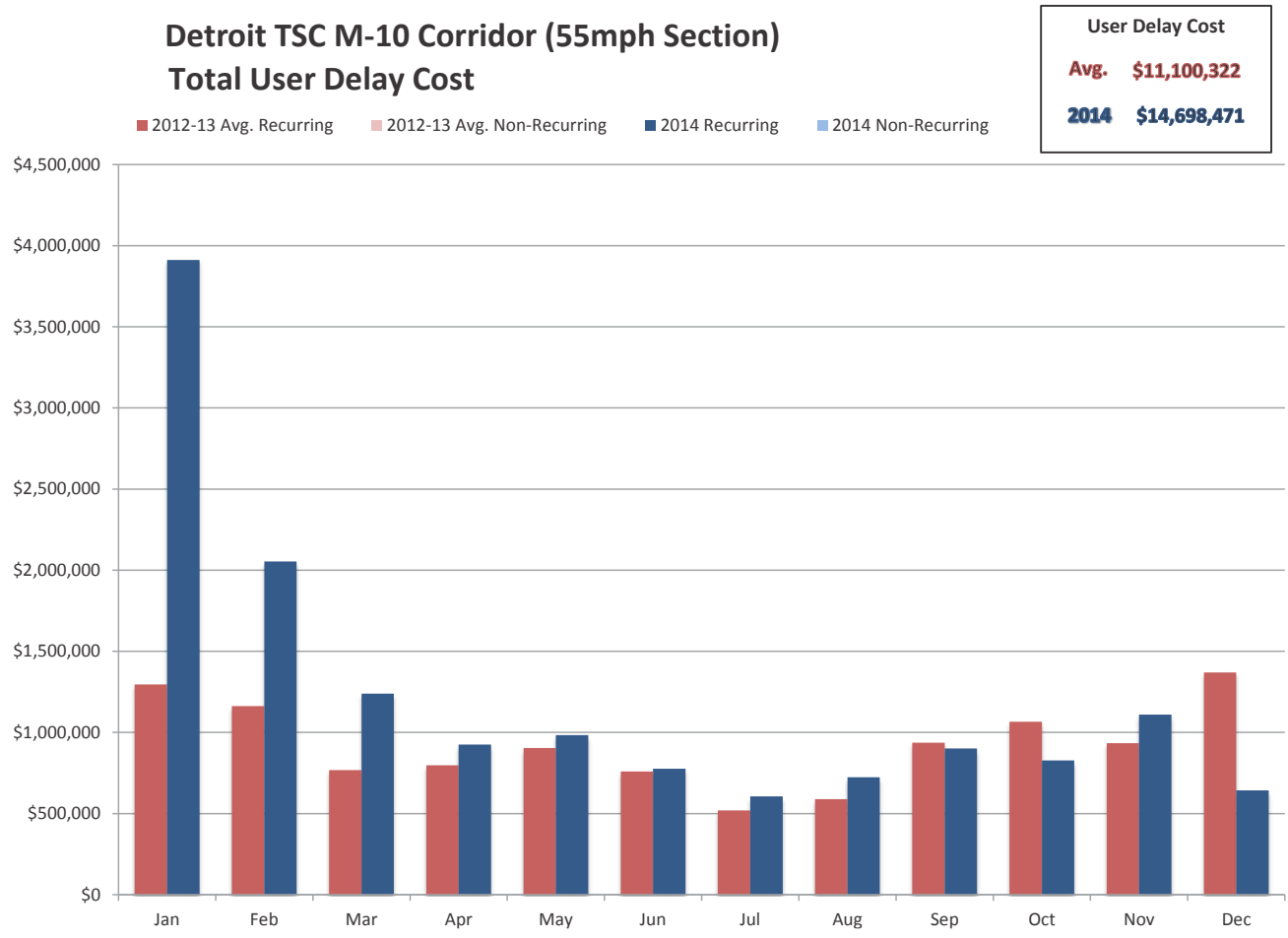



**Figure 57.** Oakland County M-10 Corridor total user delay cost

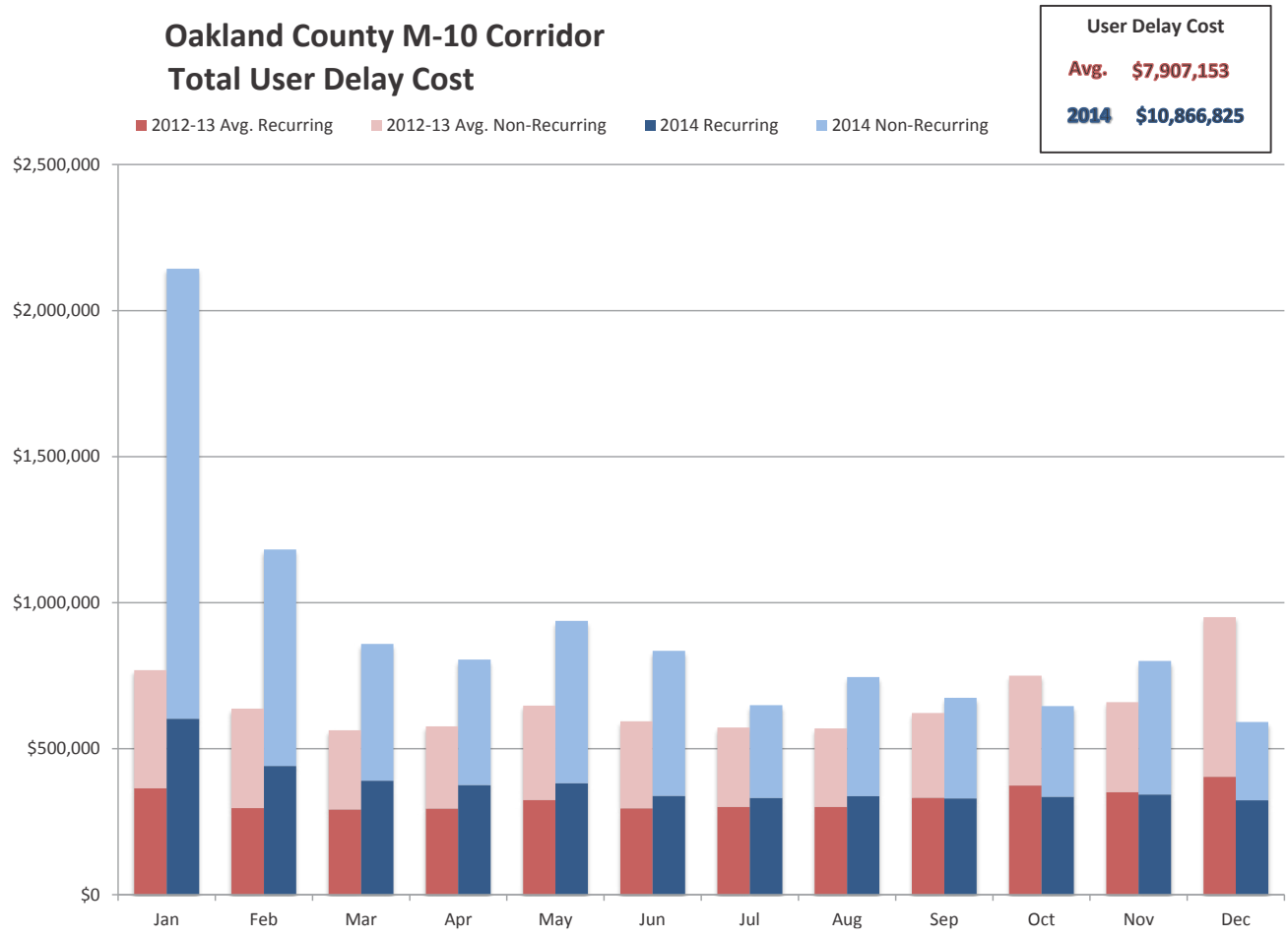


Figure 58. Metro Region M-10 northbound

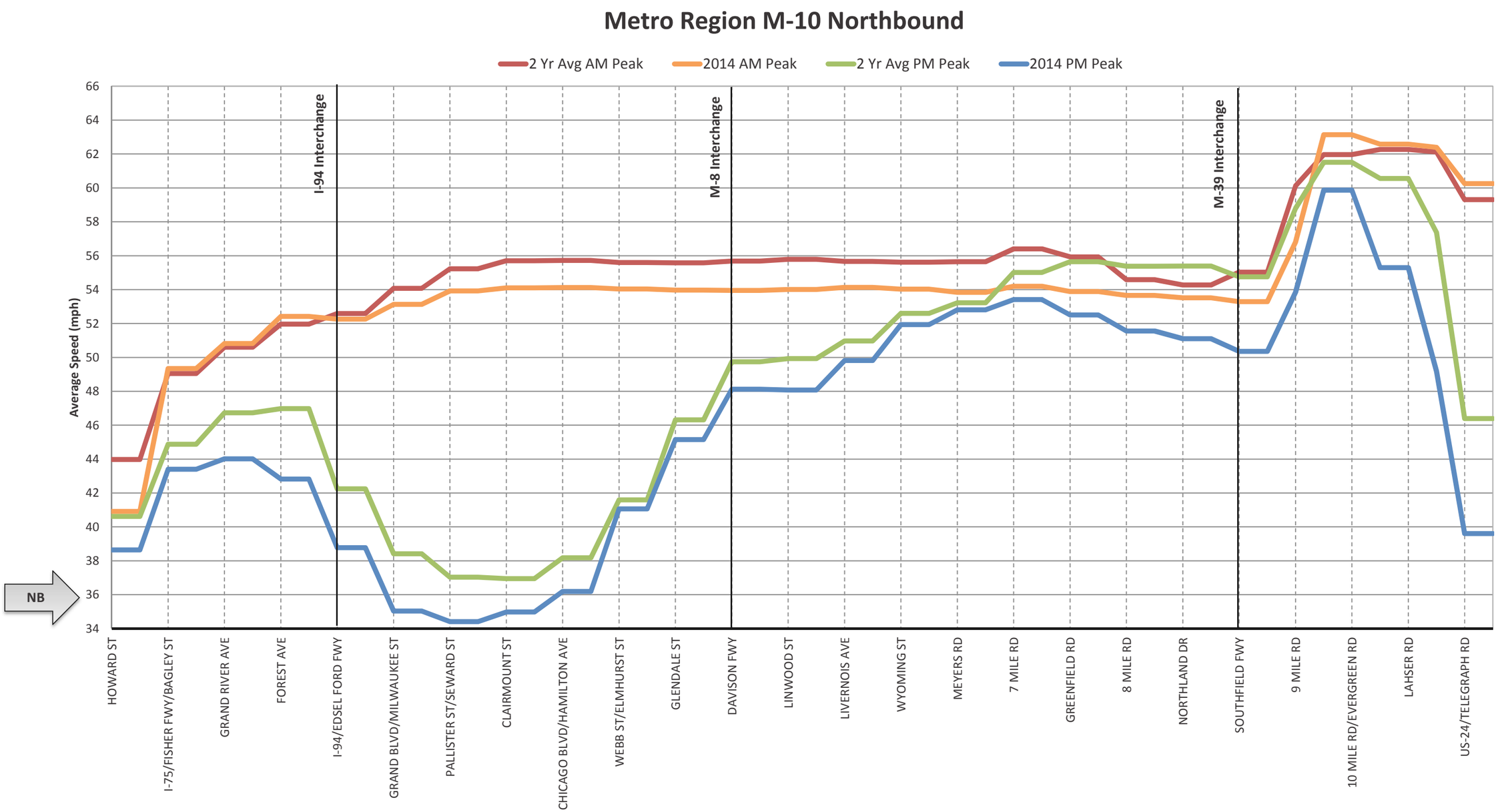
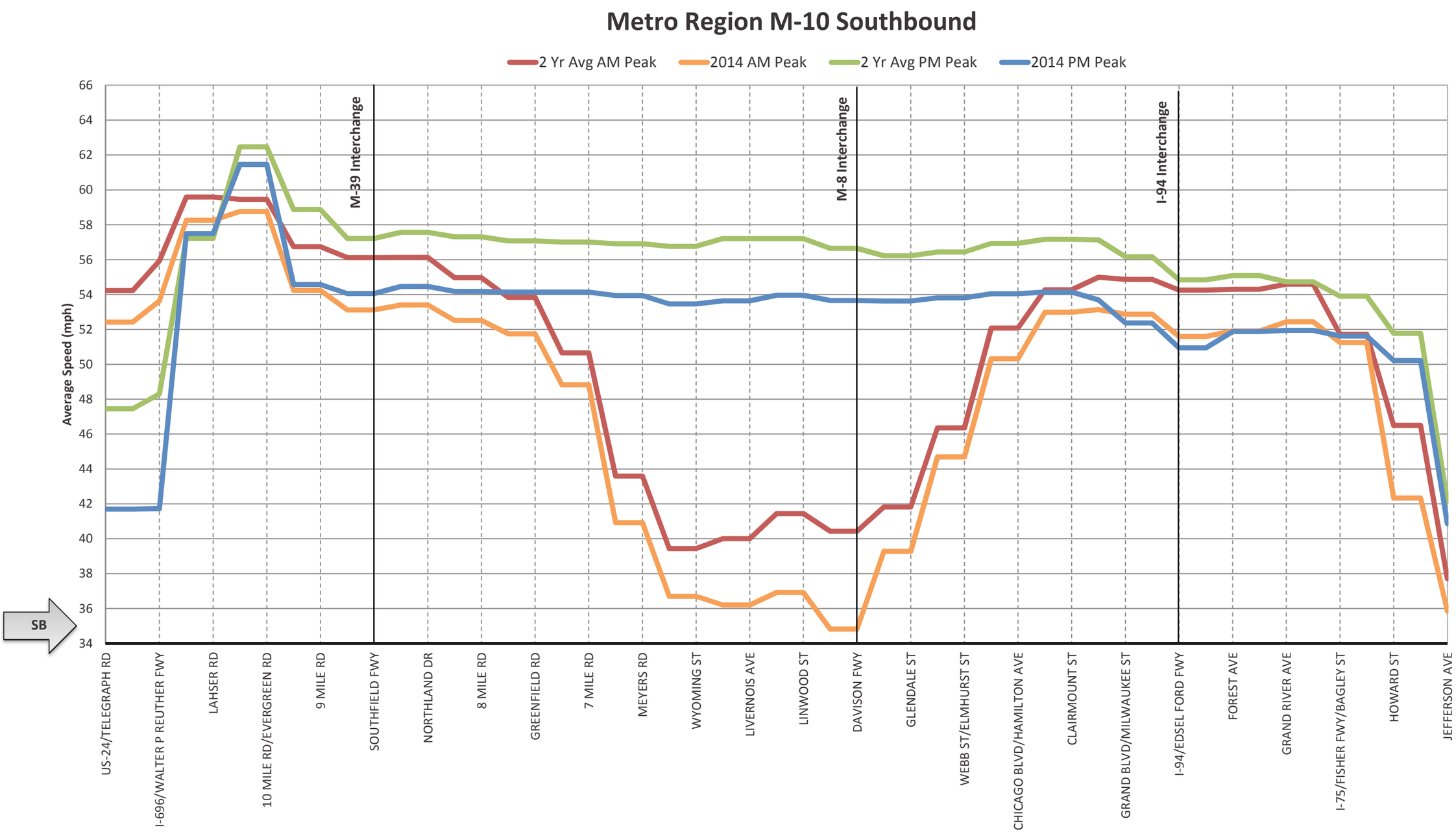


Figure 59. Metro Region M-10 southbound



# Travel Time Reliability

**Figure 60.** Travel time reliability M-10

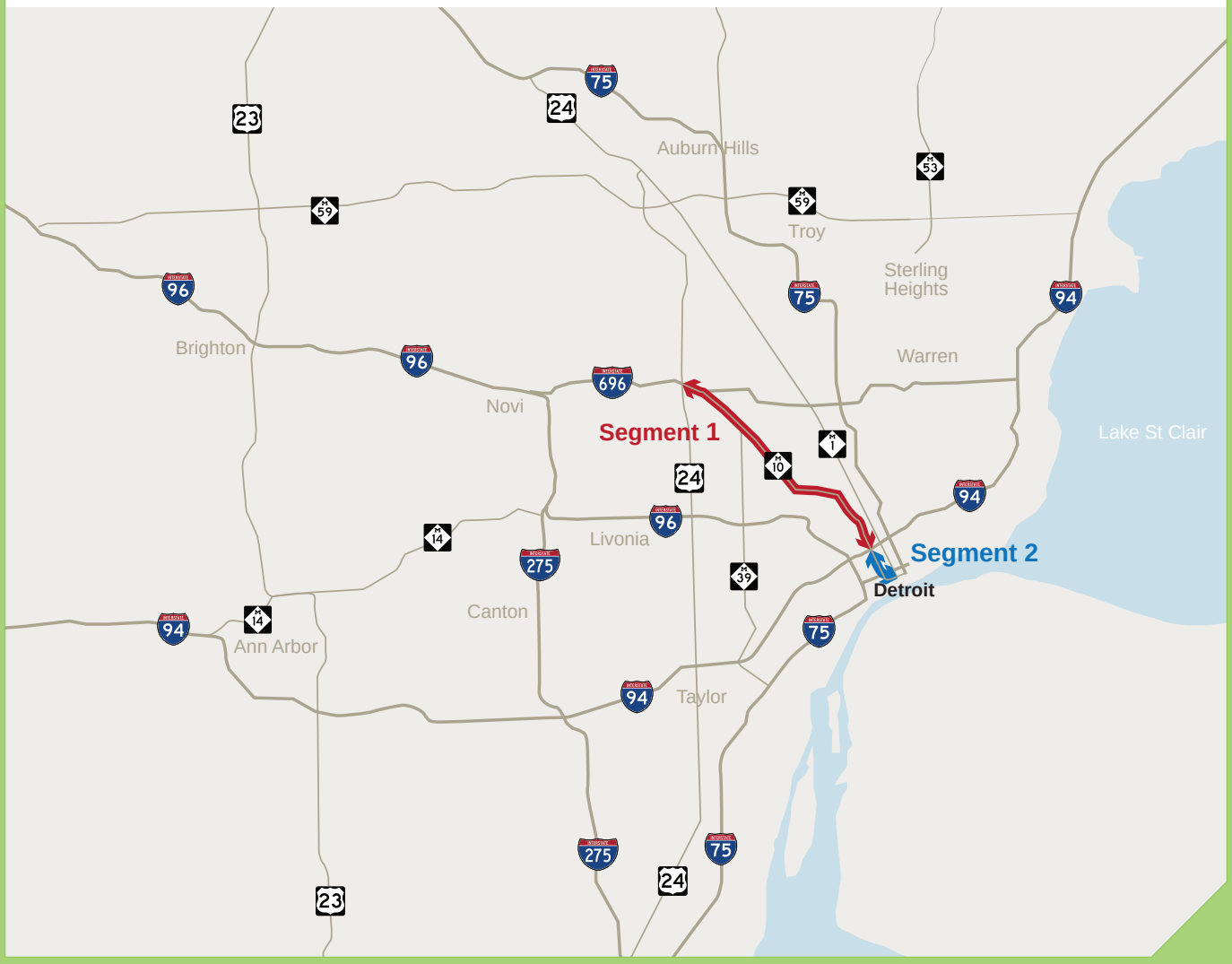
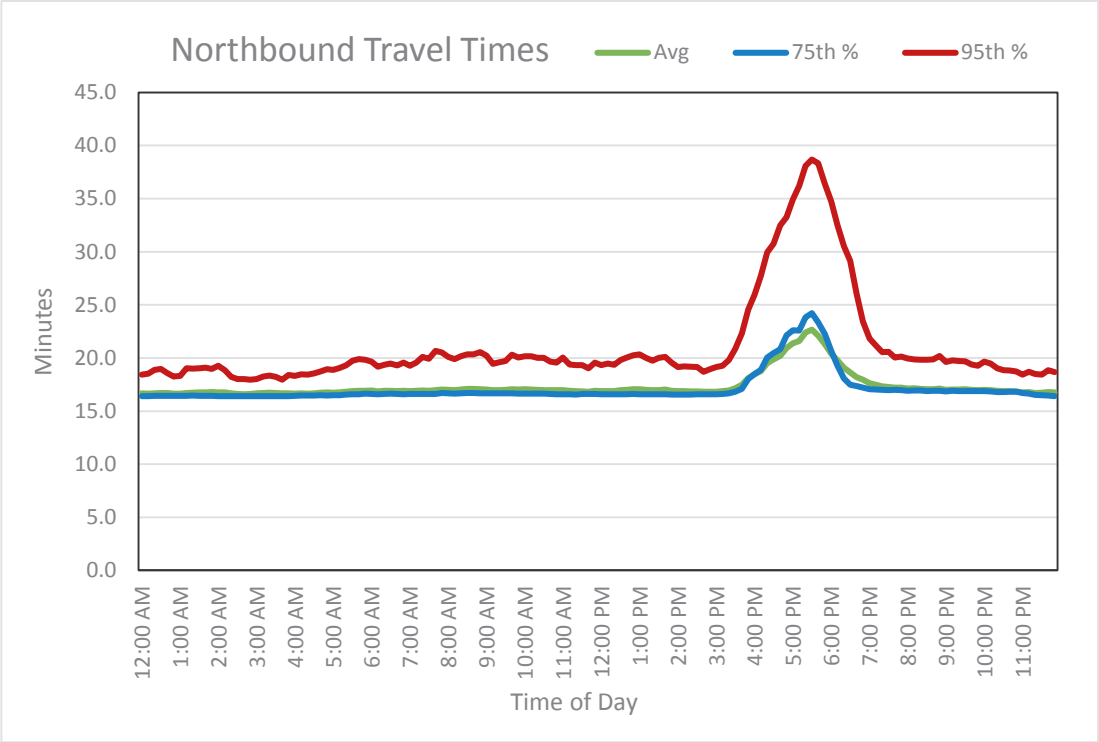


**Figure 61.** Segment 1- M-10 between I-94/Edsel Ford Fwy and US-24/Telegraph Rd

Segment 1

Travel time (minutes) for M-10 between I-94/Edsel Ford Fwy and US-24/Telegraph Rd



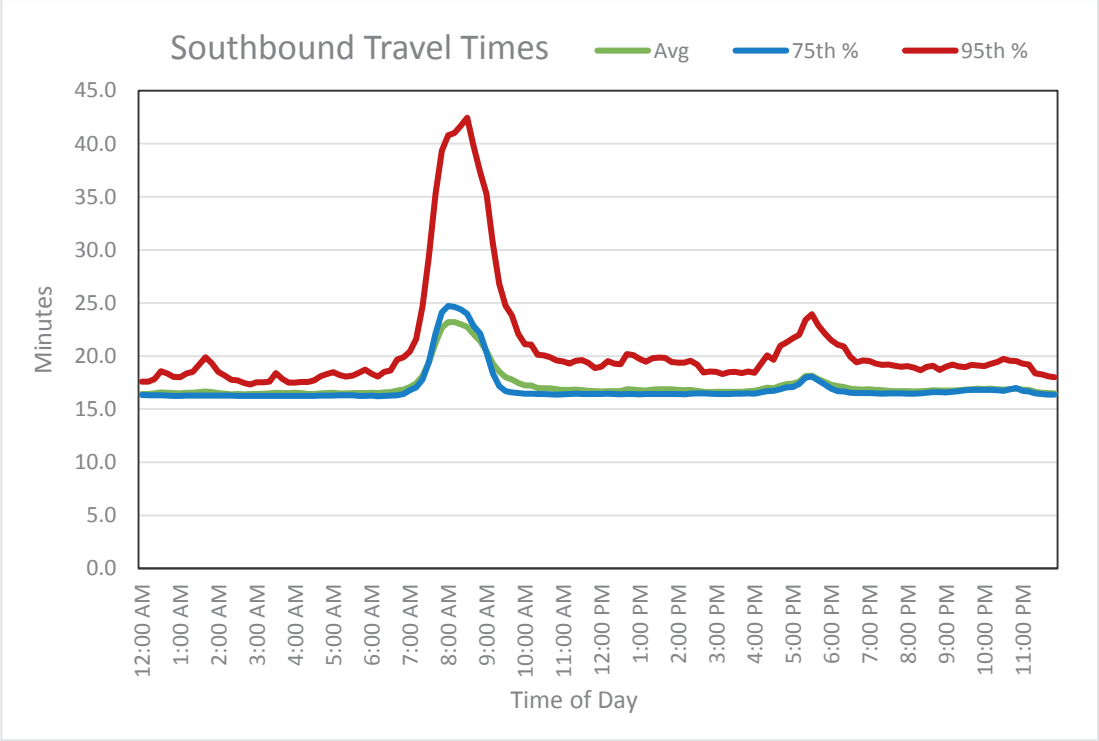
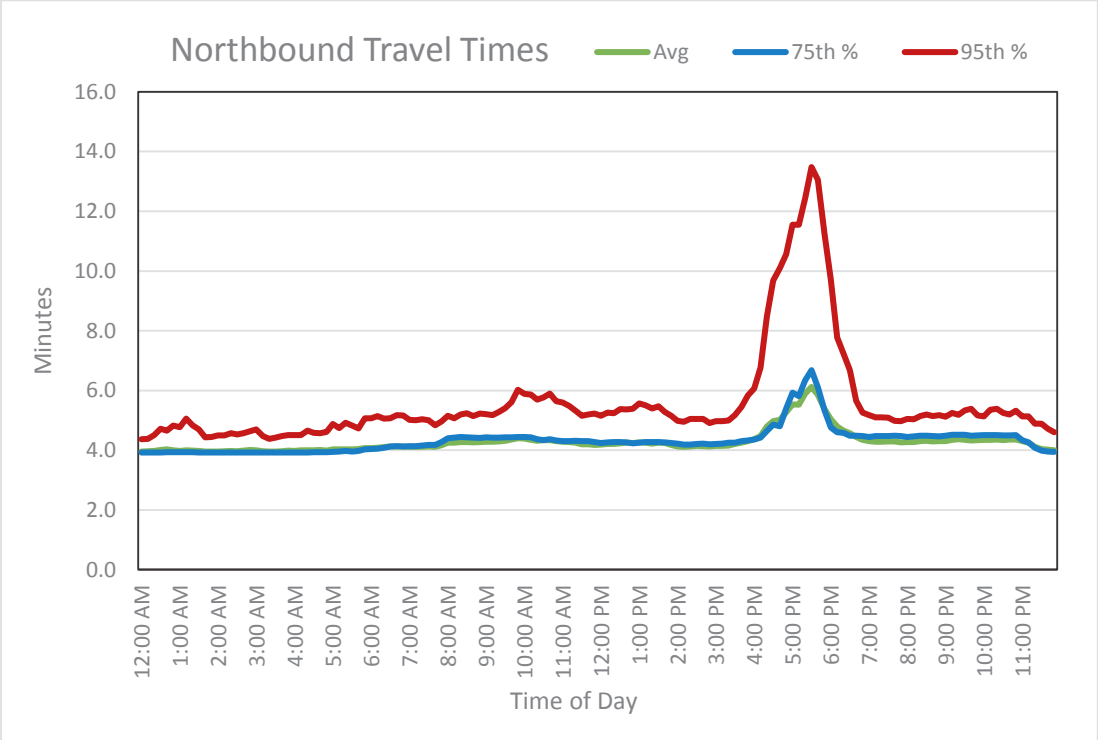
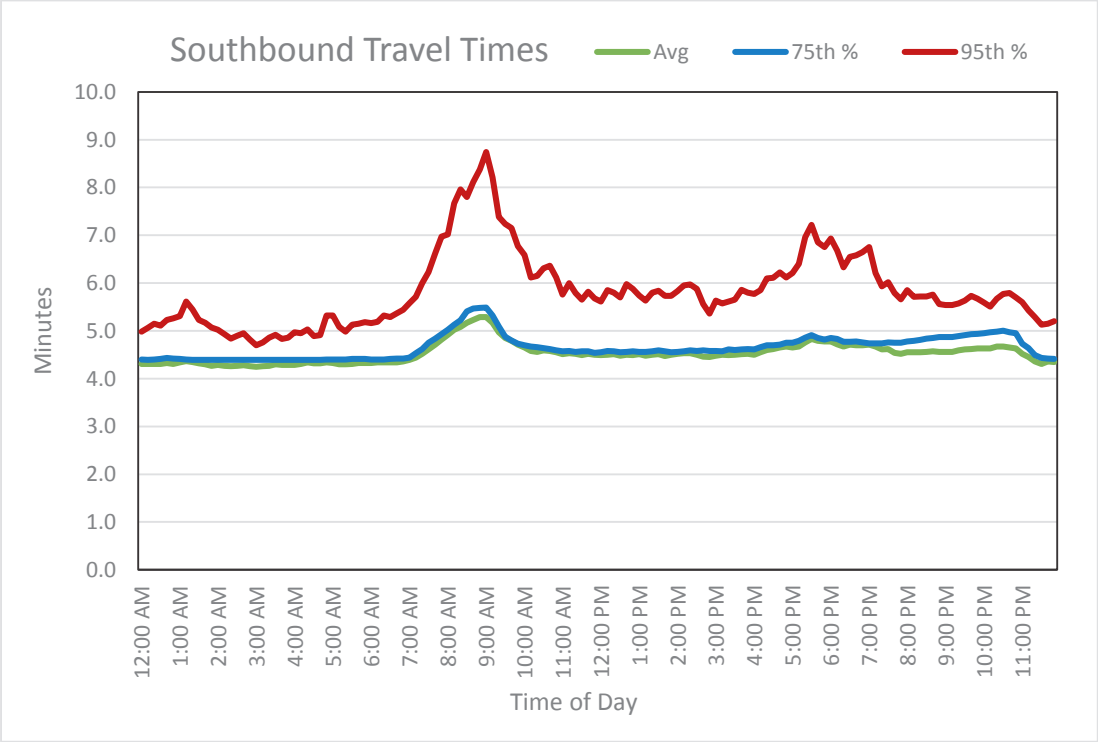



**Figure 62.** Segment 2- M-10 between M-1/Woodward Ave and I-94/Edsel Ford Fwy

## Segment 2

### Travel time (minutes) for M-10 between M-1/Woodward Ave and I-94/Edsel Ford Fwy



Chapter 4

# Corridor

Interstate 69: **St. Clair**

Interstate 75: **Taylor, Detroit 55mph, Detroit 70mph, and Oakland**

Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 63.** Taylor TSC M-14 Corridor total user delay cost

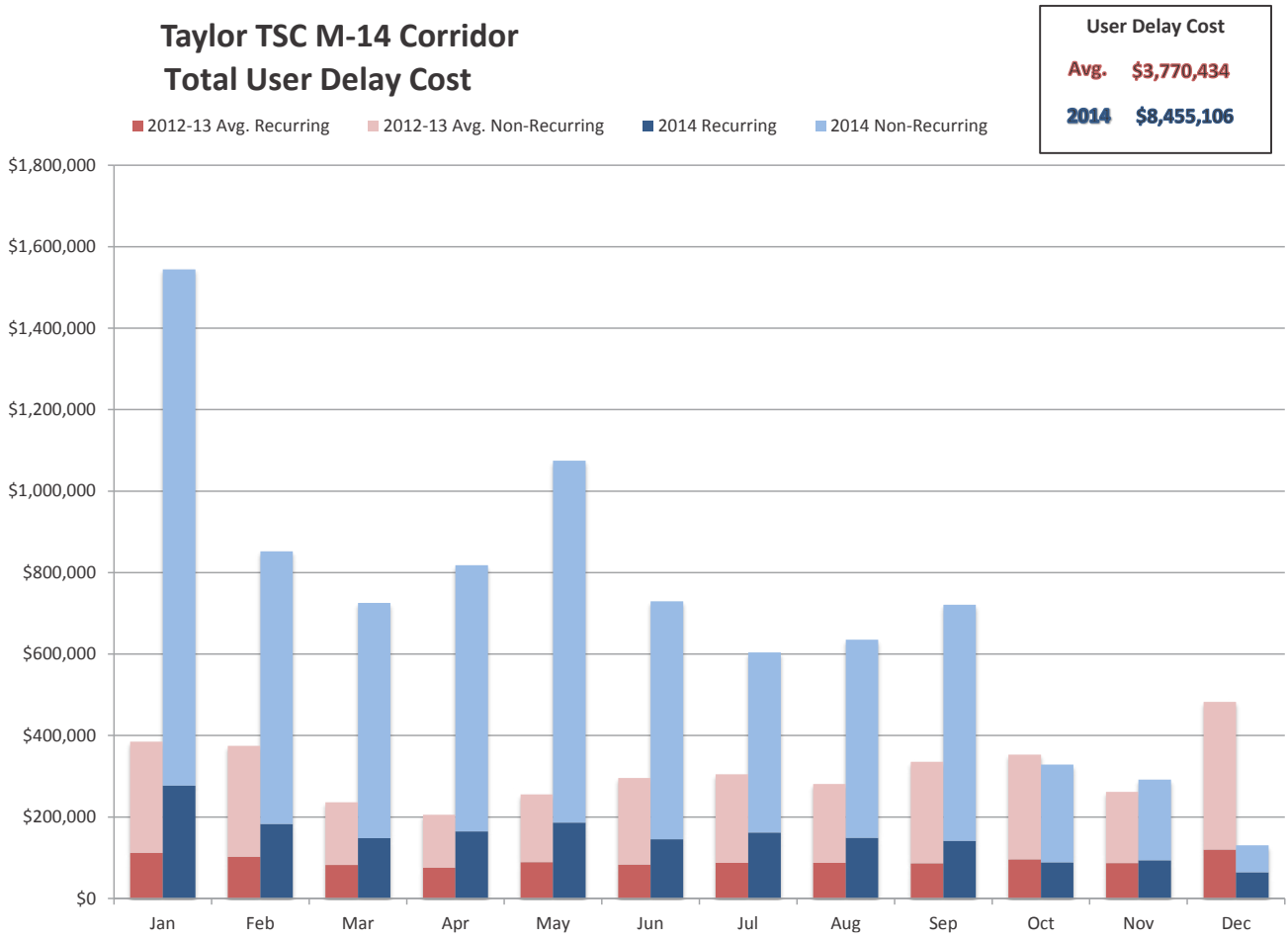


Figure 64. Metro Region M-14 eastbound

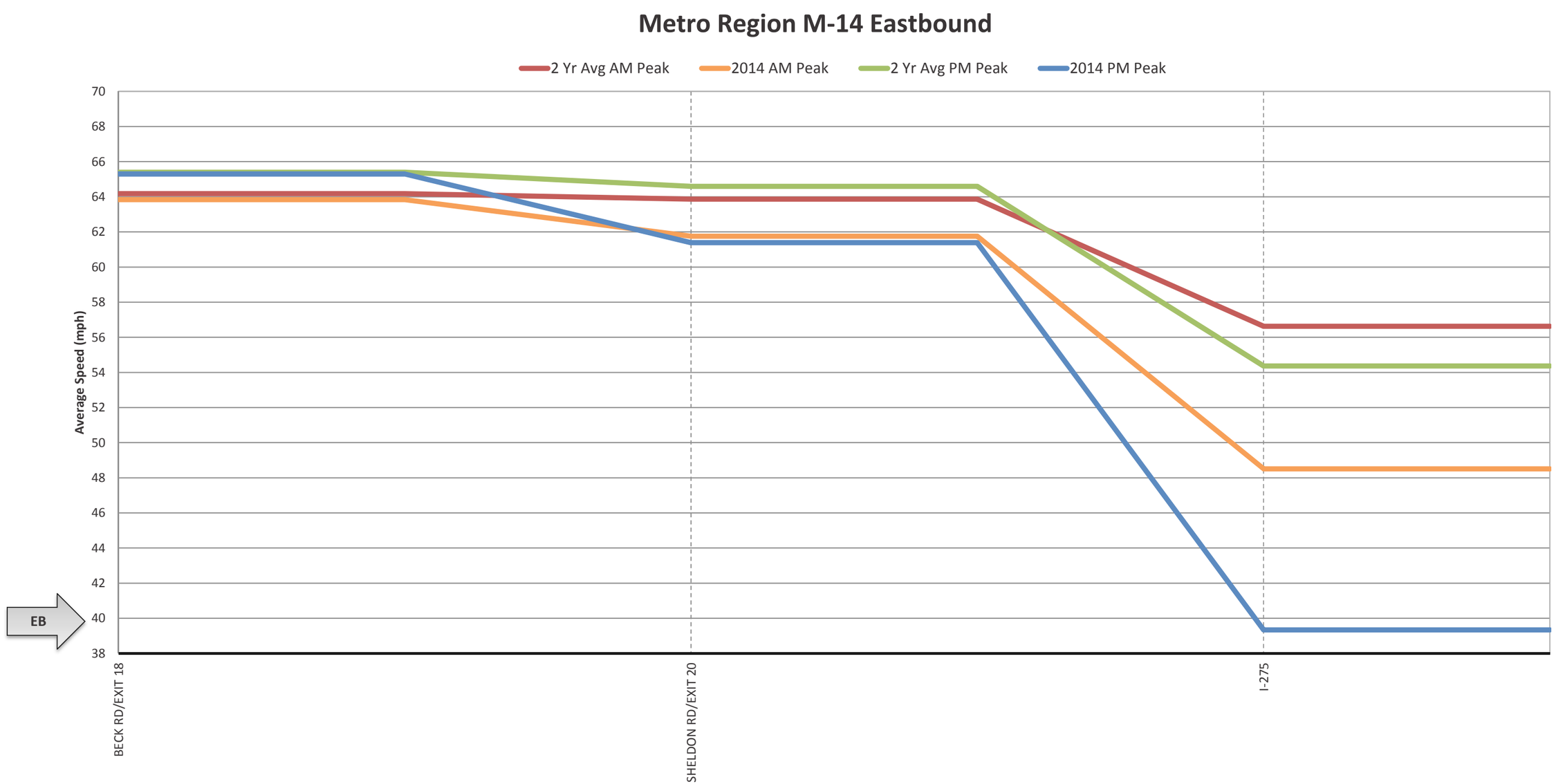
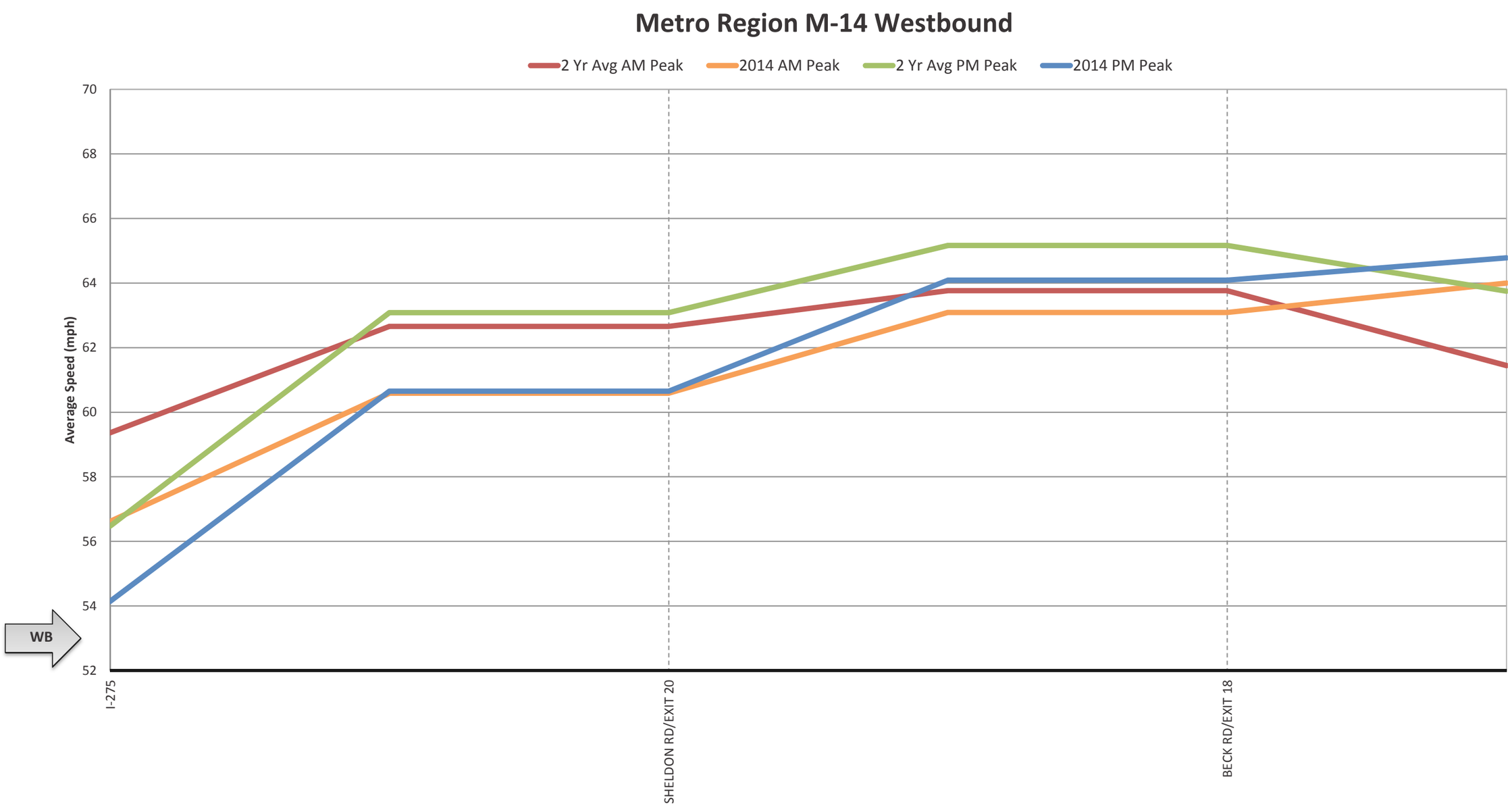


Figure 65. Metro Region M-14 westbound



Chapter 4

# Corridor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Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

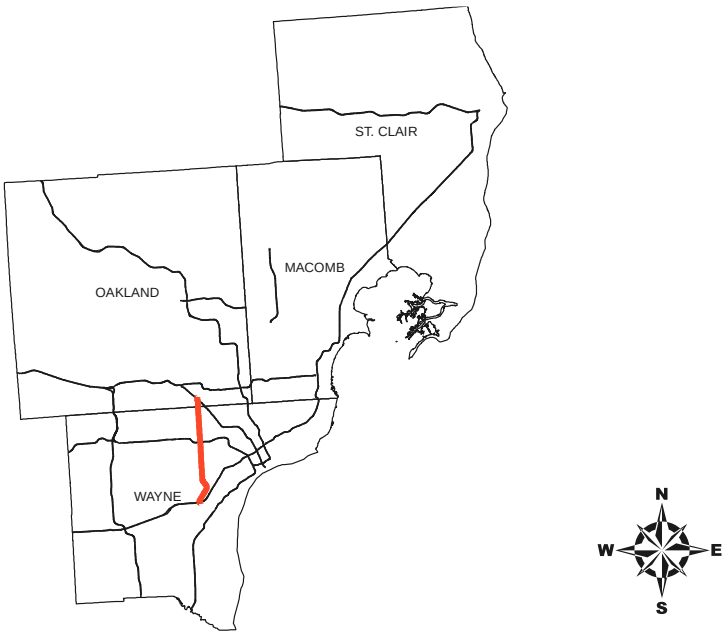
Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 66.** Detroit TSC M-39 Corridor total user delay cost.pdf



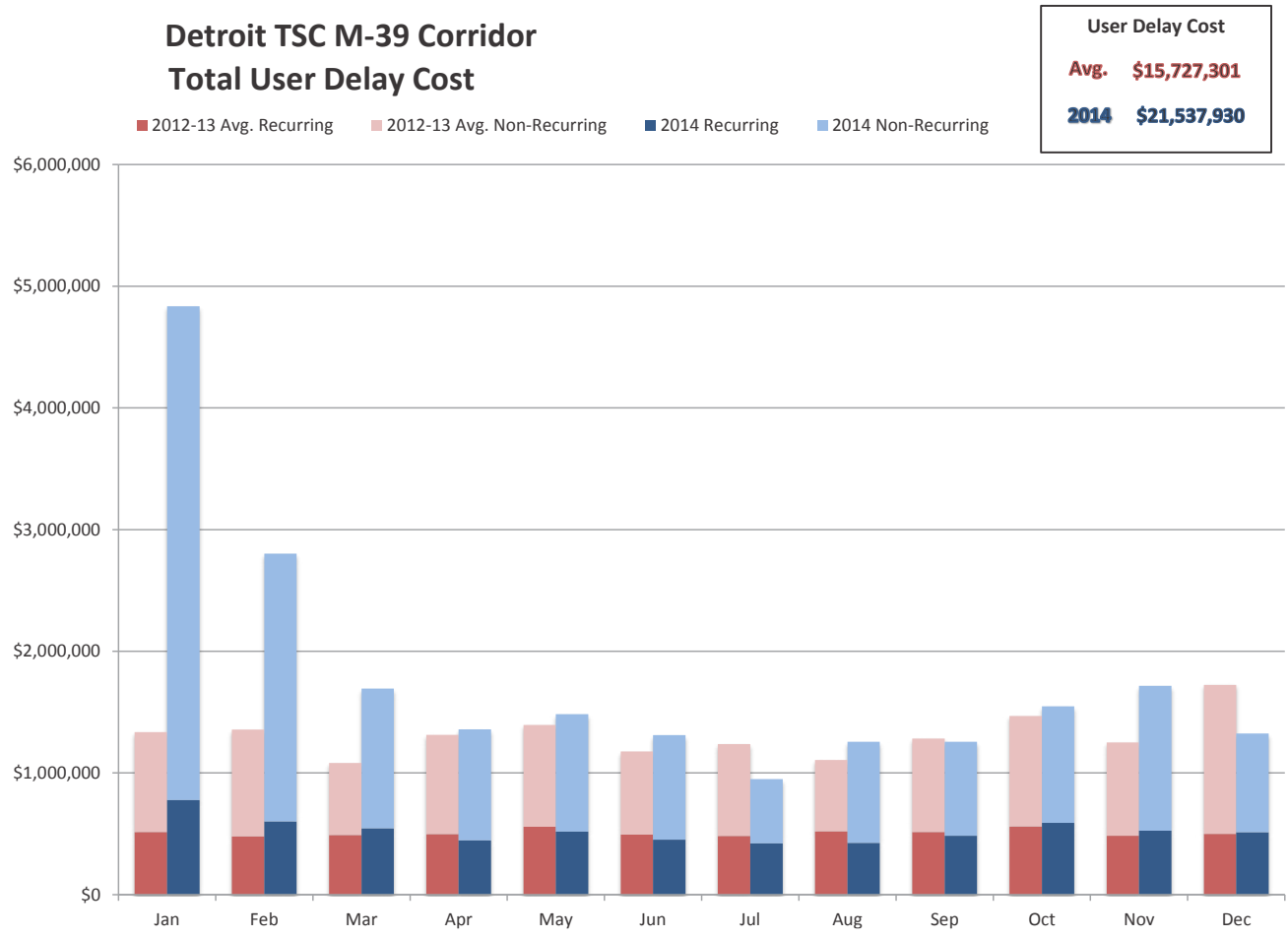



Figure 67. Metro Region M-39 northbound

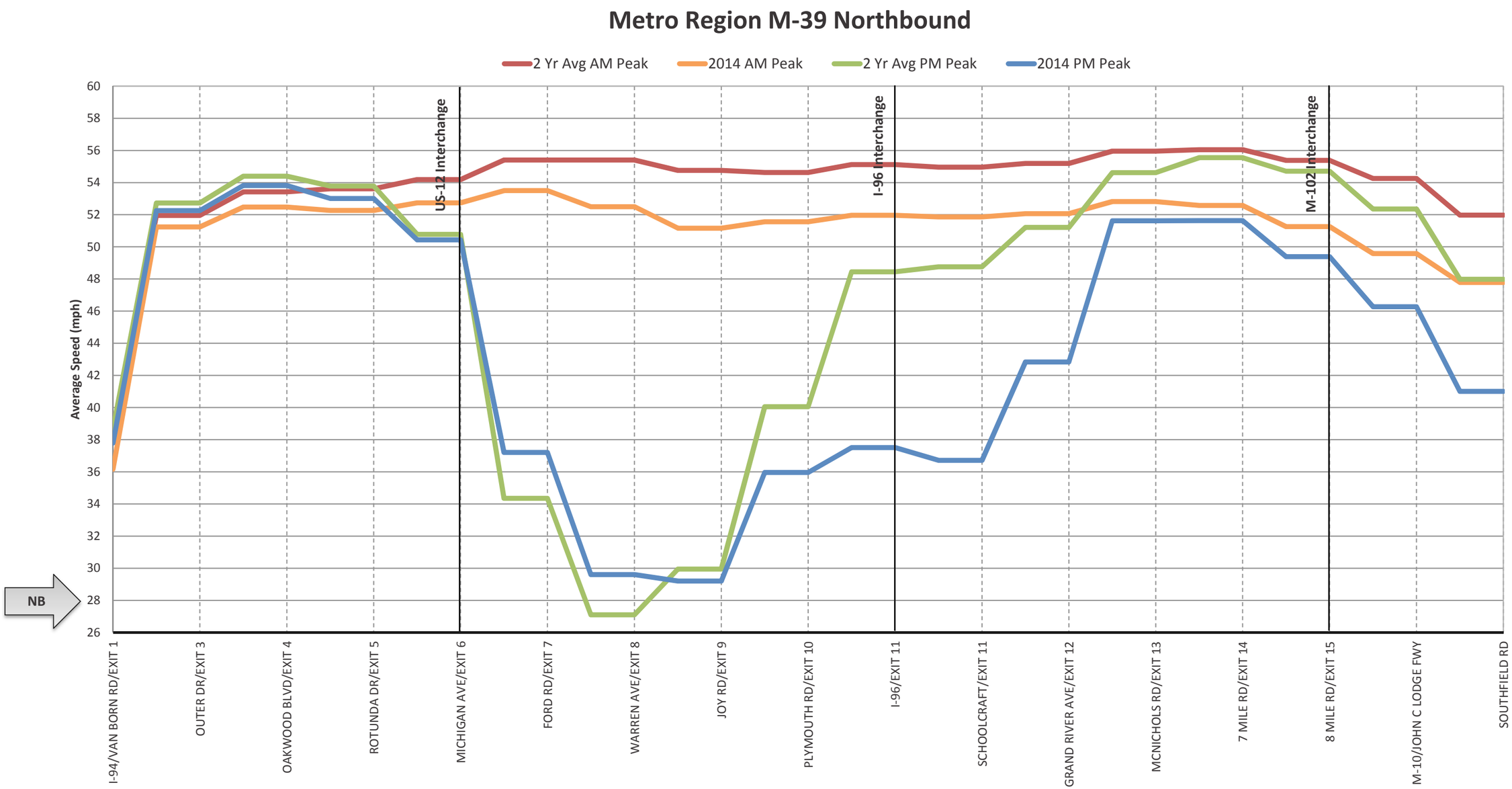
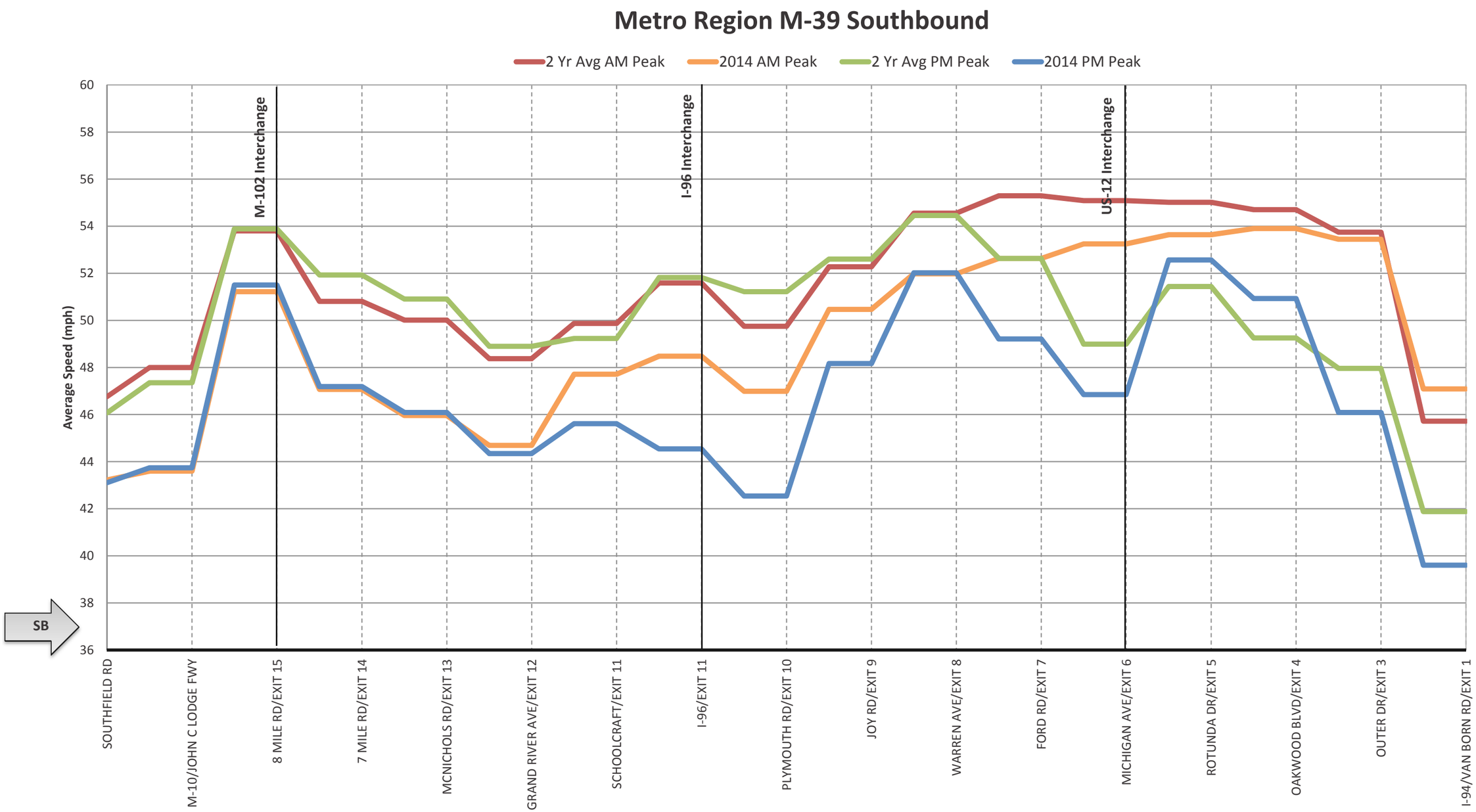


Figure 68. Metro Region M-39 southbound



# Travel Time Reliability

Figure 69. Travel time reliability M-39

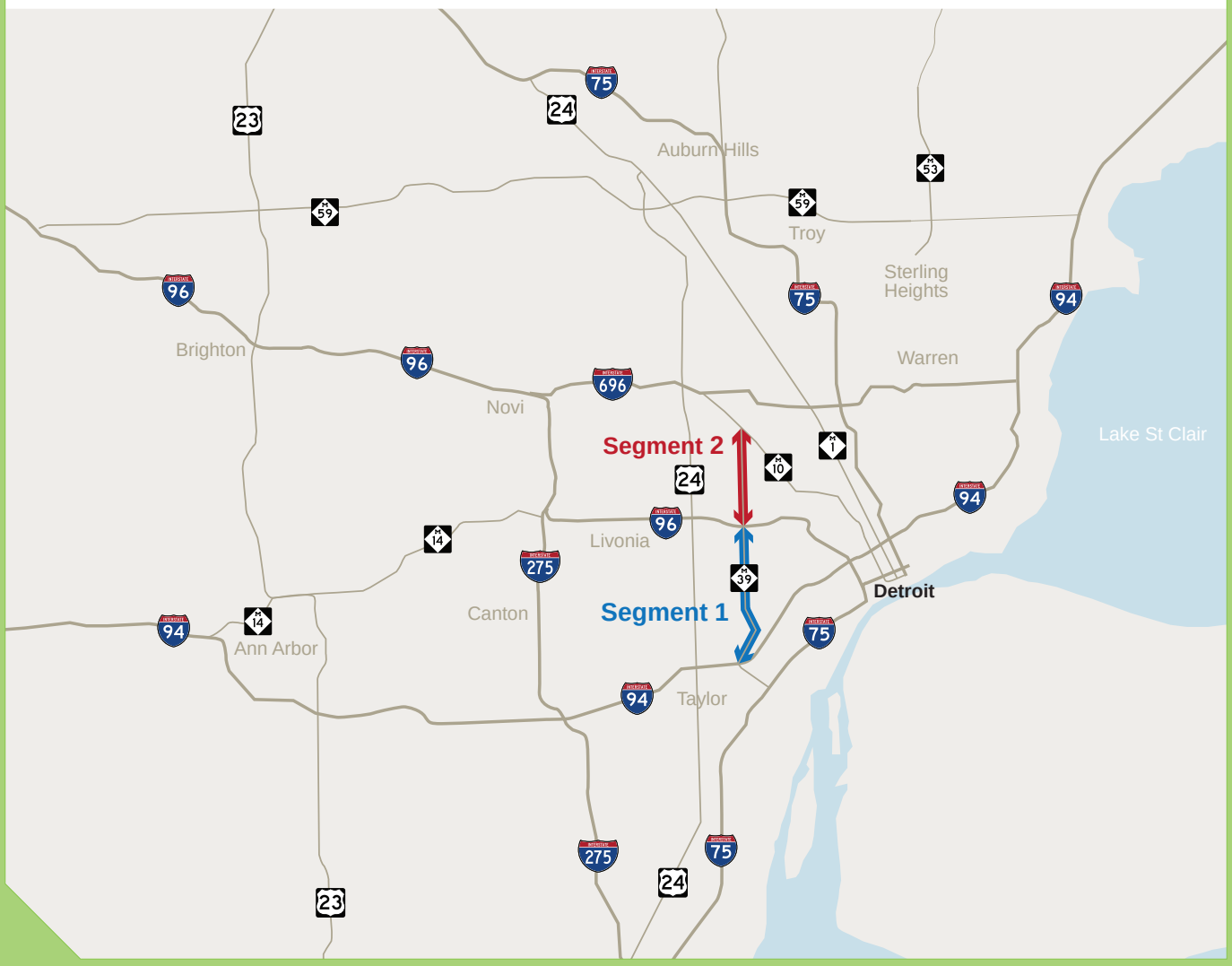
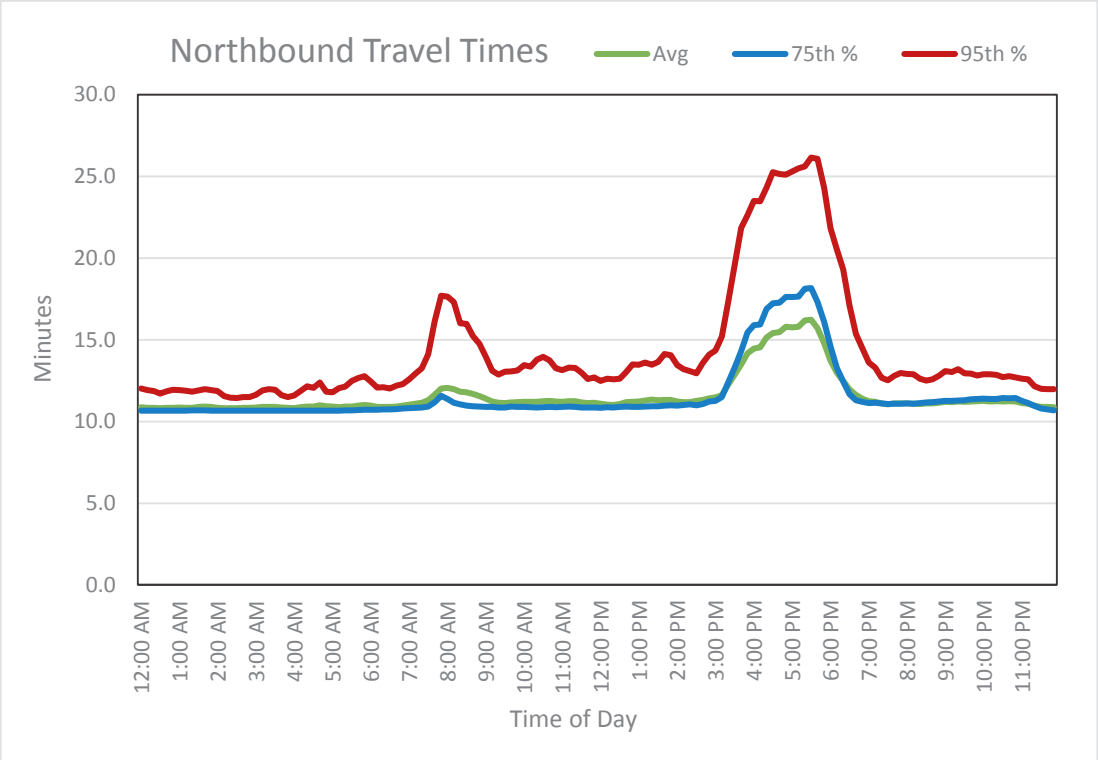


**Figure 70.** Segment 1- M-39 between I-96 and I-94/Van Born Rd

## Segment 1

Travel time (minutes) for M-39 between I-96/Exit 11 and I-94/Van Born Rd/Exit 1



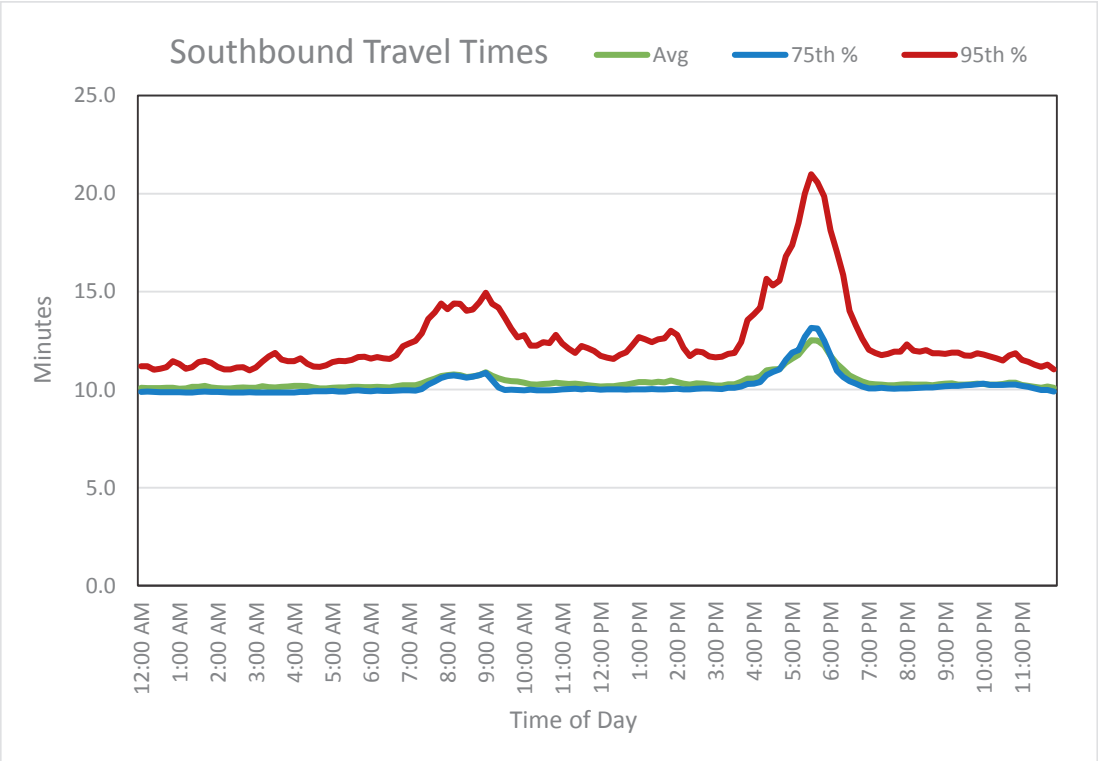
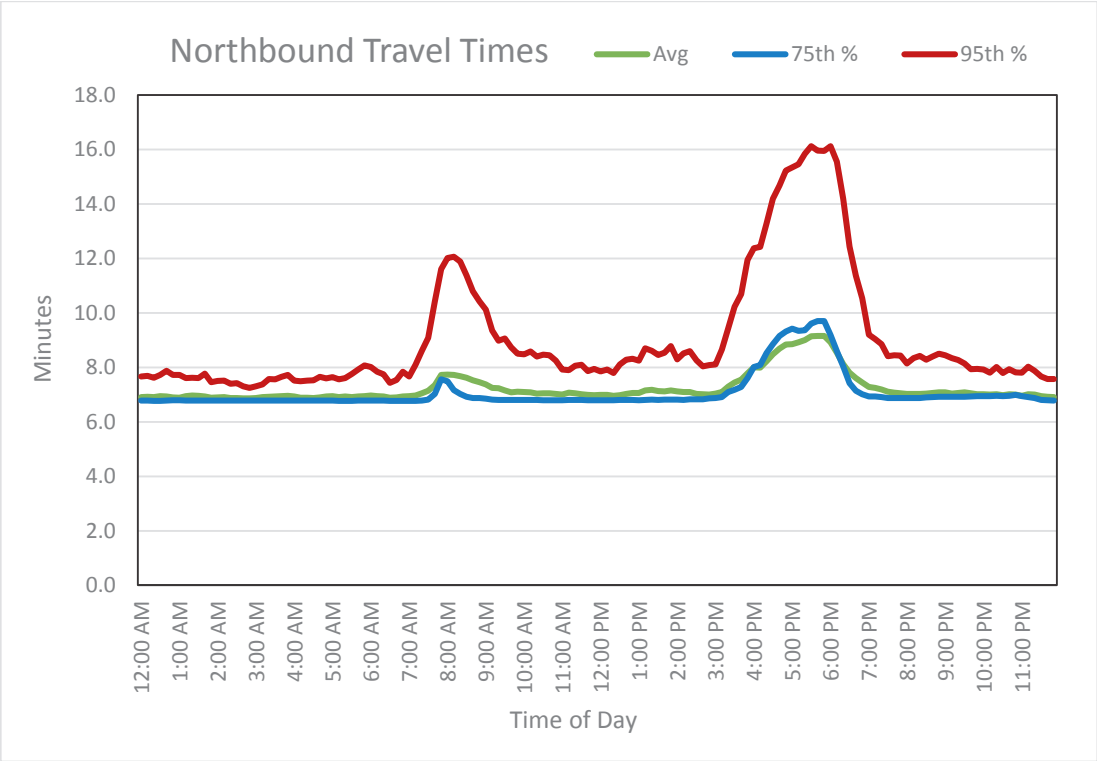
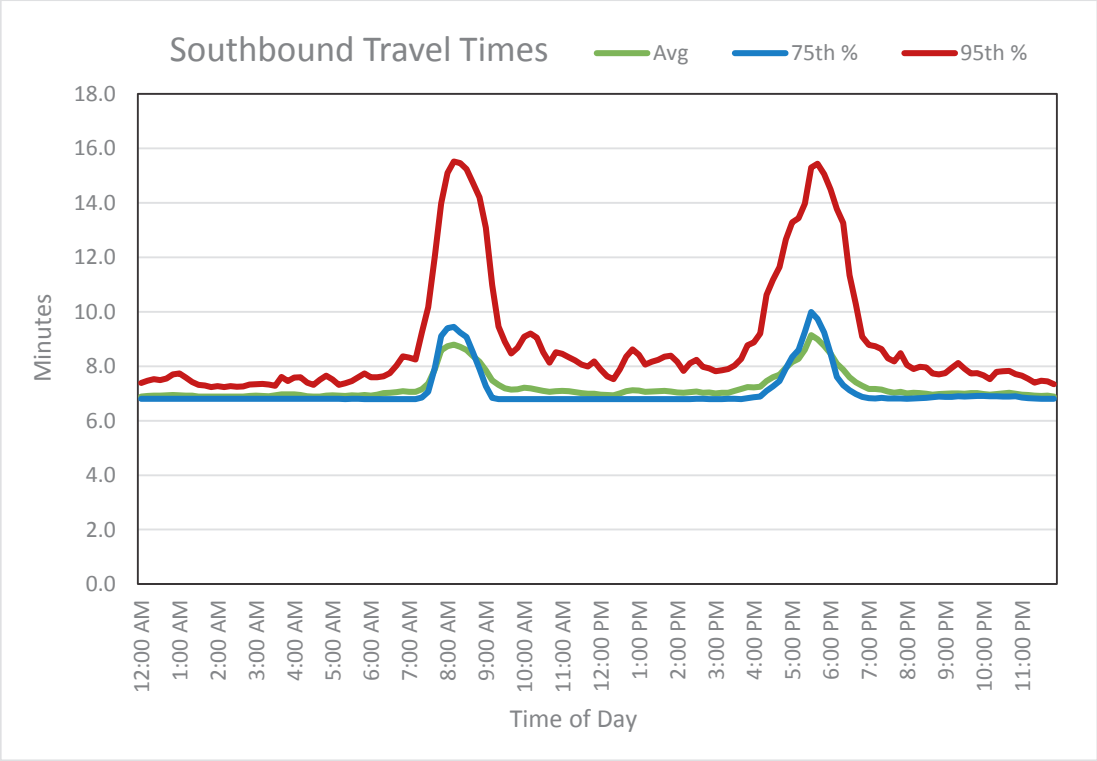



**Figure 71.** Segment 2- M-39 between I-96 and Southfield Rd

## Segment 2

### Travel time (minutes) for M-39 between I-96/Exit 11 and Southfield Rd



Chapter 4

# Corridor


Interstate 69: **St. Clair**

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Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 72.** Macomb County M-53 Corridor total user delay cost

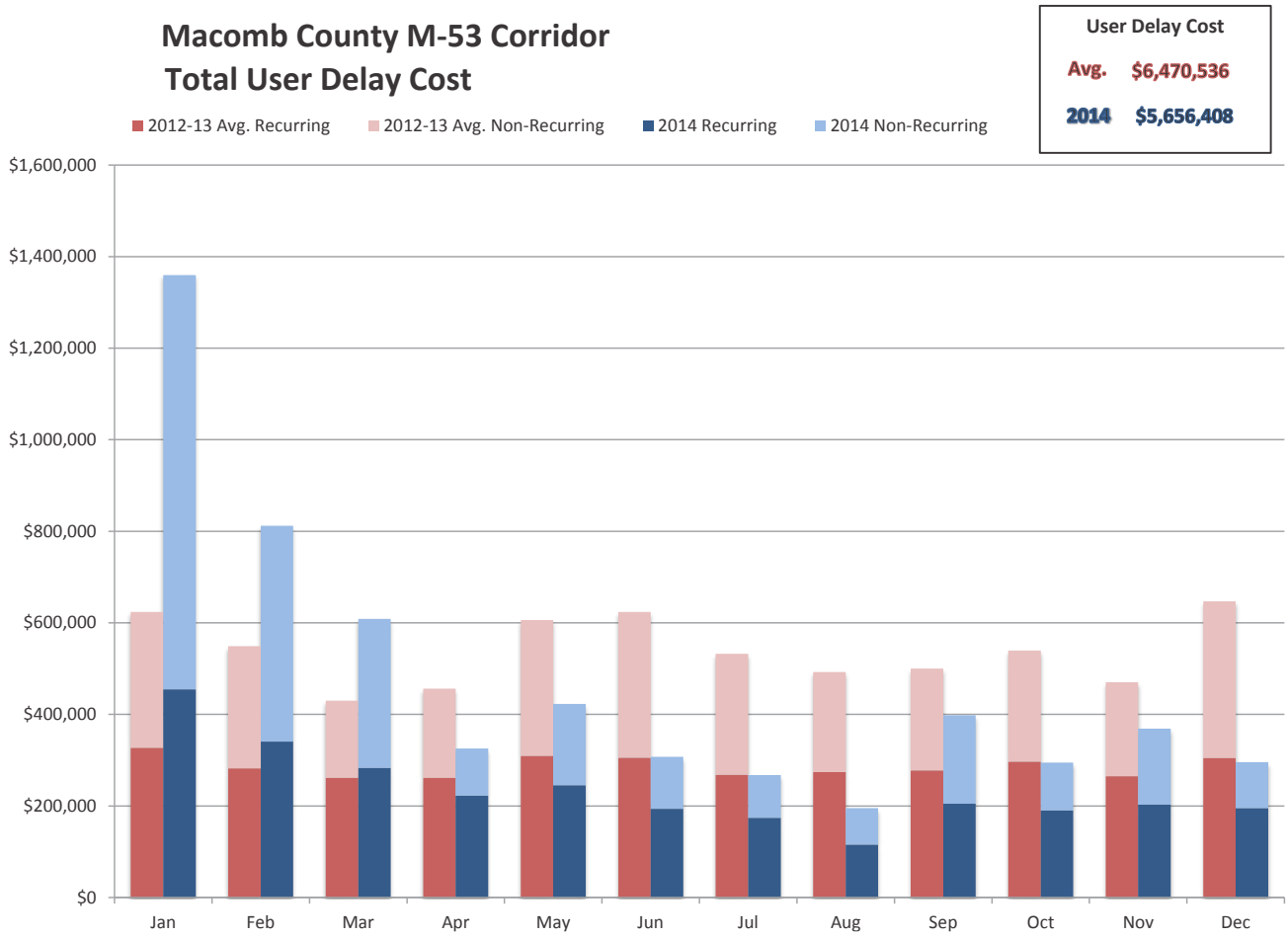


Figure 73. Metro Region M-53 northbound

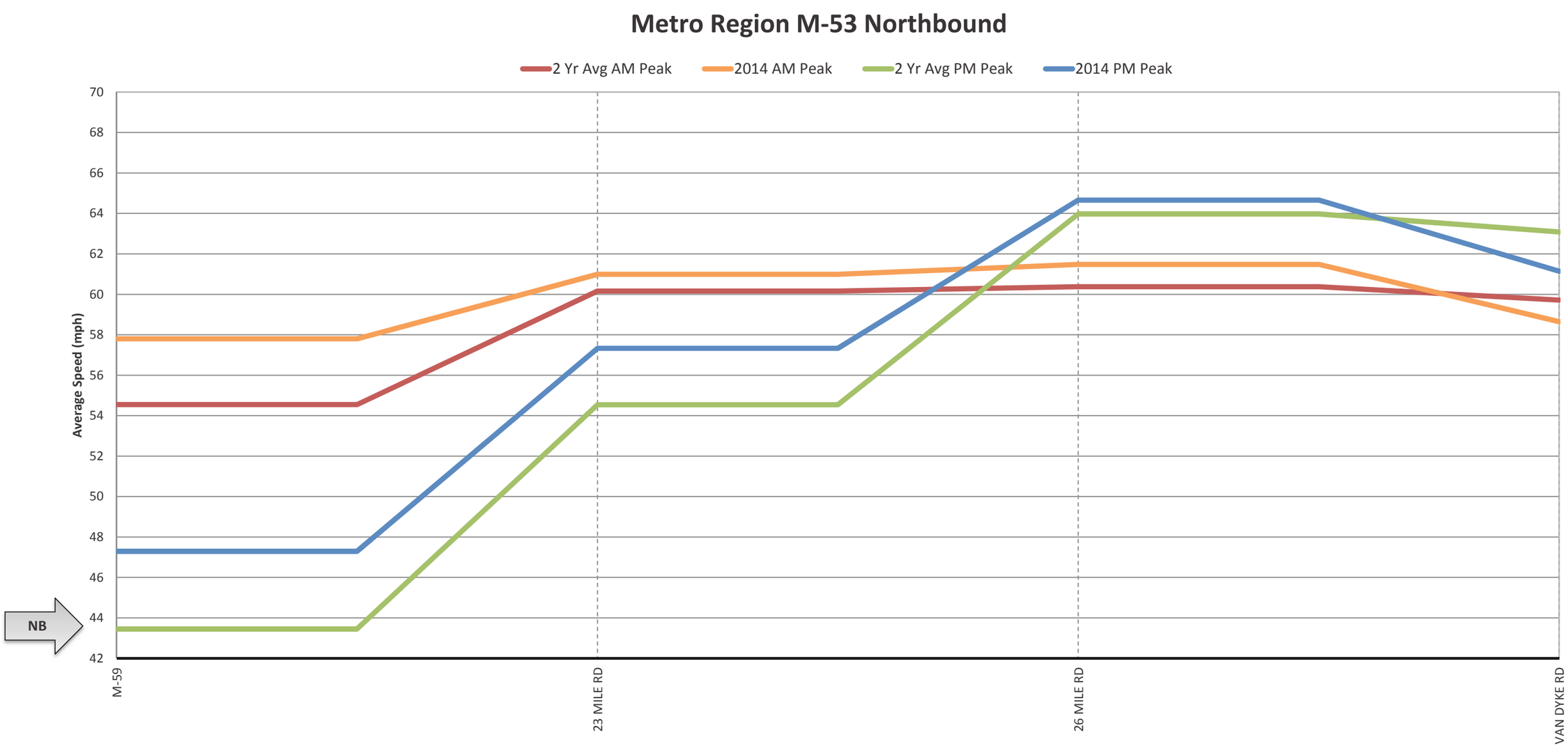
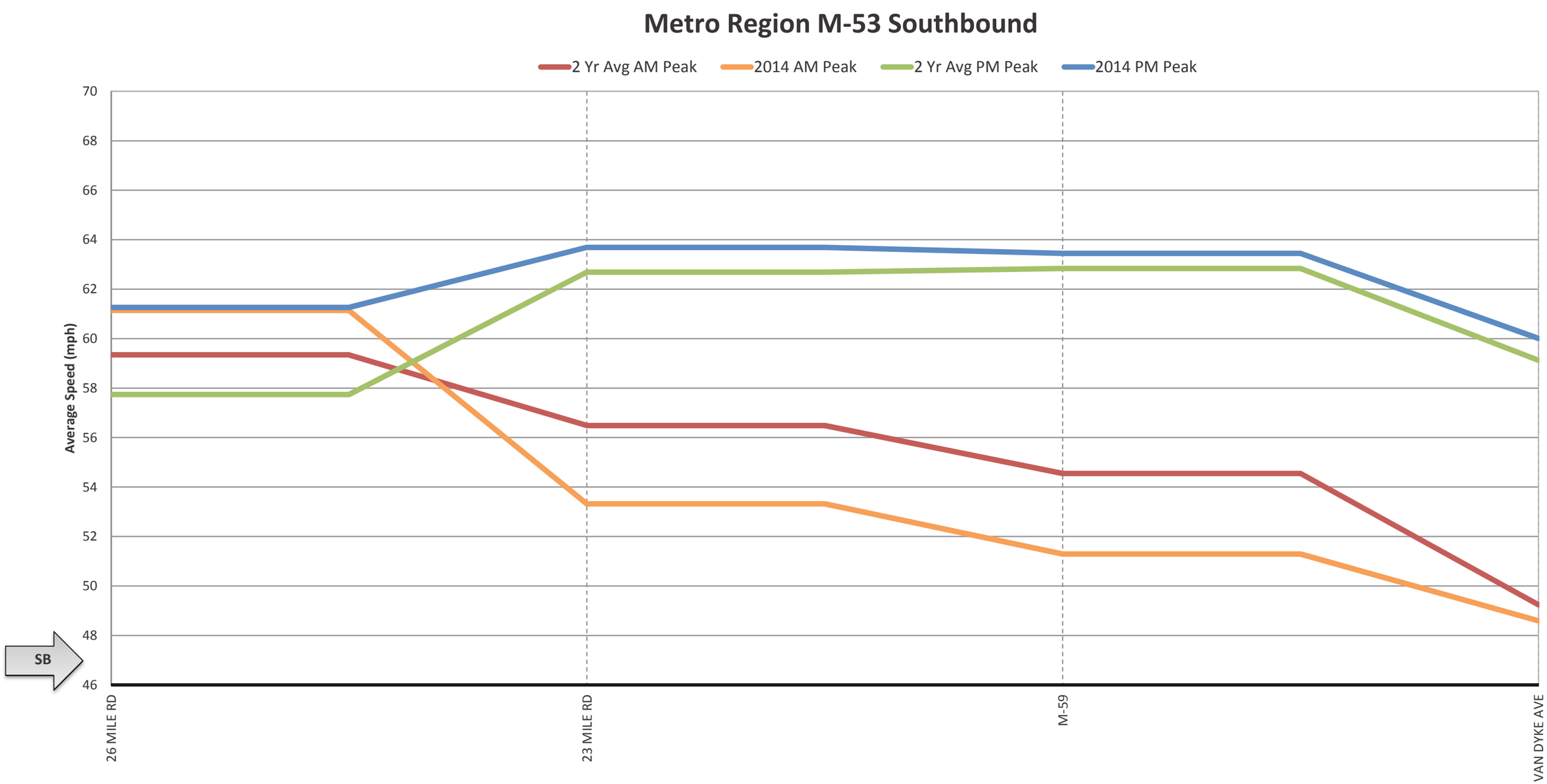


Figure 74. Metro Region M-53 southbound



# Travel Time Reliability

Figure 75. Travel time reliability M-53

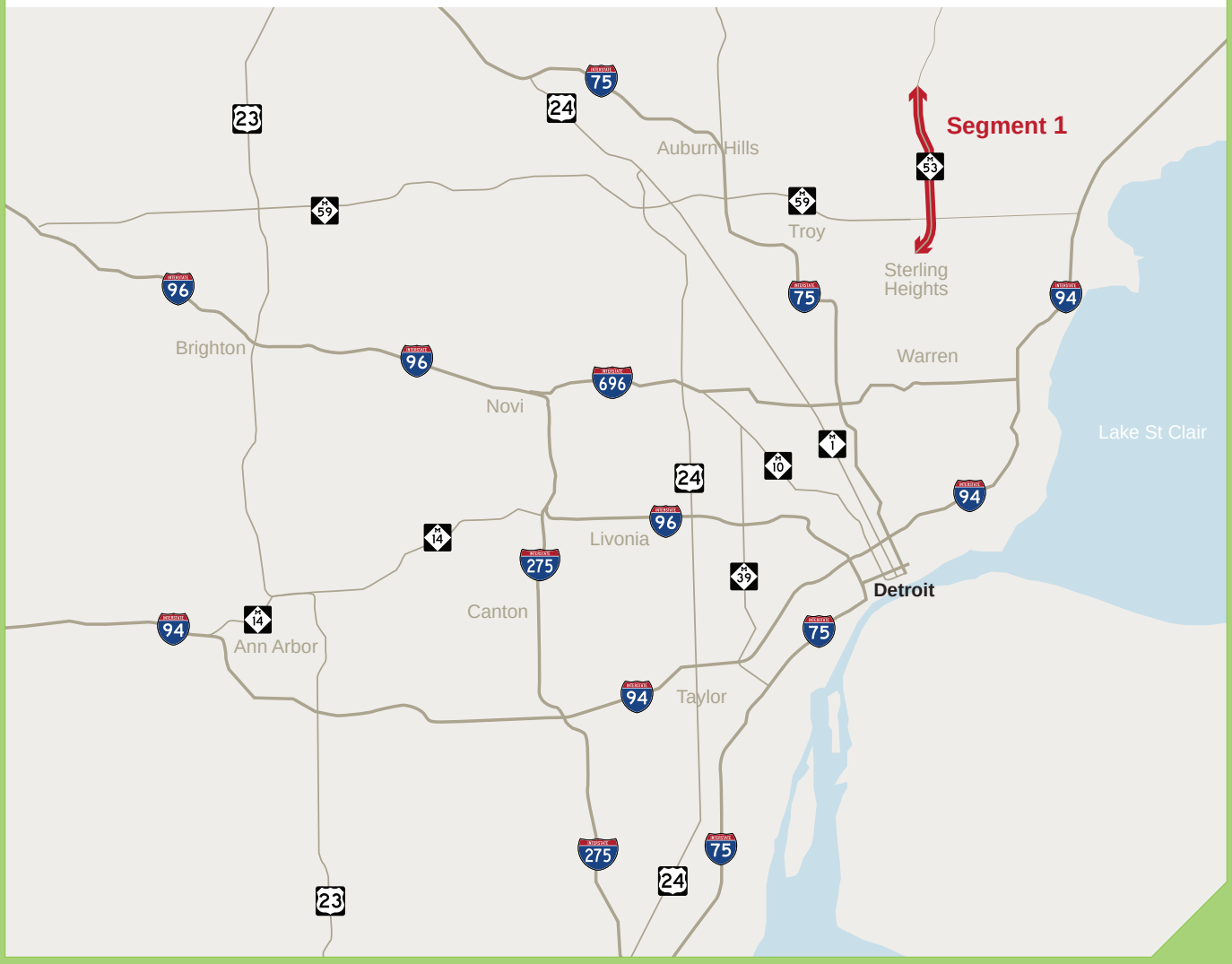
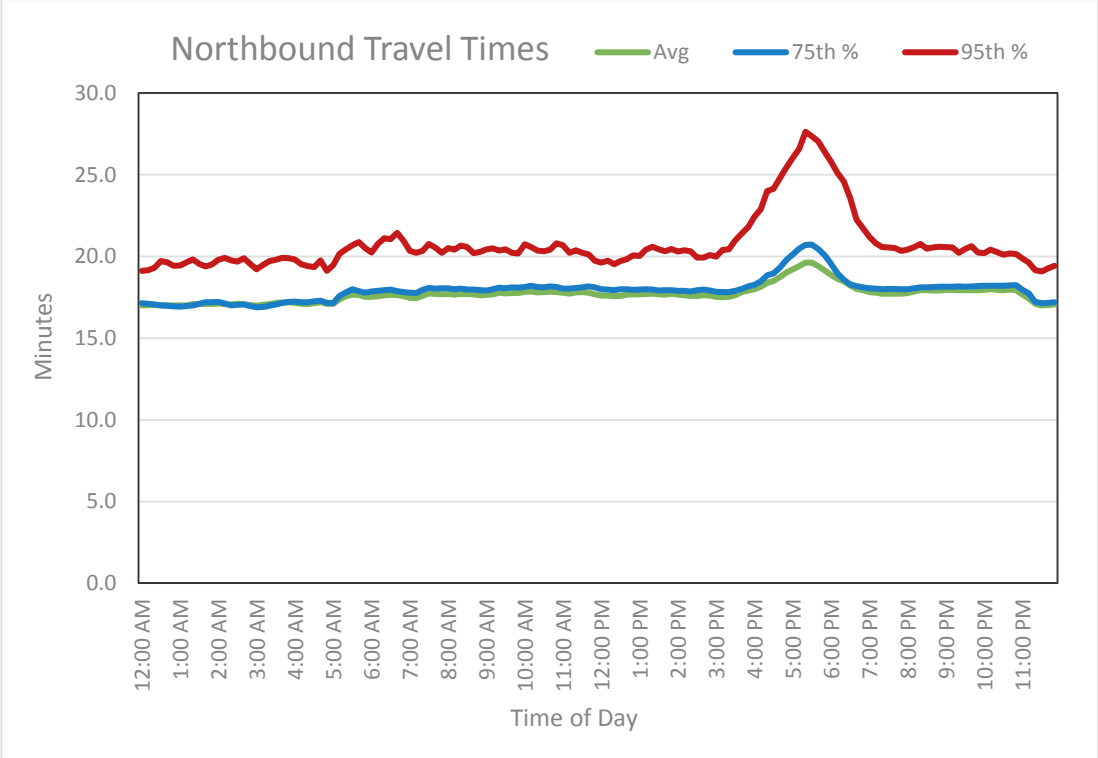
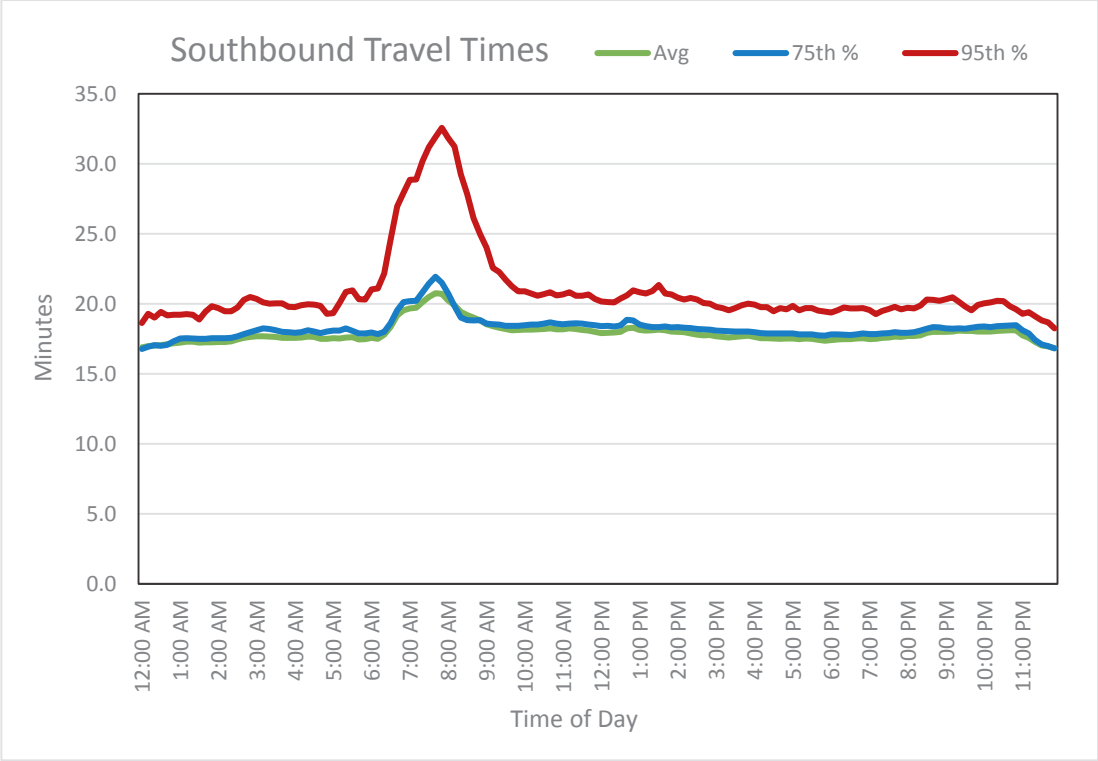


**Figure 76.** Segment 1- M-53

Segment 1

Travel time (minutes) for M-53



Chapter 4

# Corridor


Interstate 69: **St. Clair**

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Interstate 94: **Taylor, Detroit 55mph, Macomb, and St. Clair**

Interstate 96: **Oakland, Taylor, and Detroit Plus Local**

Interstate 275: **Wayne**

Interstate 696: **Oakland and Macomb**

Michigan 10: **Detroit 55mph and Oakland**

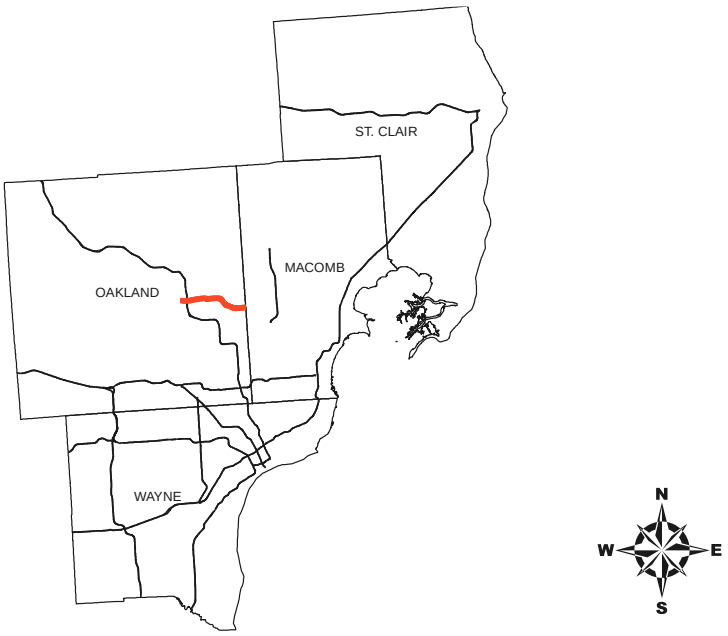
Michigan 14: **Taylor**

Michigan 39: **Detroit 55mph**

Michigan 53: **Macomb**

Michigan 59: **Oakland**

**Figure 77.** Oakland County M-59 Corridor total user delay cost



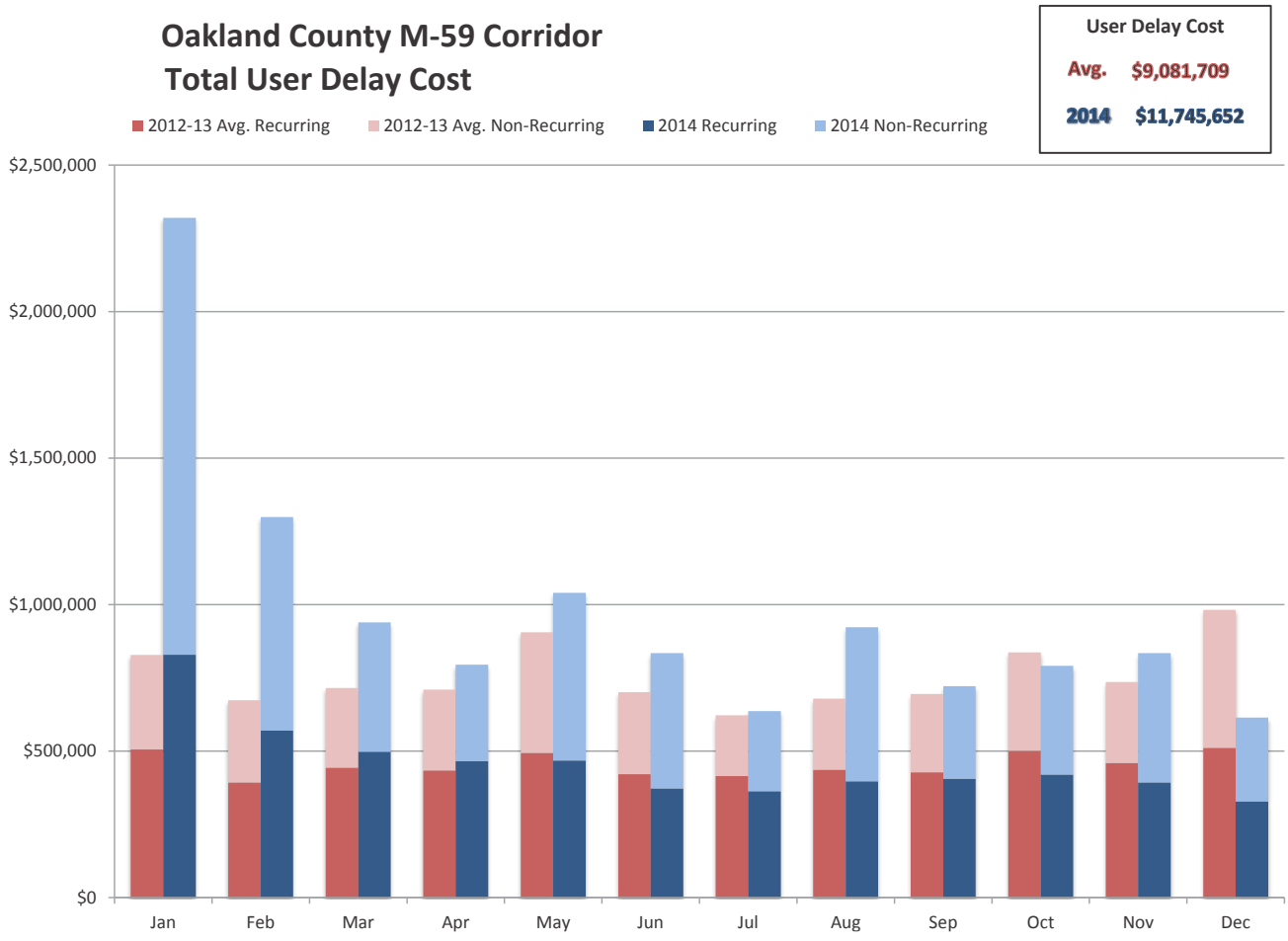



Figure 78. Metro Region M-59 eastbound

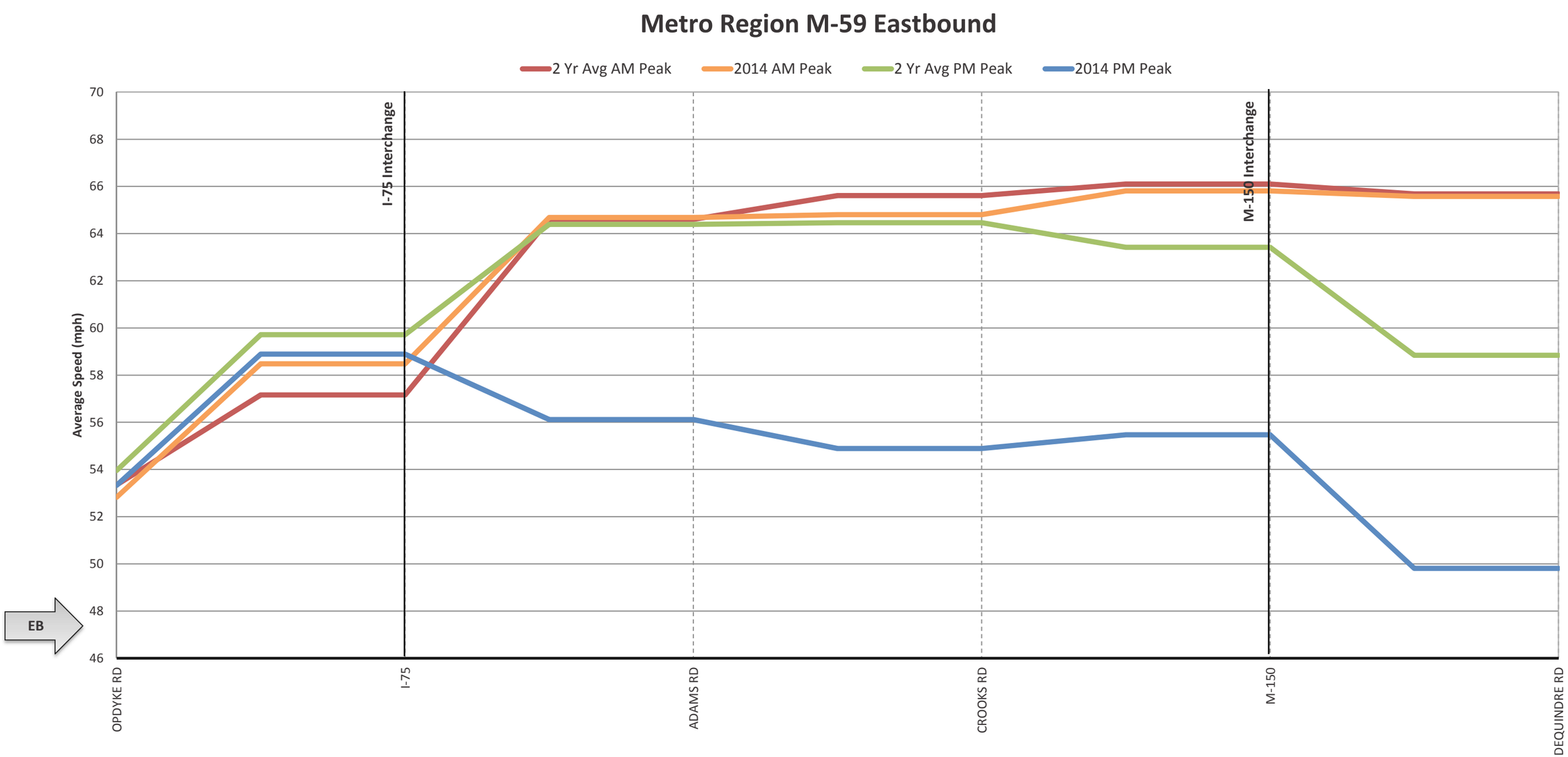
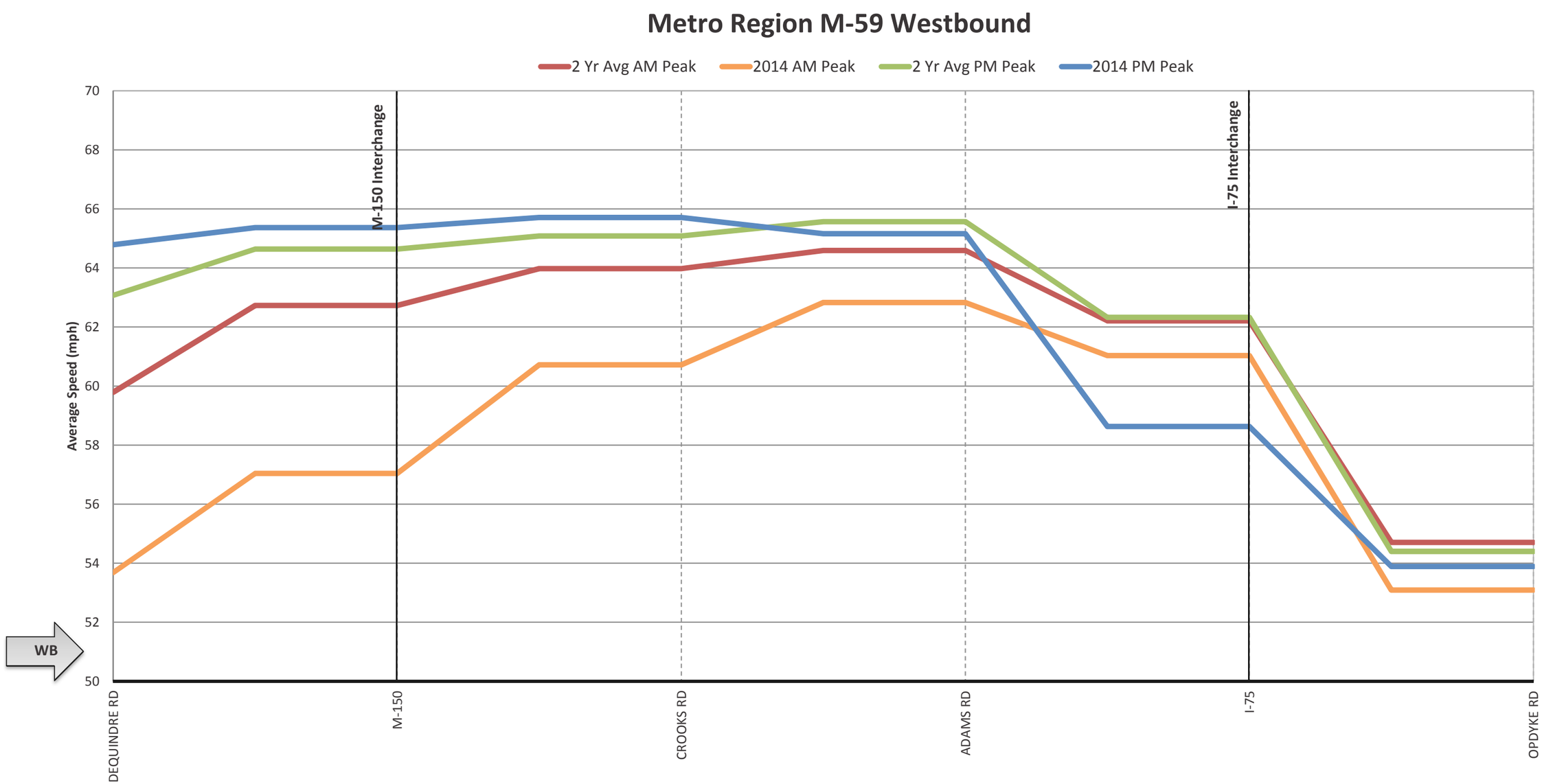


Figure 79. Metro Region M-59 westbound



# Travel Time Reliability

Figure 80. Travel time reliability M-59

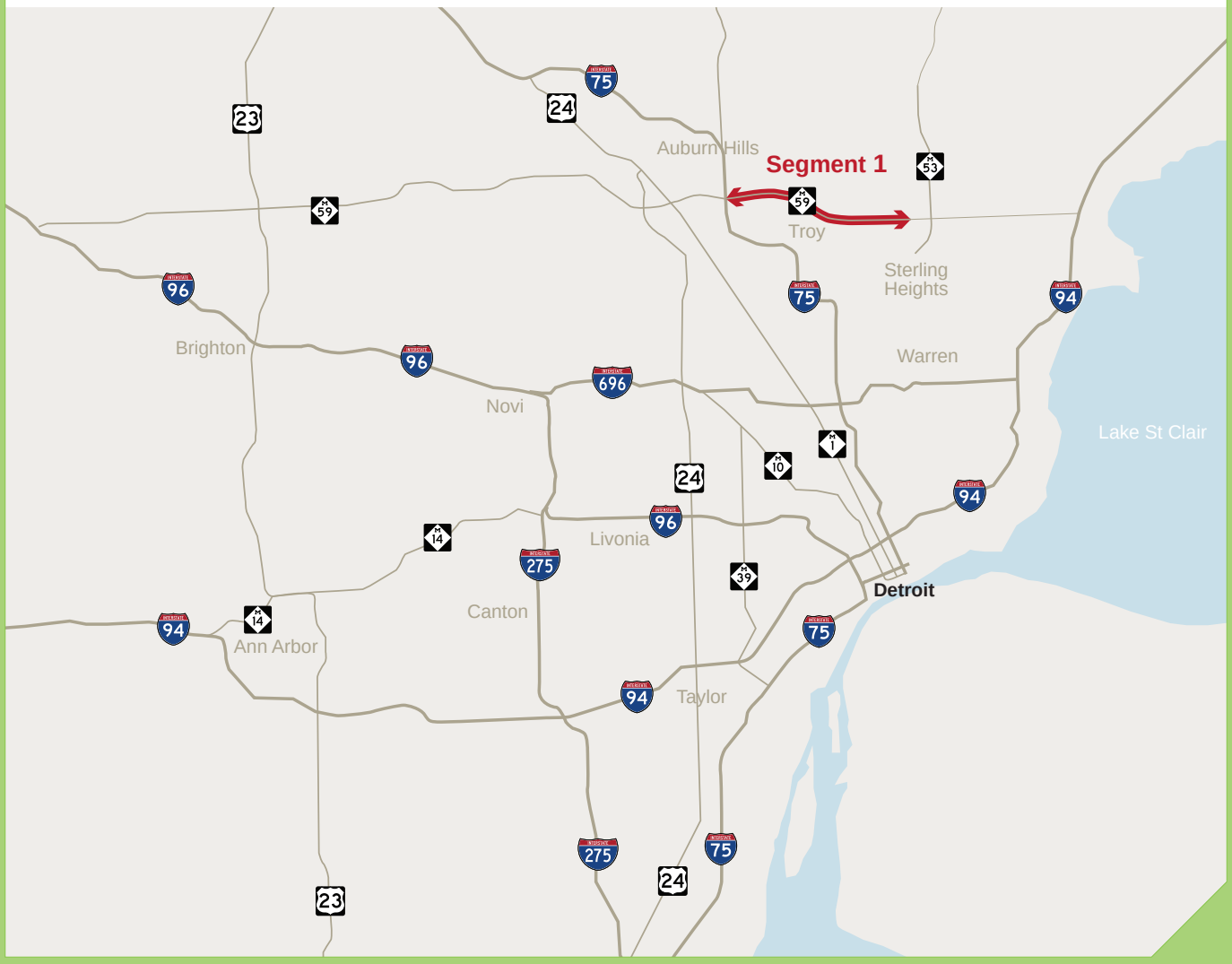
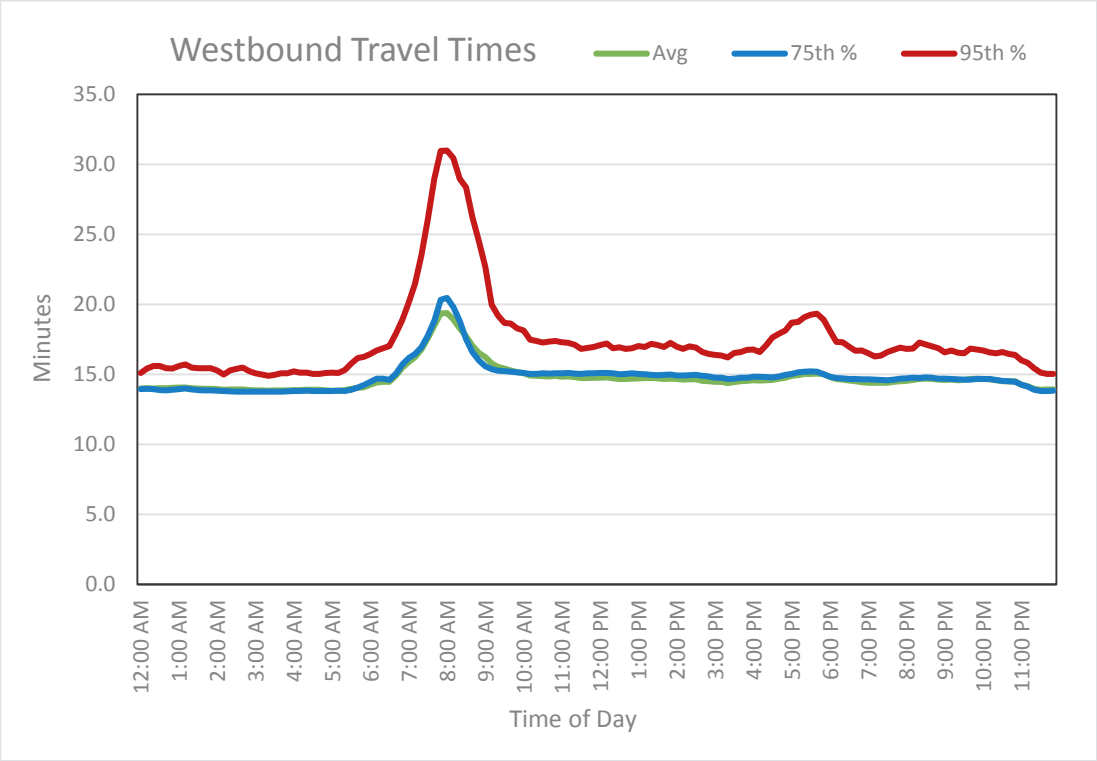
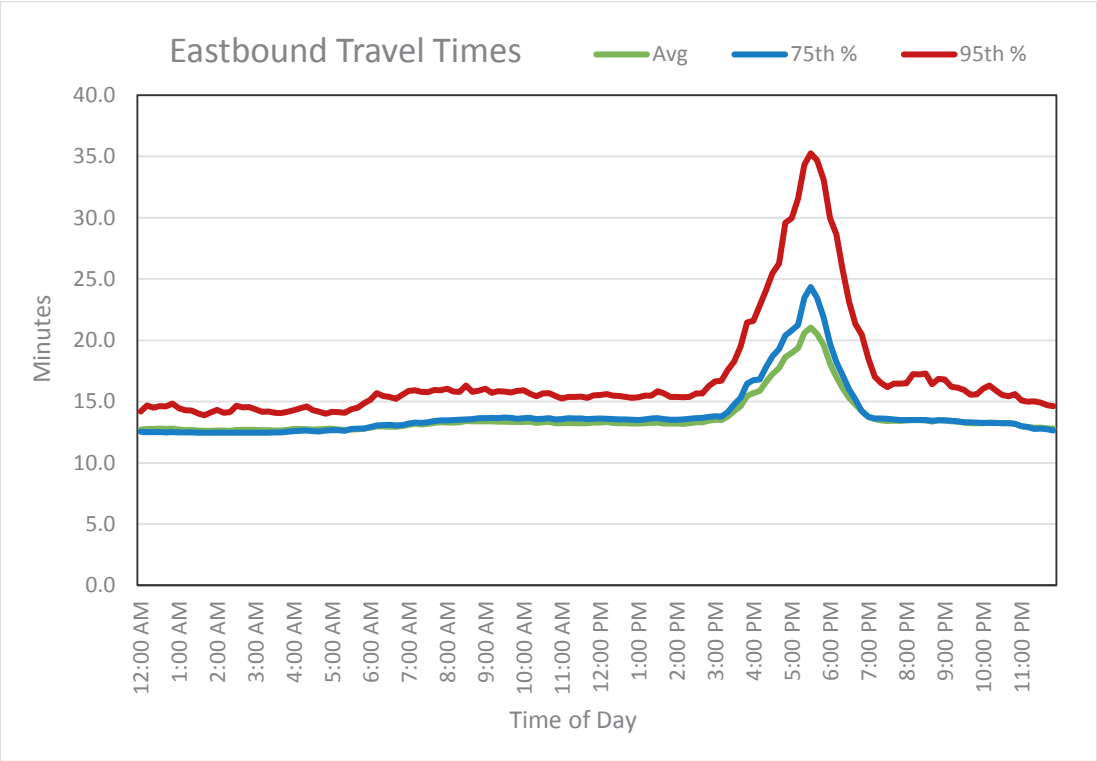


**Figure 81.** Segment 1- M-59 between Van Dyke Ave and MLK Jr Blvd

## Segment 1

### Travel time (minutes) for M-59 between Van Dyke Ave and MLK Jr Blvd



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