

MAP-21 Visual Analytics (and beyond the PM3)

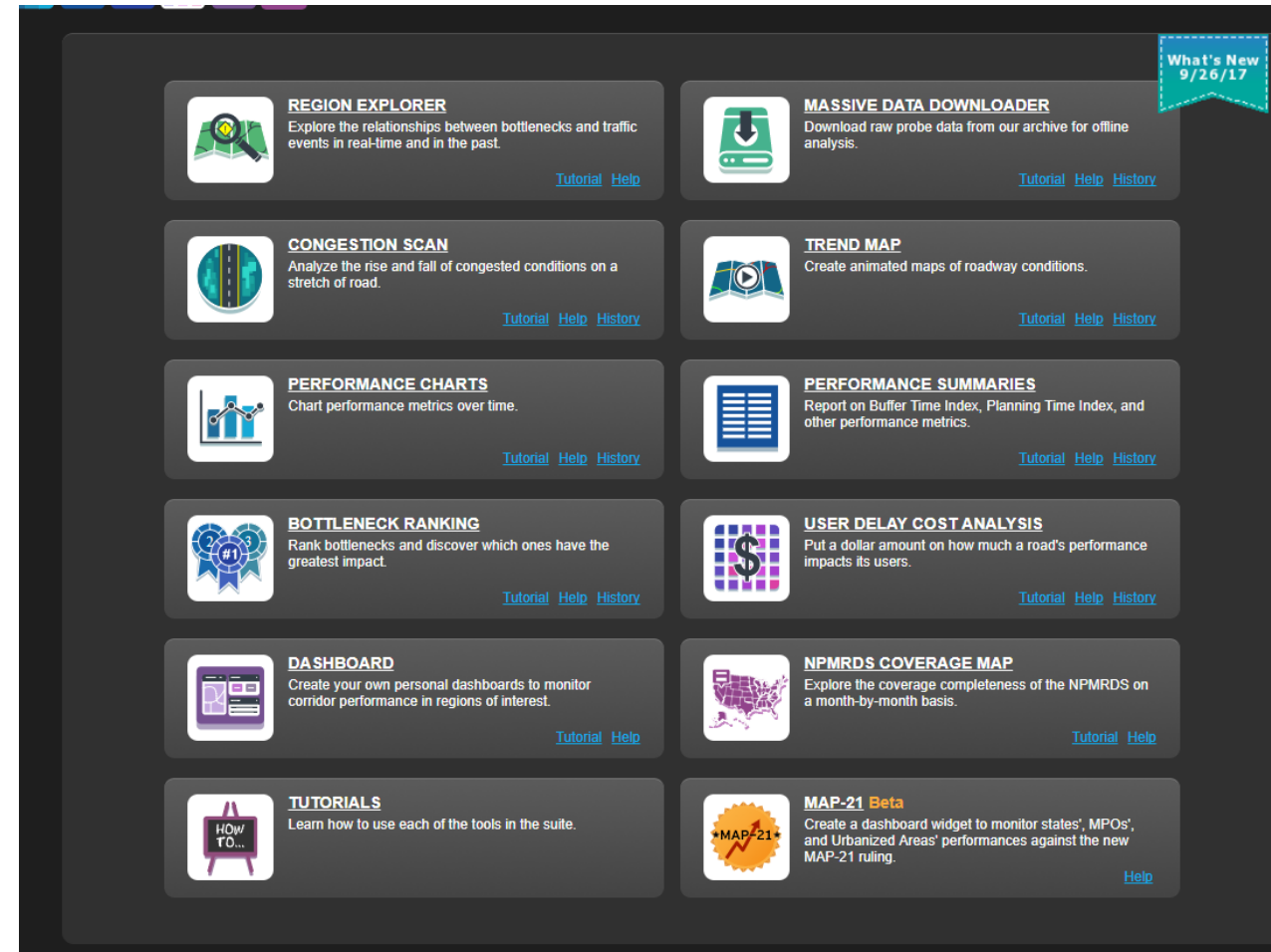
Michael Pack, Director of CATT Laboratory



Enabling agencies through better communication, data-based decision making, advanced insights discovery, and enhanced operations and planning capabilities.

Competitive Procurement with AASHTO

- Tools & Tech Support
 - MAP-21 reporting tools including:
 - Additional Tools for deep-dive analytics
- Additional INRIX NPMRDS v2.0 Data
 - Jan 2016 – Jan. 2017
 - Beyond the NHS (all TMCs) data set





Our MAP-21 widgets are fully up to date with the final MAP-21 ruling.

1. Select geography:

☒ State

Type state name or select from list...

☐ MPAs

☐ UZAs

VA - Roanoke Valley MPO, Roanoke

VA - Staunton-Augusta-Waynesboro MPO (SAWMPO)

VA - Tri Cities Area MPO, Petersburg

VA - Winchester-Frederick County MPO, Winchester (WinFr...)

VT - Chittenden County RPC, Burlington

WA - Longview-Kelso-Rainier MPO, Kelso

WA - Puget Sound Regional Council, Seattle (PSRC)

WA - Skagit MPO, Mt. Vernon (SMPO)

[Provide](#)

WA - Southwest Washington Regional Transportation Council

2. Select mode:

☐ Percent

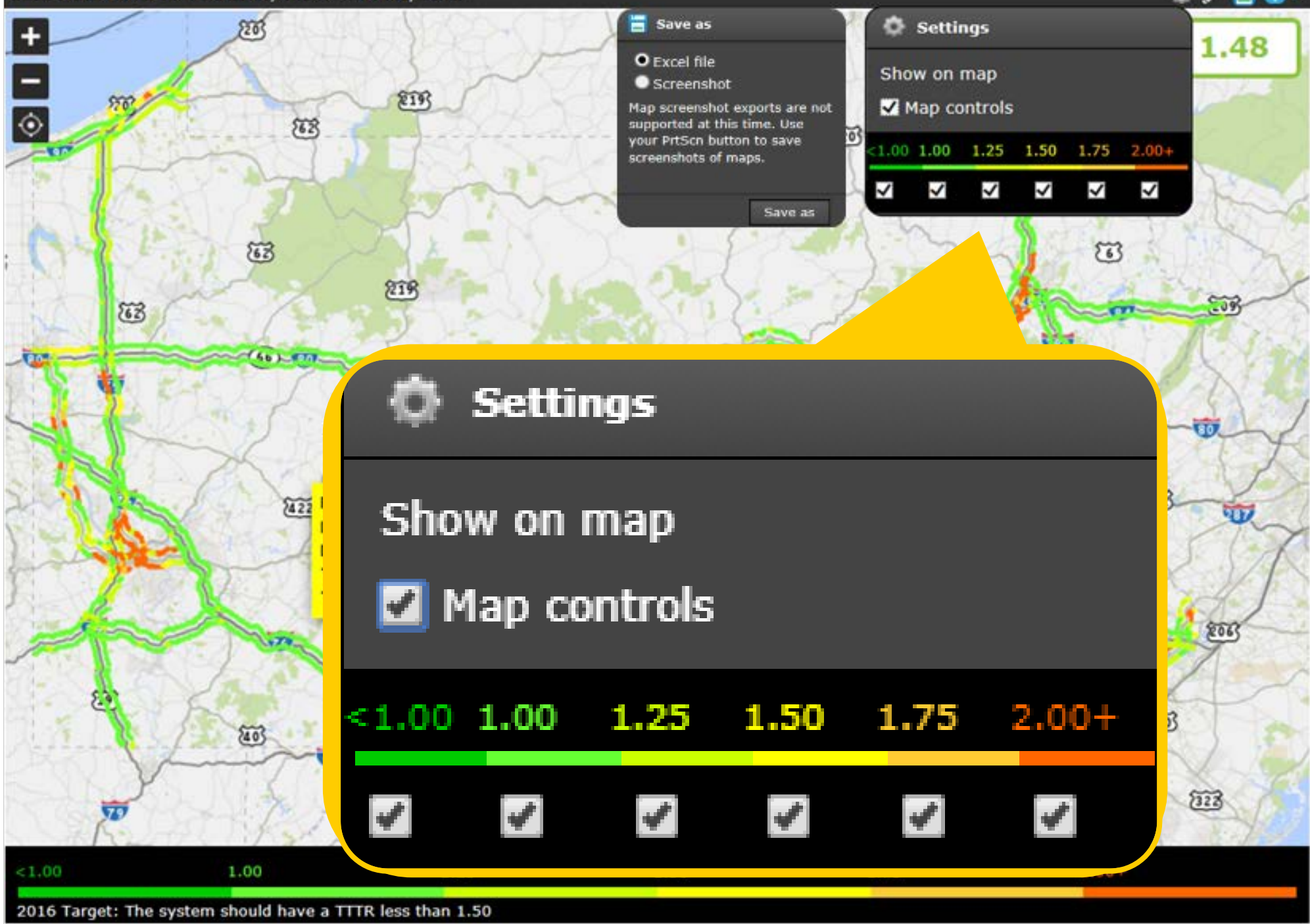
Travel

☐ Percent

Intersta

☐ Truck T

☐ Annual



Maryland

MAP-21 Interstate System Travel Time Reliability

Year's Performance

Target
at least
80%

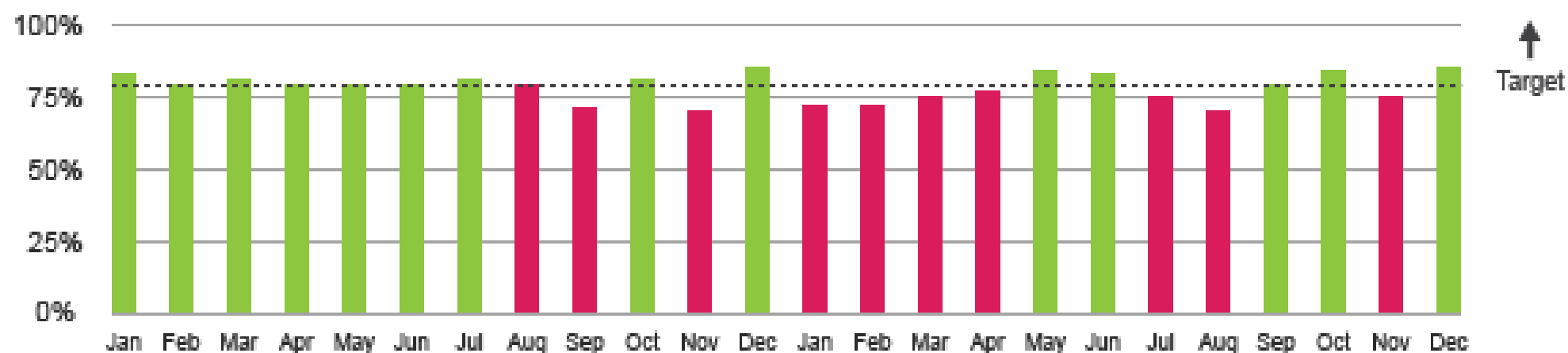
2015

 **80.3%**

2016

 **80.5%**

2016 and 2015 Target: At least 80% of the system should have a LOTTR less than 1.5



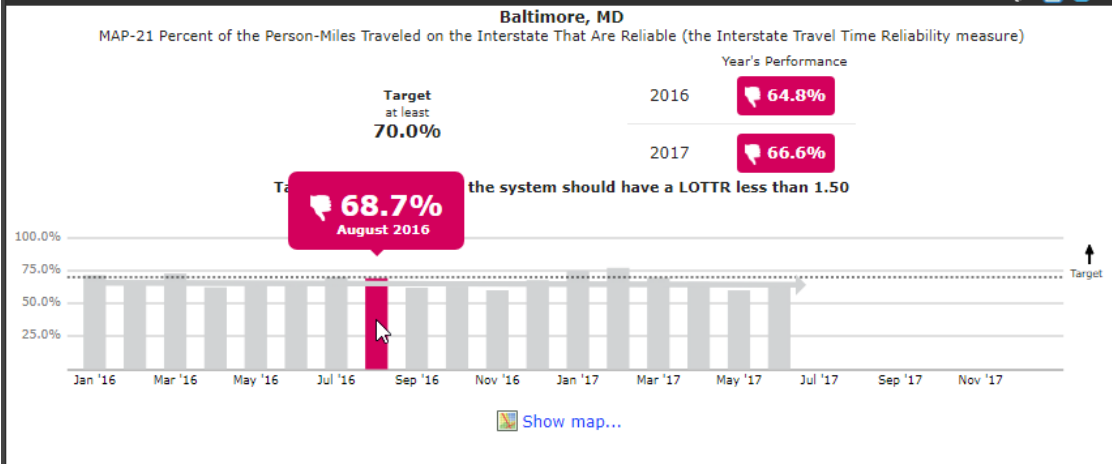
[Show map...](#)

Using NPMRDS (Truck and passenger vehicles) data

Updated Jul 1, 2017 10:42 AM (9m ago)

Yearly reliability calculated using 97.4% of miles in Maryland 

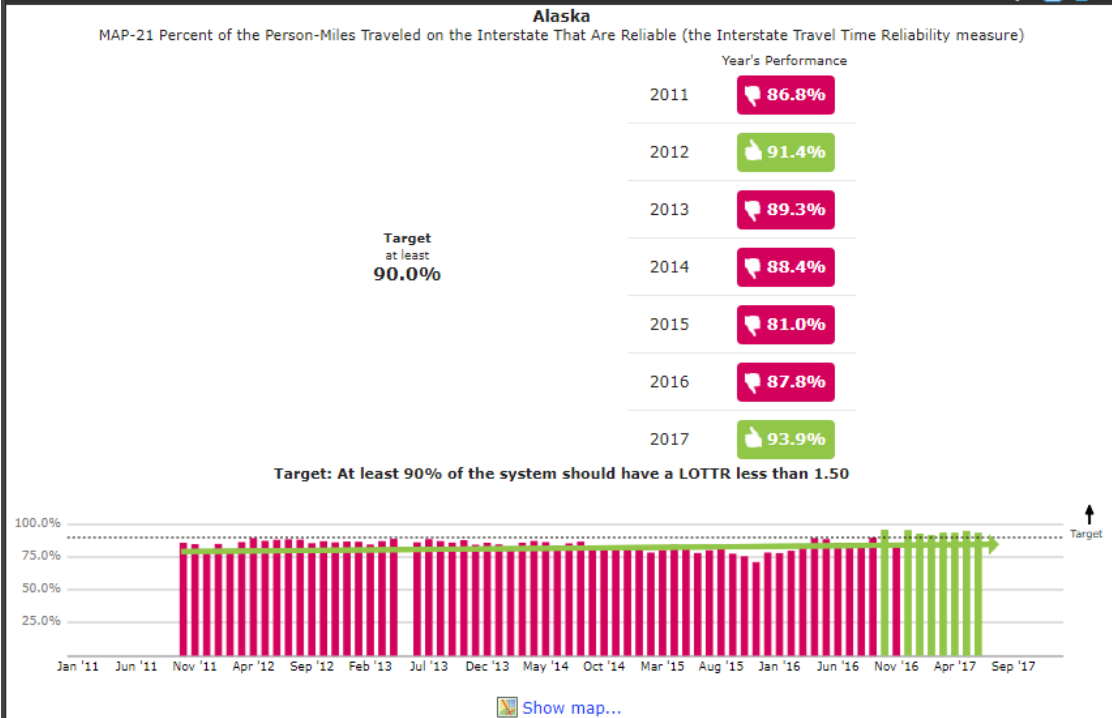
Interstate Travel Time Reliability for Baltimore (MD)



Using NPMRDS (Trucks and passenger vehicles) data Updated Dec 7, 2017 2:36 PM (5m ago)

Yearly reliability calculated using 99.55% of miles in Baltimore

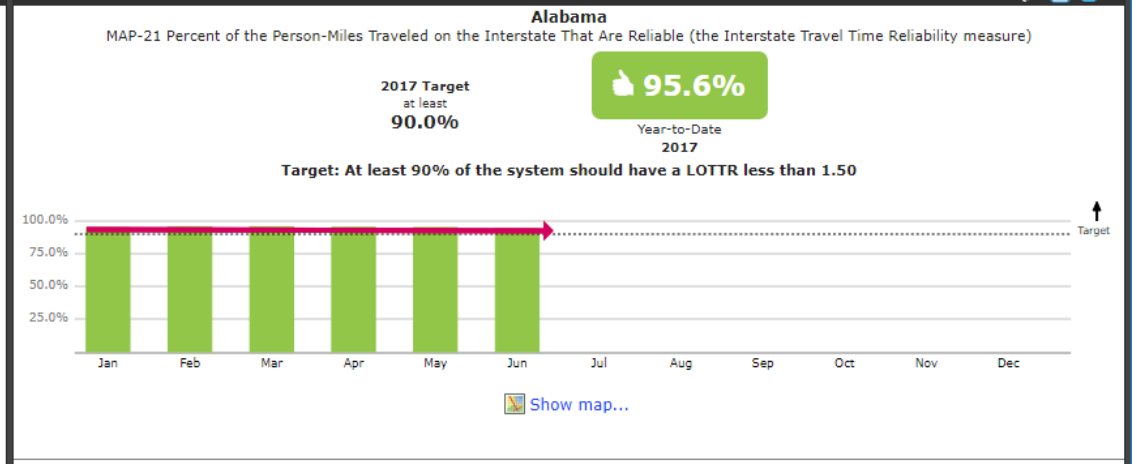
Interstate Travel Time Reliability for Alaska



Using NPMRDS (Trucks and passenger vehicles) data Updated Dec 7, 2017 2:36 PM (5m ago)

Yearly reliability calculated using 99.57142857142857% of miles in Alaska

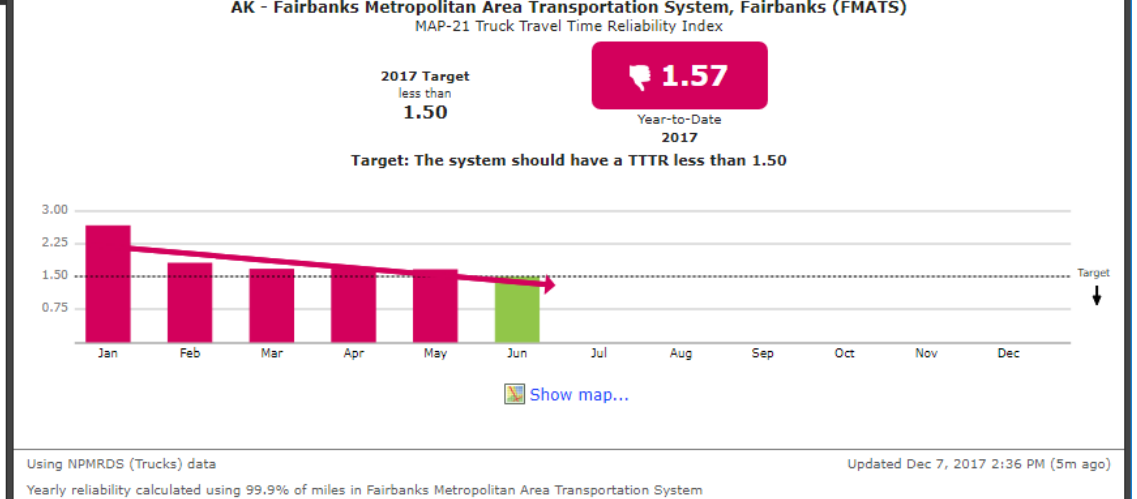
2017 Interstate Travel Time Reliability for Alabama



Using NPMRDS (Trucks and passenger vehicles) data Updated Dec 7, 2017 2:36 PM (5m ago)

Yearly reliability calculated using 100% of miles in Alabama

2017 Truck Travel Time Reliability Index for AK - Fairbanks Metropolitan Area Transportation System, Fairbanks (FMATS)



Using NPMRDS (Trucks) data Updated Dec 7, 2017 2:36 PM (5m ago)

Yearly reliability calculated using 99.9% of miles in Fairbanks Metropolitan Area Transportation System

Alaska

MAP-21 Percent of the Person-Miles Traveled on the Interstate That Are Reliable (the Interstate Travel Time Reliability measure)

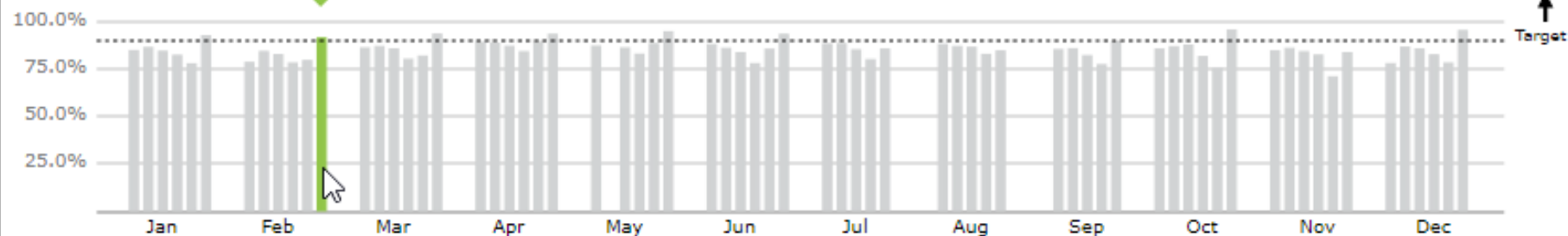
Year's Performance

2011	86.8%
2012	91.4%
2013	89.3%
2014	88.4%
2015	81.0%
2016	87.8%
2017	93.9%

Target
at least
90.0%

91.3%
February 2017

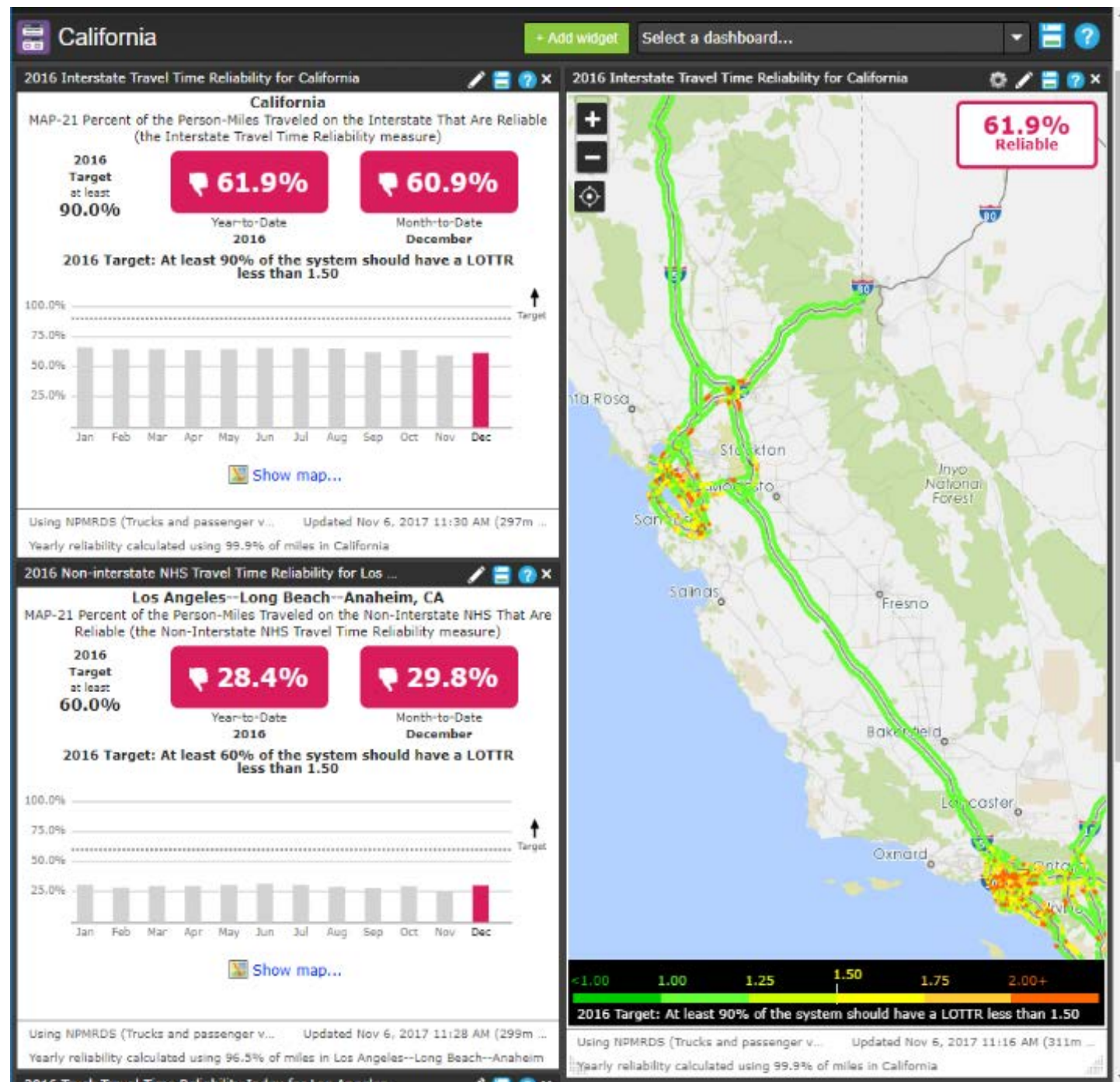
At least 90% of the system should have a LOTTR less than 1.50

[Show map...](#)

Using NPMRDS (Trucks and passenger vehicles) data

Updated Dec 7, 2017 12:53 PM (109m ago)

Yearly reliability calculated using 99.57142857142857% of miles in Alaska



Other NPMRDS Use-case Examples

- System Performance Reporting
- Problem Identification
- Project Prioritization
- After Action Incident Review
- Before & After Studies
- Operations
- Travel Time Analysis
- Work Zone Impacts
- Significant Event Analysis
- Public Information Campaigns



Real-world

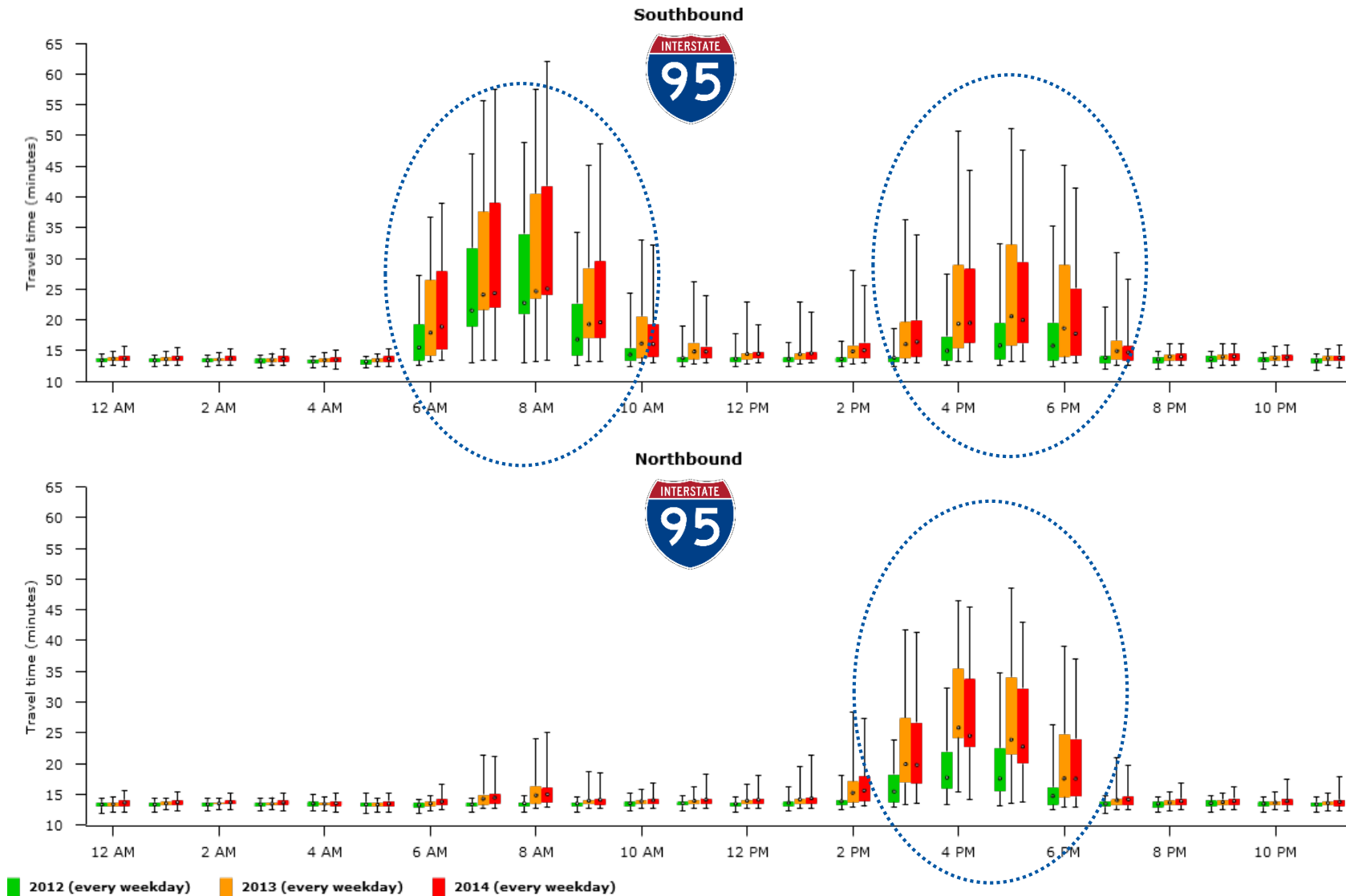
agency use cases





Work Zone Impacts

dynamic charting with a wide range of display options



The \$2B I-95 Reconstruction project in Philadelphia, PA caused 20% - 45% increases in peak period travel time.

These charts were used to help justify increased transit spending for extra rail cars to help mitigate construction impact.



Infrastructure Failure Impacts

estimate the cost of delay due to congestion

Cost & Delay Impacts of the I-85 Bridge Collapse in Atlanta, GA

Total Cost																									
	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Totals
3/10/17	\$6.5K	\$5.3K	\$1.9K	\$2K	\$10.6K	\$30.9K	\$122.3K	\$255.9K	\$290.9K	\$213.1K	\$223.4K	\$256.8K	\$345.3K	\$396.9K	\$484.4K	\$659.6K	\$937.3K	\$907.6K	\$556.5K	\$315.2K	\$194.2K	\$126.7K	\$109.6K	\$35.7K	\$8,468.5K
3/11/17	\$19.7K	\$10.6K	\$7.9K	\$2.5K	\$2.7K	\$3.2K	\$10.3K	\$34.6K	\$72.7K	\$113.4K	\$165K	\$221.3K	\$301.2K	\$343.6K	\$380.6K	\$411.2K	\$429.5K	\$346.7K	\$237.5K	\$175.7K	\$125.2K	\$96.4K	\$74.2K	\$33.2K	\$3,618.7K
3/12/17	\$20.1K	\$8.9K	N/A	\$3.1K	\$4.3K	\$6.4K	\$9.1K	\$15.9K	\$81K	\$88.3K	\$114K	\$143.9K	\$175K	\$192.5K	\$220.6K	\$204.4K	\$203.9K	\$171.2K	\$135.1K	\$107.5K	\$92.9K	\$68.6K	\$42.7K	\$10.4K	\$2,099.9K
3/13/17	\$3.2K	\$2.1K	\$1.4K	\$1.5K	\$2.6K	\$10.4K	\$93.2K	\$276K	\$317.2K	\$174.6K	\$146K	\$179.6K	\$219.4K	\$222K	\$292.2K	\$449K	\$688.6K	\$850.8K	\$453.1K	\$175K	\$164.5K	\$114.1K	\$59.8K	\$16K	\$4,912.4K
3/14/17	\$5.6K	\$2.6K	\$1.9K	\$1.8K	\$3.1K	\$13.8K	\$107.8K	\$340.1K	\$424.8K	\$279.5K	\$197K	\$202.3K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$4,619.8K
3/15/17	\$3.9K	\$2.1K	\$1.6K	\$1.8K	\$3.1K	\$10.3K	\$94.8K	\$305.1K	\$419K	\$291.7K	\$193.8K	\$203.7K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$5,844.9K
3/16/17	\$4.4K	\$2.2K	\$2.1K	\$1.7K	\$2.5K	\$11.3K	\$104.4K	\$311.4K	\$363.4K	\$243.8K	\$189.2K	\$203.5K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$5,880.3K
3/17/17	\$8.5K	\$4.2K	\$2.6K	\$2.6K	\$3K	\$11.4K	\$82.8K	\$234.5K	\$256.3K	\$174.3K	\$166.2K	\$213.8K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$5,765.7K
3/18/17	\$15K	\$7.5K	\$4.5K	\$4.5K	\$5.5K	\$11.5K	\$97.7K	\$52.9K	\$88.7K	\$114.6K	\$163.5K	\$200K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$3,410.1K
3/19/17	\$9.3K	\$5.8K	\$3.5K	\$3.5K	\$4.5K	\$11.5K	\$105.8K	\$14.4K	\$59.6K	\$92.7K	\$135.8K	\$171.5K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$2,473.2K
3/20/17	\$3.8K	\$2.5K	\$1.5K	\$1.5K	\$2.5K	\$11.5K	\$105.8K	\$316.5K	\$392.7K	\$266K	\$237.6K	\$254.9K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$4,857K
3/21/17	\$4.2K	\$2.5K	\$1.5K	\$1.5K	\$2.5K	\$11.5K	\$105.8K	\$339.7K	\$419.3K	\$273K	\$214.2K	\$228.3K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$5,223.8K
3/22/17	\$4.5K	\$2.5K	\$1.5K	\$1.5K	\$2.5K	\$11.5K	\$105.8K	\$402.7K	\$517.8K	\$341.7K	\$247K	\$222.9K	\$238K	\$264.6K	\$305.8K	\$397.1K	\$620.2K	\$745.1K	\$444.4K	\$207.5K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$5,765.1K
3/23/17	\$6.3K	\$2.5K	\$1.5K	\$1.5K	\$2.5K	\$11.5K	\$105.8K	\$350.6K	\$438.9K	\$276.4K	\$218.3K	\$238.1K	\$297K	\$326.8K	\$371.3K	\$514K	\$774.9K	\$939.7K	\$601.5K	\$255.4K	\$160.8K	\$108.8K	\$76.1K	\$14.6K	\$6,100.9K
3/24/17	\$4.6K	\$2.5K	\$1.5K	\$1.5K	\$2.5K	\$11.5K	\$105.8K	\$292.6K	\$296.5K	\$199K	\$187K	\$240.3K	\$357.1K	\$410.9K	\$552.5K	\$744.6K	\$1,010.1K	\$1,029K	\$597.3K	\$268.2K	\$195.5K	\$160.8K	\$108.8K	\$76.1K	\$6,776.5K
3/25/17	\$20.4K	\$11.5K	\$7.5K	\$7.5K	\$9.5K	\$11.5K	\$104.4K	\$35.7K	\$76.8K	\$122.9K	\$177.3K	\$241.6K	\$321.9K	\$396.1K	\$408.8K	\$435.6K	\$393.7K	\$330.1K	\$255.2K	\$172.8K	\$133.5K	\$108.8K	\$76.1K	\$14.6K	\$3,744.4K
3/26/17	\$16.7K	\$11.5K	\$7.5K	\$7.5K	\$9.5K	\$11.5K	\$104.4K	\$14.3K	\$85K	\$98.5K	\$135.6K	\$167.6K	\$218K	\$226K	\$236.9K	\$231.9K	\$234.1K	\$199K	\$166.1K	\$108.7K	\$92.6K	\$66.1K	\$42.7K	\$11.5K	\$2,371.7K
3/27/17	\$3.4K	\$2.5K	\$1.5K	\$1.5K	\$2.5K	\$11.3K	\$103.8K	\$331.3K	\$402K	\$271.8K	\$173.9K	\$199.5K	\$240.3K	\$256.5K	\$277K	\$372.1K	\$544.4K	\$654.6K	\$403.9K	\$166.6K	\$119.9K	\$86.5K	\$52K	\$15.2K	\$4,693.9K
3/28/17	\$4.5K	\$2.5K	\$1.9K	\$1.8K	\$3.2K	\$18K	\$189.8K	\$452.8K	\$541.1K	\$327K	\$219.8K	\$194.8K	\$223.2K	\$244.3K	\$290.1K	\$405.7K	\$638.3K	\$811.9K	\$498.7K	\$203.3K	\$134K	\$101.5K	\$60.7K	\$14.6K	\$5,583.9K
3/29/17	\$4.4K	\$2.8K	\$2.1K	\$3K	\$4.6K	\$13.4K	\$146.2K	\$393.3K	\$542.6K	\$339.2K	\$235.5K	\$230.6K	\$276.4K	\$301.9K	\$330K	\$446.6K	\$681.7K	\$872.4K	\$568.6K	\$249.7K	\$157.9K	\$111.5K	\$59.5K	\$14.6K	\$5,987K
3/30/17	\$4.2K	\$2.5K	\$2K	\$1.5K	\$3.3K	\$13.3K	\$130K	\$460K	\$527.3K	\$360.2K	\$278.3K	\$262.2K	\$315.5K	\$325K	\$396.6K	\$511.6K	\$857.7K	\$1,092.6K	\$752.8K	\$406.6K	\$290.7K	\$154.7K	\$76.9K	\$35.4K	\$7,254.9K
3/31/17	\$14.6K	\$2.8K	\$2.7K	\$3.2K	\$5.1K	\$24.3K	\$180.9K	\$441.8K	\$506.1K	\$357.8K	\$307.8K	\$342.3K	\$459K	\$546.5K	\$669.9K	\$891.6K	\$1,058.4K	\$911.6K	\$503.7K	\$261.3K	\$170.3K	\$120.2K	\$66.9K	\$24.2K	\$7,872.8K
4/01/17	\$18.6K	\$6.2K	\$2.9K	\$2K	\$2.6K	\$5.6K	\$12.6K	\$36.4K	\$113.5K	\$200.5K	\$243K	\$310.5K	\$375.2K	\$385.6K	\$368.2K	\$361.9K	\$323.7K	\$254.1K	\$186.2K	\$146.3K	\$118.2K	\$87K	\$63.9K	\$27.4K	\$3,662K
4/02/17	\$9.7K	\$4.8K	\$2.4K	\$2.1K	\$1.9K	\$3.2K	\$6.7K	\$11.4K	\$54.3K	\$85.5K	\$113.5K	\$149.7K	\$191.9K	\$214.6K	\$227.3K	\$259.2K	\$240K	\$172.1K	\$142.4K	\$120.6K	\$97.1K	\$71.7K	\$47.1K	\$15.8K	\$2,244.7K
4/03/17	\$3.8K	\$1.9K	\$1.4K	\$1.5K	\$3.1K	\$14.9K	\$136.3K	\$317.2K	\$337.1K	\$215.7K	\$123K	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$1,156K
Hourly Totals	\$222.3K	\$111.6K	\$62.5K	\$54.7K	\$85K	\$274.8K	\$2,126.7K	\$6,036.9K	\$7,584.6K	\$5,521.4K	\$4,805.9K	\$5,279.5K	\$6,597.9K	\$7,338.1K	\$8,345.8K	\$10,680.3K	\$14,391.9K	\$15,715.3K	\$9,946.5K	\$4,911.6K	\$3,484.7K	\$2,520.8K	\$1,595.5K	\$493.5K	Grand Total \$118,187,913.14

Typical Thurs. UDC = \$5M-\$6M
Bridge Collapse Thurs. UDC = \$7.2M; Fri. UDC = \$7.8M
(with PM rush starting 2-3 hr. sooner than normal)

User delay increased by ~20% on Thursday & Friday

User delay
increased by $\approx 20\%$
on Thursday &
Friday

Typical Thurs. UDC = \$5M-\$6M
Bridge Collapse Thurs. UDC = \$7.2M; Fri. UDC = \$7.8M
(with PM rush starting 2-3 hr. sooner than normal)

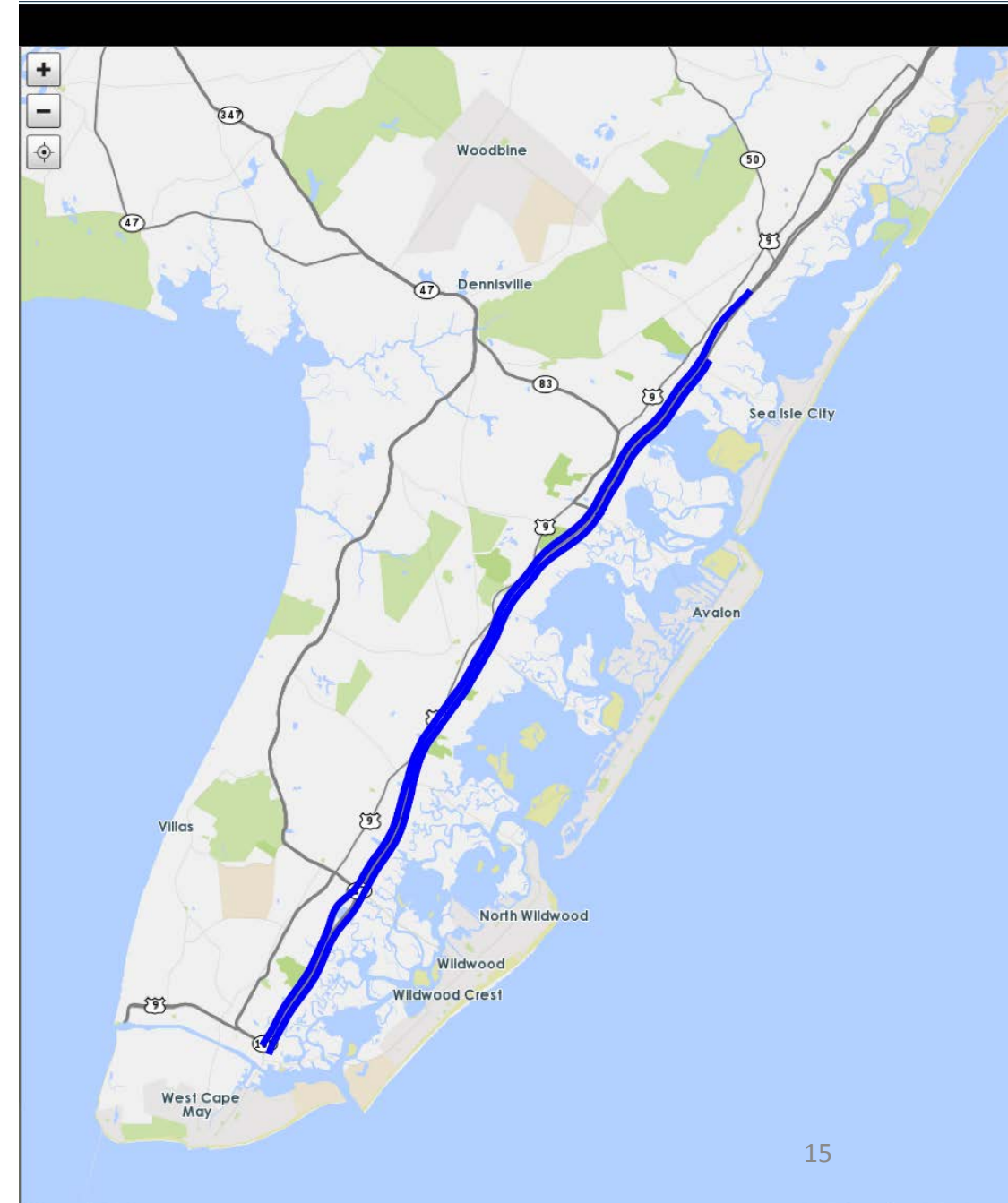
I just spend \$200M, and all I got was this...

- You just spent \$200M on a 6-month major road widening project along that corridor you (and everybody else) hate. Some commuters are now complaining that things haven't improved---in fact, they claim things have gotten worse. You can see the headlines now: "\$200M fattens road, shrinks commuter patience!"
- What can you produce to show the true impact of this recent investment (positive or negative).

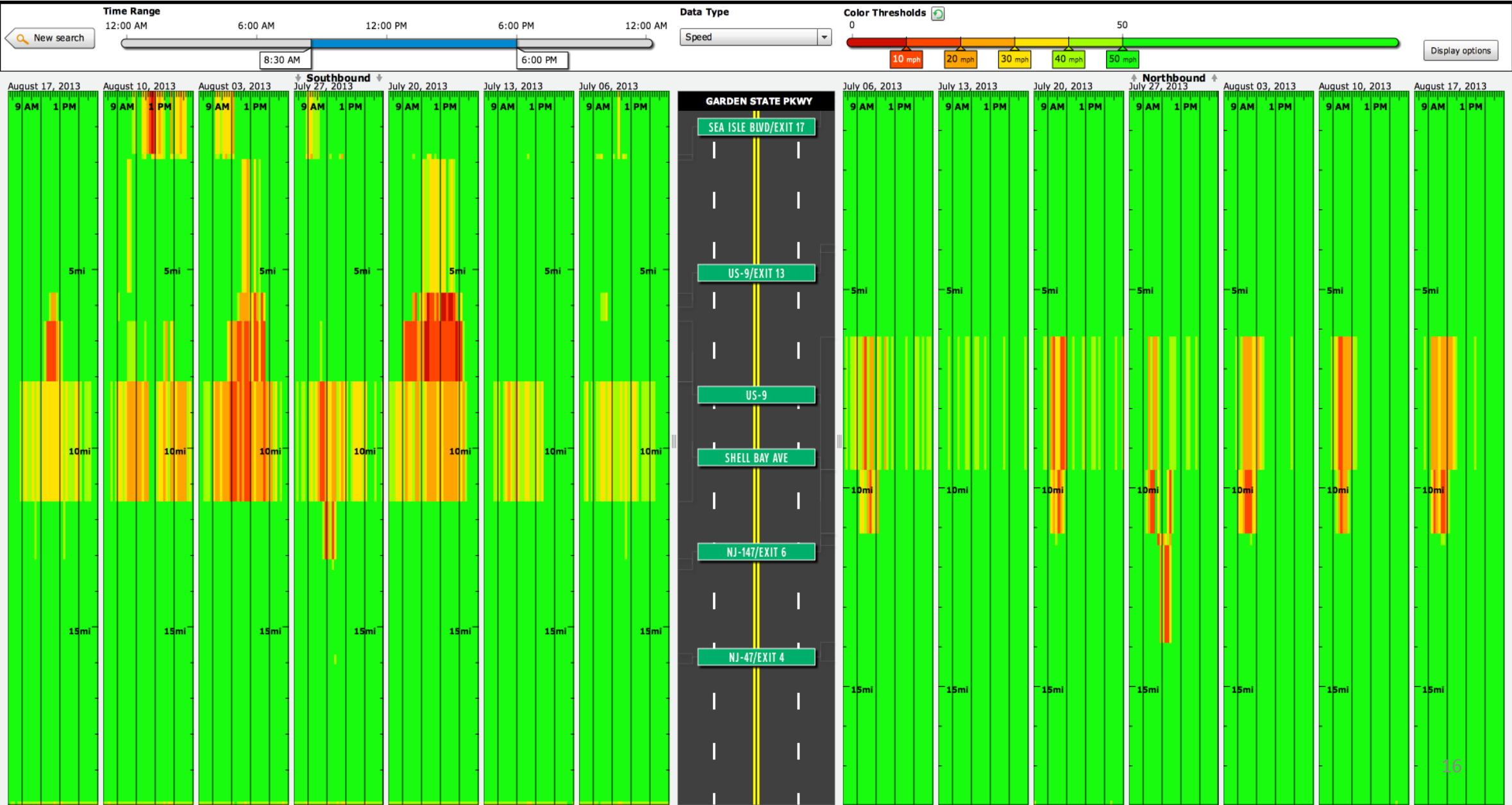
MOBILITY IMPROVEMENT INVESTMENT: BEFORE & AFTER DOCUMENTATION FOR REMOVAL OF 3 SIGNALS ON GARDEN STATE PARKWAY



Download Data for the Garden State Parkway



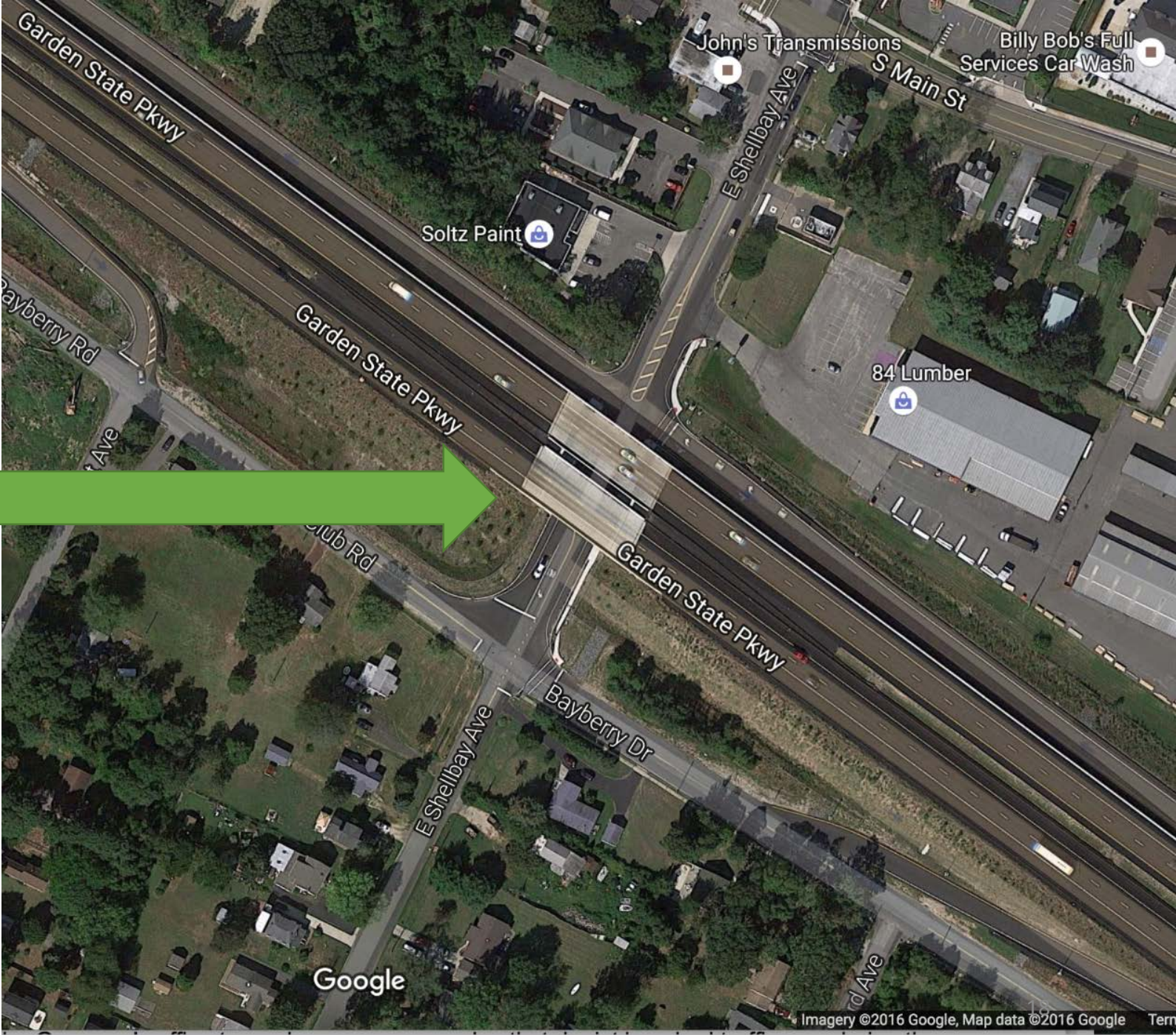
7 Saturdays *before* work to remove 3 signals



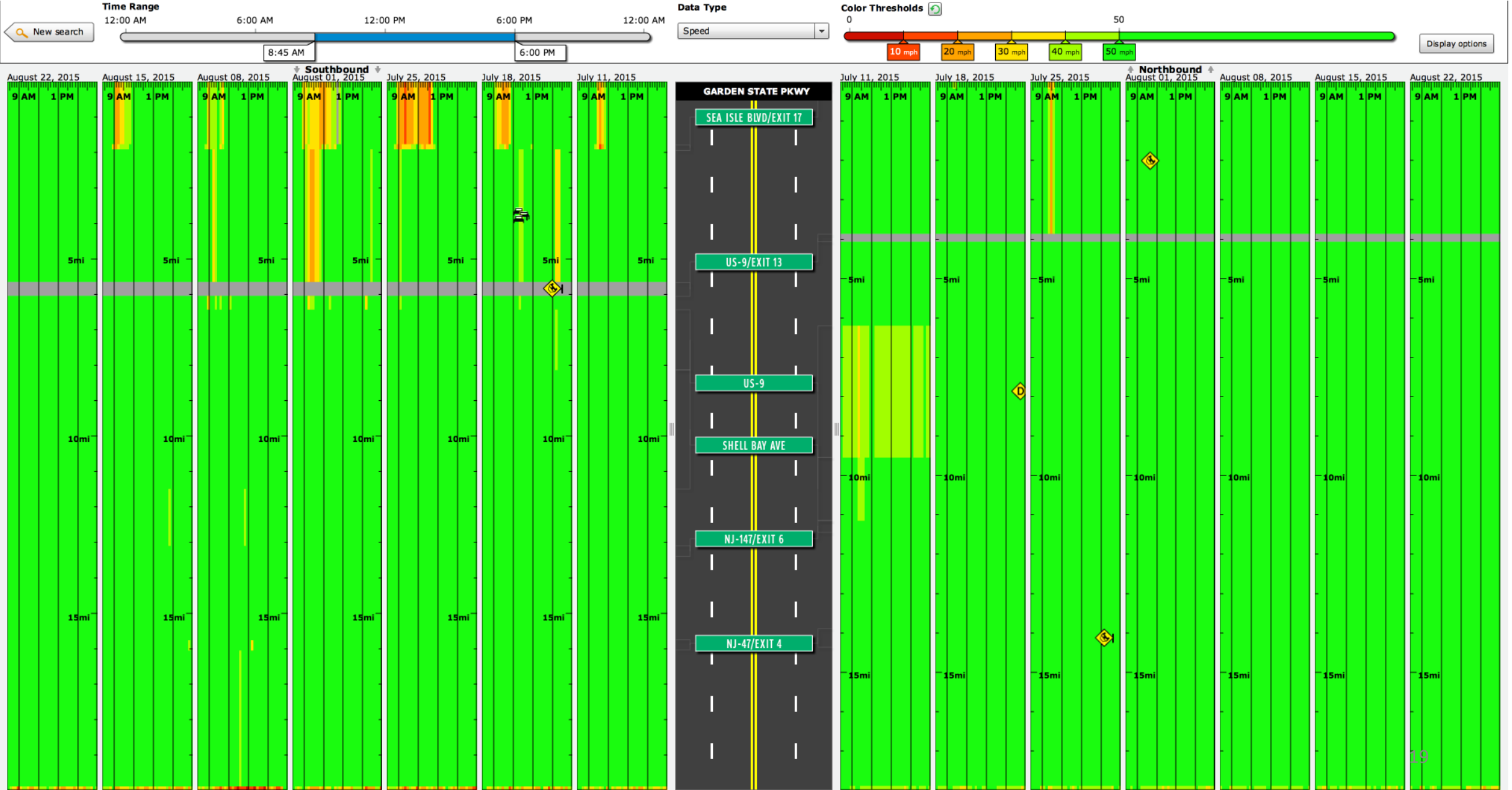
7 Saturdays *during* work to remove 3 signals



Work Completed



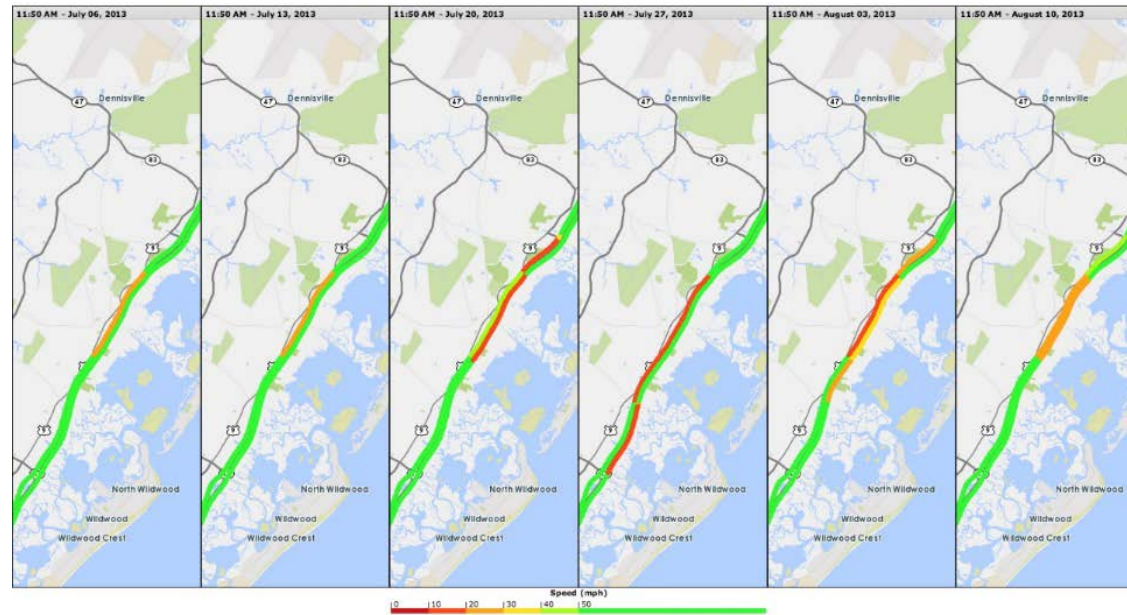
7 Saturdays *after* removal of signals



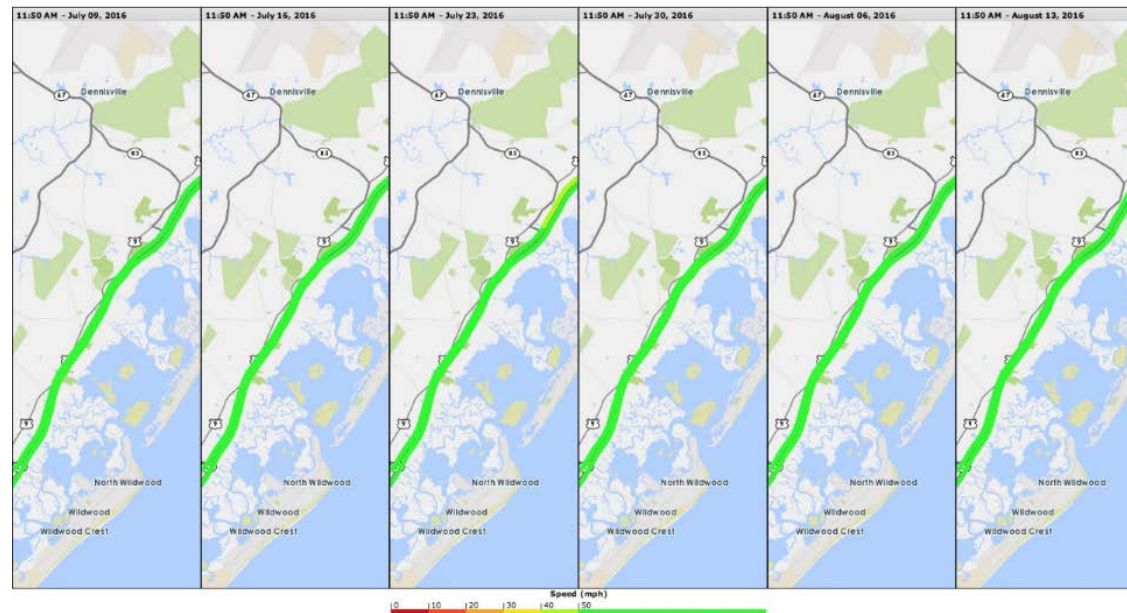
Another 7 Saturdays after removal of signals

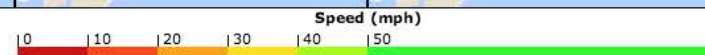
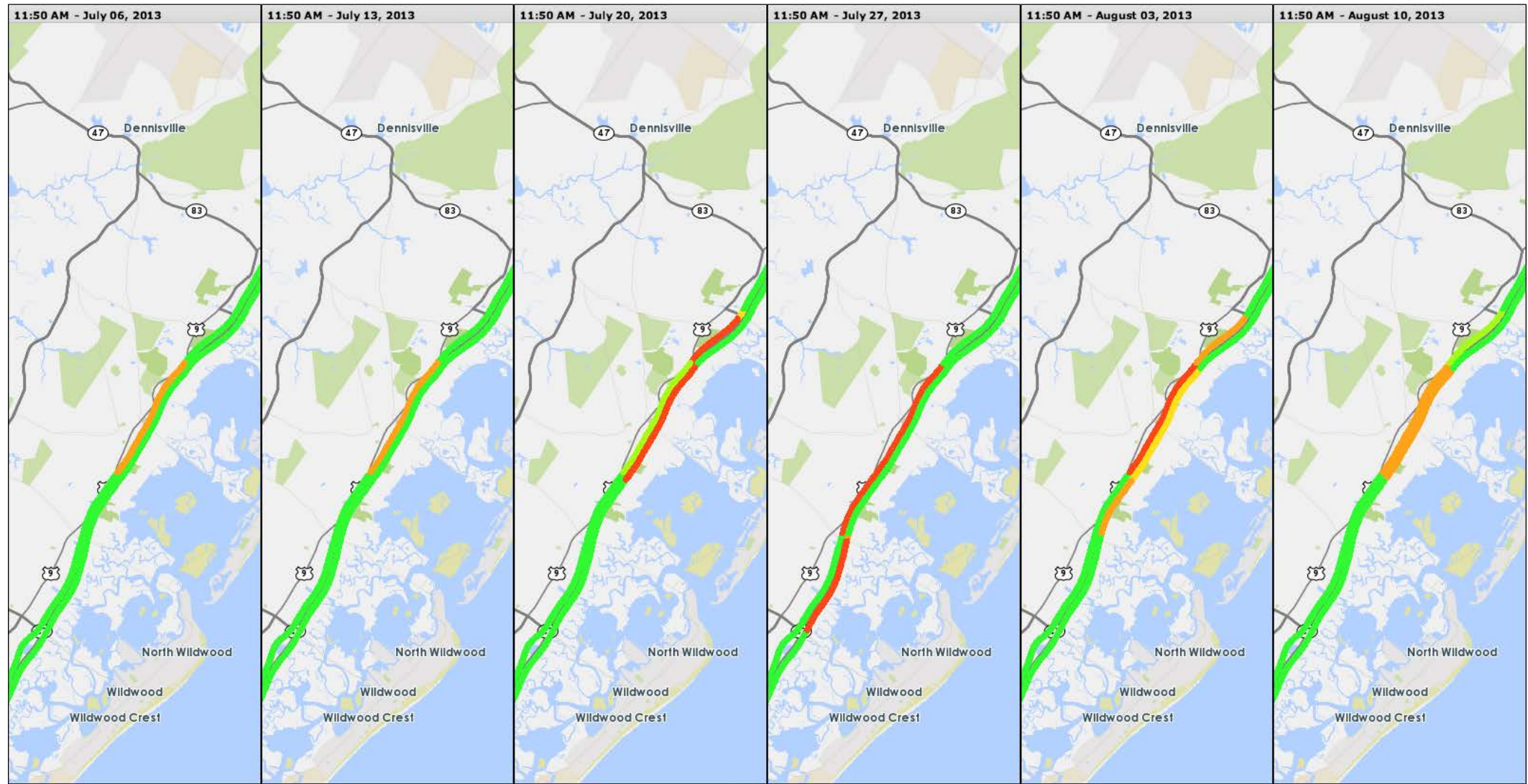


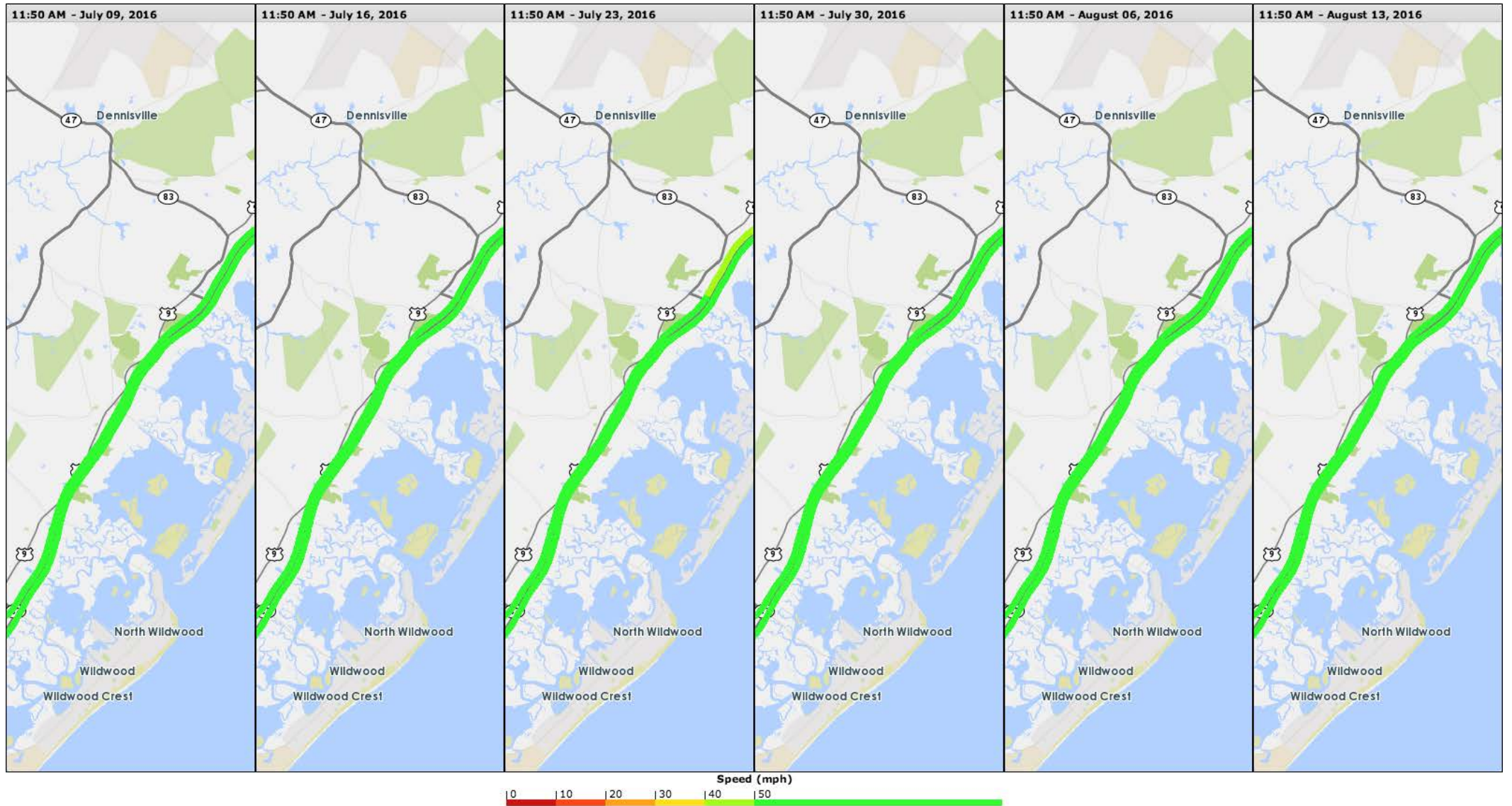
BEFORE
(summer Saturdays)



AFTER
(summer Saturdays)







Integrating Output into Reports to “tell your story”

- Elevator Pitch Brochures

Reliability

The project was evaluated for changes in **Reliability** using the VPP Suite **Performance Summaries** module:

• **Travel Time** – the time it takes to drive along a stretch of road

• **Buffer Time** – the extra time you must add to your average trip to ensure on time arrival

• **Planning Time** – the total time you should allow to ensure on time arrival

User Delay Cost

The project was further evaluated for changes in **Delay Cost** (total, per vehicle and per person) and **Hours of Delay** (person-hours, vehicle-hours and per vehicle) using the VPP Suite **User Delay Cost Analysis** module.

Reliability Comparison

Before Condition

	Buffer time (minutes) 5:00 PM - 6:00 PM	Planning time (minutes) 5:00 PM - 6:00 PM	Travel time (minutes) 5:00 PM - 6:00 PM
Monday	1.12	4.88	3.81
Tuesday	1.76	5.56	3.91
Wednesday	1.17	4.91	3.87
Thursday	1.12	4.88	3.82
Friday	1.47	5.23	3.9
Saturday	1.07	4.62	3.64
Sunday	0.58	4.09	3.55
Weekends	1.78	5.23	3.72
Weekdays	2.69	6.14	4.23
All Days	2.35	5.8	4.06

After Condition

	Buffer time (minutes) 5:00 PM - 6:00 PM	Planning time (minutes) 5:00 PM - 6:00 PM	Travel time (minutes) 5:00 PM - 6:00 PM
Monday	1.1	4.85	3.72
Tuesday	0.62	4.42	3.7
Wednesday	0.61	4.35	3.66
Thursday	1	4.76	3.71
Friday	0.52	4.28	3.64
Saturday	0.41	3.96	3.43
Sunday	0.57	4.08	3.48
Weekends	1.07	4.53	3.61
Weekdays	2.03	5.48	3.85
All Days	1.57	5.03	3.76

25% ↓ (Weekdays) 11% ↓ (Weekdays) 9% ↓ (Weekdays)

Comparisons of changes in **Travel, Buffer and Planning Times** show favorable reductions in the After condition that can be attributed to the improved flow in the WB lanes of I-80 prior to the Squirrelwood Road off-ramp.

User Delay Cost Comparison

Before Condition

5 PM
Delay cost:
Total: \$4,903,322.13
Per vehicle: \$1,151.86
Per person: \$969.98
Hours of delay:
Person-hours: 155,492.15 hours
Vehicle-hours: 130,940.76 hours
Per vehicle: 30.76 hours
Data validity: 88.08%

After Condition

5 PM
Delay cost:
Total: \$902,379.14
Per vehicle: \$192.3
Per person: \$161.94
Hours of delay:
Person-hours: 28,719.9 hours
Vehicle-hours: 24,185.18 hours
Per vehicle: 5.15 hours
Data validity: 95.89%

Comparisons of changes in **User Delay Cost** show substantial reductions in cost and hours of delay in the After condition, across all categories.



Technical Toolbox



Vehicle Probe Project Suite

The VPP Suite is a Flash-based web site that supports operations, planning, analysis, research & performance measure generation using probe data.



NJ OpenReach

NJ OpenReach is a web-based, multi-modal regional (NY/NJ/CT) tool that integrates incidents, construction, travel times and video.



Google™ Earth

Google™ Earth is a virtual globe and geographical information program that maps the Earth using superimposition of satellite imagery, aerial photography and GIS 3D.



NJ Department of Transportation

This Summary incorporates data, analyses and reports by various NJDOT Units, such as: Data Development, Safety, Mobility and Systems Engineering, Project Management and Systems Planning.

Project Assessment Summary

July 16, 2012



I-80/Squirrelwood Road

Highway Operational Improvement

Interchange #56; MP 56.76 – 57.47

West Paterson, Passaic County

Start Date: June 8, 2007

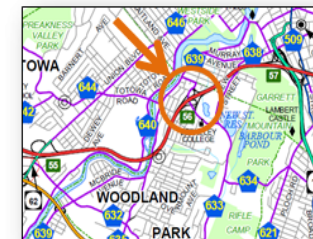
Completion Date: March 3, 2008

Construction Cost: \$1,282,304

Geographic Context

Route I-80 is a vital east-west interstate facility in northern New Jersey. It provides a continuous route between the Delaware Water Gap (at the PA border) and the George Washington Bridge (at the NY border) and is essential in serving the bedroom communities of northeast NJ and New York City, goods movement (local, regional and national) and recreational areas, such as the Pocono Mountains and Delaware Water Gap National Recreation Area.

Squirrelwood Road is classified as a urban minor arterial (County Route 636) and is accessed from I-80 at Interchange 56. This road serves the densely populated municipalities of Paterson and West Paterson in Passaic County.



Project Area Location Map

Project Background

In March, 1990, the I-80/Squirrelwood Road interchange was entered into the NJDOT's Pipeline Process via a Problem Statement generated by Township officials.

According to the Problem Statement, inadequate capacity at the unsignalized intersection of the WB exit ramp of I-80 with Squirrelwood Road causes traffic to backup on the ramp and into the I-80 mainline, creating safety and operational problems. There is also a secondary capacity constraint at the intersection of Squirrelwood Road and Glover Avenue that may contribute to this problem.

In June, 1992, a Needs Assessment report was prepared by the Bureau of Transportation and Corridor Analysis. This report described the existing conditions, general characteristics of the surrounding region, traffic analyses and proposed improvement concepts.

Subsequently, a Tier II Screening Report was completed in February, 2005, that presented accident history, revised traffic analyses and proposed traffic control and geometric improvements.

Performance ASSESSMENT

Reliability

The project was evaluated for changes in **Reliability** using the VPP Suite **Performance Summaries** module:

- **Travel Time** – the time it takes to drive along a stretch of road

- **Buffer Time** – the extra time you must add to your average trip to ensure on time arrival

- **Planning Time** – the total time you should allow to ensure on time arrival

User Delay Cost

Reliability Comparison

Before Condition

	Buffer time (minutes) 5:00 PM - 6:00 PM	Planning time (minutes) 5:00 PM - 6:00 PM	Travel time (minutes) 5:00 PM - 6:00 PM
Monday	1.12	4.88	3.81
Tuesday	1.76	5.56	3.91
Wednesday	1.17	4.91	3.87
Thursday	1.12	4.88	3.82
Friday	1.47	5.23	3.9
Saturday	1.07	4.62	3.64
Sunday	0.58	4.09	3.55
Weekends	1.78	5.23	3.72
Weekdays	2.69	6.14	4.23
All Days	2.35	5.8	4.06

After Condition

	Buffer time (minutes) 5:00 PM - 6:00 PM	Planning time (minutes) 5:00 PM - 6:00 PM	Travel time (minutes) 5:00 PM - 6:00 PM
Monday	1.1	4.85	3.72
Tuesday	0.62	4.42	3.7
Wednesday	0.61	4.35	3.66
Thursday	1	4.76	3.71
Friday	0.52	4.28	3.64
Saturday	0.41	3.96	3.43
Sunday	0.57	4.08	3.48
Weekends	1.07	4.53	3.61
Weekdays	2.03	5.48	3.85
All Days	1.57	5.03	3.76

25% ↓ (Weekdays)

11% ↓ (Weekdays)

9% ↓ (Weekdays)

Comparisons of changes in **Travel**, **Buffer** and **Planning Times** show favorable reductions in the After condition that can be attributed to the improved flow in the WB lanes of I-80 prior to the Squirrelwood Road off-ramp.

Project Detail

The project will eliminate the bottleneck occurring at the intersection of Squirrelwood Road and the WB I-80 off ramp, that causes traffic to queue back down the ramp and deceleration lane into the I-80 through lanes, by:

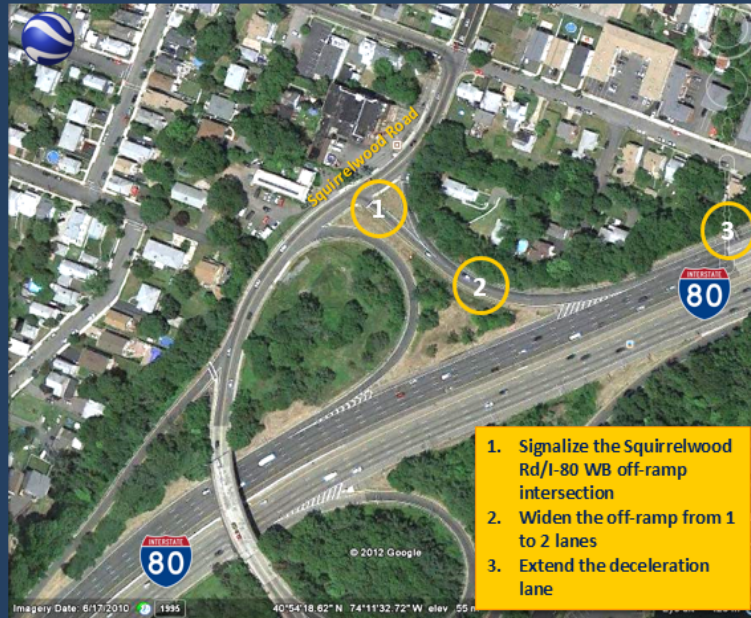
► Signaling the intersection of the WB off-ramp and Squirrelwood Road (to reduce left turn delays and queues)

► Widening the ramp to 2 lanes (for extra storage capacity and to remove the conflict of left turning vehicles blocking right turning vehicles)


► Extending the deceleration lane leading to the WB I-80 off ramp (for extra storage capacity)


There are no right-of-way issues with widening the ramp or extending the deceleration lane on I-80.

Project Element Location Map



Highway Capacity Software Intersection Analysis

 Location		Volume	Level of Service		Avg. Queue (ft.)	
Approach	Movement	AM	No Signal	Signal	No Signal	Signal
Squirrelwood Road		250 1020	A A	A B	0 0	38 145
Eastbound	Through					
Westbound	Through					
Route I-80 Exit 56 Ramp		250 570	F D	C See note	209 65	72 0
Northbound	Left					
	Right					

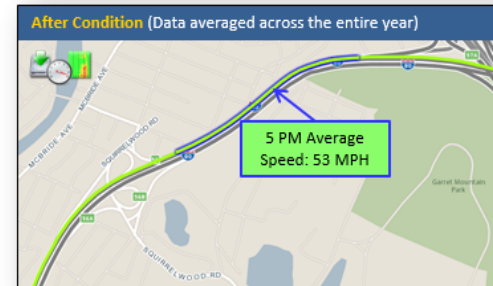
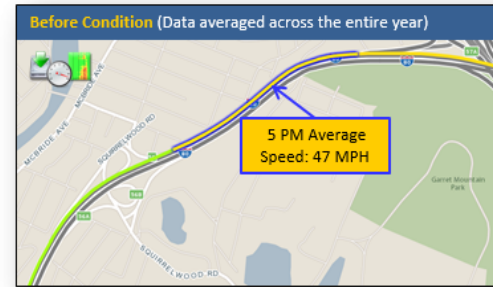
 Location		Volume	Level of Service		Avg. Queue (ft.)	
Approach	Movement	PM	No Signal	Signal	No Signal	Signal
Squirrelwood Road						
Eastbound	Through	490	A	B	57	98
Westbound	Through	800	A	B	0	162
Route I-80 Exit 56 Ramp						
Northbound	Left	340	F	C	386	116
	Right	600	F	See note	424*	424*

HCS analysis indicates a substantial LOS and Avg. Queue improvement on the ramp approach of the intersection with only a slight LOS degradation on the Squirrelwood Rd. approaches.

* This queue represents the available storage on the ramp. Observed queue extends as far back as 1,500' on the I-80 WB mainline.

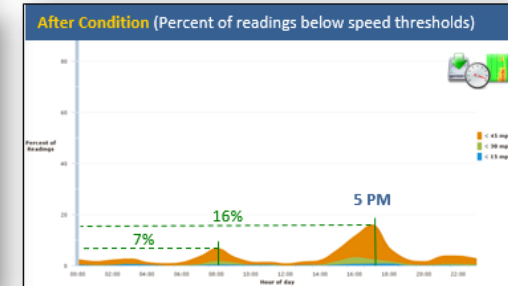
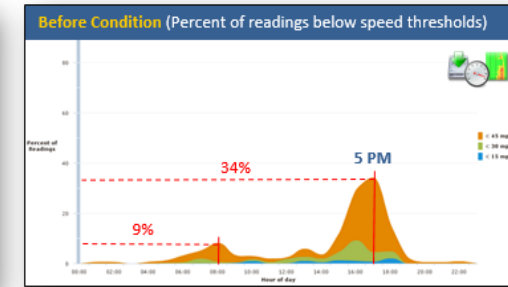
Note: LOS under signalized conditions is not provided for channelized right turn. Results would be similar to un-signalized analysis.

Average Speed Change



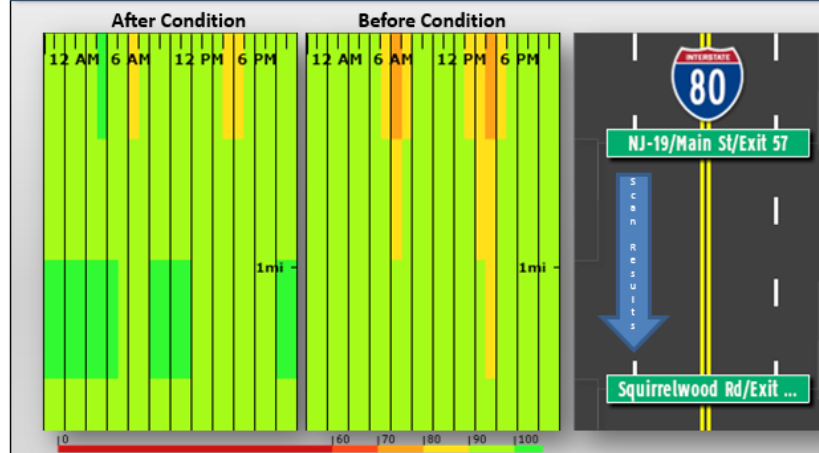
During the PM Peak Hour (5:00 PM), there has been a **13% increase in speed** along the section of WB I-80 approaching the Squirrelwood Road interchange (blue highlight) since the implementation (and "shake-out" period) of the project. (the AM Peak Hour showed a **4% increase in speed**).

Speed Threshold Change



There has been a substantial improvement in speeds that fall below 45 MPH (a threshold indicating the beginning of congested conditions). In the "Before" condition, PM Peak Hour (5:00 PM), 34% of readings were < 45 MPH. In the "After", the percentage of readings dropped to 16%, an **overall decrease of 53%**.

Congestion Comparison



Using a VPP congestion scan, comparisons between the before & after condition show improvement in congestion intensity and duration in the 5 PM WB direction of I-80, prior to the Squirrelwood Rd Interchange.

After Action Reviews

- There's just been a really bad incident up on I-495. The roads were closed longer than most people would have thought, and it's unclear 1) what the impacts were, 2) why the road needed to remain closed for that long, and 3) could anything have been done to improve it?
- What can you produce?

Continuous Improvements through AARs

Maryland, State Highway Administration: I-495 on the American Legion Bridge

Wednesday, November 23, 2016



New search

Time Range

12:00 AM

6:00 AM

12:00 PM

6:00 PM

12:00 AM

Data Type

Speed

Color Thresholds

0

10 mph

20 mph

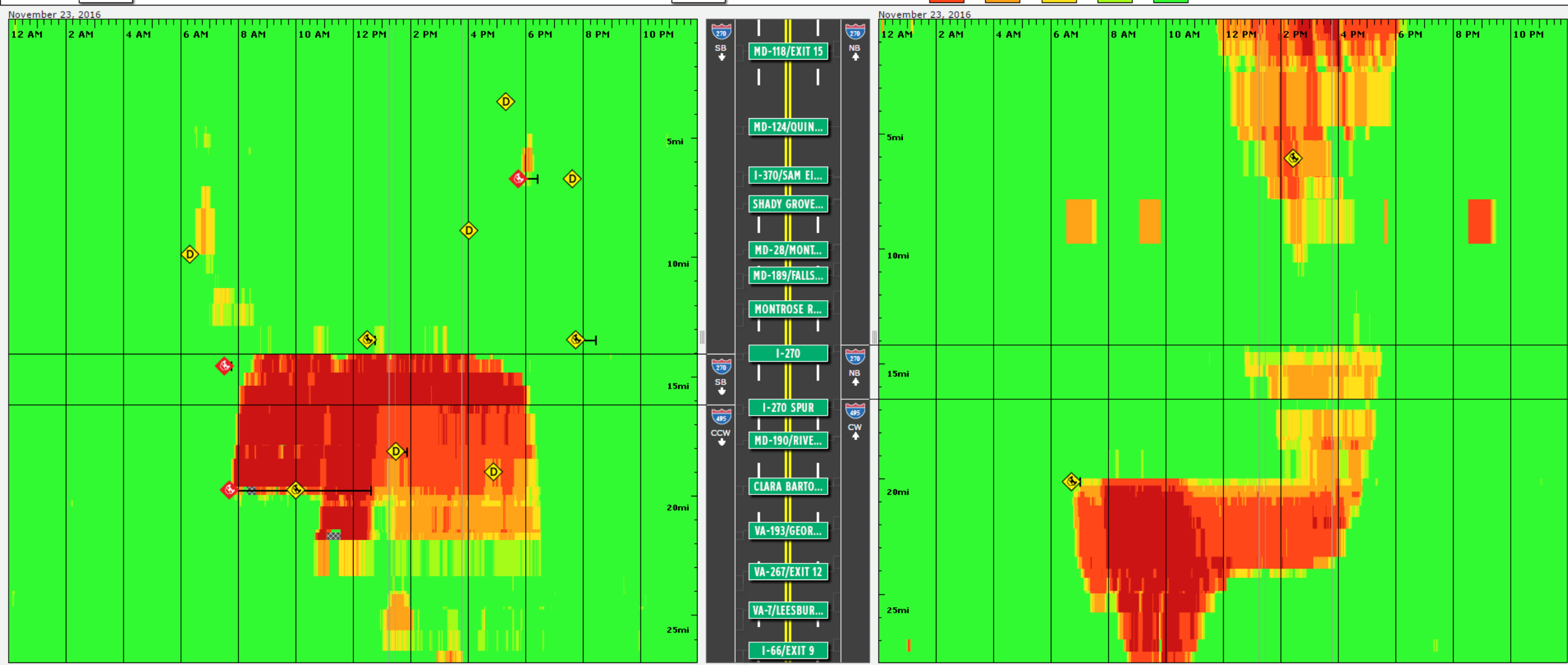
30 mph

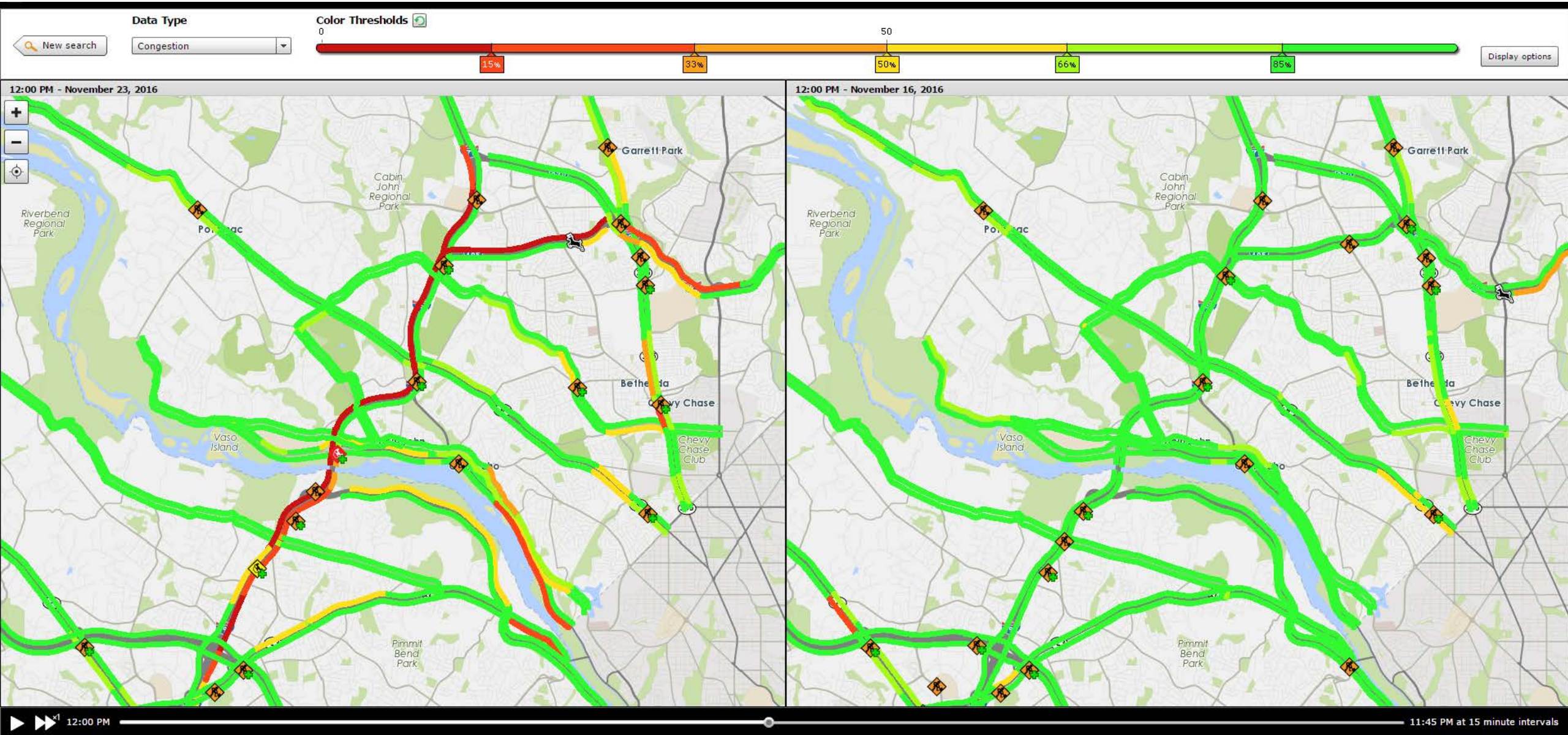
40 mph

50 mph

50

Display options





Total Cost																									
	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Totals
11/23/16	\$0.1K	\$0.1K	\$0K	\$0K	\$0.1K	\$0K	\$5.8K	\$50.9K	\$130.8K	\$165.7K	\$155.5K	\$122.4K	\$91K	\$86.5K	\$126.8K	\$127.3K	\$86.2K	\$47K	\$5.6K	\$0.5K	\$7.6K	\$4.9K	\$0.1K	\$0K	\$1,214.8K
Hourly Totals	\$0.1K	\$0.1K	\$0K	\$0K	\$0.1K	\$0K	\$5.8K	\$50.9K	\$130.8K	\$165.7K	\$155.5K	\$122.4K	\$91K	\$86.5K	\$126.8K	\$127.3K	\$86.2K	\$47K	\$5.6K	\$0.5K	\$7.6K	\$4.9K	\$0.1K	\$0K	Grand Total \$1,214,838.32

- Normal Delay = \$150k
- Total this day = \$1.2M
- **Extra resulting from this event = \$1.05M**
 - This is conservative as it does not:
 - Include extra delay on 495 to the east
 - Delay on other arterials
 - Excess fuel consumption
 - Emissions
 - Secondary incidents

Pre-Thanksgiving Travel Advisory

- Thanksgiving is a few weeks away. The PIO in your agency wants to put out a press release reminding travelers of the expected travel conditions during Thanksgiving week. What can you produce for the PIO?

Predicting holiday travel

Using the VPP Suite and RITIS apps, you can create graphics like this:



Thanksgiving Week 2016

Interstate Travel Forecast for the Baltimore, MD region
(Based upon an evaluation of Thanksgiving week in 2015)

“Thanksgiving holiday travel is expected to increase from 2015 by 3 percent in Maryland, according to AAA Mid-Atlantic. That’s 31,000 more Marylanders on the road from Wednesday, November 23, through Sunday, November 27.”

As quoted in BMC’s “Cog Quarterly” (Fall / 2016)

TUESDAY

11.22.16

⚠️ Avoid 3PM – 7PM

INSIGHT

Worst time between
4pm – 6pm
Heaviest congestion
on I-695
(between I-95 & I-70)

WEDNESDAY

11.23.16

⚠️ Avoid 2PM – 5PM

INSIGHT


Collisions are
47% higher
than normal,
statewide.
Drive carefully!

THURSDAY

11.24.16

👍 Great day to drive!

INSIGHT

Low usage all day.

Happy Thanksgiving

FRIDAY

11.25.16

👍 Great day to drive!

INSIGHT

Low usage all day.
Black Friday shows a
lower usage than an
average Friday.

SATURDAY

11.26.16

👍 Great day to drive!

INSIGHT

Low usage all day;
only minor
congestion on I-95.

SUNDAY

11.27.16

⚠️ Drive Carefully!

INSIGHT

Moderate usage all
day, I-95 SB north of
the city congested
12PM to 7PM.
Collisions are
12% higher than
normal, statewide.

MONDAY

11.28.16

⚠️ Avoid 3PM – 6PM

INSIGHT

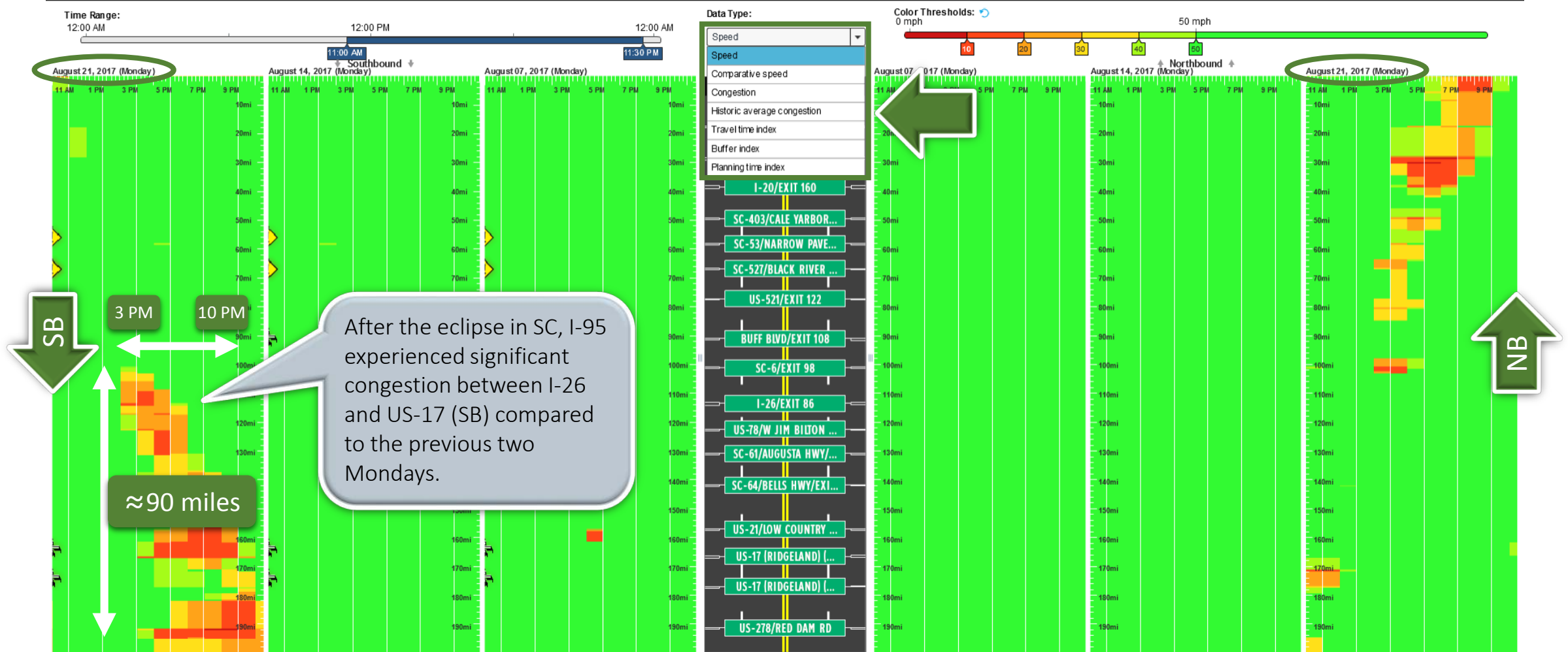
Worst time between
4pm – 5pm
Heaviest congestion
on I-695





Significant Event Analysis

heat map for temporal / spatial performance evaluation



Pros and Cons of the NPMRDS

- **Great** for analysis, with a few caveats...
 - only on the NHS network (**though you can purchase more**)
 - You must be willing to wait a little while to conduct your analysis
 - Occasional temporal gaps (no imputation) which makes certain types of analytics tricky
 - You need to be okay with 5-minute granularity
 - Real-time monitoring isn't feasible (because the data isn't real-time)
 - Visualization tools help increase utilization and speed of the analysis, but they certainly aren't mandatory



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