Baltimore Metropolitan Council

Quarterly Congestion Analysis Report for the Baltimore Region

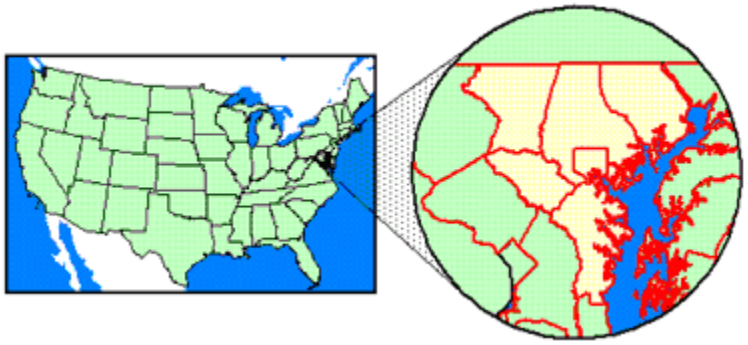
Top 10 Bottleneck Locations

4th Quarter 2017

Table of Contents

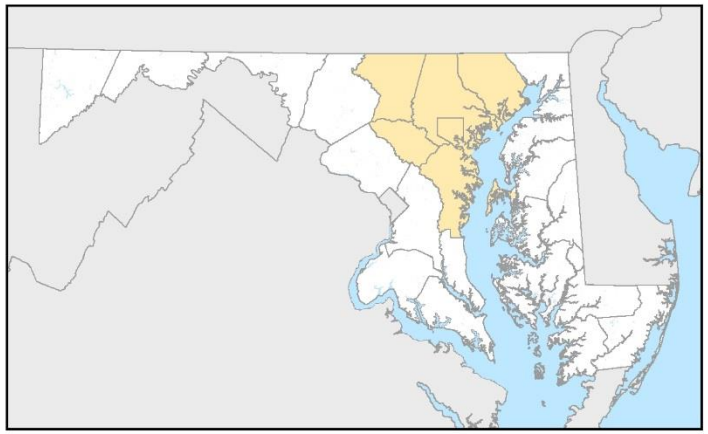
About the Region

Located in the heart of the Mid-Atlantic on the east coast, the Baltimore region includes:



The Baltimore region is the nation's 19th largest market, with over 2.5 million people. The market also ranks among the top 20 in the country in the number of households, total effective buying income and retail sales.

Baltimore Metropolitan Region

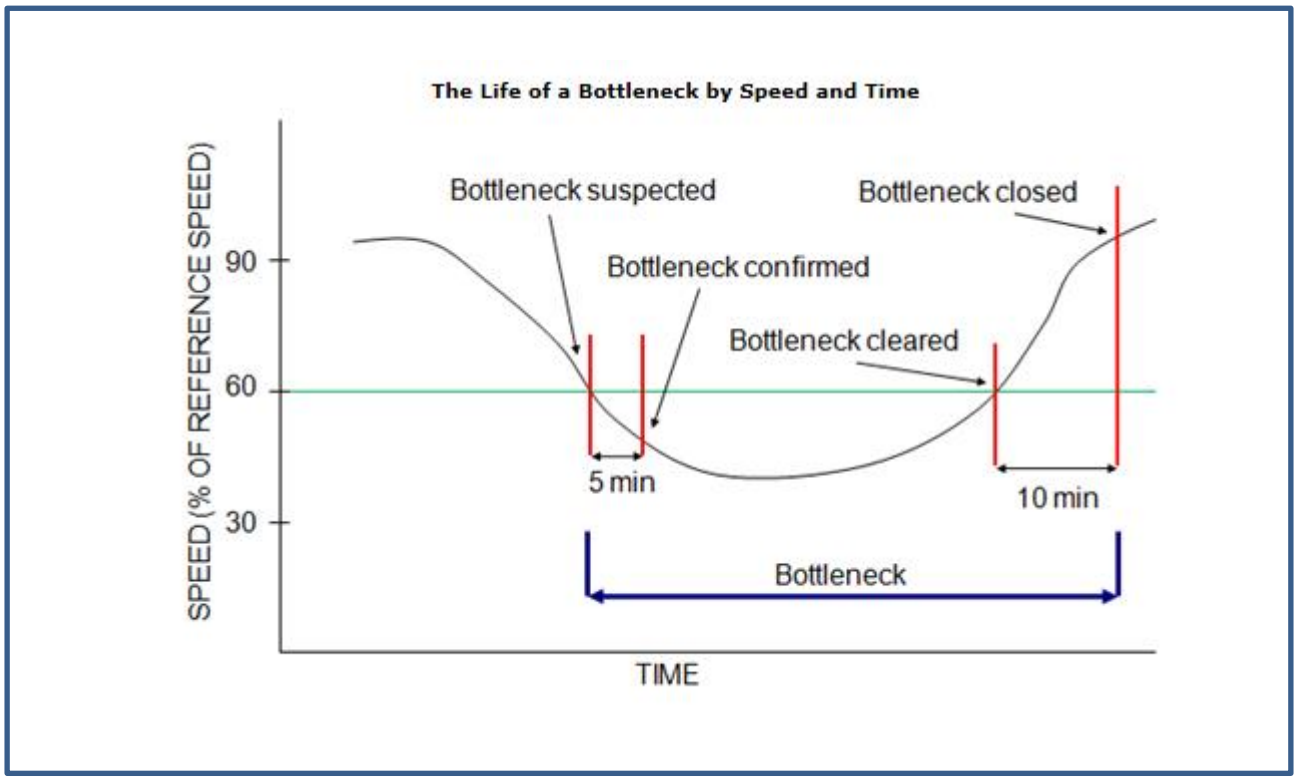


Prepared by
Transportation Planning Division
Projected Coordinate System: NAD 1983 State Plane (ft)
Data Source: BMC, © NAVTEQ 2016, TIGER/Line®, MTA
Printed - April 2017

How are bottleneck conditions tracked?

If the reported speed falls below 60% of the reference, the road segment is flagged as a potential bottleneck

Bottleneck conditions are determined by comparing the current reported speed to the reference speed for each segment of road. Reference speed values are provided by INRIX for each segment, and represent the 85th percentile observed speed for all time periods, with a maximum value of 65 mph. If the reported speed falls below 60% of the reference, the road segment is flagged as a potential bottleneck. If the reported speed stays below 60% for five minutes, the segment is confirmed as a bottleneck location. Adjacent road segments meeting this condition are joined together to form the bottleneck queue. When reported speeds on every segment associated with a bottleneck queue have returned to values greater than 60% of their reference values and remained that way for 10 minutes, the bottleneck is considered cleared. Bottlenecks whose total queue length, determined by adding the length of each road segment associated with the bottleneck is less than 0.3 miles are ignored. Queues may originate outside the Baltimore region but are reported on if any portion extends into the region.



How are bottleneck conditions tracked?

Bottleneck Ranking Table

Rank	Map	Bottleneck head location	Impact	Average max...	Average daily dur...	Total duration	All Events/Inc...
1	☑	I-495 CW @ CLARA BARTON PKWY/EXIT 41	32,170.11	3.67	5 h 51 m	7 d 07 h 57 m	18
2	☐	I-495 CW @ I-270 SPUR	27,167.59	5.25	2 h 45 m	3 d 10 h 48 m	57
3	☐	I-95 N @ MD-100/EXIT 43	23,117.99	5.08	2 h 50 m	3 d 13 h 01 m	113
4	☑	I-495 CCW @ MD-97/GEORGIA AVE/EXIT 31	22,657.46	2.72	4 h 35 m	5 d 17 h 30 m	205
5	☐	I-495 CW @ MD-214/CENTRAL AVE/EXIT 15	22,505.20	3.43	3 h 25 m	4 d 06 h 41 m	368
6	☐	I-270 S @ MD-109/EXIT 22	21,832.78	4.45	3 h 09 m	3 d 22 h 48 m	50
7	☐	I-695 CW @ MD-41/PERRING PKWY/EXIT 30	21,655.03	2.91	3 h 17 m	4 d 02 h 48 m	149

The Bottleneck Ranking Table will display a list of locations identified as being bottlenecks along with some additional information for each location, including:

- *Rank* - The ranked position of the location according to the current table ordering. (*Impact* by default)
- *Impact* - The aggregation of queue length over time for congestion originating at each location in mile-minutes. For example, if at time t1 an element has congestion covering one mile of the roadway, it has an impact of 1. If the congestion then grows at time t2 to cover 2 miles, the location will now have an impact of 3. If at time t3 congestion shrinks to 1 mile, and at t4 there is no congestion, the element will have a final impact of 4.
- *Average max length* - The average maximum length, in miles, of queues formed by congestion originating at the location.
- *Average daily duration* - The average amount of time per day that congestion is identified originating at the location.
- *Total duration* - The total amount of time congestion was identified at the location.
- *All Events/Incidents* - The number of traffic events and incidents that occurred within the space of the bottleneck at any time during the time period being analyzed.

Bottleneck Ranking Incident Icons

When showing event/incident icons on some of the graphs in the Bottleneck Ranking tool a minimalist approach has been taken. In order to reduce clutter and confusion on the graphs, icons have been simplified down to single shape and color. Each represents the following:

Red — Severe events and incidents

- Emergency Roadwork
- Injury
- Medical Emergency

Orange — Roadwork

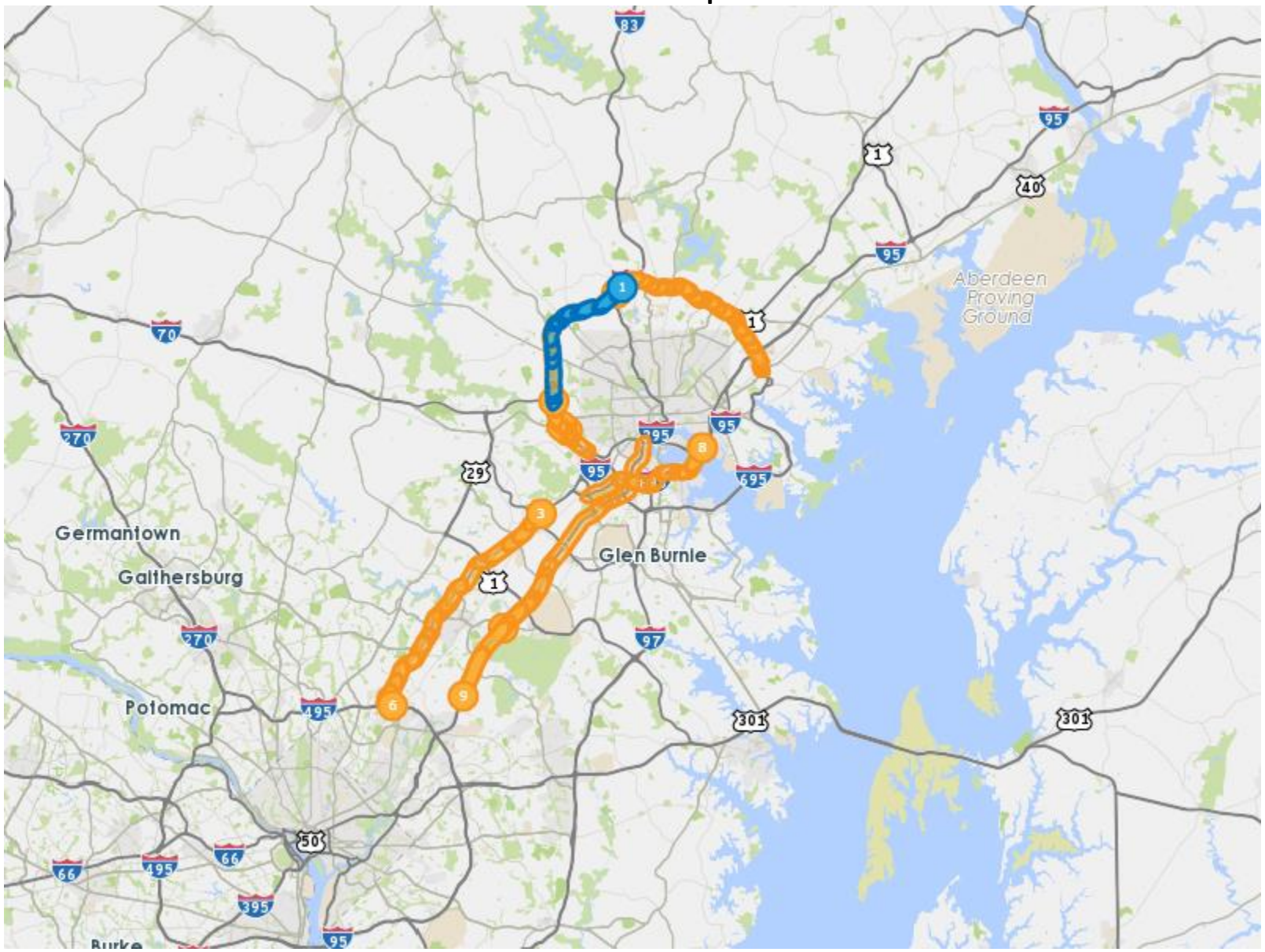
Yellow — All other events and incidents

More detailed icons may be used at times when a major incident was the cause of a bottleneck.

Incident/Event Icons

Top 10 Bottlenecks in the Baltimore Region
4th Quarter 2017

Overview Map



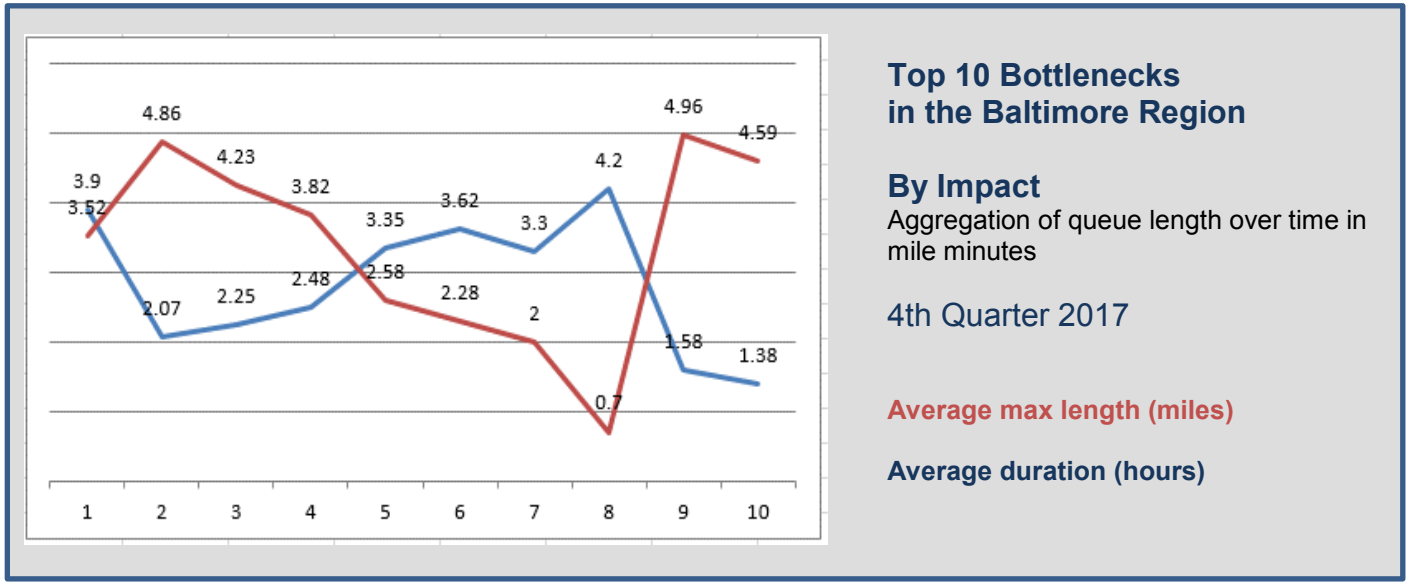
Top 10 Bottlenecks in the Baltimore Region
4th Quarter 2017

By Impact

The aggregation of queue length over time for congestion originating at each location in mile minutes. This table indicates the top 10 congested corridors in the region.

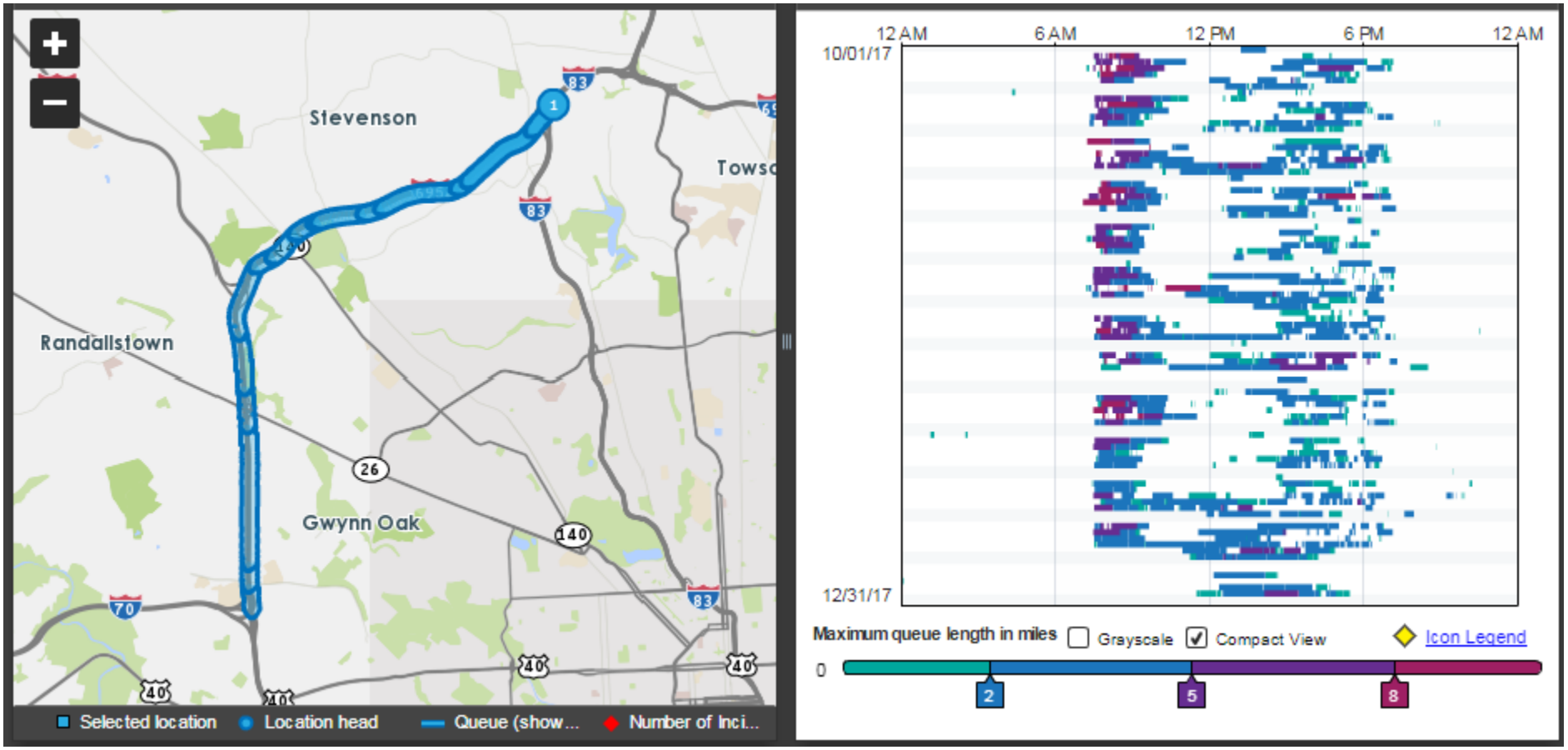
	Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events Incidents
1	I-695 IL @ I-83/MD-25/EXIT 23	69,102	3.52	3 h 54 m	15 d 00 h 07 m	452
2	I-695 OL @ EDMONDSON AVE/EXIT 14	58,243	4.86	2 h 04 m	7 d 22 h 38 m	1,039
3	I-95 N @ MD-100/EXIT 43	53,148	4.23	2 h 15 m	8 d 16 h 30 m	361
4	I-695 OL @ US-40/EXIT 15	51,977	3.82	2 h 29 m	9 d 12 h 43 m	935
5	MD-295 S @ MD-198	49,167	2.58	3 h 21 m	12 d 21 h 51 m	365
6	I-95 S @ I-495/EXIT 27-25	47,942	2.28	3 h 37 m	13 d 21 h 06 m	258
7	I-695 IL @ I-70/EXIT 16	42,926	2.00	3 h 18 m	12 d 15 h 51 m	265
8	I-895 N @ HARBOR TUNNEL THWY (NORTH)	40,739	0.70	4 h 12 m	16 d 03 h 23 m	270
9	MD-295 S @ POWDER MILL RD	39,505	4.96	1 h 35 m	6 d 01 h 57 m	271
10	I-695 OL @ I-83/MD-25/EXIT 23	34,816	4.59	1 h 23 m	5 d 08 h 17 m	540

IL = Inner Loop OL = Outer Loop NB = Northbound SB = Southbound EB = Eastbound WB = Westbound



#1 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

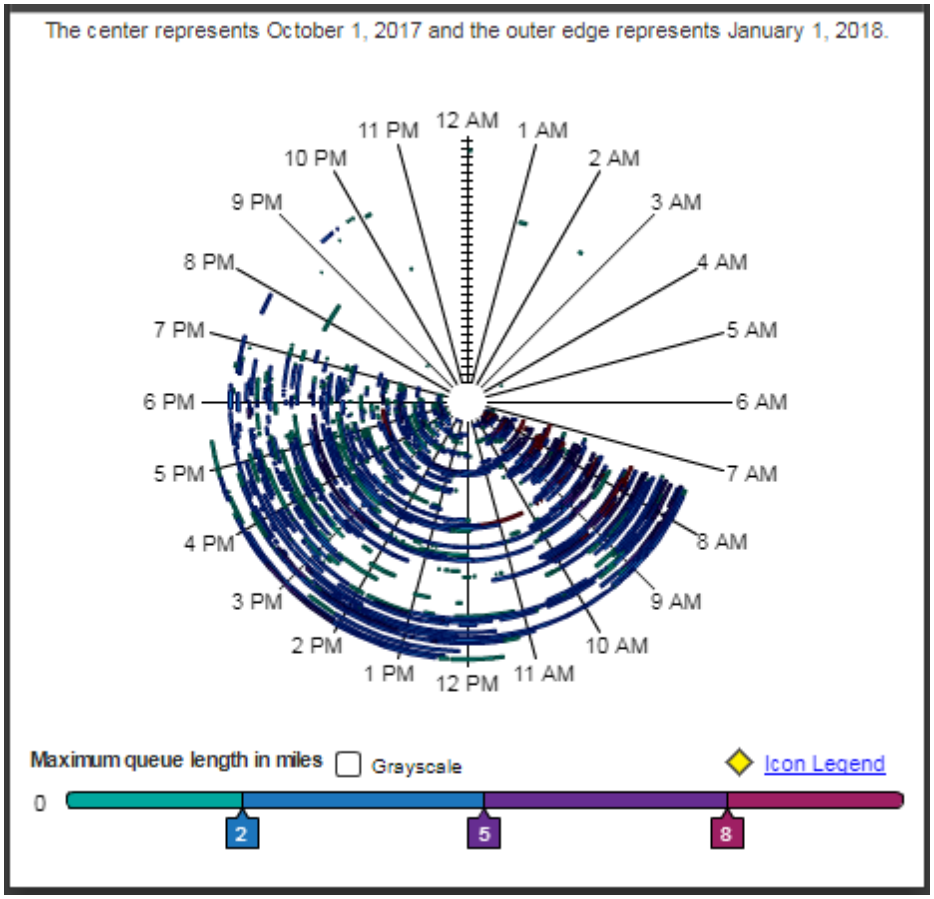
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 IL @ I-83/MD-25/EXIT 23	69.102	3.52	3 h 54 m	15 d 00 h 07 m	452



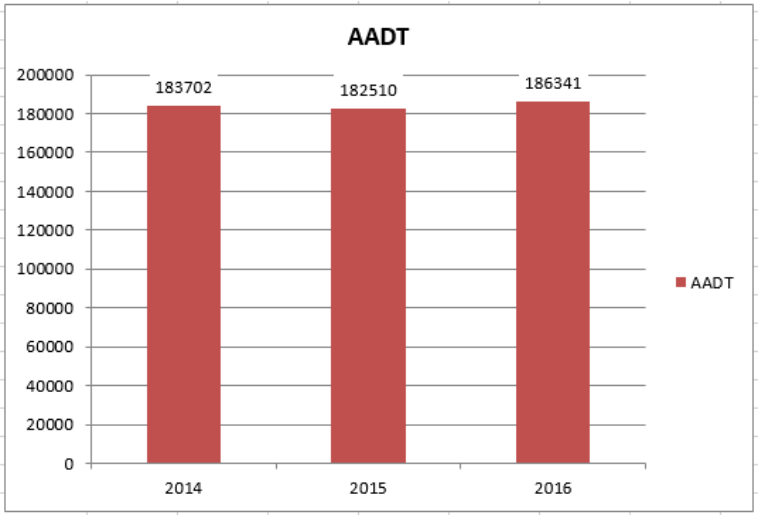
Notes: Rush hour congestion more severe during the AM peak period. The lane drop approaching the ramp to southbound I-83 is a contributing factor, as are merging and weaving at the interchanges in this segment

#1 Ranked Bottleneck in the Baltimore Region –4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 IL @ I-83/MD-25/EXIT 23	69,102	3.52	3 h 54 m	15 d 00 h 07 m	452

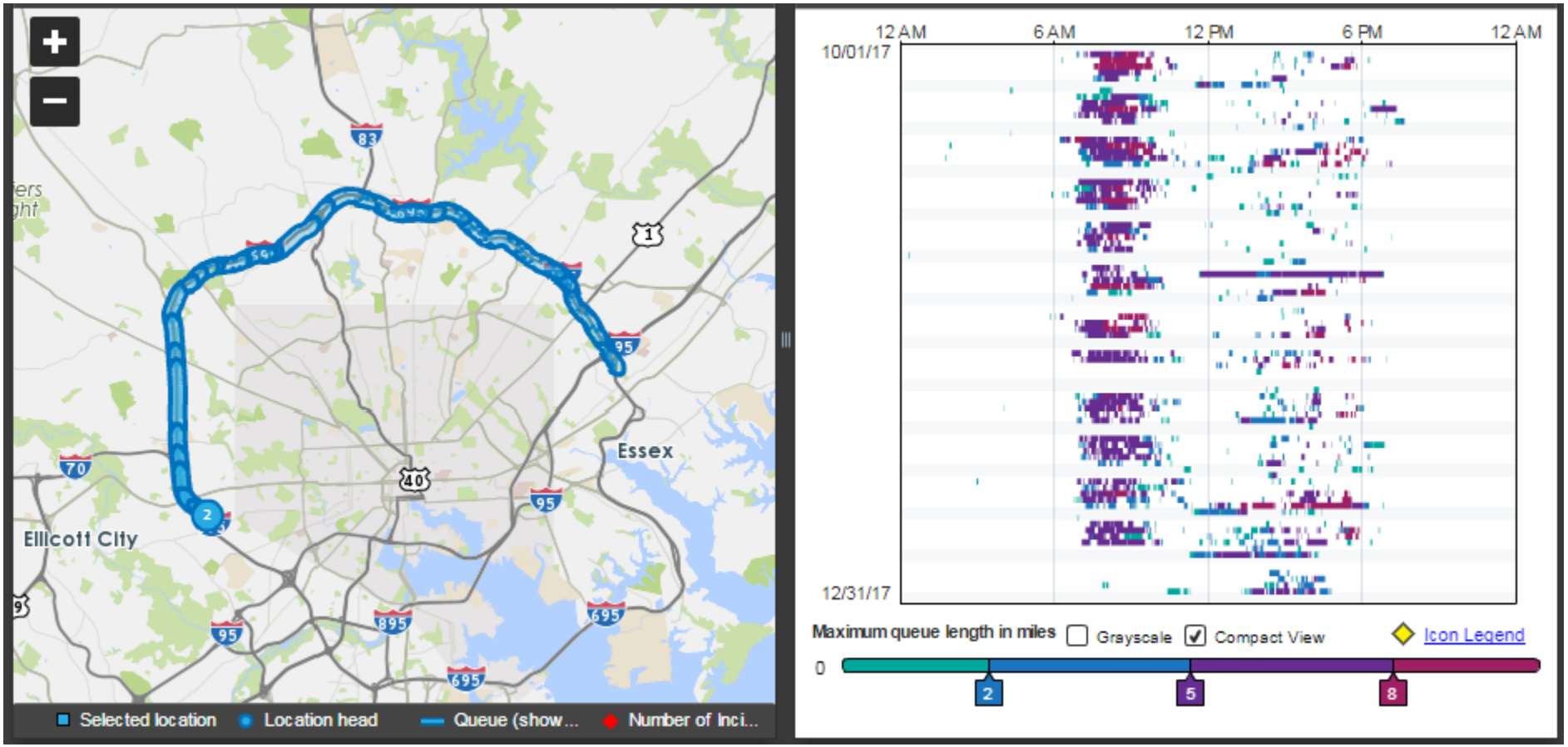


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.50 MI N OF GREENSPRING AVE



#2 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

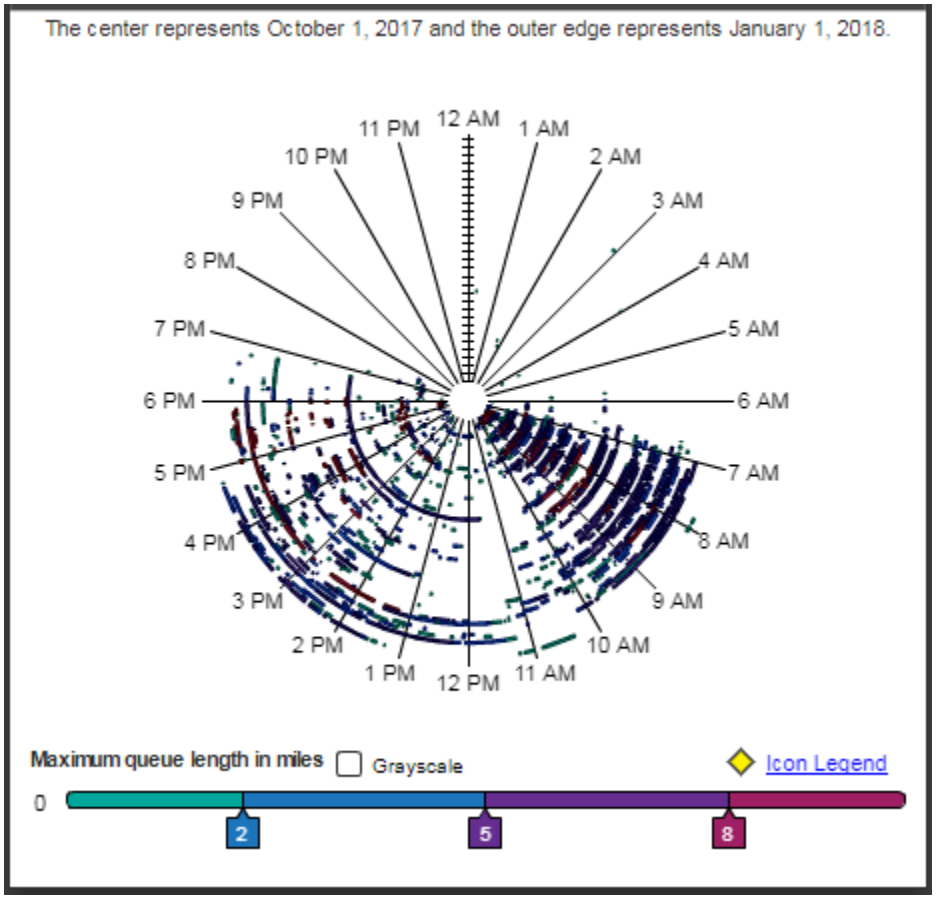
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 OL @ EDMONDSON AVE/EXIT 14	58,243	4.86	2 h 04 m	7 d 22 h 38 m	1,039



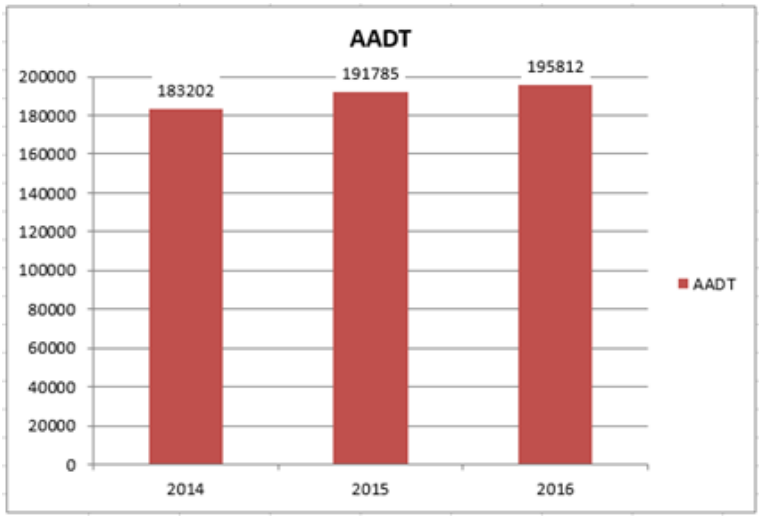
Notes: Longstanding bottleneck on the outer loop of the beltway primarily during the morning rush. High traffic volume area. Also contributing to congestion in the area is a beltway widening project which began in February. "The plan is for crews to add a fourth lane to the outer loop and widen the median in anticipation of a possible fifth lane. The bridges over Ingleside and Edmondson avenues will be replaced to increase the clearance height." (Source: The Baltimore Sun 2/23/15)

#2 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 OL @ EDMONDSON AVE/EXIT 14	58,243	4.86	2 h 04 m	7 d 22 h 38 m	1,039

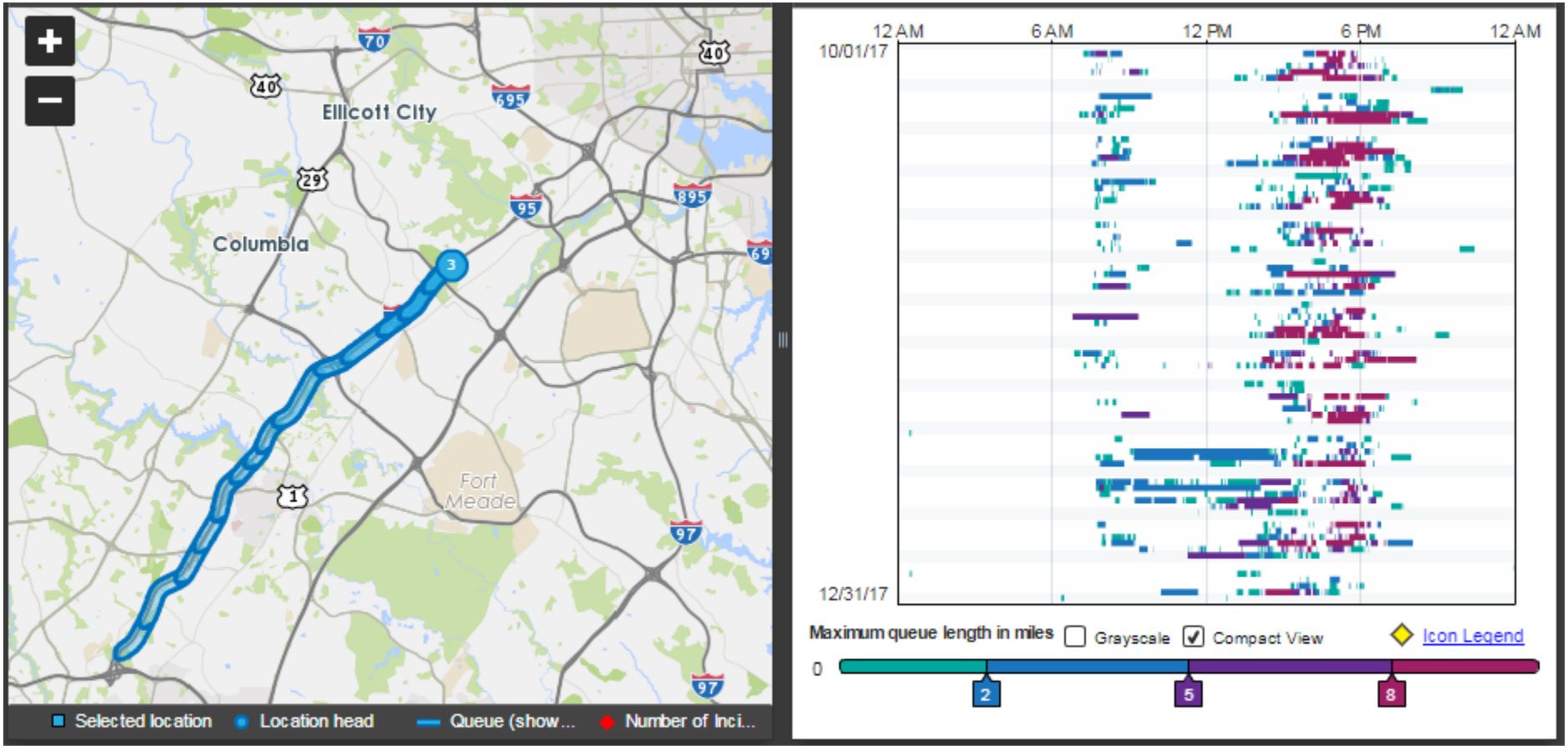


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_ IS695 – 100 ft South of Ingleside Ave (ATR#32)



#3 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

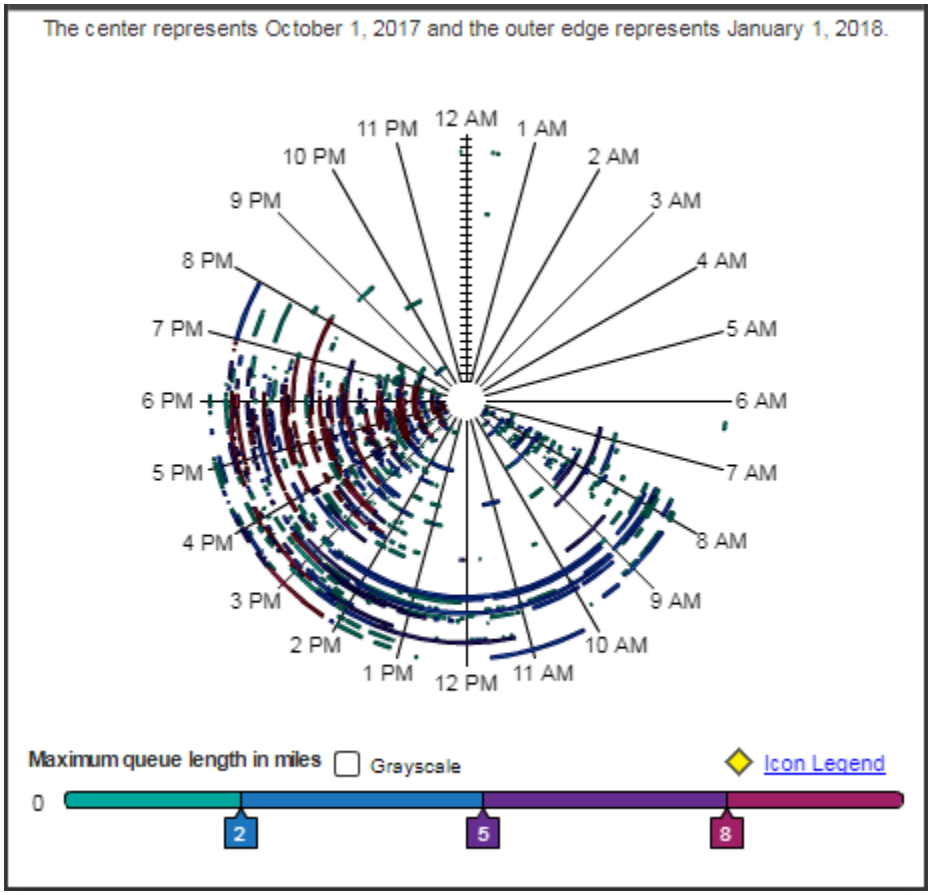
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-95 N @ MD-100/EXIT 43	53,148	4.23	2 h 15 m	8 d 16 h	361



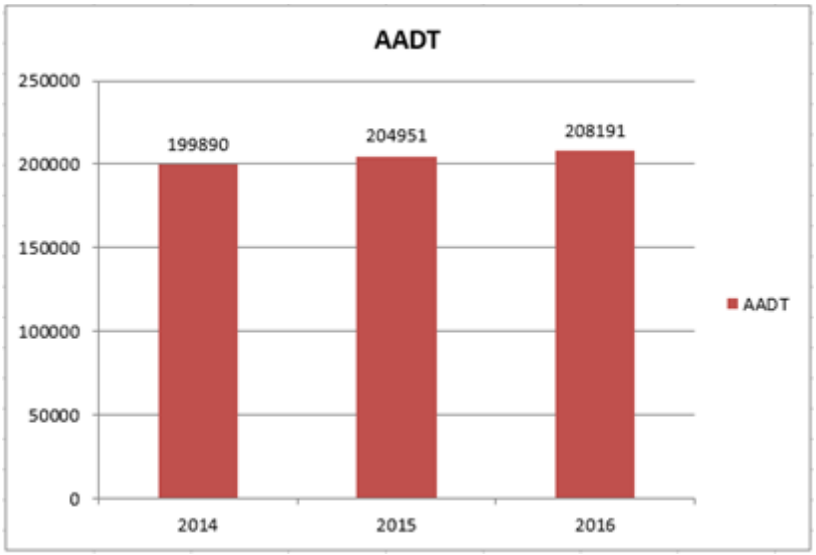
Notes: Congestion in the afternoon rush hour. Contributing factors include traffic entering at MD-175, weaving to exit at MD-100, and the half-mile uphill grade midway between MD-175 and MD-100.

#3 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-95 N @ MD-100/EXIT 43	53,148	4.23	2 h 15 m	8 d 16 h 30 m	361

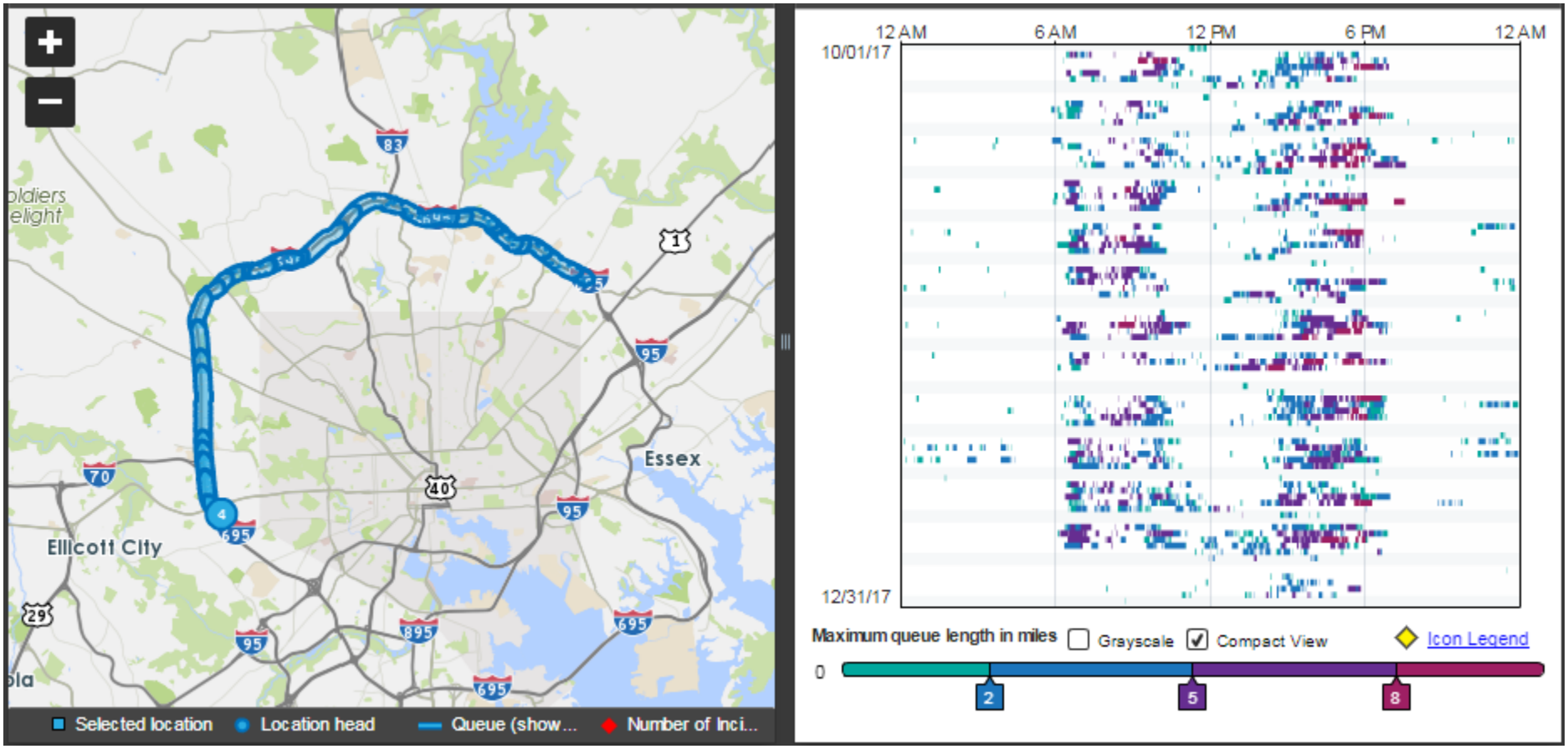


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS 95 .08-MILE S OF MD 103 (ATR#39)



#4 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

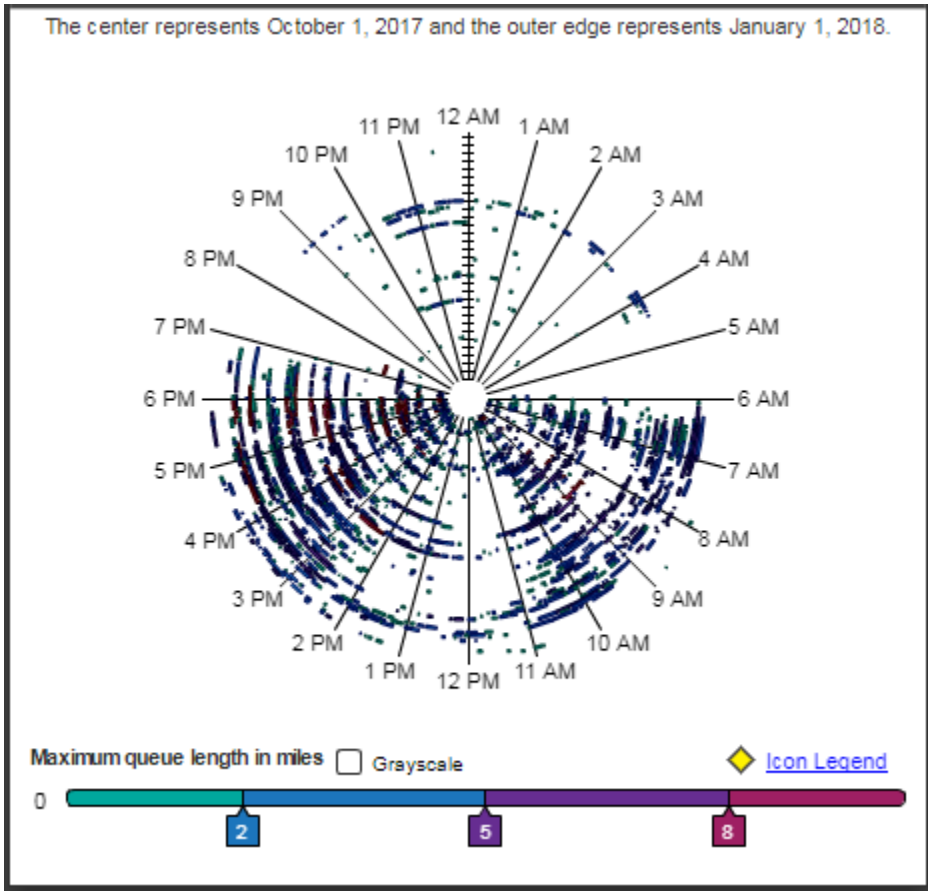
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 OL @ US-40/EXIT 15	51,977	3.82	2 h 29 m	9 d 12 h 43 m	935



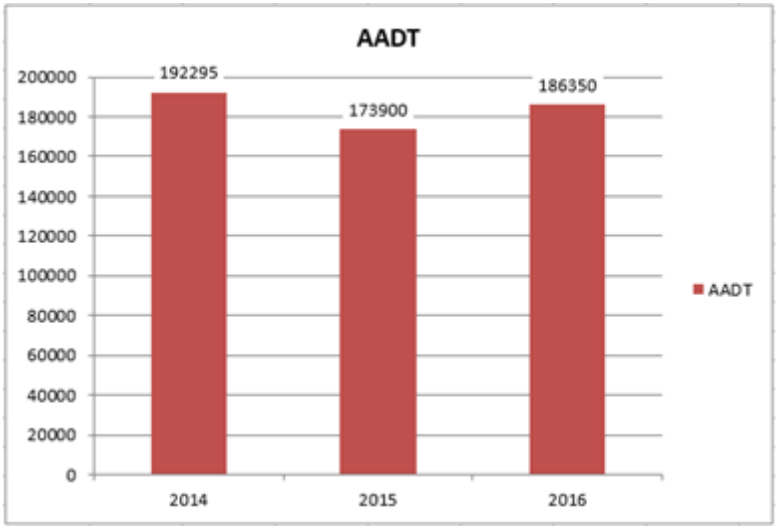
Notes: Delays found in both the morning and afternoon. Longstanding bottleneck on the outer loop of the beltway primarily during the morning rush. High traffic volume area. Also contributing to congestion in the area is a beltway widening project.

#4 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 OL @ US-40/EXIT 15	51,977	3.82	2 h 29 m	9 d 12 h 43 m	935

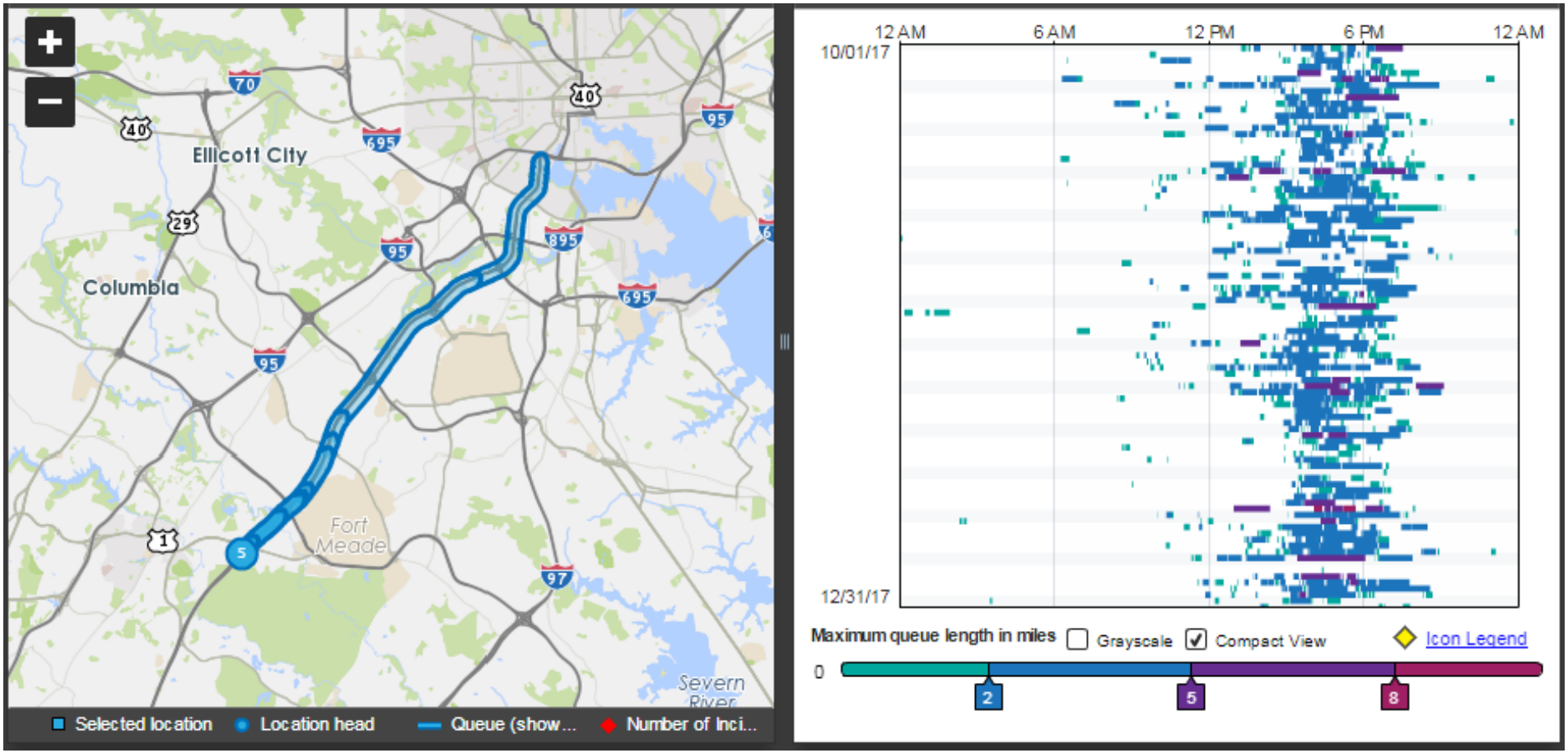


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.50 MI S OF IS70



#5 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

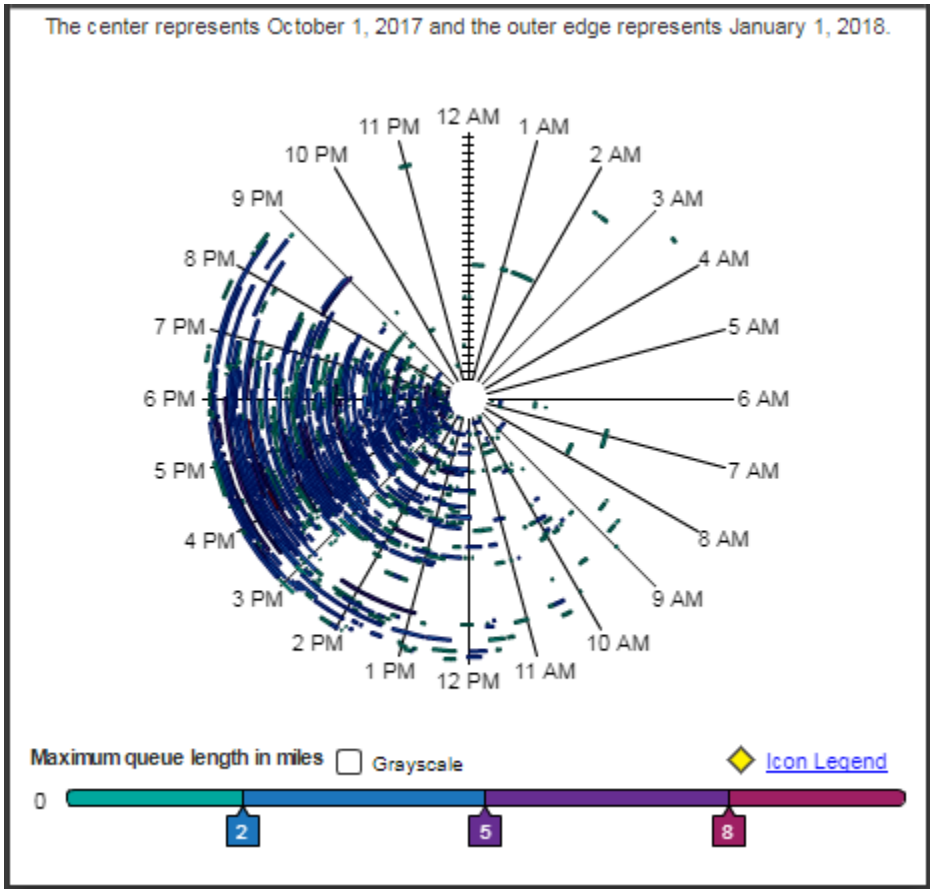
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
MD-295 S @ MD-198	49,167	2.58	3 h 21 m	12 d 21 h 51 m	365



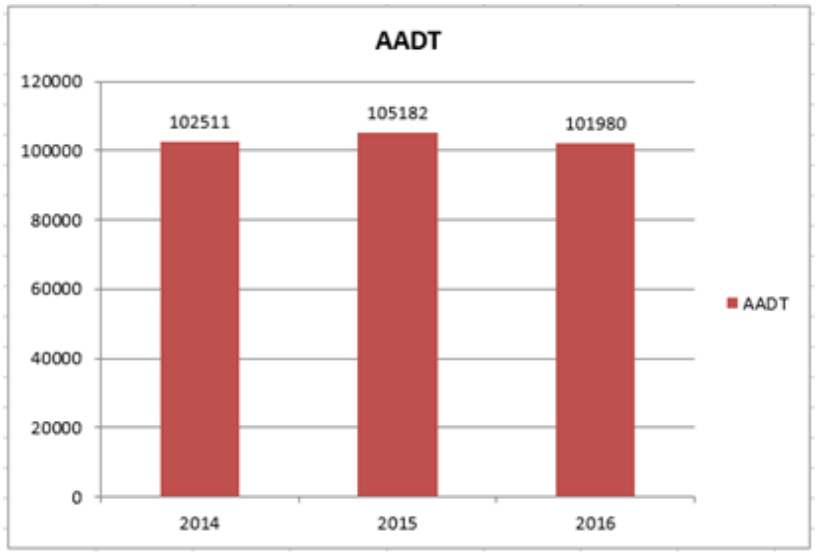
Notes: Southbound PM congestion extending from MD-198 extending into the southern portion of the Baltimore region near Fort Meade occurring during both the morning and afternoon peak periods. Volume related delays caused by factors such as Baltimore commuters to DC and Fort Meade and the MD-295 merge with the heavily congested Capital Beltway

#5 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
MD-295 S @ MD-198	49,167	2.58	3 h 21 m	12 d 21 h 51 m	365

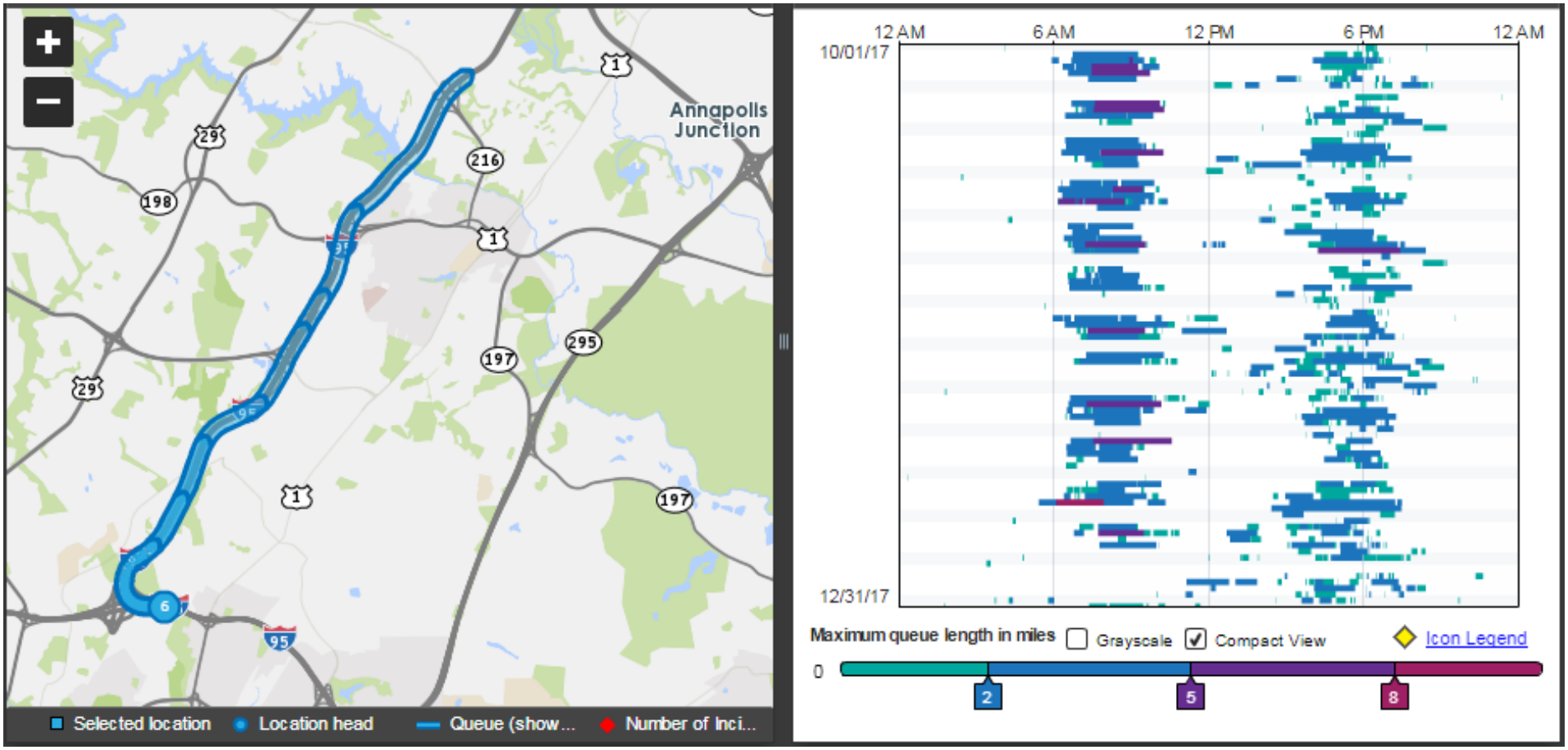


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION MD295-.50 MI S OF MD32



#6 Ranked Bottleneck in the Baltimore Region –4th Quarter 2017

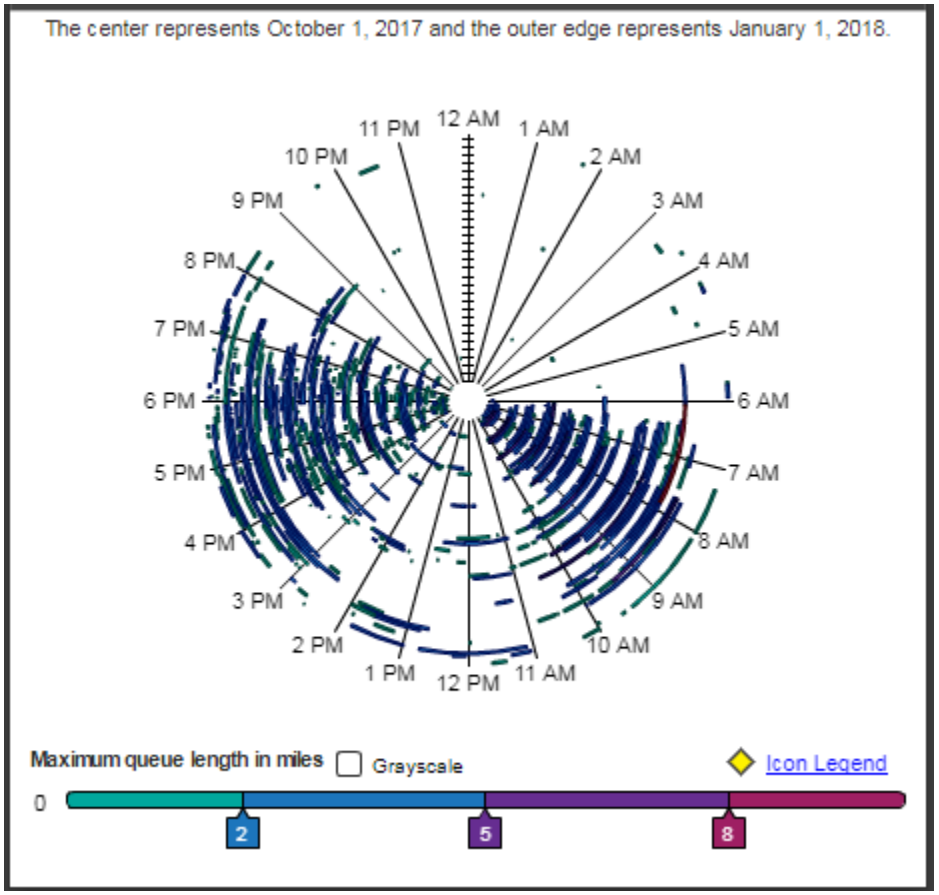
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-95 S @ I-495/EXIT 27-25	47,942	2.28	3 h 37 m	13 d 21 h 06 m	258



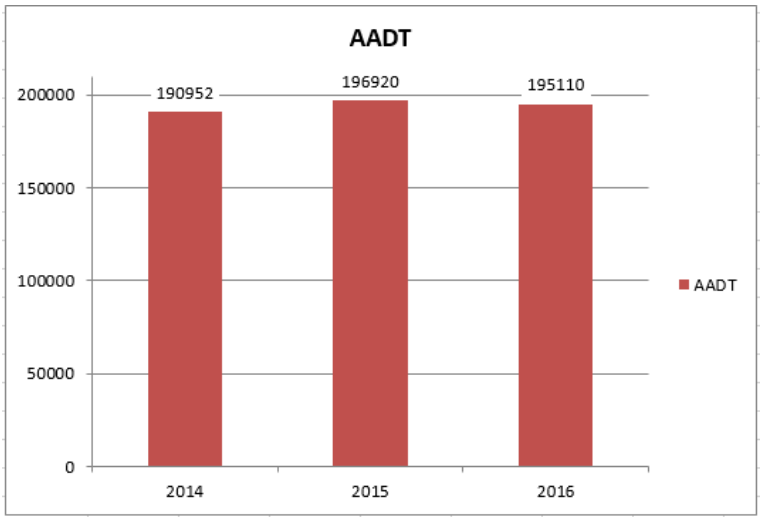
Notes: I-95 merge with the Capital Beltway I-495. Congestion seen in the morning and afternoon rush hour sometimes extending into the southern portion of the Baltimore region.

#6 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-95 S @ I-495/EXIT 27-25	47,942	2.28	3 h 37 m	13 d 21 h 06 m	258



Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS95 -.50 MI S OF MD216



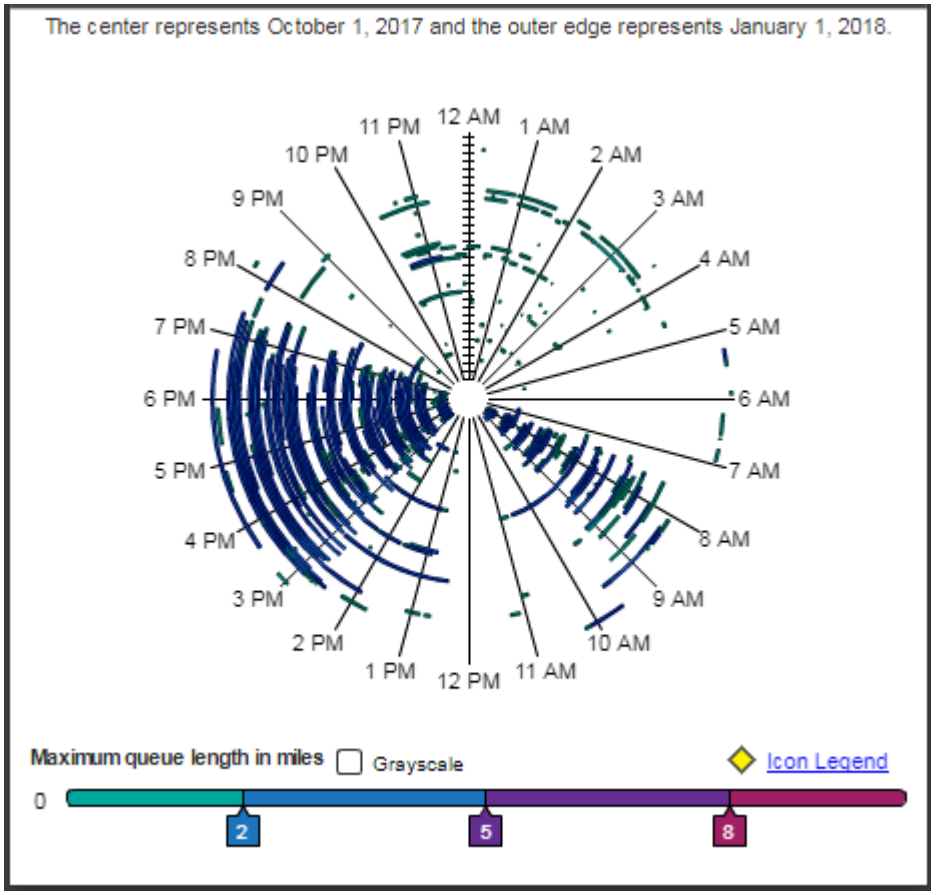
#7 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 IL @ I-70/EXIT 16	42,926	2.00	3 h 18 m	12 d 15 h 51 m	265

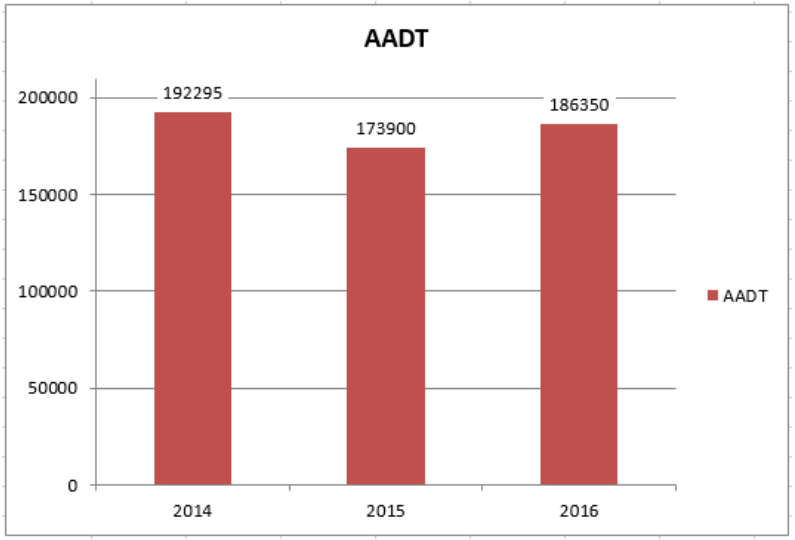
Notes: Normal inner-loop congestion with the greatest delays between MD 144 and the lane drop at I-70. High-volume ramps from Security Blvd, I-70 and US 40 contributed to the congestion.

#7 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 IL @ I-70/EXIT 16	42,926	2.00	3 h 18 m	12 d 15 h 51 m	265

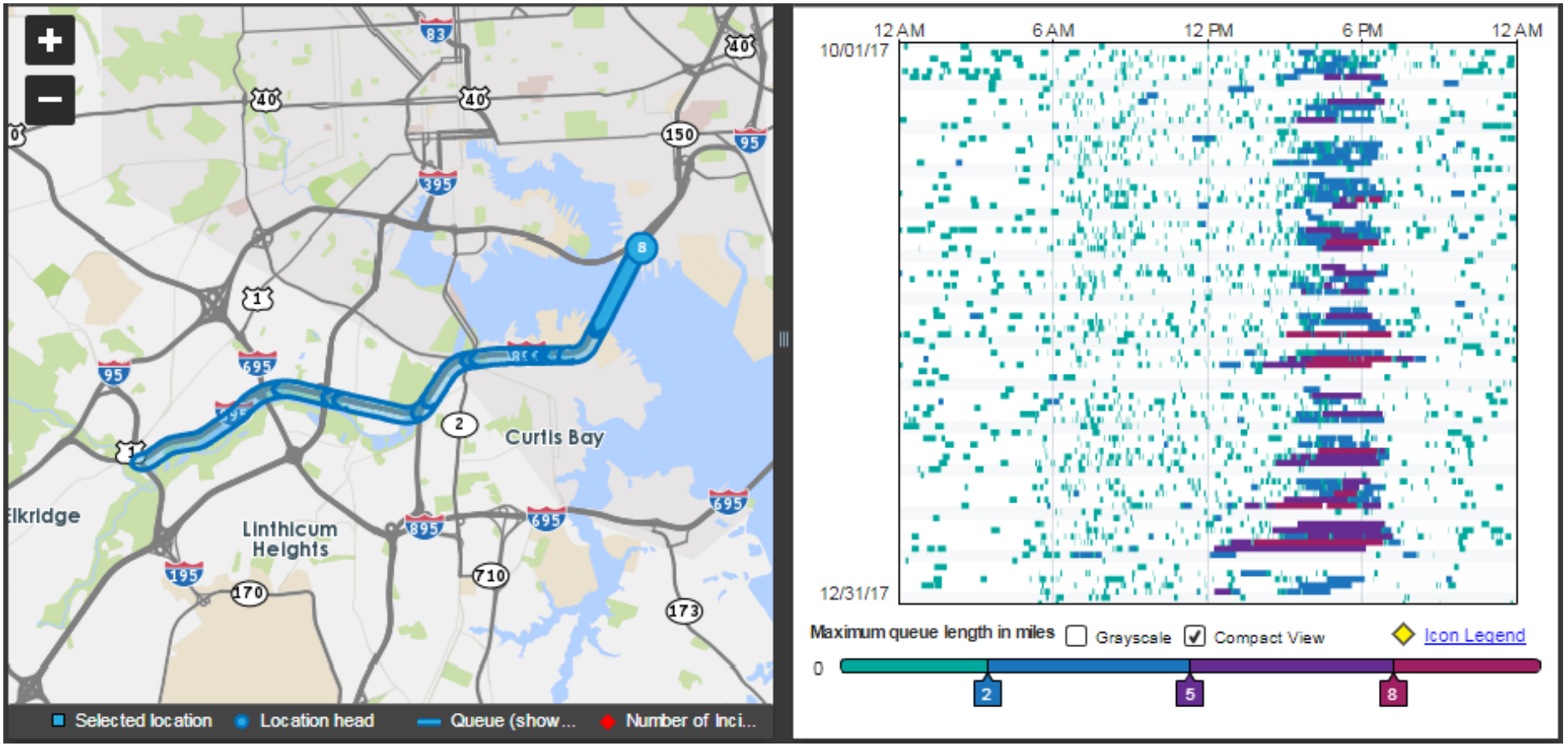


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.50 MI S OF IS70



#8 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

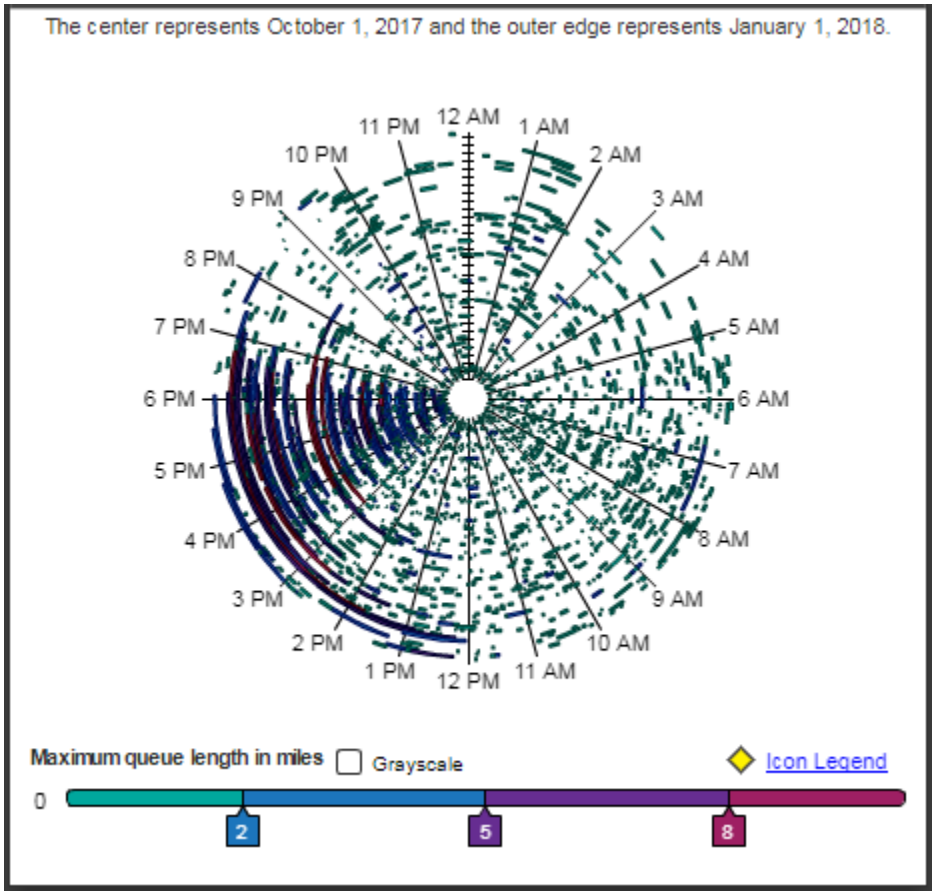
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-895 N @ HARBOR TUNNEL THWY	40,739	0.70	4 h 12 m	16 d 03 h 23 m	270



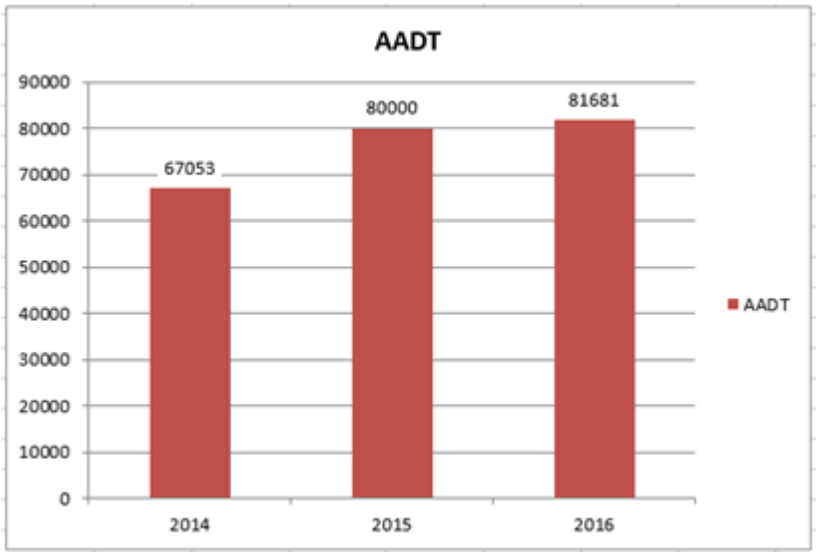
Notes: Backups start before the "K-Truss steel bridge" due to toll plaza and lane drop at the tunnel entrance and continue until traffic exits the tunnel. Bottleneck conditions exist intermittently at all times but become consistent and have higher impact during the PM rush hour.

#8 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-895 N @ HARBOR TUNNEL THWY	40,739	0.70	4 H 12 M	16 D 03 H 23 M	270

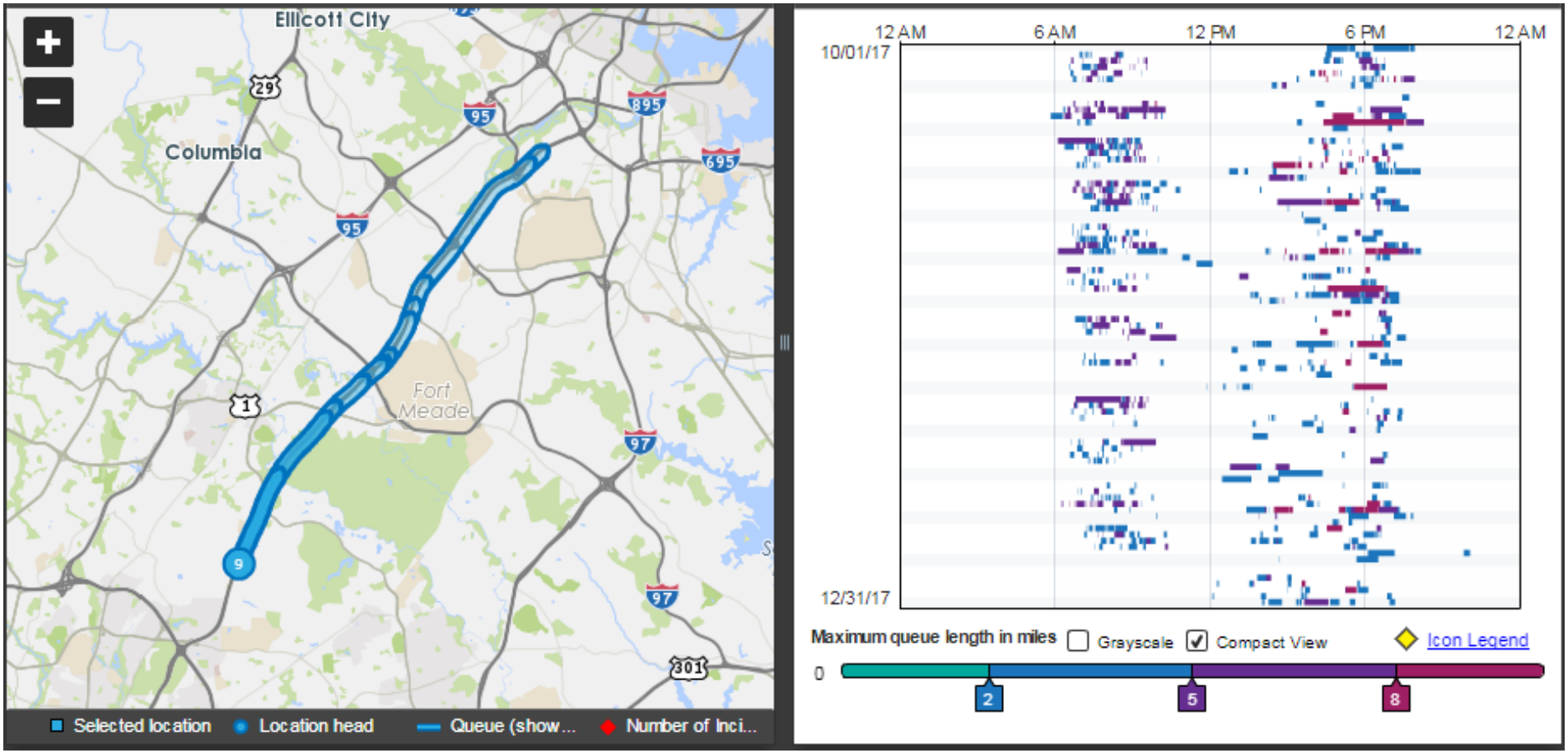


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS 895-.30 MI S OF FRANKFURST AVE



#9 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

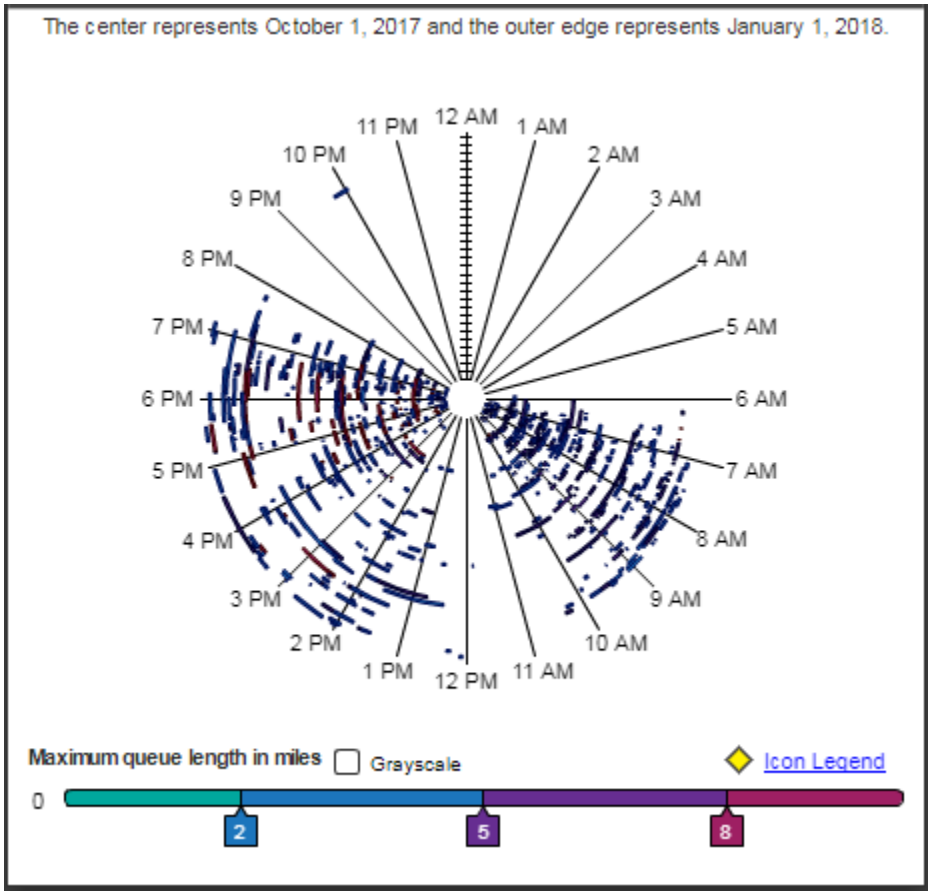
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
MD-295 S @ POWDER MILL RD	39,505	4.96	1 h 35 m	6 d 01 h 57 m	271



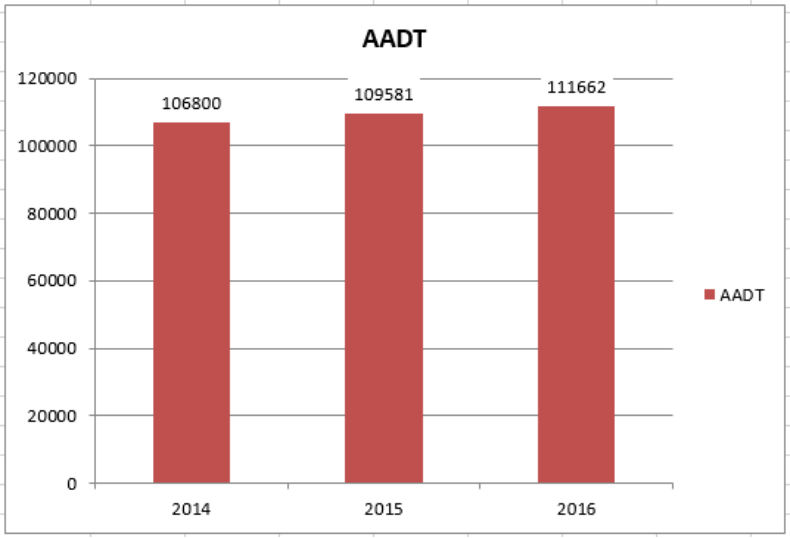
Notes: Southbound AM and PM congestion extending from Powder Mill Rd just barely extending into the southern portion of the Baltimore region near Fort Meade occurring during both the morning and afternoon peak periods.

#9 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
MD-295 @ POWDER MILL RD	39,505	4.96	1 h 35 m	6 d 01 h 57 m	271

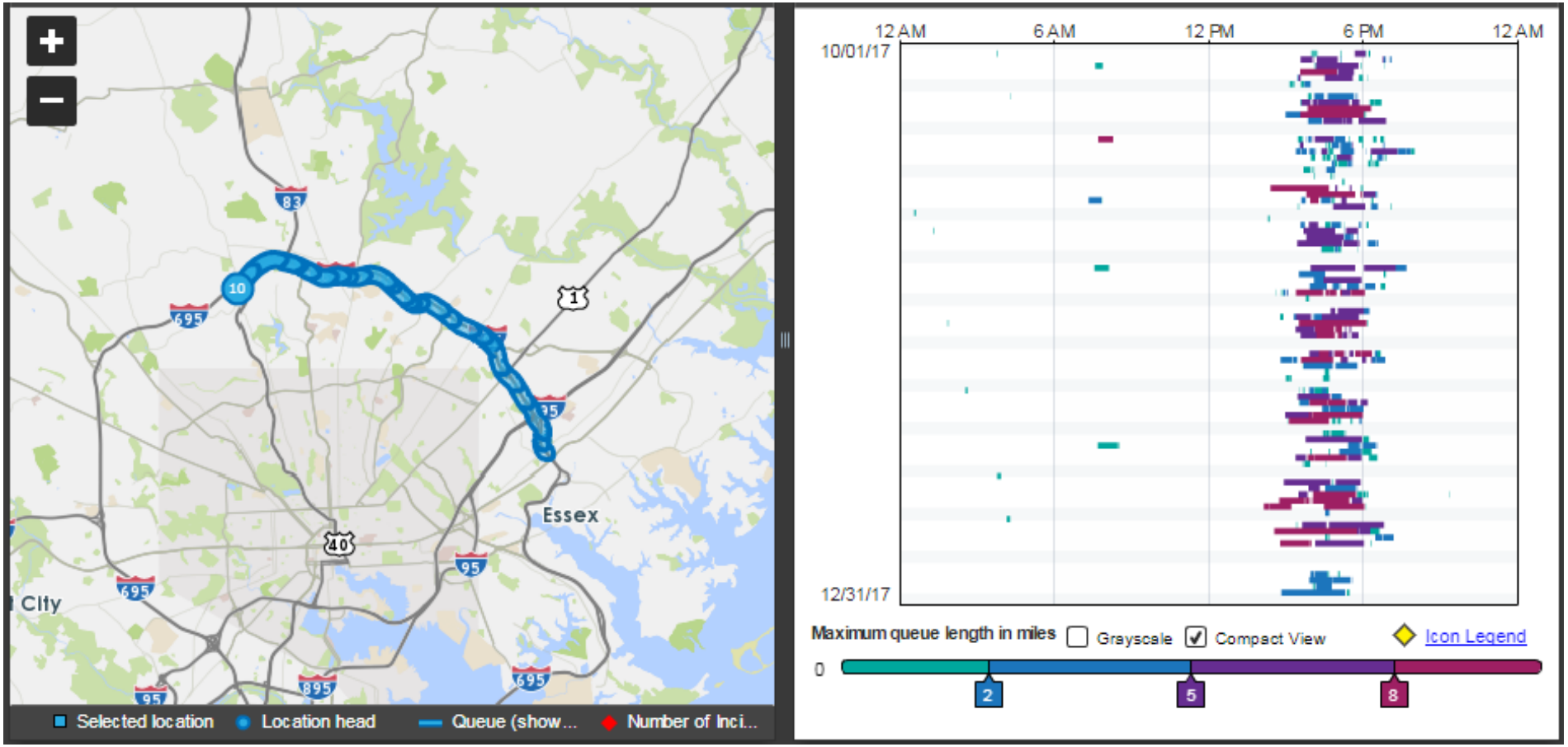


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION MD295-.60 MI S OF MD197



#10 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

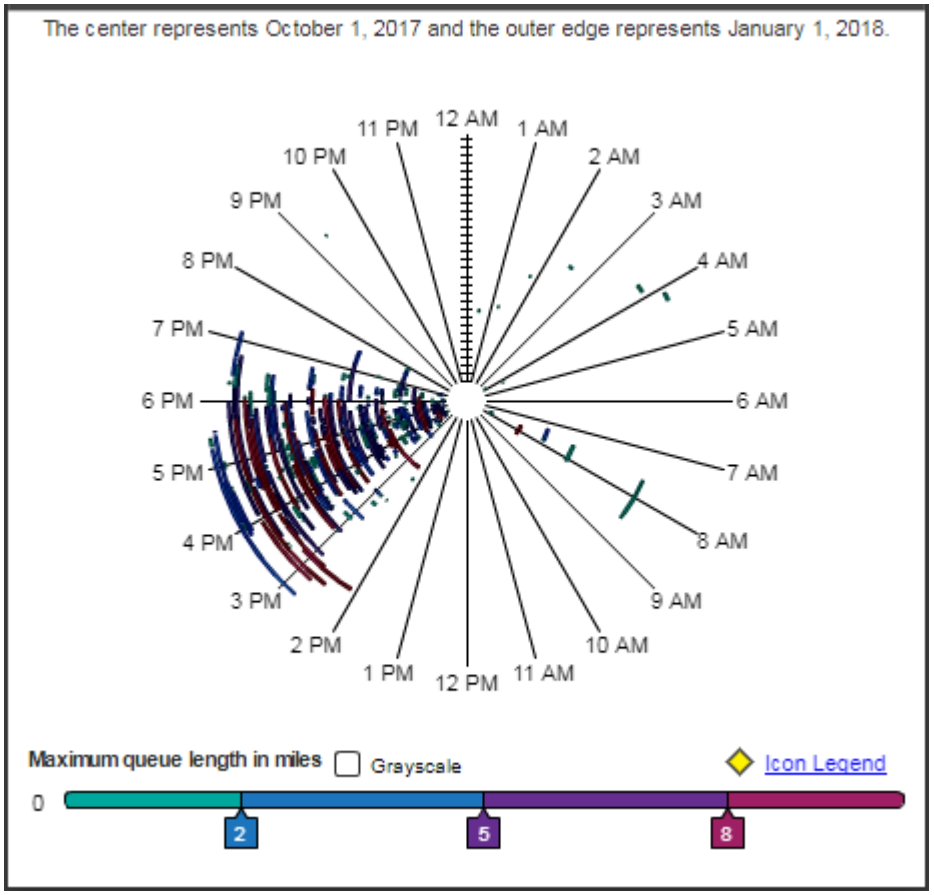
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 OL @ I-83/MD-25/EXIT 23	34,816	4.59	1 h 23 m	5 d 08 h 17 m	540



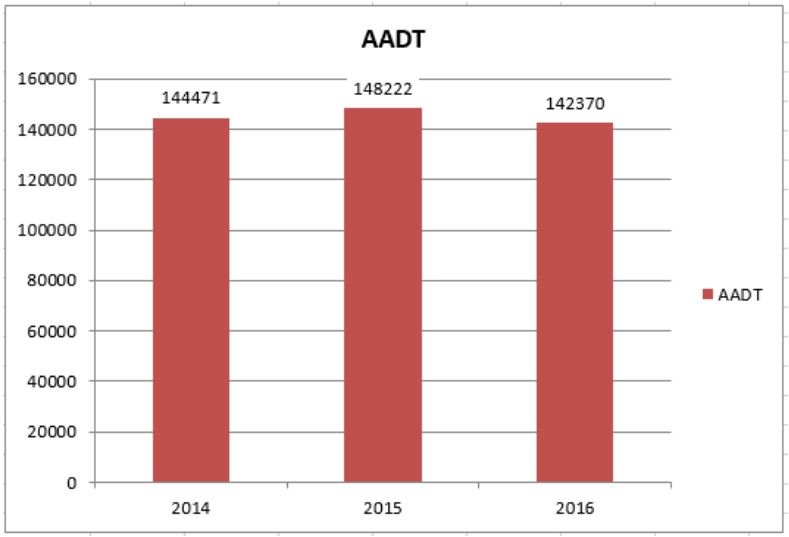
Notes: Mainline congestion in the afternoon rush hour. Contributing factors to this longstanding bottleneck include merging & weaving traffic at each of the interchanges of I-83 north and southbound and between US 1 and Providence Rd; the lane drop (4 lanes to 3) before Perring Parkway; and the sharp curve / downhill / ramp merge combination at MD 567 (Cromwell Bridge Rd).

#10 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2017

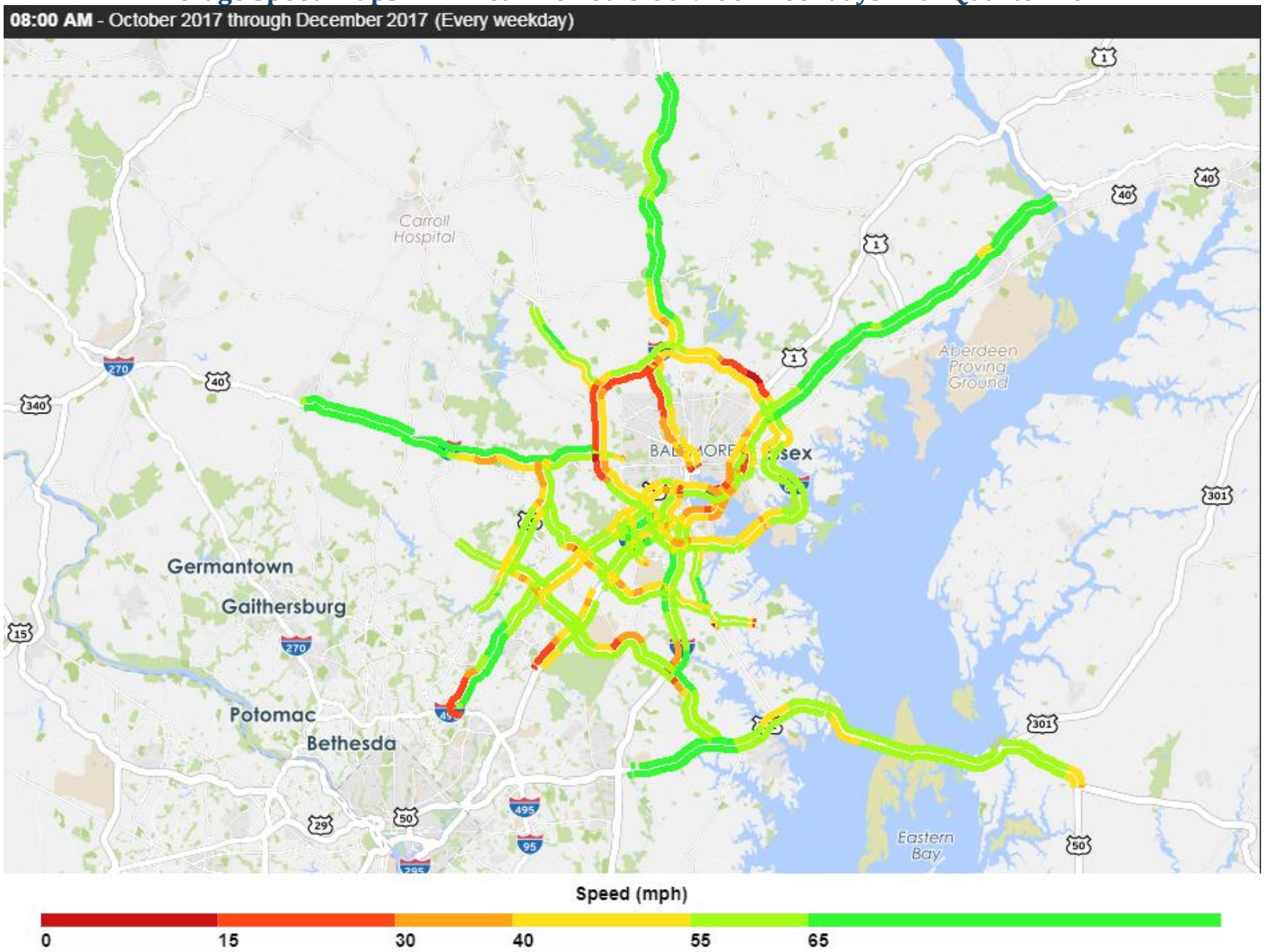
Location	Impact	Average max length (miles)	Average Daily Duration	Total Duration	All Events/Incidents
I-695 OL @ I-83/MD-25/EXIT 23	34,816	4.59	1 h 23 m	5 d 08 h 17 m	540



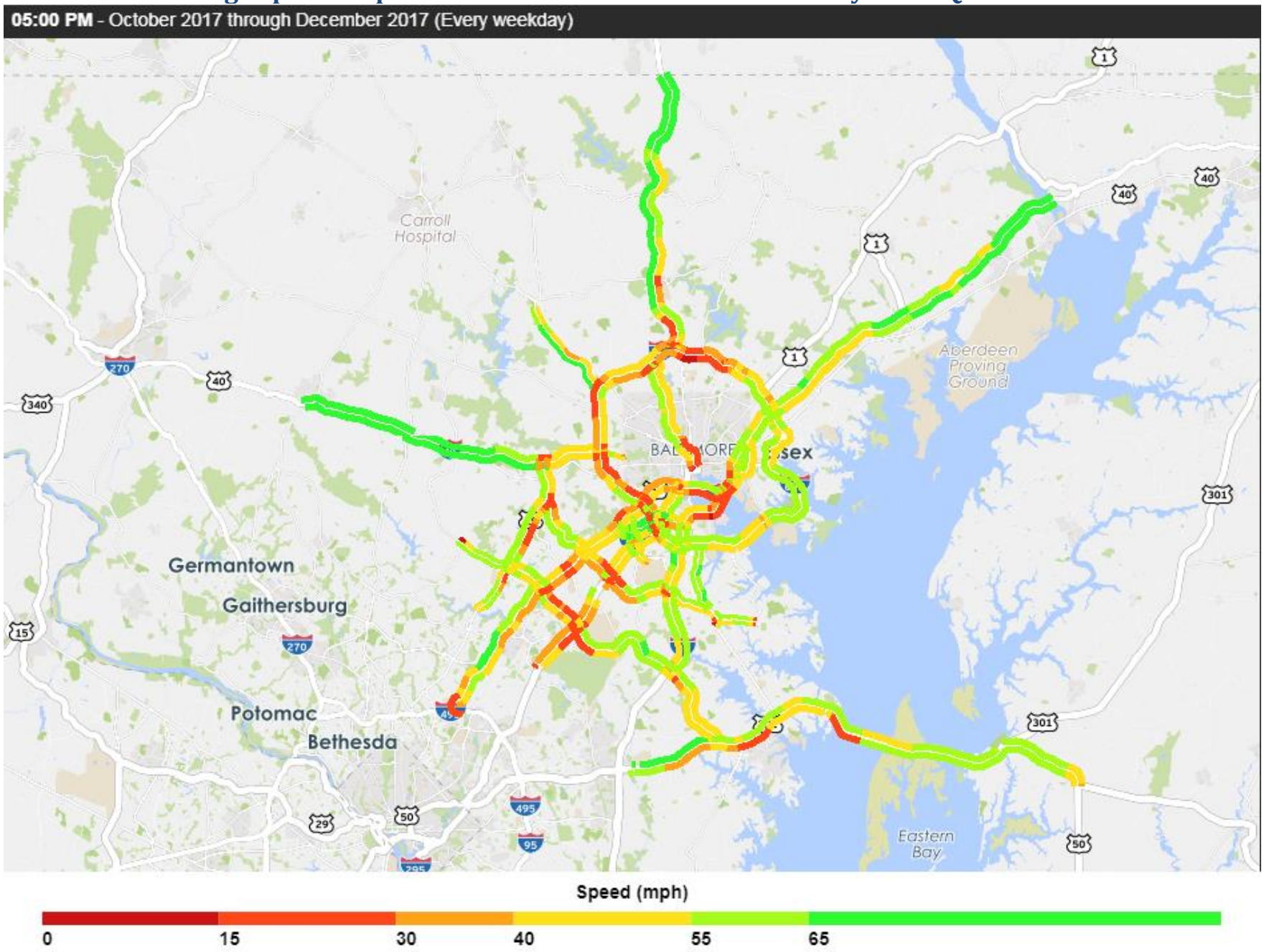
Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.20 MI N OF MD542



Average Speed Maps – AM Peak Period 8:00-9:00 Weekdays: 4th Quarter 2017



Average Speed Maps – PM Peak Period 5:00-6:00 Weekdays: 4th Quarter 2017



The Vehicle Probe Project

Data and graphics in this report were generated from the *Vehicle Probe Project* suite. *The Vehicle Probe Project* (VPP) is a groundbreaking initiative and collaborative effort among the I-95 Corridor Coalition, University of Maryland, INRIX, HERE and Tom Tom and has been providing comprehensive and continuous real-time travel information for more than seven years. Member agencies like the Baltimore Metropolitan Council have found numerous uses for the data beyond simply travel information.

There are **now** **7,000 centerline freeway miles**, more than **20,000 freeway and arterial miles** in all, including continuous coverage of the I-95 corridor from New Jersey through Florida. Coverage also exists in Rhode Island. The network includes full coverage of freeways and major arterials in North Carolina and the Tidewater area of Virginia, full or nearly full coverage of limited access roads in New Jersey, Maryland and South Carolina and the northern and eastern portions of Florida. In addition, coverage now includes ramps at 160 major highway-to- highway interchanges, with all states having interchanges included except Georgia.

Agency Participation
As the value of the data from the Vehicle Probe Project is realized through the various applications and the continued quality via the validation efforts, the member states have increased their commitment to this project. In fact, all of the participating states have committed their own funds to continue this project and many have increased their coverage far beyond the initial core area.

Numerous Uses for the Data
I-95 Corridor Coalition member agencies have found many uses for the vehicle probe data, including:

- Travel Information for 511 (web and phone) Systems, Dynamic Message Signs, and Kiosks
- Travel Time Calculations for Message Boards
- Performance Measures and Travel Time Reliability Support
- Traffic Pattern Observations (in-state and multi-state)
- Trip Planning (www.i95travelinfo.net)
- Performance Measures Tool – Continuing the momentum in performance analysis, the newest initiative from the Coalition is the Vehicle Probe Project Suite. The basic tools include:

Bottleneck and Incident dashboard
Massive Raw Data Downloader
Historical Data Visualizations and Performance Measures (Congestion Scan)
UMD CATT Lab made the VPP suite available to participating agencies. For the training video, please visit http://vpp.ritis.org/suite/screencast/

Should you have any questions, please contact:

- For general project questions, Marygrace Parker at 518-852-4083 or *i95mgp@ttlc.net*
  For the Vehicle Probe Project Suite, Michael L. Pack at 301-405-0722 or *packml@umd.edu*

Project Manager · Victor Henry

Author · Edward Stylc

Data Collection Contributors
I-95 Corridor Coalition · University of Maryland CATT Lab · INRIX
Skycomp

Mike Kelly, Executive Director
Todd Lang, Director of Transportation Planning
Regina Aris, Assistant Director of Transportation Planning

Baltimore Metropolitan Council
1500 Whetstone Way, Suite 300 | Baltimore, Maryland 21230
www.baltometro.org