SHA
State Highway Administration
Maryland Department of Transportation

2015 Maryland
State Highway Mobility Report

DECEMBER, 2015

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor
Pete K. Rahn, Secretary
Greg C. Johnson, P.E., SHA Administrator

Maryland Department of Transportation

2015 Maryland State Highway Mobility Report

Fourth Edition

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DECEMBER 2015

Cover Photo: I-95/I-495 @ I-295

Message from the Secretary

On behalf of Governor Larry Hogan, thank you for your interest in Maryland's transportation system. With the Governor's focus on *Changing Maryland for the Better*, we are making progress, particularly in transportation. The Hogan Administration, including the Maryland Department of Transportation's (MOOT) State Highway Administration (SHA), is focused on economic development as an absolute top priority. We are committed to delivering on the Governor's pledge to be "Open for Business."

The economic vitality of our State, creating jobs and opportunities, is closely tied to transportation. We must invest more in roads to reduce gridlock, improve safety, and reliably transport people and goods.

Maryland has a renewed commitment to infrastructure investment. Governor Hogan announced $1.97 billion in funding to upgrade highways and bridges throughout the State over the next six years. This influx of new funding allows us to address long-standing highway needs and reduce severe congestion to make Maryland more attractive for economic development. The MDOT/SHA uses a performance based approach to provide its users with a high quality reliable highway system. With a focus on policies, programs, and projects that systematically address both recurring (every day) congestion and nonrecurring (weather, crashes, work zones, special events, etc.) congestion, we continue to preserve and improve the State highway system while supporting Maryland's economic competitiveness and the quality of life of our citizens.

With more than 50 percent of congestion caused by incidents, real-time information about transportation choices is a valuable and necessary commodity. In addition to safety and congestion, transportation system reliability is another key indicator to ensure we provide our customers with a safe travel experience in Maryland. As part of this report, engineers researched and investigated the underlying causes of congestion to assist in implementing short and long-term strategies to improve traffic flow.

Maryland's transportation network of more than 31,000 miles of roadway, 5,000 plus bridges, and 2 tunnels provide mobility for vehicle drivers reaching 58 billion miles of travel each year. Additionally, 800 miles of rail lines and public transit systems serve a combined ridership of more than 400 million passengers annually. Additionally, the State has major marine facilities at the Port of Baltimore and 18 publicly owned airports including the Baltimore/Washington International Thurgood Marshall Airport. It is imperative to keep people and goods moving to have a healthy and competitive economy to support Maryland families and businesses.

Pete K. Rahn
Secretary

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Executive Summary

I-695 @ I-70

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I-695 West of I-83

The fourth annual Maryland Mobility Report provides a summary of performance along the Maryland State Highway Administration (SHA) and the Maryland Transportation Authority (MDTA) facilities for calendar year 2014. This includes identifying successes, challenges and strategies being utilized to improve the transportation services the Maryland Department of Transportation (MDOT) delivers to Marylanders and the traveling public. In order to address mobility issues, many different programs have been established to ensure safe, reliable and efficient travel of people and goods.

Governor Hogan's announcement that $1.97 billion has been dedicated to improve roads and bridges will enhance Maryland's ability to invest in transportation facilities. Eighty-four (84) new projects have been identified across the state to enhance mobility and safe movement of people and goods. MDOT-SHA continues to focus on policies, programs and projects that systematically address both recurring (every day congestion) and non-recurring congestion (due to weather, crashes, vehicle breakdowns, etc.) through a performance based approach to provide its users with a high quality, reliable highway system.

The 2015 Maryland Mobility Report describes the calendar year 2014 performance related to mobility trends in Maryland and how these compare to past years plus what has been accomplished. This includes elements such as Transportation Systems Management and Operations (TSM&O), multi-modalism, and the major capital projects SHA has undertaken in the past year.

The following is a summary of congestion and reliability trends on the Maryland highway network in 2014:

- In 2014, 56.4 billion vehicle miles of travel (VMT) occured on Maryland roadways. This is a 0.2% decrease over 2013. Approximately 72% of the VMT occurred on state highways and toll facilities. The volume on state facilities increased by 163 million VMT. In 2014, VMT in the Baltimore - Washington region was constant from last year at 44.4 billion while 12.0 billion VMT occurred on the Eastern Shore, Southern and Western Maryland.
- The largest percentage increase for VMT from 2013 to 2014 occurred in Anne Arundel County while the biggest percentage decrease took place in Garrett County.
- In the last five years, changes in VMT have varied by locality. In St Mary's and Worcester Counties, VMT has grown by over 10% while Dorchester and Garrett Counties have seen a 7% drop in VMT.

I-495 East of MD 185

- Private sector vehicle probe speed data for the Maryland freeway/expressway system showed that 8% of the system experienced heavy to severe congested conditions in the AM peak hour. Higher congestion levels occurred in the PM peak hour with 13% of the system experiencing heavy to severe congested conditions.
- In 2014, on freeways/expressways, 16% of the AM peak hour VMT and 24% of the PM peak hour VMT was in congested conditions compared to 16% and 22% (AM and PM peak hour respectively) in 2013. On weekdays, almost 100% of the peak hour congestion occurred in the Baltimore - Washington region.
- The cost of congestion to travelers on Maryland freeways/expressways system amounted to a total annual delay of 39.2 million hours and consumption of 18.4 million gallons of extra fuel. This translates into $1.7 billion dollars of annual user costs due to congestion.

The most congested freeway/expressway segments for the AM and PM peak hours are as follows:

2014 MOST CONGESTED FREEWAYS/EXPRESSWAY SEGMENTS (AVERAGE WEEKDAY)

AM Peak (8-9 AM)	PM Peak (5-6 PM)
I-495 Outer Loop - I-95 to MD 97	I-695 Inner Loop - MD 139 to Providence Road
I-695 Outer Loop - US 1 to MD 41	I-495 Inner Loop - Clara Barton Parkway to I-270
I-695 Outer Loop - MD 26 to US 40	I-270 Northbound - Shady Grove Road to Middlebrook Road
I-270 Southbound - Shady Grove Road to Montrose Road	*MD 295 (Baltimore - Washington Parkway) Northbound - Powder Mill Road to MD 32
US 50 Westbound - MD 202 to MD 201	MD 100 Westbound - MD 713 to Coca-Cola Drive

* - Maintained by National Park Service

SHA adopted a second measure of system performance to reflect the reliability or the variability of travel time on its facilities, the Planning Time Index. This index identifies that 9% and 13% of the freeways/expressways operate in highly to extremely unreliable conditions in the AM peak hour and the PM peak hour respectively. These percentages remained the same as 2013.

The following roadway segments were the most unreliable related to travel time variability in AM and PM peak hours.

2014 MOST UNRELIABLE FREEWAYS/EXPRESSWAY SEGMENTS (AVERAGE WEEKDAY)

AM Peak (8-9 AM)	PM Peak (5-6 PM)
I-495 Outer Loop - I-95 to US 29	I-495 Inner Loop - MD 187 to MD 185
I-695 Outer Loop - MD 140 to US 40	I-695 Inner Loop - MD 139 to Providence Road
I-695 Outer Loop - US 1 to MD 41	I-495 Inner Loop - Clara Barton Parkway to I-270
I-270 Southbound - Father Hurley Blvd. to MD 189	I-270 Southbound - Democracy Boulevard to I-495
*MD 295 Southbound - MD 202 to the Washington D.C. Line	MD 100 Westbound - MD 170 to MD 295

*Maintained by the National Park Service

Another measure of traffic congestion is the location of bottlenecks on a daily basis. Bottlenecks are defined based on the number of occurrences of speed reductions due to capacity or incident issues, average length of queue that occurs and duration of event. The top bottleneck locations are:

2014 Bottlenecks	
I-495 Inner Loop at I-270	MD 295 Northbound at MD 175*
I-95 Outer Loop at Greenbelt Metro***	I-695 Outer Loop at Edmondson Ave **
I-95 Northbound at MD 100	I-695 Inner Loop at I-795**
I-270 Southbound at I-270 Spurs	I-695 Inner Loop at MD 147**
MD 295 Northbound at I-195	MD 295 Northbound at MD 197*

* Maintained by the National Park Service ** Under Construction *** Data Under Review

US 40 @ MD 63

Traffic count data was analyzed for the SHA arterial system from an intersection and link standpoint. The system-wide analysis showed the following performance:

- Sixty-two (62) intersections were operating at a failing level of service (LOS F) based on traffic count data from the last three years.

In order to improve mobility, the MDOT-SHA uses a combination of policies, programs and strategies. Programs have been established to provide incident management and travel information services, expand pedestrian and bicycle facilities, provide ADA accommodations, increase access to transit and address freight issues. Strategies focus on maximizing the existing network. This includes using the latest advances in Intelligent Transportation Systems (ITS) technology, retiming signals to reduce delay, making more efficient use of the existing pavement through avenues such as express toll lanes, HOV lanes and reversible lanes and utilizing variable lane use control signals. In addition, geometric improvements are constructed at critical segments or intersections to address congestion hotspots. The projects are developed through a high quality data driven processes in which SHA develops and implements programs and projects to provide improved mobility in a systemic and responsible manner.

Various construction projects, technologies and system improvements were implemented by MDOT with the assistance of metropolitan planning organizations (MPOs), County and local agencies, to improve mobility within the State of Maryland. Major highlights include:

- SHA's Coordinated Highways Action Response Team (CHART) program responded to and cleared more than 23,000 incidents and assisted nearly 37,000 stranded motorists on Maryland roadways. This represents an increase of approximately 35% vs. 2013. Much of this correlates to the 24 hours a day/7 day a week expansion of service patrols in 2014.
- CHART has effectively doubled the size of its service patrols with 48 full-time patrols serving the Baltimore, Washington, Frederick and Annapolis regions. In addition, extra patrols are provided on the Eastern Shore during summer months.

I-695 @ MD 372

- A customized application was developed in 2014 for the commercial vehicle industry for the Maryland 511 traveler information service. This service, with its "Know Before You Go" theme, provides reliable travel information via the web or phone on state-maintained roadways. The 511 system continues to assist highway users in better trip planning by providing route specific real time information on travel times.
- MDOT have expanded their capabilities to provide travel time information on almost 100 dynamic message signs throughout Maryland.
- Traffic signal retiming, is an annual program led by the Office of Traffic and Safety. Twenty-nine (29) signal systems accounting for 409 individual signals were reviewed in 2014. Approximately 55% of the signals were in need of retiming. The retiming of traffic signals provided for an estimated reduction of 866,000 hours of delay and an estimated 300,000 gallons of fuel savings. This resulted in $29.6 million annual user cost savings in 2014.
- Five major roadway improvement projects were completed in calendar year 2014. This included three projects associated with the BRAC improvements (MD 175 @ Rockenbach Road/Disney Road, US 40 @ MD 715 and US 40/ MD 7/MD 159). The two other projects were the reconstruction of the I-695/MD 144 interchange in Baltimore County and the I-70/South Street/Monocacy Boulevard in Frederick County. These major projects are projected to result in an annual user cost savings of $12.7 million.
- SHA completed three minor congestion relief projects through its Congested Intersection Program. The improvements were made at MD 145/MD 146, MD 197/Powder Mill Road/American Holly Drive, and US 50/MD 452/Seahawk Drive intersections. These projects result in a $8.3 million annual user cost savings.
- The MDTA opened the first express toll lane (ETL) project in Maryland. This allows motorists an option to travel on a eight mile section of I-95 from I-895 to north of MD 43 in White Marsh by paying a toll to use the free flow express toll lanes. The initial volumes and public perception has been extremely positive.

MD 175 @ MD 713

- The final section of the Intercounty Connector (ICC)/MD 200 from I-95 to US 1 opened in December 2014. Traffic usage on the existing section from I-270 to I-95 is increasing with most sections averaging 38,000 to 39,000 vehicles per day. This roadway provides a vital east-west connection between the I-270 and I-95 corridors and improves access to the I-270 Technology Corridor and the Baltimore - Washington Thurgood Marshall International Airport.
- Several major projects were under construction in calendar year 2014 to improve traffic operations including widening I-695 from MD 41 to MD 147 and reconstructing the MD 147 interchange, widening of US 29 from Seneca Drive to MD 175, an interchange project at US 15/Monocacy Boulevard and the continued widening of MD 404 in Caroline County.
- SHA's Complete Street policy focuses on a multi-modal approach to projects. This facilitates walking and bicycling as low-cost, environmentally friendly, and healthy transportation alternatives. Over 11 miles of new sidewalk was installed along with approximately 13 miles of marked bicycle facilities. The number of accessible pedestrian signals increased by 6% statewide and the number of sidewalks that are ADA compliant approaches 66%.
- MDOT collaborated to develop a 20 year Bicycle and Pedestrian Master Plan to support walking and cycling.
- The SHA and MDTA operate 104 park and ride lots. On an average day, more than 7,500 motorists park at these lots saving over 112 million vehicle miles travelled annually which provided $63 million in user cost savings.
- The I-270 HOV lanes operations provide multi-occupant vehicles with as much as 16 minutes in travel time savings in the PM peak hour. Person throughput along the corridor is substantially increased with a HOV lane accommodating as much as 1,000 additional people versus a non-HOV lane. HOV lane operations on I-270 resulted in $4.8 million user cost savings in 2014.
- The movement of commercial vehicle freight is critical to the States economy. SHA incorporates mobility and safety measures such as virtual weigh stations, improvements to at-grade railroad crossings and providing more overnight parking spaces. Calendar year 2014 efforts includes approximately 10 upgrades to railroad crossings and provision of additional overnight parking spaces at the I-95 southbound Welcome Center near Laurel.

US 50/301 Bay Bridge

- SHA is developing a Transportation Systems Management and Operations (TSM&O) Strategic/Implementation Plan to streamline agency structure and functions for improving travel time reliability on state highway system. Various policies and pilot opportunities are being developed for implementation of active traffic management (ATM) and Integrated Corridor Management (ICM) strategies.
- The FHWA's Strategic Highway Research Program (SHRP2) awarded SHA $2 million in implementation assistance to advance mobility performance management, state-of-the-art modeling tools and innovations for transportation planning and operations.
- MDOT-SHA refined its technical and business process through its freeway and arterial congestion management initiatives to develop low cost high benefit congestion mitigation solutions in a strategic manner. Performance dashboards and visualization tools were developed to provide transparent and objective performance measurement analysis and reporting.

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What is in the Maryland State Highway Mobility Report?

The 2015 Maryland State Mobility Report is broadly written around the central theme of:

- What is Happening? (Trends and Needs Identification - Chapter I)
    - Chapter I reviews the Mobility Trends in Maryland including traffic volumes, congestion, reliability and truck trends for the year 2014. This chapter includes the congestion and reliability maps statewide and for the Baltimore / Washington region for the peak hours. The Top 30 peak hour congestion and reliability locations and 24 hour bottlenecks on the Maryland freeway/expressway system are identified.
- What is MDOT-SHA doing and what are the outcomes? (Mitigation Strategies/Solutions - Chapter II)
    - Chapter II reviews the Capital Projects implemented in 2014 along with the user benefits. Programs and policies include CHART activities and various multimodal strategies implemented by the SHA.
- Appendices A - C include fact sheets to highlight the performance of major freeway/expressway, arterial corridors and capital projects completed in 2014.

What's new in the 2015 Report:

- Long term impacts of major capital projects on congestion.
- Expansion of freight information.
- Addition of safety and reliability benefits for capital projects.
- Additional year to year comparisons.

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Mobility

Trends in Maryland

I-270 @ Rockledge Drive

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A. Traffic Volume Trends

I-95 South of MD 43

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I-270 North of MD 124

Traffic Volume Trends

Nationwide, after a period of flat or decreasing travel, traffic volumes have started to rise. For the third straight year, the number of vehicle miles travelled has increased. In 2014, the largest increase in over 10 years occurred with travel up by an estimated 1.7% or 50 billion vehicle miles nationwide. Urban areas experienced much of the increase. This holds true for the Baltimore - Washington regions especially in the surrounding suburbs.

The following facts highlight trip patterns in Maryland:

- Maryland is first in the nation in terms of longest commuting times according to the latest American Community Survey with an average of 32.5 minutes. The District of Columbia which includes many Maryland commuters is fourth in the nation with commuting times on average of 29.9 minutes each way.
- Approximately 220,000 people commute from Maryland into Washington D.C.
- There are almost 140,000 people that commute into Baltimore City each day. Almost 55% of these people travel from Baltimore County with the remaining from other jurisdictions.
- Maryland's population in 2014 was approximately 5.98 million, about 200,000 people greater than in 2010 according to the US Census Bureau. By 2040, population is projected to increase to over 6.9 million. In addition, job growth in Maryland is expected to keep pace with an estimated 800,000 additional jobs between 2010 and 2040.
- The 2015 Urban Mobility Scorecard has cited the Washington, DC region as number 1 in the nation in terms of yearly delay per auto commuter, increased fuel consumed due to travel in congested conditions and congestion cost per auto commuter in 2014.
- In measures developed as part of the 2015 Urban Mobility Scorecard, the Baltimore Metropolitan area is ranked #14 in truck congestion costs, #18 in excess fuel consumed and #18 in total congestion costs in the nation. The yearly delay experienced by Baltimore area commuters, the leading sign of congestion, ranks the area at #23 nationwide.

Roadways in Maryland are owned and operated either by local entities such as counties, cities, local municipalities, private entities or by the MDOT including Maryland SHA or Maryland Transportation Authority (MDTA). Generally, the local roadways carry the lower volumes of traffic. The higher volume roadways are mainly owned and operated by SHA and MDTA. SHA owns and maintains the numbered, non-toll routes in Maryland's 23 counties, a total of 14,800 lane-miles and 2,566 bridges that represent the backbone of Maryland's transportation system. This infrastructure forms the majority of the National Highway System (NHS) in Maryland to connect local and county roads to major commercial, office and residential centers. The transportation network not only provides roadway connections but also multi-modal connectivity to airports, railroads, mass transit, and the port. Although SHA roadways account for only 22% of the state's lane miles they carry 66% of the state's traffic. The MDTA owns and operates all toll roads in the state. This includes I-95 in Baltimore City to the Delaware State Line, I-895 including spurs to I-97 and MD 2, MD 695 from east of MD 10 to MD 151, the Hatem Bridge (US 40), the Bay Bridge (US 50/301), the Nice Bridge (US 301) and MD 200 (Intercounty Connector).

The growth in traffic volumes in the last twenty-five years in Maryland varies greatly. In more rural areas and in center city areas, traffic volumes has seen relatively no growth or even a decrease along certain roadways. Conversely, interstates highways, major arterials and roadways in suburban areas has seen a tremendous amount of growth. The following chart illustrates some of the growth that has taken place in traffic volumes over the last twenty-five years:

Location	1989 Average Daily Traffic	2014 Average Daily Traffic
MD 528 North of MD 90	29,000	46,100
US 50/301 West of US 50/301 Split	36,100	65,000
I-270 North of MD 28	100,500	226,300
I-795 North of I-695	40,000	108,900
MD 235 East of MD 4	34,600	58,500
I-70 West of US 40	41,000	65,100
MD 32 East of MD 108	12,500	45,500

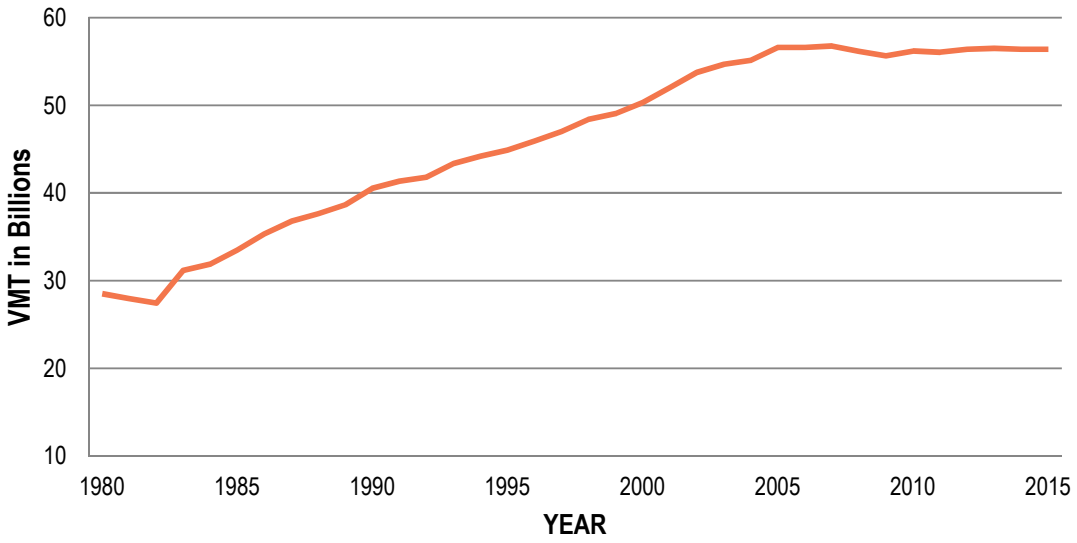
A measure from year to year on the usage of Maryland's roadways besides traffic volumes is reflected in the number of Vehicle Miles Traveled (VMT) along the various roadways. VMT is a standard performance measure of travel for various roadway classifications on a local, regional, state and national level. VMT is defined as the number of vehicles times the distance they traverse along the network. VMT has been measured for decades in each state throughout the nation and thereby gives a comparison in growth from one year and one decade to the next. Many areas in Maryland have seen growth in VMT that has outpaced population growth and SHA's ability to expand the roadway network particularly in the

I-70 @ South Mountain

Baltimore / Washington region. This causes an increase in congestion on the roadway network. In order to keep pace with the VMT and congestion, various multi-modal and traveler incentive programs are utilized to help manage the demand for transportation services.

In Maryland, vehicular traffic nearly doubled between the early 1980s' and the mid 2000s'. This increase was based on various economic and social conditions such as the increase of women in the work force and people moving further from their location of employment. The economic downturn of the late 2000s had the opposite impact causing a reduction in VMT. VMT has been mostly flat over the past several years. The following graph depicts the VMT trend over the past 35 years.

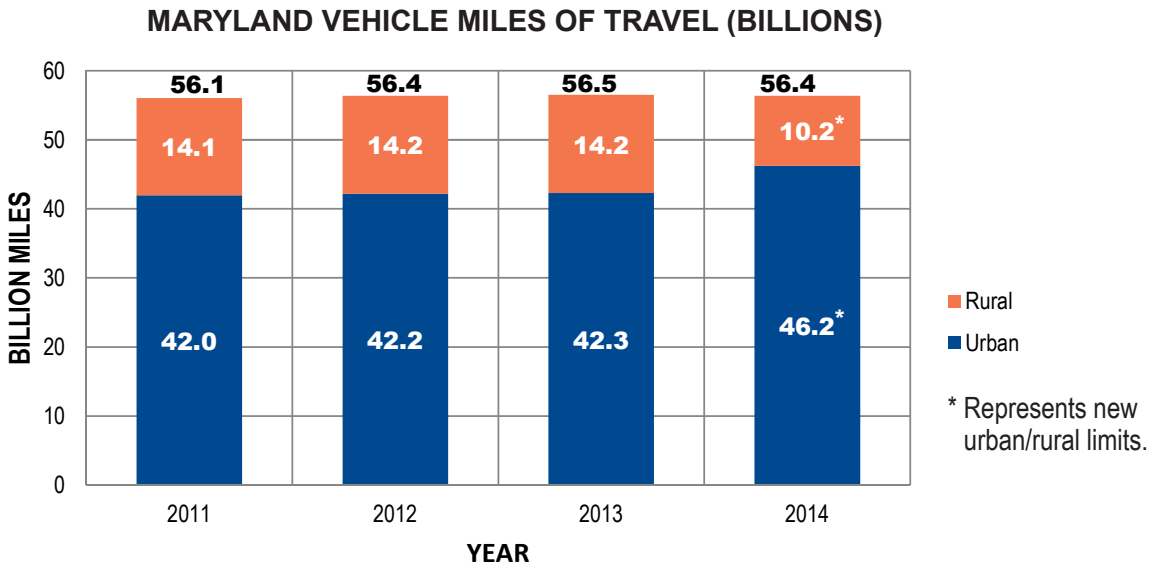
MARYLAND ANNUAL VEHICLE MILES OF TRAVEL



In calendar year 2014, the statewide VMT is estimated to be 56.4 billion vehicle miles. This is less than a 0.2% decrease over 2013 and represents a 0.4 billion vehicle miles off the all-time high of 56.8 billion vehicle miles in 2007. The highest volume SHA freeway, SHA arterial and MDTA toll facilities segments are depicted in the following table.

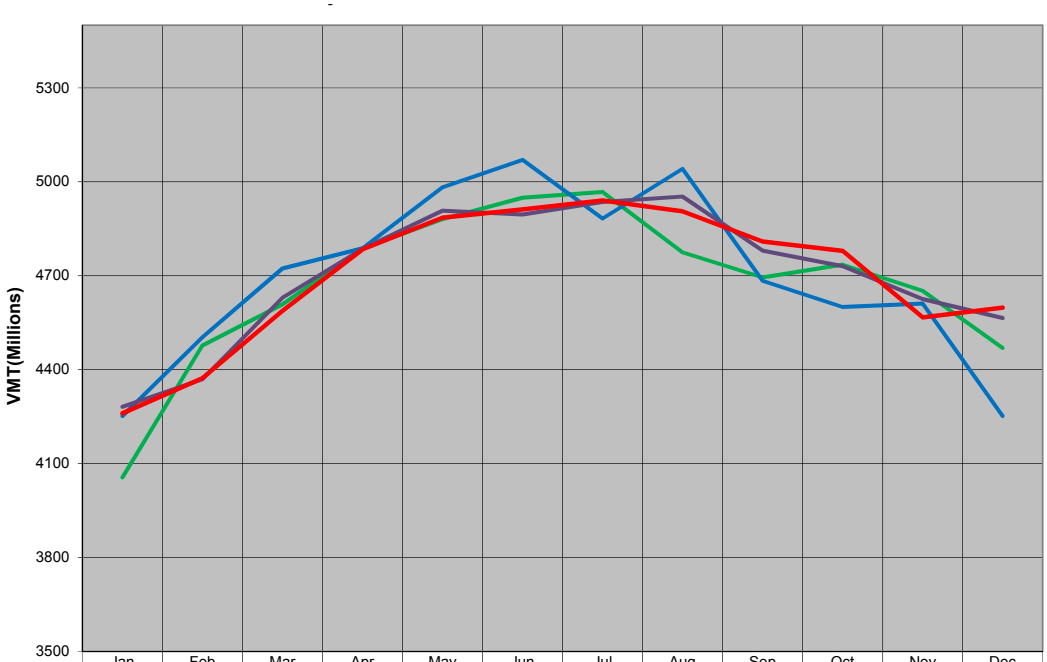
Highest Average Daily Traffic Volumes			
Freeway Section	2014 ADT	Arterial Section	2014 ADT
I-270 N of I-270 Split	252,000	US 301/MD 5 N of Chadds Ford Road	86,000
I-270 N of MD 189	251,000	MD 5 S of MD 223	81,000
I-495 E of MD 650	247,000	MD 124 E of I-270	75,000
I-495 S of I-270 West Leg	244,000	MD 210 S of I-95	70,000
I-495 W of MD 97	232,000	MD 4 E of MD 337	70,000
MDTA Toll Facility Crossings		2014 ADT	
I-95 Ft. McHenry Tunnel		114,000	
I-95 Tydings Bridge		80,000	
I-895 Harbor Tunnel		71,000	
US 50/301 Bay Bridge		70,000	

The 2014 VMT on all state and toll maintained roadways was 40.5 billion, which is an increase of approximately 163 million miles over 2013. The 2014 VMT along all other roadways decreased to 15.9 billion from 16.1 billion in 2013. Urban and rural limits were modified in 2014 to reflect changes in the 2010 Census. This modification substantially increased the VMT on urban roadways in Maryland and decreased the VMT on rural roadways. The following chart shows the VMT trends with for the last few years.



The charts below show the monthly distribution and the disaggregation of VMT by ownership and roadway type.

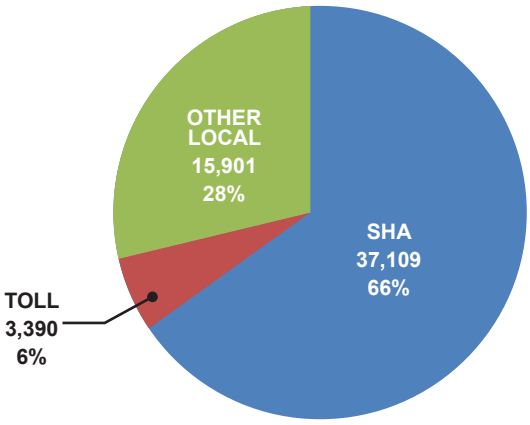
MONTHLY DISTRIBUTION OF ANNUAL VEHICLE MILES OF TRAVEL



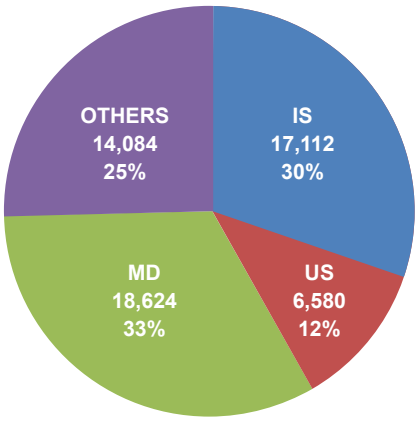
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011 VMT (Millions)	4056	4477	4608	4788	4880	4949	4968	4775	4694	4735	4652	4469
2012 VMT (Millions)	4252	4504	4723	4787	4982	5070	4883	5042	4684	4600	4611	4252
2013 VMT (Millions)	4281	4369	4629	4785	4908	4895	4935	4953	4780	4731	4625	4565
2014 VMT (Millions)	4260	4373	4588	4784	4885	4911	4940	4905	4809	4779	4567	4598

NOTE: This chart displays estimated monthly Vehicle Miles of Travel compared with the previous year based on data collected at approximately 67 continuous count stations throughout the State.

2014 VMT BY OWNERSHIP (MILLION)

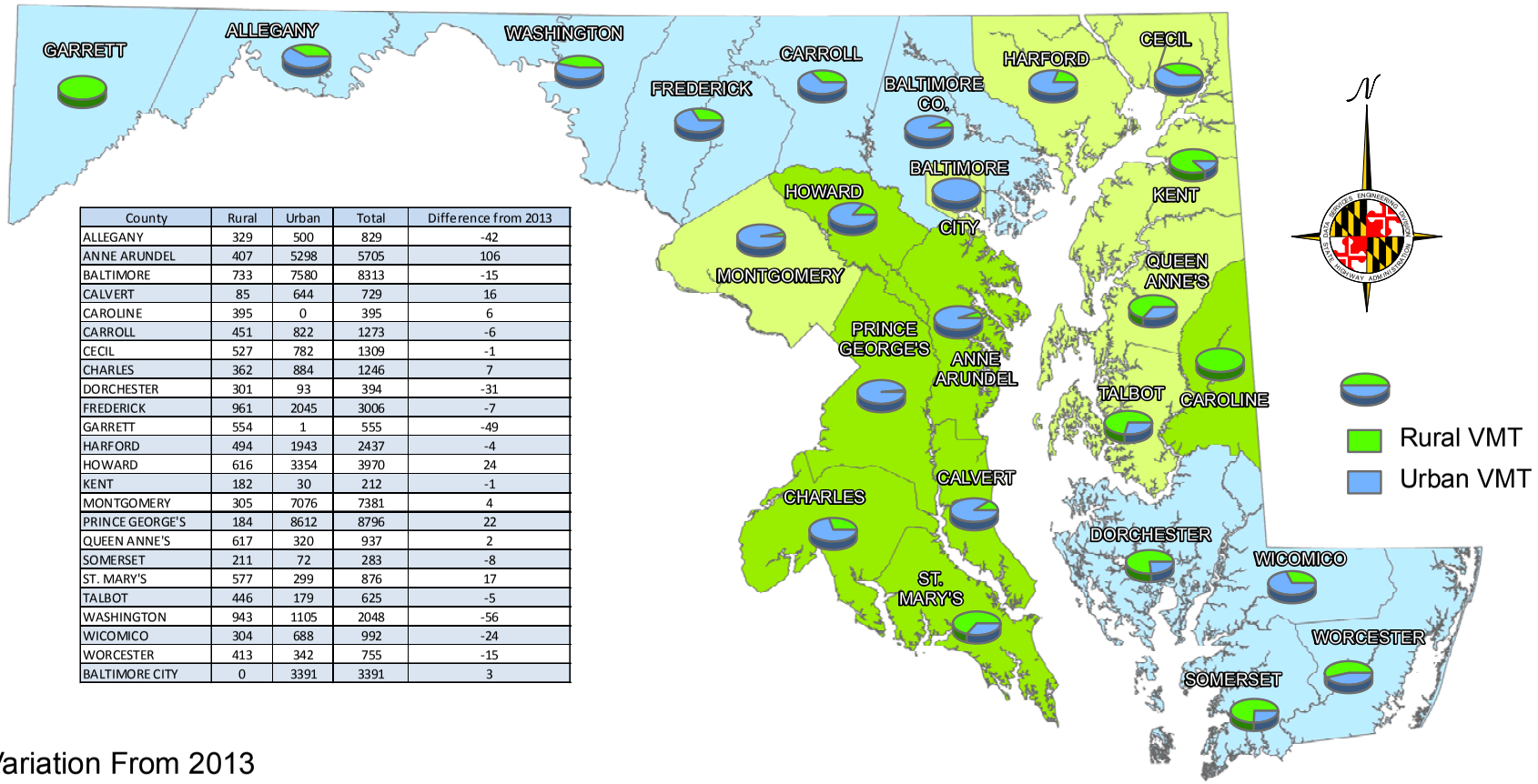


2014 VMT BY ROADWAY TYPE (MILLION)



On a countywide basis, the change in VMT from county to county varies with some counties increasing, some decreasing and other remaining virtually the same. The largest increase in VMT experienced was in Anne Arundel County while Washington County had the greatest decrease in total volume. This is shown in the following figure.

VEHICLE MILES OF TRAVEL - 2014 DATA



County	Rural	Urban	Total	Difference from 2013
ALLEGANY	329	500	829	-42
ANNE ARUNDEL	407	5298	5705	106
BALTIMORE	733	7580	8313	-15
CALVERT	85	644	729	16
CAROLINE	395	0	395	6
CARROLL	451	822	1273	-6
CECIL	527	782	1309	-1
CHARLES	362	884	1246	7
DORCHESTER	301	93	394	-31
FREDERICK	961	2045	3006	-7
GARRETT	554	1	555	-49
HARFORD	494	1943	2437	-4
HOWARD	616	3354	3970	24
KENT	182	30	212	-1
MONTGOMERY	305	7076	7381	4
PRINCE GEORGE'S	184	8612	8796	22
QUEEN ANNE'S	617	320	937	2
SOMERSET	211	72	283	-8
ST. MARY'S	577	299	876	17
TALBOT	446	179	625	-5
WASHINGTON	943	1105	2048	-56
WICOMICO	304	688	992	-24
WORCESTER	413	342	755	-15
BALTIMORE CITY	0	3391	3391	3

Variation From 2013

- Increased More Than 5 Million Miles
- Remained Within 5 Million Miles
- Decreased More Than 5 Million Miles

The state was divided into five regions for purposes of analysis throughout this report. The regions and the Counties within those regions are as follows:

BALTIMORE METROPOLITAN REGION

- Anne Arundel County
- Baltimore City
- Baltimore County
- Carroll County
- Harford County
- Howard County

WASHINGTON METROPOLITAN REGION (MARYLAND COUNTIES)

- Frederick County
- Montgomery County
- Prince George's County

SOUTHERN MARYLAND

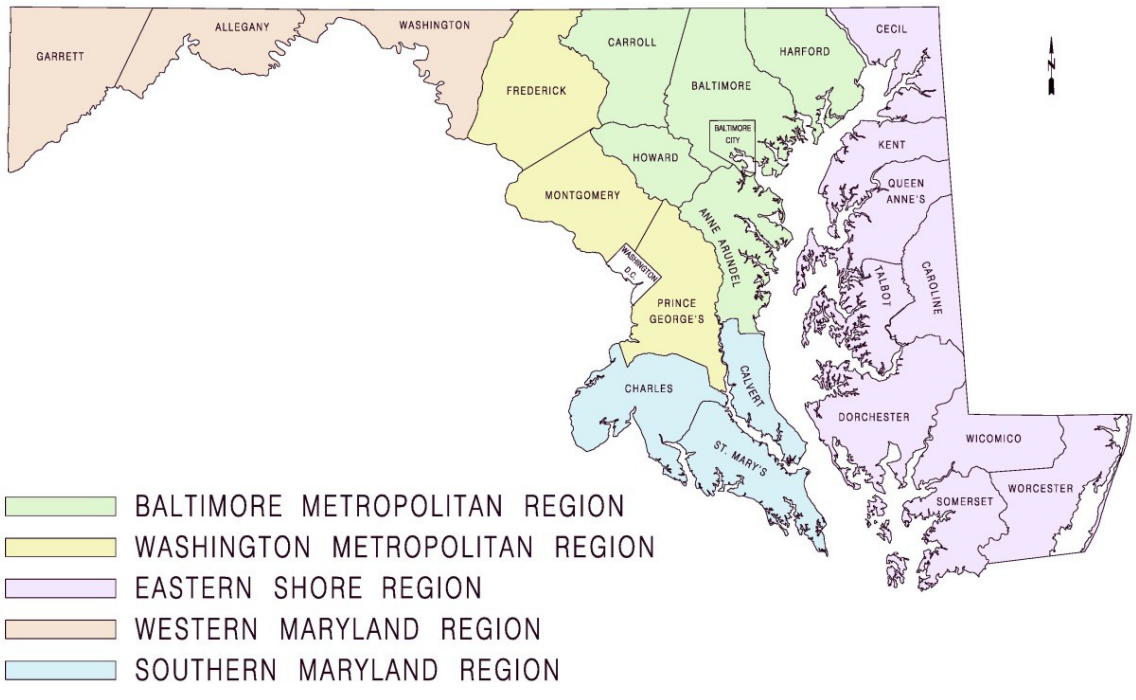
- Calvert County
- Charles County
- St. Mary's County

EASTERN SHORE

- Caroline County
- Cecil County
- Dorchester County
- Kent County
- Queen Anne's County
- Somerset County
- Talbot County
- Wicomico County
- Worcester County

WESTERN MARYLAND

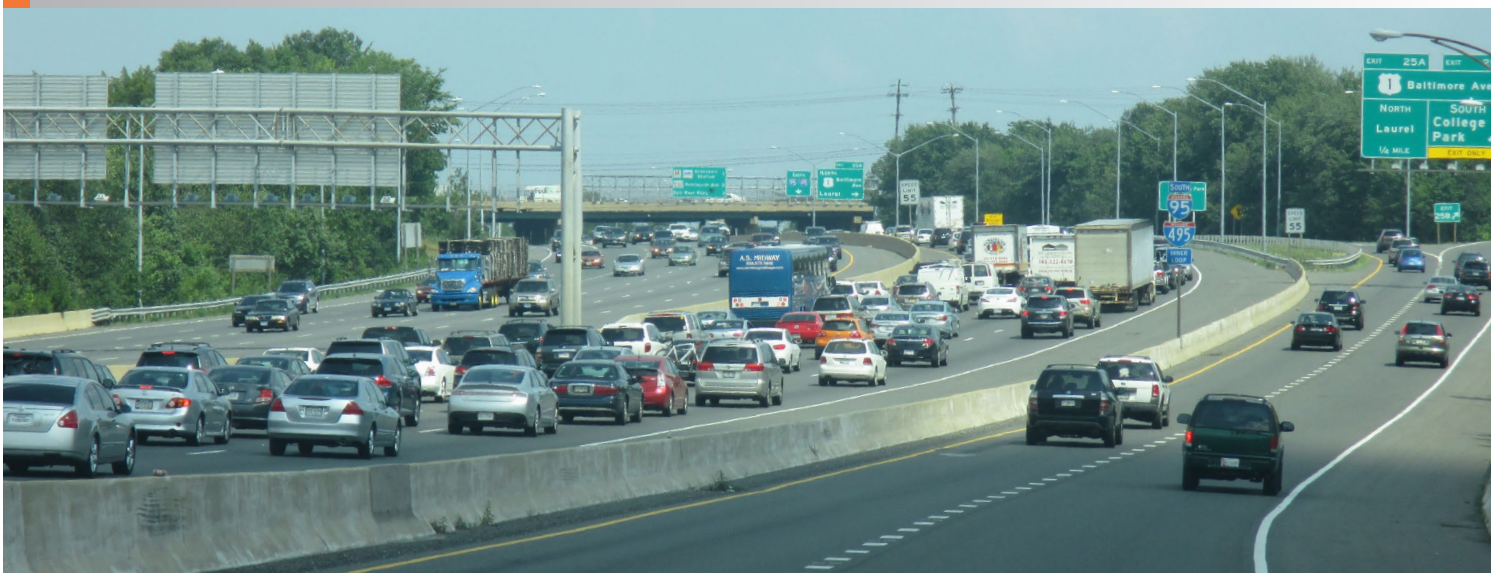
- Allegany County
- Garrett County
- Washington County



The VMT was measured for the five regions. As shown by the following chart almost all areas were flat last year except for a decrease in VMT in Western Maryland.

VMT	2011	2012	2013	2014
Baltimore Region	25.0	25.2	25.2	25.2
Washington Region	19.1	19.1	19.2	19.2
Southern Region	2.8	2.8	2.9	2.9
Eastern Shore Region	5.8	5.9	5.8	5.8
Western Region	3.4	3.4	3.4	3.3
Total	**56.1**	**56.4**	**56.5**	**56.4**

B. Congestion Trends



I-95 / I-495 @ US 1

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I-95 North of MD 43

Congestion Trends

Traffic congestion that impacts mobility occurs due to a variety of reasons. This can include sections of a freeway where motorists merge or diverge from the roadway, locations where the volume is greater than the capacity or in weave sections where traffic is both trying to enter or exit from the freeway. Variations that influence these congestion breakdowns include automobile and truck traffic volumes, geometrics, lane width and shoulder width. This is referred to as recurring congestion. The other type of congestion, non-recurring congestion relates to events such as crashes, vehicle breakdowns and weather that cause highways to experience slowing or stop and go conditions. Over the years congestion has increased due to the limited availability of funding for infrastructure improvements in roads and public transportation which has not been able to keep up with the growth in demand. The impacts of a congested system are detrimental in several ways including increased costs to the individual user, environmental impacts and degrading the overall quality of life.

Congestion measures have changed dramatically over past several years as vehicle probe speed data is now available from a variety of private sources on a minute by minute basis over the entire year. This data, together with analyses methodologies that have been developed and tested over time, provides a detailed “picture” of mobility for travelers using the highway system in Maryland. The private data comes from INRIX, a company that provides both real-time and historic traffic speed data collected from an estimated 100 million probe vehicles nationwide including commercial vehicle fleets. In addition, public data is developed from a statewide program that collects traffic volume data on all of its roadways in a continual cycle. The University of Maryland Center for Advanced Transportation Technology (UMD CATT) uses the INRIX speed data, together with detailed traffic volume data from the SHA – Office of Planning and Preliminary Engineering to generate measures of congestion and reliability across the entire freeway system. These congestion and reliability measures have also been closely coordinated with the Washington and Baltimore Metropolitan Planning Organizations (MPOs) to ensure regional consistency in reporting.

Different agencies measure congestion by alternative methods. These measures may include delay, level of service and volume to capacity ratio. The advent of big data sets to measure congestion has become more popular. The utilization of

I-695 @ I-70

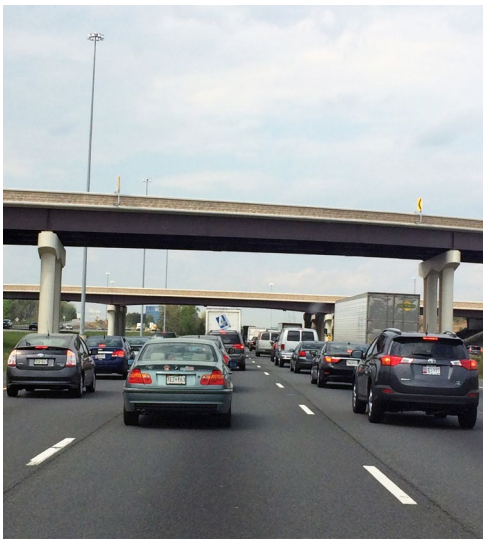
vehicle probe data allows for other measures relatively easy to communicate to a range of audiences: the Travel Time Index and the Planning Time Index. The Travel Time Index (TTI) compares the 50th percentile travel time of a trip on a segment of freeway/expressway for a particular hour to the travel time of a trip during off peak (free-flow or uncongested) conditions. The index depicts how much longer, on average, travel times are during congestion compared to free flow conditions. The higher the TTI number for a given hour of the day, the longer the travel times. For example, a TTI of 2.0 indicates that a trip that takes 5 minutes in light traffic will take twice as long, or 10 minutes in congested conditions.

For the purposes of the statewide and regional congestion maps presented in this report, the TTI is depicted as follows:

- Uncongested (TTI < 1.15)
- Moderate Congestion (1.15 < TTI < 1.3)
- Heavy Congestion (1.3 < TTI < 2.0)
- Severe Congestion (TTI > 2.0)

A network wide analysis of the TTI for each highway segment was performed to provide a comprehensive picture of the statewide Maryland freeway/expressway network for average weekday conditions. The analysis was conducted on a statewide basis and for the five major geographic regions. The congestion and reliability measures are further analyzed for the combined Baltimore - Washington region, where the majority of weekday congestion occurs.

The analysis of vehicle probe data involves 1,655 directional miles of freeways/expressways that account for approximately 95% of all these type of roadways in Maryland. This includes 1,116 directional miles of freeways/expressways in the combined Baltimore - Washington region with the remaining directional miles on the Eastern Shore, Southern Maryland and Western Maryland.



I-95 South of MD 200

CONGESTION MEASURES ON THE MARYLAND STATE FREEWAY/EXPRESSWAY NETWORK

1. Statewide Peak Hour Congestion (Percent System Congested & Percent VMT in Congested Conditions)

The TTI was computed for each section of the freeway/expressway system in Maryland for average weekday travel. The analysis was performed for the AM and PM peak hours with the highest levels of congestion occurring from 8-9 AM in the morning peak and from 5-6 PM in the afternoon peak hour. The TTI for those hours are shown in Figure 1 and 2.

Motorists experience heavy to severe congestion (TTI > 1.3) on a total of 136 road miles (8% of the statewide freeway/expressway network) during the AM peak hour (8-9 AM). This amounts to 16% of the morning peak hour VMT occurring in congested conditions.

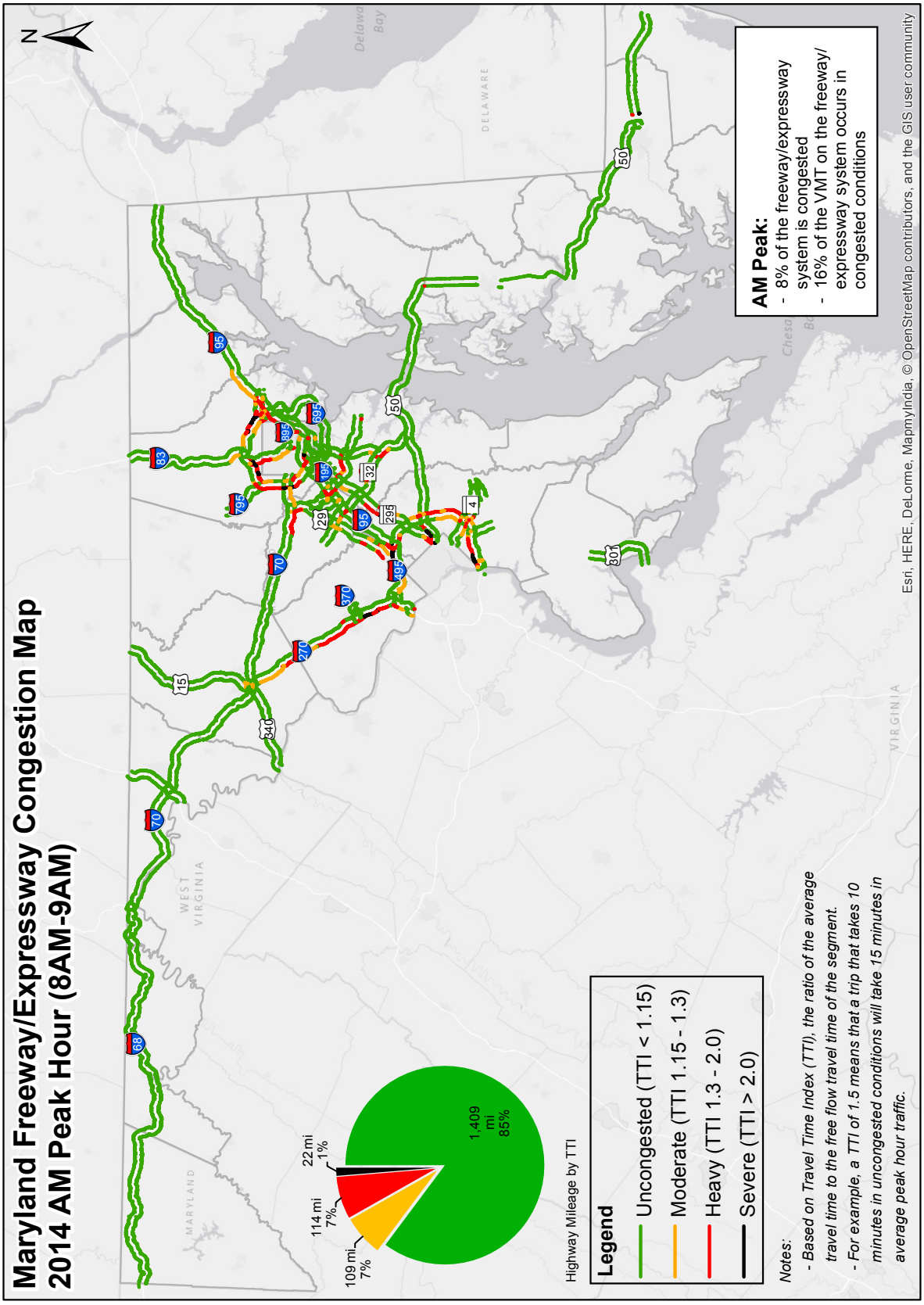
The afternoon peak hour (5-6 PM) analysis shows that congestion is more severe in the PM peak period. Heavy to severe congestion occurs on a total of 224 road miles (13% of the statewide freeway/expressway network) during the afternoon peak hour (5-6 PM). Twenty-four (24) % of the afternoon peak hour VMT occurs in congested conditions.

A comparison was performed between 2014 and 2013 metrics. This shows that the AM peak hour performance remained relatively constant while the PM peak hour showed a 1% increase in heavy to severe congestion on the freeway/expressway system.

STATEWIDE FREEWAY/EXPRESSWAY NETWORK
(AVERAGE WEEKDAY AM & PM PEAK HOUR CONGESTION SUMMARY)

Heavy to Severe Congestion	2014		2013		CHANGE	
	AM	PM	AM	PM	AM	PM
Roadway Miles	136	224	130	209	+6	+15
Percent of Roadway Miles	8	13	8	12	0	+1
Percent of Peak Hour VMT Impacted	16	24	16	22	0	+2

Figure 1


Maryland Freeway/Expressway Congestion Map
2014 AM Peak Hour (8AM-9AM)
N
AM Peak:
- 8% of the freeway/expressway system is congested
- 16% of the VMT on the freeway/ expressway system occurs in congested conditions
Legend
Uncongested (TTI < 1.15)
Moderate (TTI 1.15 - 1.3)
Heavy (TTI 1.3 - 2.0)
Severe (TTI > 2.0)
Highway Mileage by TTI
1,409 mi 85%
114 mi 7%
109 mi 7%
22 mi 1%
Notes:
- Based on Travel Time Index (TTI), the ratio of the average travel time to the free flow travel time of the segment.
- For example, a TTI of 1.5 means that a trip that takes 10 minutes in uncongested conditions will take 15 minutes in average peak hour traffic.
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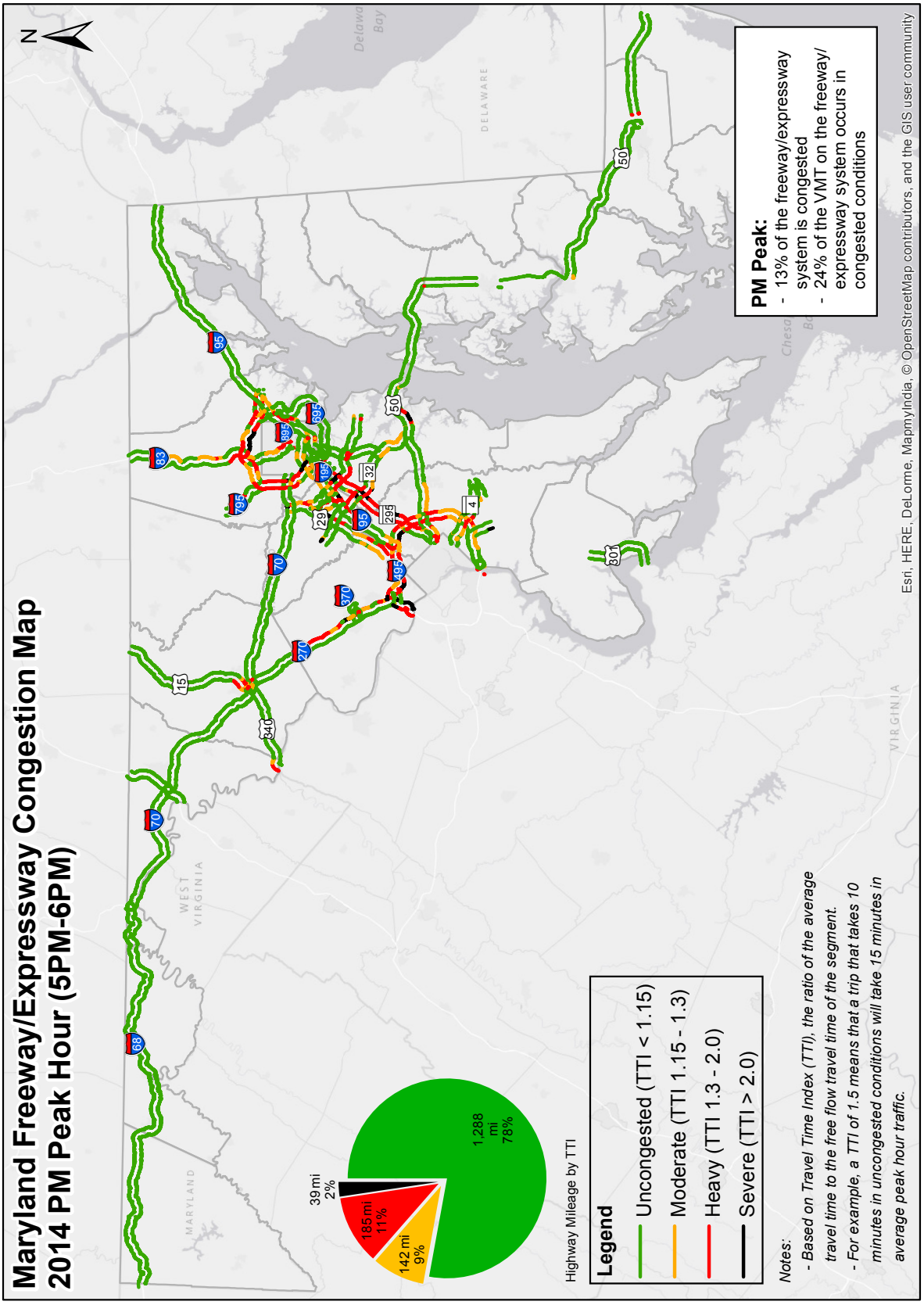
MARYLAND
WEST VIRGINIA
DELAWARE
VIRGINIA

Figure 2


Maryland Freeway/Expressway Congestion Map
2014 PM Peak Hour (5PM-6PM)
N
PM Peak:
- 13% of the freeway/expressway system is congested
- 24% of the VMT on the freeway/ expressway system occurs in congested conditions
Legend
Uncongested (TTI < 1.15)
Moderate (TTI 1.15 - 1.3)
Heavy (TTI 1.3 - 2.0)
Severe (TTI > 2.0)
Highway Mileage by TTI
39 mi 2%
185 mi 11%
142 mi 9%
1,288 mi 78%
Notes:
- Based on Travel Time Index (TTI), the ratio of the average travel time to the free flow travel time of the segment.
- For example, a TTI of 1.5 means that a trip that takes 10 minutes in uncongested conditions will take 15 minutes in average peak hour traffic.
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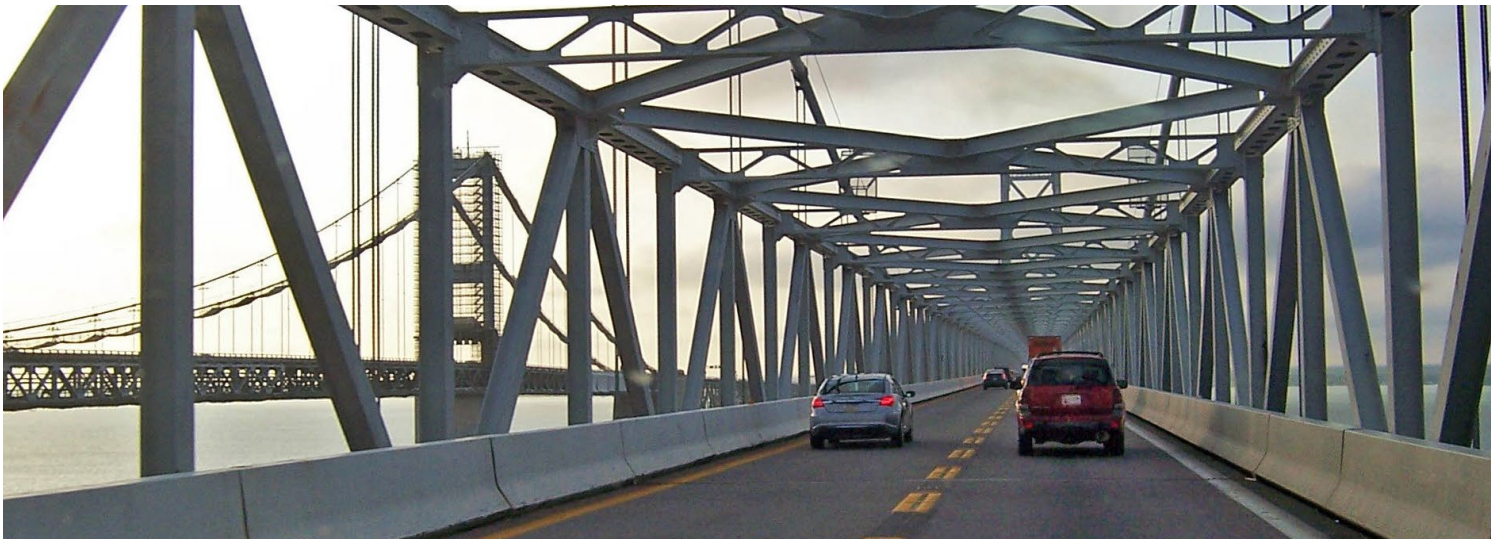
MARYLAND
WEST VIRGINIA
DELAWARE
VIRGINIA



US 50/301 Bay Bridge

BALTIMORE - WASHINGTON METROPOLITAN REGION PEAK HOUR CONGESTION

Mobility issues are most prevalent in the Baltimore / Washington Region. These area roadways carry the highest traffic volumes in the state with a mixture of commuting and through travel. The high traffic volumes normally indicates speeds along these roadways are the lowest and therefore, this impacts mobility for motorists and freight operators.

Heavy to severe congestion (TTI > 1.3) occurs on 12% of the freeways/expressways in the Baltimore / Washington region, accounting for a total of 135 road miles operating under these conditions. The vehicle miles traveled under these conditions in the morning peak hour is 17% of the total morning peak hour VMT. This was an approximate 1% increase in heavy to severe congestion with an additional six road miles operating under these conditions compared to year 2013.

Motorists in the Baltimore - Washington Metropolitan region experience the highest levels of congestion in the afternoon peak hour. This amounts to a total of 221 (19%) road miles that motorists experience heavy to severe congestion (TTI > 1.3) or 28% of the total VMT that transpires in the afternoon peak hour occurs under these conditions. This shows a slight increase over 2013 (2% increase in the number of road miles with 14 more miles of the system experiencing heavy to severe congestion).

The Travel Time Index Maps are provided for the peak hours (8-9 AM and 5-6 PM) in figures 3 and 4.

EASTERN SHORE, SOUTHERN & WESTERN MARYLAND CONGESTION

The other three regions of Maryland including the Eastern Shore, Southern Maryland and Western Maryland experience limited areas of congestion throughout the year. The Eastern Shore including northeast Maryland is characterized by seasonal congestion along the US 50 and I-95 corridors. Kent Island and the Town of Elkton experience more traditional operational issues. Southern Maryland which has become a bedroom community to Washington, DC and the Lexington Park area experiences typical commuter congestion in the AM and PM peak periods. Congestion in these regions mainly occur on corridors that directly provide access to the District. Congestion in Western Maryland mainly occurs in the Hagerstown area which is the hub of two major interstate routes (I-70 and I-81) with high truck volumes and associated traffic generating land uses such as warehousing and distribution centers. Figures 1-2 highlight traffic operations in the three regions during the AM and PM peak hours.

Figure 3

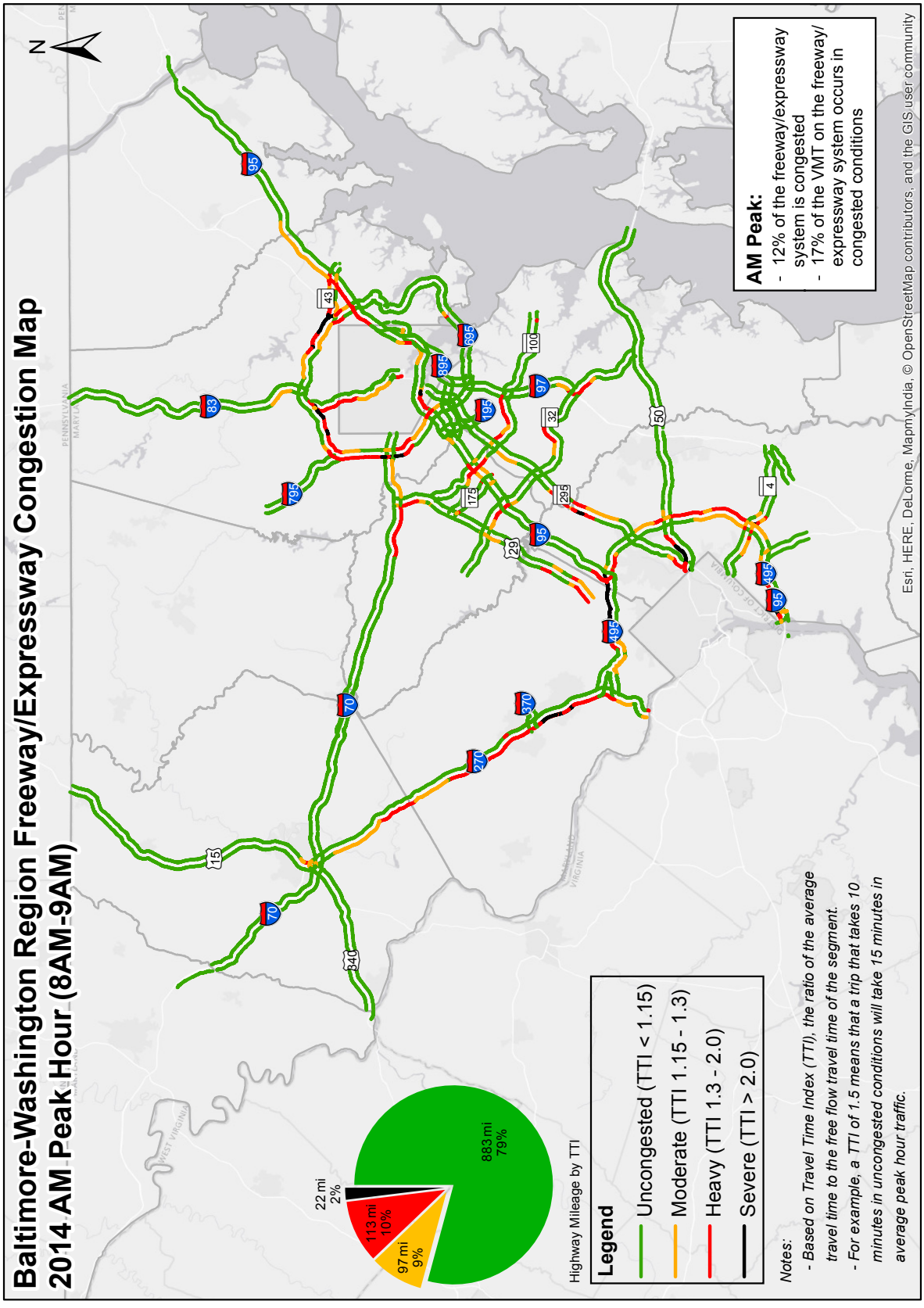

Baltimore-Washington Region Freeway/Expressway Congestion Map
2014 AM Peak Hour (8AM-9AM)
N
AM Peak:
- 12% of the freeway/expressway system is congested
- 17% of the VMT on the freeway/ expressway system occurs in congested conditions
Legend
Uncongested (TTI < 1.15)
Moderate (TTI 1.15 - 1.3)
Heavy (TTI 1.3 - 2.0)
Severe (TTI > 2.0)
Highway Mileage by TTI
22 mi 2%
113 mi 10%
97 mi 9%
883 mi 79%
Notes:
- Based on Travel Time Index (TTI), the ratio of the average travel time to the free flow travel time of the segment.
- For example, a TTI of 1.5 means that a trip that takes 10 minutes in uncongested conditions will take 15 minutes in average peak hour traffic.
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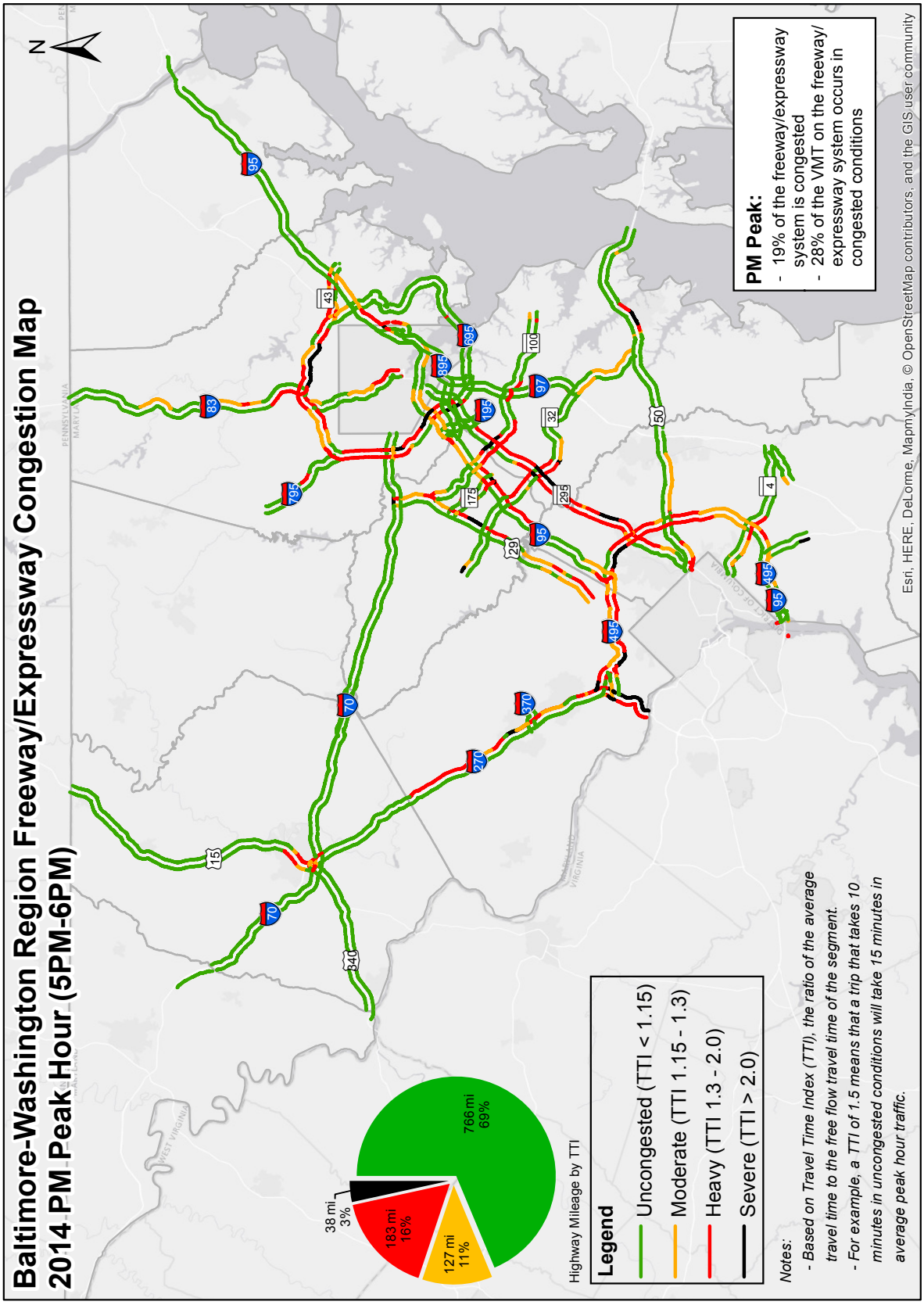
Figure 4


Baltimore-Washington Region Freeway/Expressway Congestion Map
2014 PM Peak Hour (5PM-6PM)
N
PM Peak:
- 19% of the freeway/expressway system is congested
- 28% of the VMT on the freeway/ expressway system occurs in congested conditions
Legend
Uncongested (TTI < 1.15)
Moderate (TTI 1.15 - 1.3)
Heavy (TTI 1.3 - 2.0)
Severe (TTI > 2.0)
Highway Mileage by TTI
766 mi 69%
127 mi 11%
183 mi 16%
38 mi 3%
Notes:
- Based on Travel Time Index (TTI), the ratio of the average travel time to the free flow travel time of the segment.
- For example, a TTI of 1.5 means that a trip that takes 10 minutes in uncongested conditions will take 15 minutes in average peak hour traffic.
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MD 65 South of US 40

2. Statewide Cost of Congestion

The estimated cost of congestion due to auto delay, truck delay and wasted fuel and emissions on the freeway/ expressway network in 2014 was calculated on a statewide and region wide basis. The statewide cost is estimated to be $1.7 billion which includes:

- Auto Delay Cost: $1.486 Billion
- Truck Delay Cost: $100.1 Million
- Wasted Fuel Cost: $64.8 Million
- Air Emissions Cost: $47.1 Million

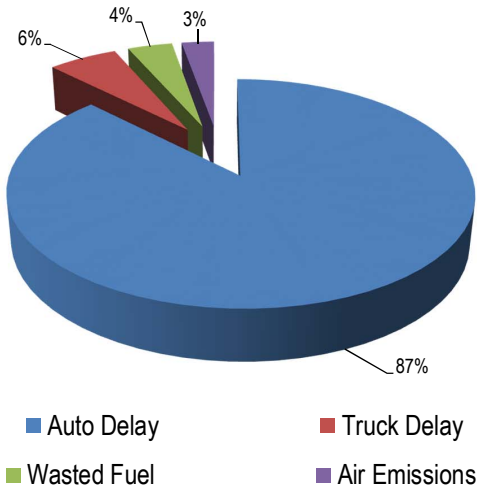
Since the majority of congestion occurs in the Baltimore / Washington region, this area experiences the highest user cost, estimated to be $1.64 billion. The cost associated with congestion for the Eastern Shore, Southern and Western Maryland regions is estimated to be $58 million. The congestion costs state and region wide for this year and compared to previous years are shown in the following table.

TOTAL COST OF CONGESTION ($MILLIONS)		
Region	**2014**	**2013**
Statewide	1,698	1,676
Baltimore Region	686	681
Washington Region	954	949
Eastern Shore Region	47	31
Southern Region	5	4
Western Region	6	11

The percent breakdown of the congestion costs by source and by different regions for the freeway/expressway system is depicted in the following graphs.

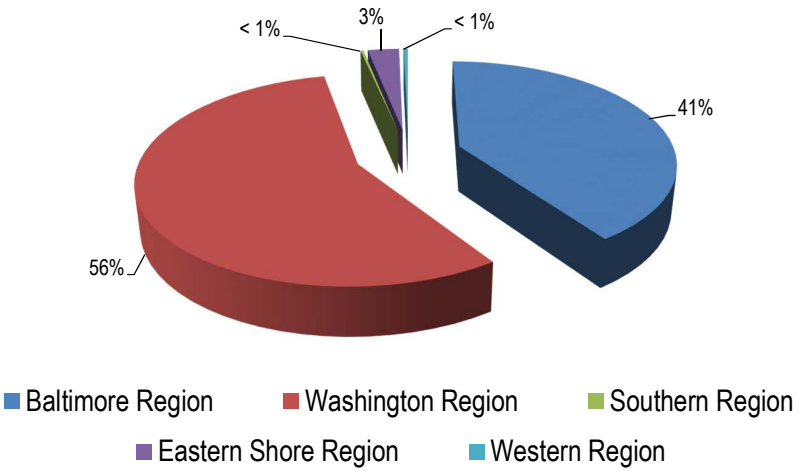
PERCENT OF STATEWIDE CONGESTION COST BY SOURCE

(TOTAL CONGESTION COST = $1.7 BILLION)



PERCENT OF STATEWIDE CONGESTION COST BY REGION

(TOTAL CONGESTION COST = $1.7 BILLION)



Top 30 Congested Segments

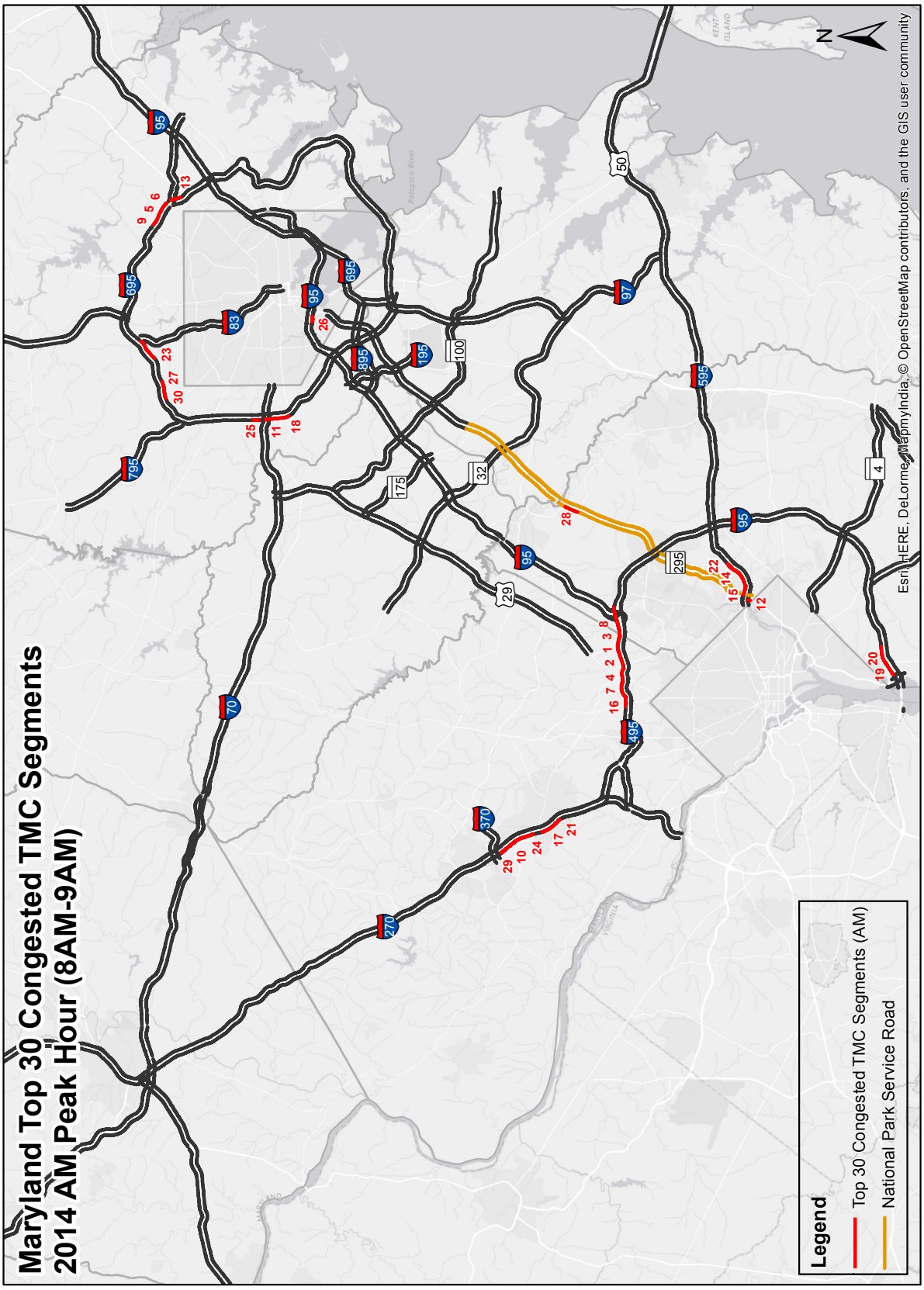
All freeway/expressway segments statewide were analyzed to determine the roadway segments that experience the highest levels of congestion in the AM peak hour (8-9 AM) and PM peak hour (5-6 PM). This analysis identified the locations with the highest TTI values. Figures 5 and 6 and the following tables depict the Top 30 locations for congestion in the peak hours, in the State on average weekdays.

2014 TOP 30 CONGESTED SEGMENTS AM PEAK

2014 RANK	ROAD	LOCATION	DIRECTION	2014 TTI	2013 RANK	RANK CHANGE 2013 TO 2014
1	I-495	@ MD 650	Outer Loop	3.98	1	0
2	I-495	MD 650 to MD 193	Outer Loop	3.94	2	0
3	I-495	Prince George's County Line to MD 650	Outer Loop	3.60	3	0
4	I-495	MD 193 to US 29	Outer Loop	3.20	4	0
5	I-695	MD 147 to MD 41*	Outer Loop	3.16	6	-1
6	I-695	MD 43 to MD 147*	Outer Loop	2.87	7	-1
7	I-495	US 29 to MD 97	Outer Loop	2.53	17	-10
8	I-495	I-95 to Montgomery County Line	Outer Loop	2.50	12	-4
9	I-695	@ MD 41*	Outer Loop	2.49	16	-7
10	I-270	Shady Grove Rd to MD 28	Southbound	2.46	9	1
11	I-695	@ I-70	Outer Loop	2.45	5	6
12	MD-295	US 50 to Washington DC/Line[1]	Southbound	2.45	10	2
13	I-695	US 1 to MD 43	Outer Loop	2.37	20	-7
14	US-50	MD 202 to MD 459	Westbound	2.37	14	0
15	US-50	MD 459 to MD 201	Westbound	2.26	22	-7
16	I-495	@ MD 97	Outer Loop	2.25	28	-12
17	I-270	@ MD 189	Southbound	2.24	15	2
18	I-695	I-70 to US 40	Outer Loop	2.17	13	5
19	I-495	MD 210 to IS 295	Inner Loop	2.14	27	-8
20	I-495	MD 414 to MD 210	Inner Loop	2.14	19	1
21	I-270	MD 189 to Montrose Rd	Southbound	2.12	23	-2
22	US-50	@ MD 202	Westbound	2.10	21	1
23	I-695	Greenspring Ave to I-83	Inner Loop	2.10	34	-111
24	I-270	@ MD 28	Southbound	2.06	50	-26
25	I-695	MD 26 to MD 122	Outer Loop	2.06	11	14
26	I-95	Washington Blvd to I-395*[2]	Northbound	2.04	48	-22
27	I-695	Stevenson Rd to Greenspring Ave	Inner Loop	2.04	36	-9
28	MD-295	@ MD 197[1]	Southbound	2.01	53	-25
29	I-270	I-370 to Shady Grove Rd	Southbound	1.99	44	-15
30	I-695	MD 129 to Stevenson Rd	Inner Loop	1.96	38	-8

[1] Owned by the National Park Service [2] Owned and Maintained by the Maryland Transportation Authority *Under or Nearby Construction

Figure 5


Maryland Top 30 Congested TMC Segments
2014 AM Peak Hour (8AM-9AM)
Legend
Top 30 Congested TMC Segments (AM)
National Park Service Road
N
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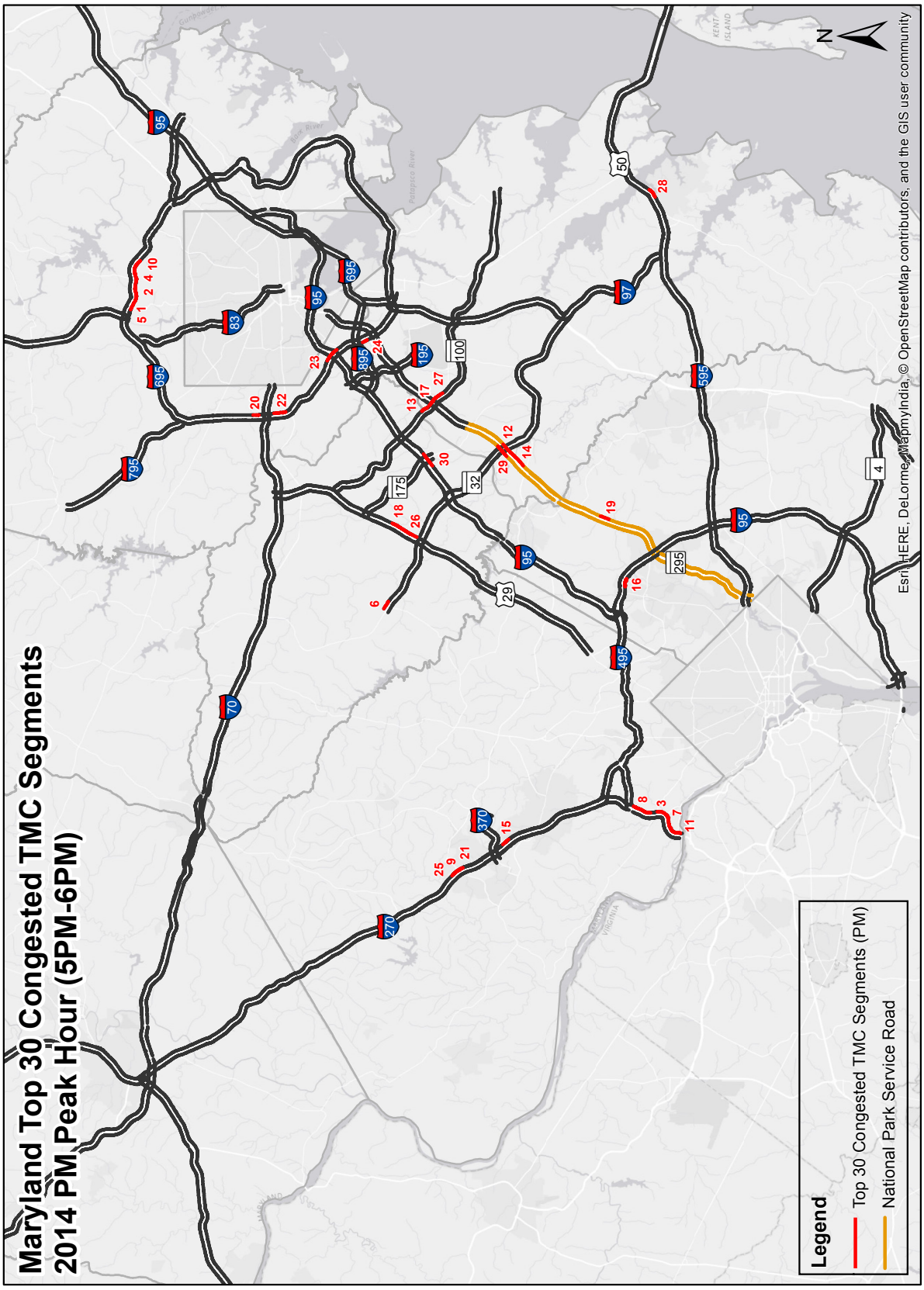
2014 TOP 30 CONGESTED SEGMENTS PM PEAK

2014 RANK	ROAD	LOCATION	DIRECTION	2014 TTI	2013 RANK	RANK CHANGE 2013 TO 2014
1	I-695	MD 139 to MD 45	Inner Loop	4.02	2	-1
2	I-695	MD 45 to MD 146	Inner Loop	3.70	4	-2
3	I-495	Cabin John Pkwy to MD 190	Inner Loop	3.59	1	2
4	I-695	@ MD 146	Inner Loop	3.38	7	-3
5	I-695	@ MD 139	Inner Loop	3.16	5	0
6	MD-32	Great Star Dr to MD 108	Westbound	3.16	3	3
7	I-495	Clara Barton Pkwy to Cabin John Pkwy	Inner Loop	3.11	6	1
8	I-495	MD 190 to I-270Y (West)	Inner Loop	3.10	8	0
9	I-270	MD 124 to Middlebrook Rd	Northbound	3.02	9	0
10	I-695	MD 146 to Providence Rd	Inner Loop	2.96	15	-5
11	I-495	@ Clara Barton Pkwy	Inner Loop	2.85	10	1
12	MD-295	@ MD 32[1]	Northbound	2.70	12	0
13	MD-100	@ Coca Cola Dr	Westbound	2.59	22	-9
14	MD-295	MD 198 to MD 32[1]	Northbound	2.57	14	0
15	I-270	@ Shady Grove Rd CD Lanes	Northbound	2.55	17	-2
16	I-495	US 1 to Greenbelt Metro	Inner Loop	2.53	27	-11
17	MD-100	@ MD 295	Westbound	2.52	21	-4
18	US-29	MD 32 to Broken Land Pkwy*	Northbound	2.52	19	-1
19	MD-295	Powder Mill Rd to MD 197[1]	Northbound	2.47	13	6
20	I-695	@ MD 122	Inner Loop	2.38	55	-35
21	I-270	MD 117 to MD 124	Northbound	2.38	23	-2
22	I-695	US 40 to I-70	Inner Loop	2.36	61	-39
23	I-695	@ I-95*	Inner Loop	2.35	11	12
24	I-695	@ Hammonds Ferry Rd/Nursery Rd	Outer Loop	2.30	41	-17
25	I-270	@ MD 124	Northbound	2.30	20	5
26	US-29	MD 32 to Broken Lane Pkwy*	Northbound	2.26	32	-6
27	MD-100	MD 713 to MD 295	Westbound	2.22	30	-3
28	US-50	@ MD 70	Eastbound	2.22	42	-14
29	MD-295	MD 32 to MD 198[1]	Southbound	2.21	25	4
30	I-95	MD 32 to MD 175	Northbound	2.21	28	2

[1] Owned by the National Park Service *Under or Nearby Construction

Figure 6


Maryland Top 30 Congested TMC Segments
2014 PM Peak Hour (5PM-6PM)
Legend
Top 30 Congested TMC Segments (PM)
National Park Service Road
N
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C. Reliability Trends

I-695 South of MD 26

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Reliability Trends

Another measure of roadway operation relates to the variability or unreliability of the system. This is especially important since roadway users normally accept some level of congestion during the peak hour of travel. If travel times vary greatly it becomes more difficult for motorists to plan their trip to arrive on time. This increases driver frustration and has a cost associated with the additional travel time. The cost varies by trip purpose and nature and the importance to that particular motorist. For example, to catch a flight, have a freight delivery occur on time or just to be able to make a child's event may have very high costs to that particular person or business. A more reliable freeway system allows for trips to be better planned and meet expectations of the motorists using the network.

Incidents including vehicular breakdowns, crashes, weather and lane reductions through work zones greatly impact reliability. This non-recurring congestion impacts automobiles, trucks and on-street transit services. Reliability is critical for transit operations. Variations in travel time make it difficult for transit operators to provide reliable schedules. This in turn can lead to a decrease in rider confidence and the potential to reduce ridership on the impacted routes.

Trip reliability is measured by the Planning Time Index (PTI). The PTI represents the total time motorists should allow to make sure they arrive at their destination on-time while taking into account potential impacts due to non-recurrent congestion. As evaluated in Maryland, this represents the 95th percentile travel time for a section of roadway. Motorists travelling in free flow conditions that take 5 minutes to traverse a section of roadway should allow for 15 minutes to ensure arriving on time when the PTI is 3.0. The lower the PTI number, the more reliable the trip while the higher the number, the less reliable and longer a trip could possibly take. Statewide and for the Baltimore / Washington region reliability maps presented in this report, categorize PTI for freeways/expressways as follows:

- Reliable (PTI < 1.5)
- Moderately Unreliable (1.5 < PTI < 2.5)
- Highly to Extremely Unreliable (PTI > 2.5)

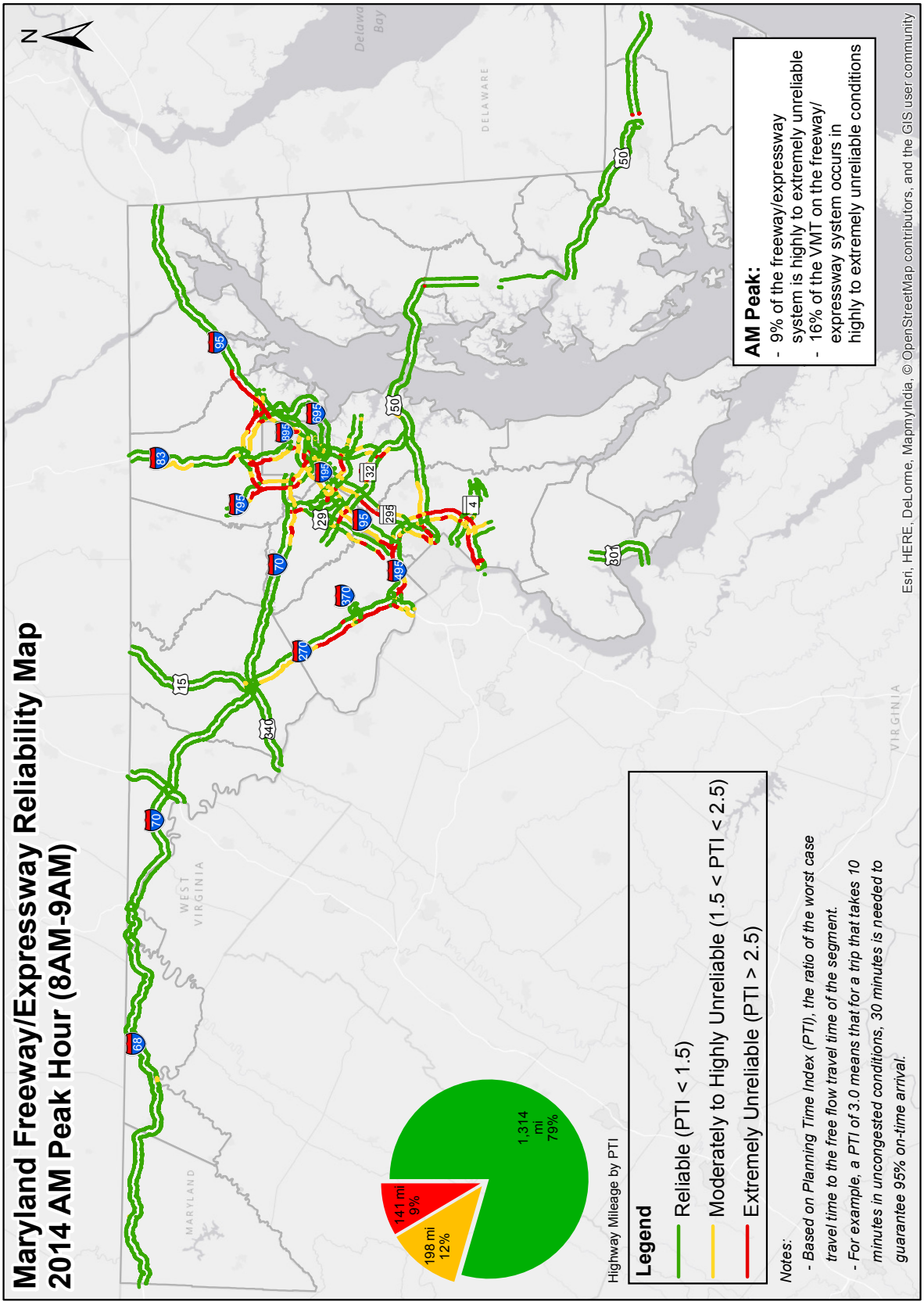
1. Statewide Freeway/Expressway Peak Hour Reliability

The PTI was calculated on a statewide basis for the peak hours (8-9 AM and 5-6 PM) of the network. Figures 7 and 8 depict the results of the analysis.

Highly to extremely unreliable conditions (PTI > 2.5) occur on a total of 141 road miles (9% of the statewide freeway/expressway network) in the AM peak hour. This amounts to an estimated 16% of the morning peak hour VMT that occurs under these conditions.

There are a total of 211 road miles (13% of the statewide freeway/expressway network) that operate under highly to extremely unreliable conditions (PTI > 2.5) in the PM peak hour. The vehicle miles traveled under these unreliable conditions is estimated to be 23% of the afternoon peak hour, VMT.

Figure 7


Maryland Freeway/Expressway Reliability Map
2014 AM Peak Hour (8AM-9AM)
N
AM Peak:
- 9% of the freeway/expressway system is highly to extremely unreliable
- 16% of the VMT on the freeway/ expressway system occurs in highly to extremely unreliable conditions
Legend
Reliable (PTI < 1.5)
Moderately to Highly Unreliable (1.5 < PTI < 2.5)
Extremely Unreliable (PTI > 2.5)
Highway Mileage by PTI
1,314 mi 79%
198 mi 12%
141 mi 9%
Notes:
- Based on Planning Time Index (PTI), the ratio of the worst case travel time to the free flow travel time of the segment.
- For example, a PTI of 3.0 means that for a trip that takes 10 minutes in uncongested conditions, 30 minutes is needed to guarantee 95% on-time arrival.
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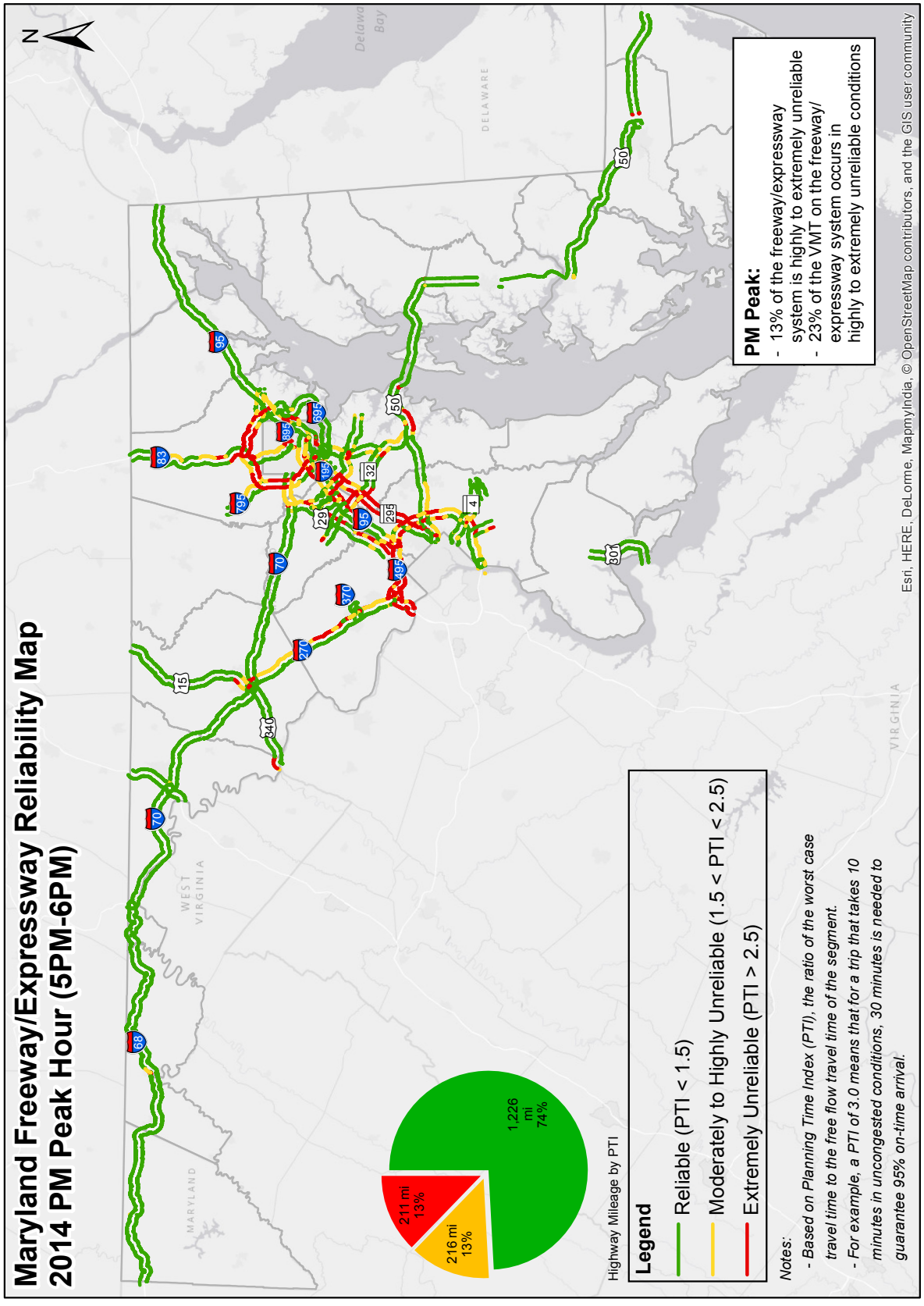
MARYLAND
WEST VIRGINIA
DELAWARE
VIRGINIA

Figure 8


Maryland Freeway/Expressway Reliability Map
2014 PM Peak Hour (5PM-6PM)
N
MARYLAND
WEST VIRGINIA
DELAWARE
VIRGINIA
Delaware Bay
1,226 mi 74%
216 mi 13%
211 mi 13%
Highway Mileage by PTI
Legend
Reliable (PTI < 1.5)
Moderately to Highly Unreliable (1.5 < PTI < 2.5)
Extremely Unreliable (PTI > 2.5)
PM Peak:
- 13% of the freeway/expressway system is highly to extremely unreliable
- 23% of the VMT on the freeway/expressway system occurs in highly to extremely unreliable conditions
Notes:
- Based on Planning Time Index (PTI), the ratio of the worst case travel time to the free flow travel time of the segment.
- For example, a PTI of 3.0 means that for a trip that takes 10 minutes in uncongested conditions, 30 minutes is needed to guarantee 95% on-time arrival.
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The 2014 reliability trends statewide indicate the freeway/expressway system have stayed relatively constant over the past year. A very slight decrease occurred in the number of roadway miles that occurred under highly to extremely unreliable conditions as depicted in the following chart.

STATEWIDE FREEWAY/EXPRESSWAY NETWORK
AVERAGE WEEKDAY AM & PM PEAK HOUR RELIABILITY SUMMARY

Highly to Extremely Unreliable Conditions	2014		2013		CHANGE	
	AM	PM	AM	PM	AM	PM
Number of Roadway Miles	141	211	145	213	-4	-2
Percent of Roadway Miles	9	13	9	13	0	0
Percent of Peak Hour VMT Impacted	16	23	17	22	-1	+1

2. Baltimore - Washington Region Peak Hour Reliability

In addition to statewide reliability trends, the Baltimore / Washington region freeway/expressway system was analyzed based on the PTI for the AM (8-9) and PM (5-6) peak hours. The reliability maps for the region are shown in Figures 9 and 10.

There was a total of 141 road miles (13% of network) where motorists experience highly to extremely unreliable (PTI > 2.5) conditions in the morning peak hour. Highly to extremely unreliable conditions occur during 18% of the morning peak hour VMT.

Motorists experience highly to extremely unreliable conditions (PTI > 2.5) on 208 road miles (19% of the network) within the Baltimore / Washington region during the PM peak hour. Twenty-seven (27)% of the afternoon peak hour VMT in the Baltimore / Washington region occurs in highly or extremely unreliable conditions.

In the AM and PM peak hours for the Baltimore / Washington region highly to extremely unreliable conditions remained constant between 2014 and 2013. The Baltimore / Washington region accounts for approximately 99% of the highly to extremely unreliable roadways.

Figure 9

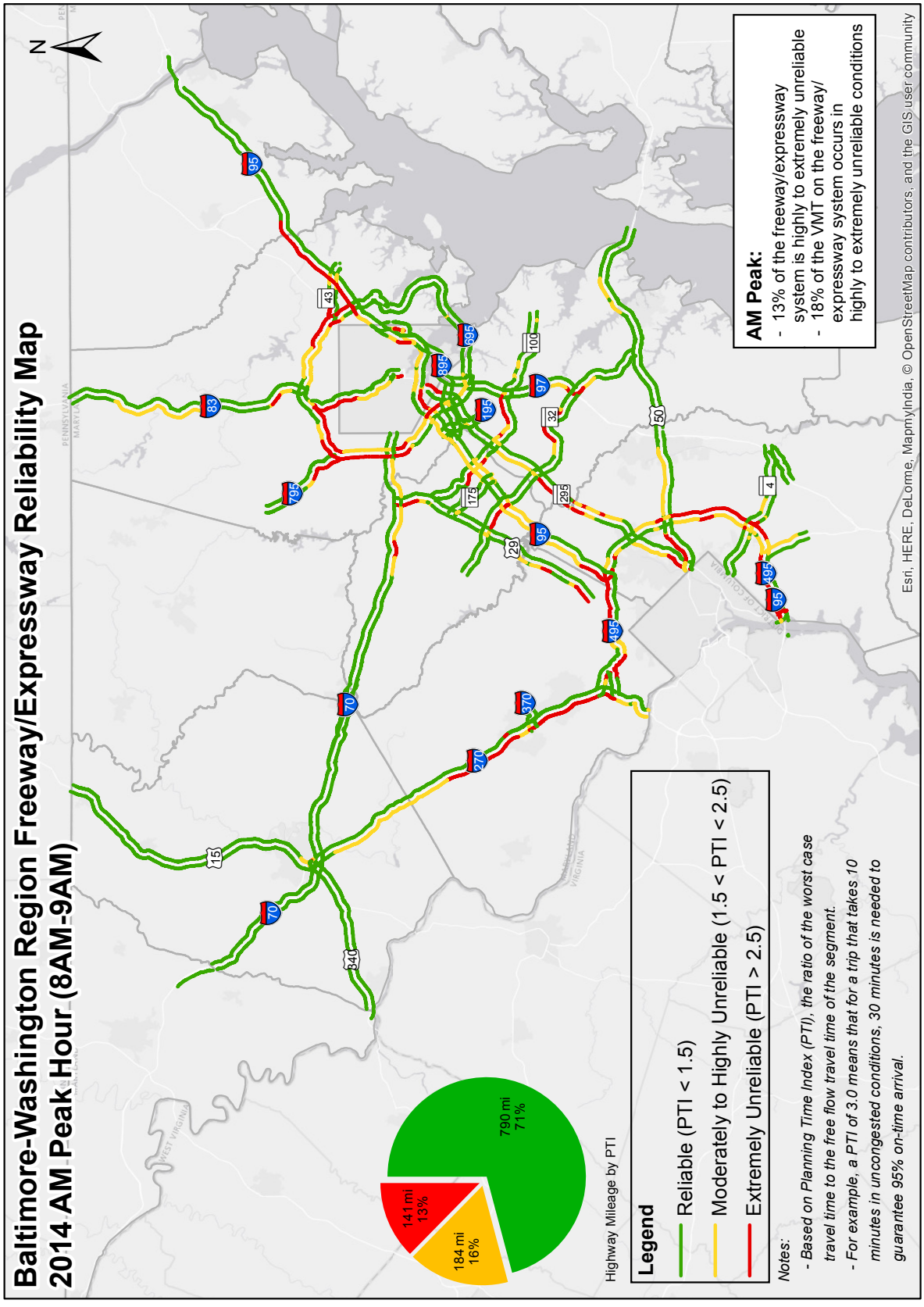
Baltimore-Washington Region Freeway/Expressway Reliability Map
2014 AM Peak Hour (8AM-9AM)
N
AM Peak:
- 13% of the freeway/expressway system is highly to extremely unreliable
- 18% of the VMT on the freeway/ expressway system occurs in highly to extremely unreliable conditions
Legend
Reliable (PTI < 1.5)
Moderately to Highly Unreliable (1.5 < PTI < 2.5)
Extremely Unreliable (PTI > 2.5)
Highway Mileage by PTI
790 mi 71%
184 mi 16%
141 mi 13%
Notes:
- Based on Planning Time Index (PTI), the ratio of the worst case travel time to the free flow travel time of the segment.
- For example, a PTI of 3.0 means that for a trip that takes 10 minutes in uncongested conditions, 30 minutes is needed to guarantee 95% on-time arrival.
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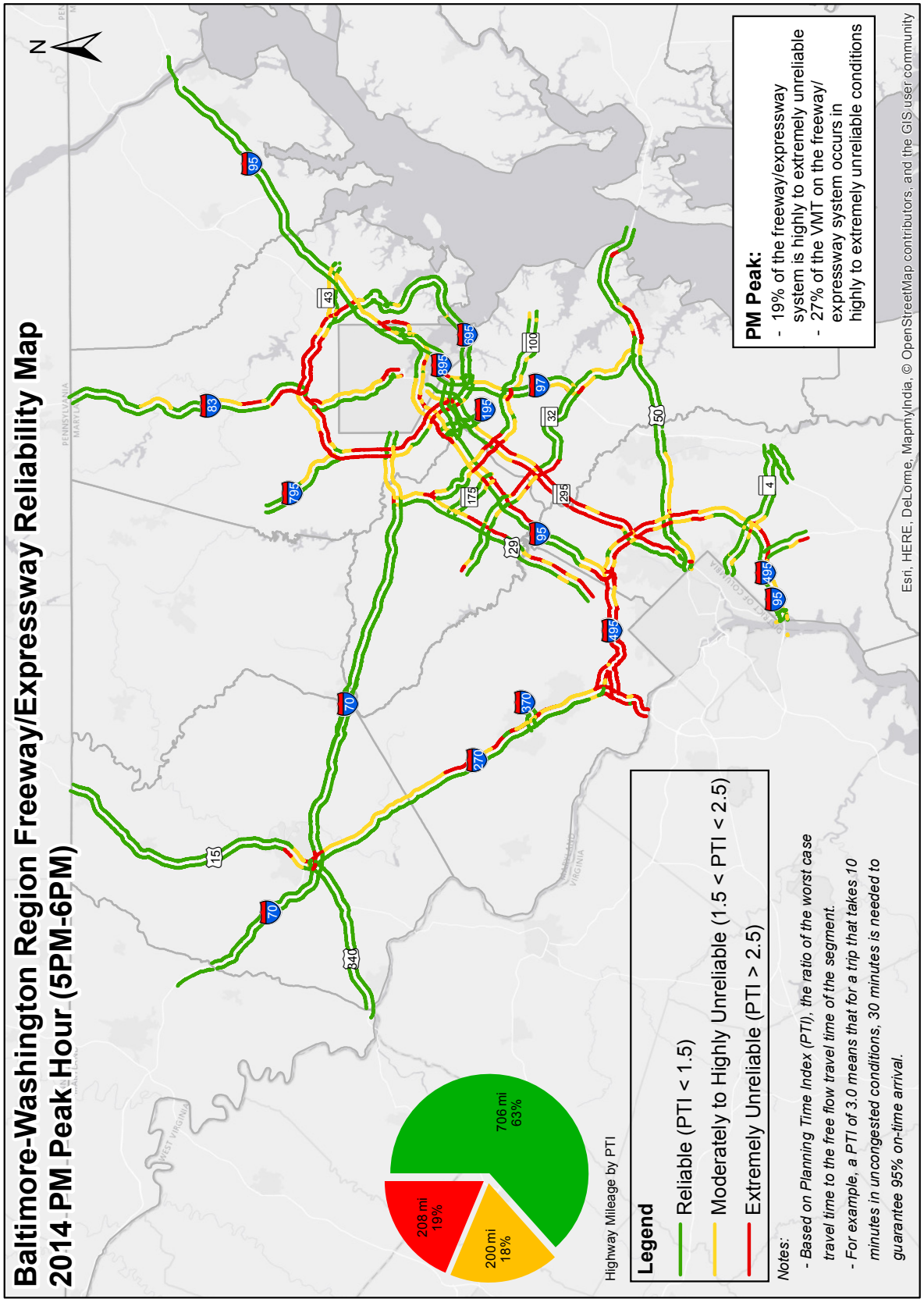
Figure 10


Baltimore-Washington Region Freeway/Expressway Reliability Map
2014 PM Peak Hour (5PM-6PM)
N
PM Peak:
- 19% of the freeway/expressway system is highly to extremely unreliable
- 27% of the VMT on the freeway/ expressway system occurs in highly to extremely unreliable conditions
Legend
Reliable (PTI < 1.5)
Moderately to Highly Unreliable (1.5 < PTI < 2.5)
Extremely Unreliable (PTI > 2.5)
Highway Mileage by PTI
706 mi 63%
200 mi 18%
208 mi 19%
Notes:
- Based on Planning Time Index (PTI), the ratio of the worst case travel time to the free flow travel time of the segment.
- For example, a PTI of 3.0 means that for a trip that takes 10 minutes in uncongested conditions, 30 minutes is needed to guarantee 95% on-time arrival.
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I-495 @ I-95

2. Congestion and Reliability Correlation

In general, there is a strong correlation between the average congestion (TTI based maps shown in Figures 1 - 4) and the reliability (PTI based maps in Figures 7-10). Roadways that experience high levels of average or recurring congestion are more vulnerable to failures due to incidents, weather, workzones, etc, hence more unreliable. Minor incidents can produce severe back-ups and system level unreliable conditions for hours. Conversely, roadways with lower TTI may have some reserve capacity to absorb the disruption caused by non-recurring congestion and show higher reliability.

The following table illustrates the correlation between the top five TTI ranked locations with their corresponding PTI rank.

AM Peak Hour			PM Peak Hour		
	TTI Rank	PTI Rank		TTI Rank	PTI Rank
I-495 @ MD 650	1	1	I-695 MD 139 to MD 45	1	4
I-495 MD 650 to MD 193	2	6	I-695 MD 45 to MD 146	2	8
I-495 Prince George's County Line to MD 650	3	2	I-495 Cabin John Parkway to MD 190	3	9
I-495 MD 193 to US 29	4	15	I-695 @ MD 146	4	10
I-695 MD 147 to MD 41	5	9	I-695 @ MD 139	5	2

Top 30 Unreliable Segments

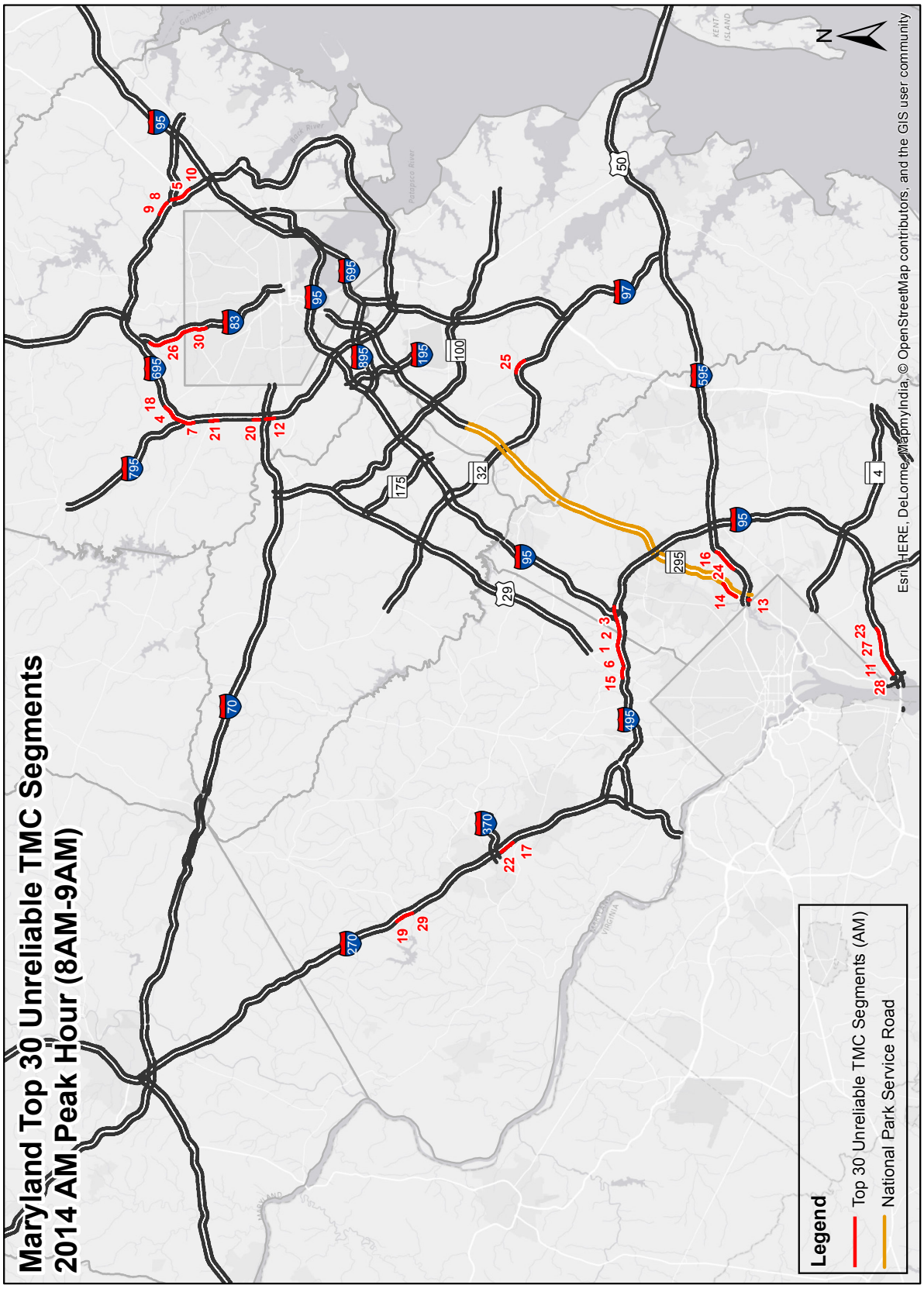
The top 30 most unreliable freeway/expressway segments based on the PTI for the AM peak hour (8-9 AM) and PM peak hour (5-6 PM) are listed in the following tables and shown in Figures 11 and 12:

2014 TOP 30 UNRELIABLE SEGMENTS AM PEAK

2014 RANK	ROAD	LOCATION	DIRECTION	2014 TTI	2013 RANK	RANK CHANGE 2013 TO 2014
1	I-495	@ MD 650	Outer Loop	9.01	1	0
2	I-495	Prince Georges Co/L to MD 650	Outer Loop	8.66	3	-1
3	I-495	I-95 to Montgomery Co/L	Outer Loop	8.58	2	1
4	I-695	MD 140 to I-795	Outer Loop	7.91	8	-4
5	I-695	US 1 to MD 43	Outer Loop	7.69	6	-1
6	I-495	MD 650 to MD 193	Outer Loop	7.51	10	-4
7	I-695	I-795 to MD 26*	Outer Loop	7.51	4	3
8	I-695	MD 43 to MD 147*	Outer Loop	7.23	5	3
9	I-695	MD 147 to MD 41*	Outer Loop	6.92	11	-2
10	I-695	@ US 1	Outer Loop	6.84	9	1
11	I-495	@ MD 210	Inner Loop	6.77	12	-1
12	I-695	I-70 to US 40	Outer Loop	6.25	7	5
13	MD-295	US 50 to Washington DC/L[1]	Southbound	5.80	24	-11
14	MD-295	MD 202 to US 50[1]	Southbound	5.77	20	-6
15	I-495	MD 193 to US 29	Outer Loop	5.75	22	-7
16	US-50	MD 410 to MD 202	Westbound	5.73	18	-2
17	I-270	Shady Grove Rd to MD 28 CD Lanes	Southbound	5.60	15	2
18	I-695	@ MD 140	Outer Loop	5.58	17	1
19	I-270	@ Father Hurley Blvd	Southbound	5.35	37	-18
20	I-695	MD 26 to MD 122	Outer Loop	5.21	13	7
21	I-695	@ MD 26	Outer Loop	5.20	21	0
22	I-270	I-370 to Shady Grove Rd	Southbound	5.14	42	-20
23	I-95	@ MD 414	Inner Loop	4.89	30	-7
24	US-50	MD 202 to MD 459	Westbound	4.87	27	-3
25	MD-32	Sappington Station Rd to MD 170	Westbound	4.87	26	-1
26	I-83	Ruxton Rd to Northern Pkwy	Southbound	4.70	38	-12
27	I-95	MD 414 to MD 210	Inner Loop	4.68	33	-6
28	I-95	MD 210 to I-295 CD Lanes	Inner Loop	4.63	40	-12
29	I-270	Father Hurley Blvd to MD 118	Southbound	4.62	57	-28
30	I-83	Northern Pkwy to Cold Spring Lane	Southbound	4.61	35	-5

[1] Owned by the National Park Service *Under or Nearby Construction

Figure 11


Maryland Top 30 Unreliable TMC Segments
2014 AM Peak Hour (8AM-9AM)
Legend
Top 30 Unreliable TMC Segments (AM)
National Park Service Road
N
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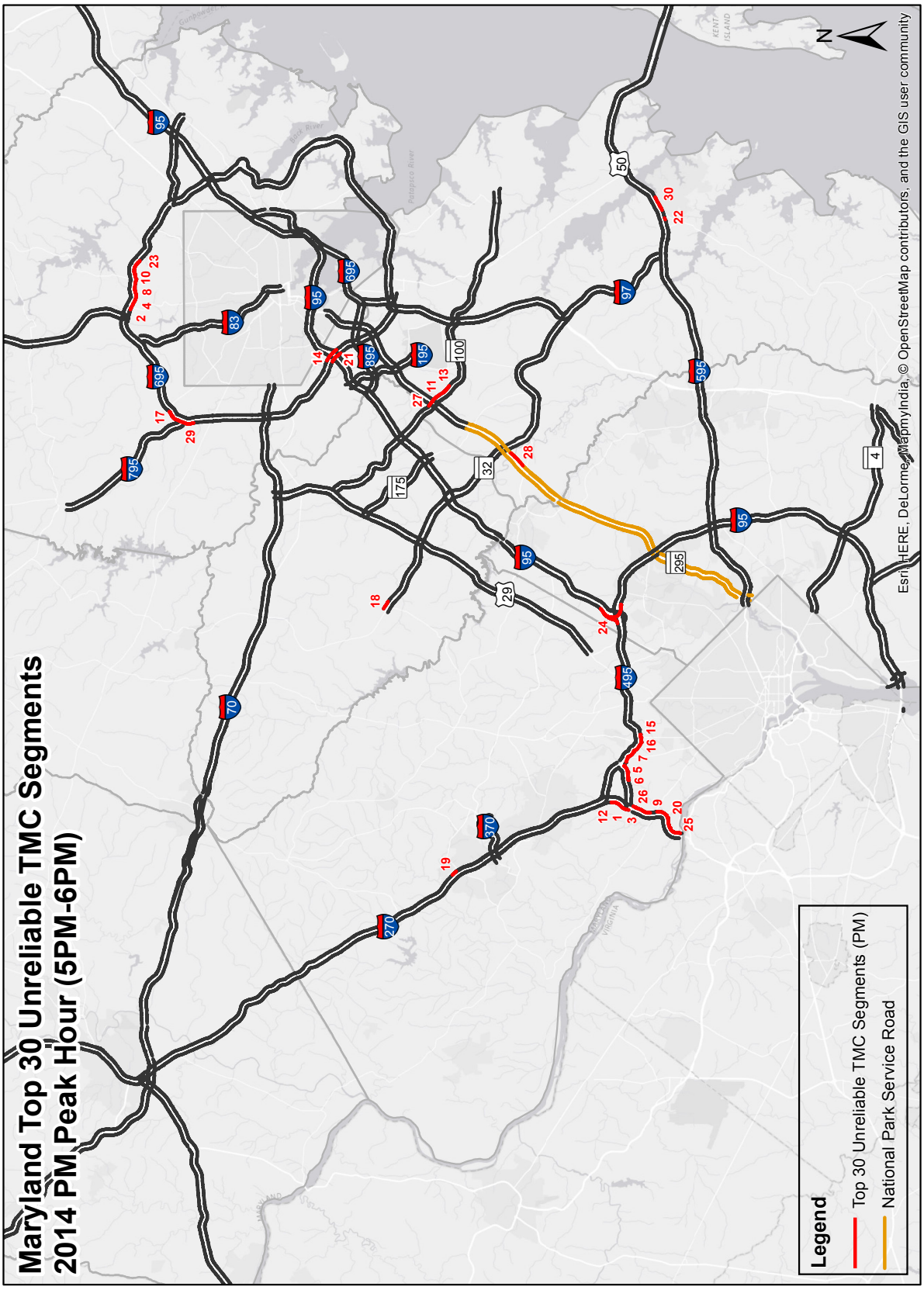
2014 TOP 30 UNRELIABLE SEGMENTS PM PEAK

2014 RANK	ROAD	LOCATION	DIRECTION	2014 TTI	2013 RANK	RANK CHANGE 2013 TO 2014
1	I-270 Spur	@ Democracy Blvd	Southbound	11.65	1	0
2	I-695	@ MD 139	Inner Loop	10.01	6	-4
3	I-270 Spur	@ I-495	Southbound	9.63	2	1
4	I-695	MD 139 to MD 45	Inner Loop	9.51	5	-1
5	I-495	MD 187 to MD 355	Inner Loop	8.48	4	1
6	I-495	@ MD 187	Inner Loop	8.16	3	3
7	I-495	@ MD 355	Inner Loop	7.85	7	0
8	I-695	MD 45 to MD 146	Inner Loop	7.58	10	-2
9	I-495	Cabin John Pkwy to MD 190	Inner Loop	7.11	8	1
10	I-695	@ MD 146	Inner Loop	6.48	17	-7
11	MD-100	MD 713 to MD 295	Westbound	6.46	11	0
12	I-270 Spur	I-270 to Democracy Blvd	Southbound	6.42	18	-6
13	MD-100	MD 170 to MD 713	Westbound	6.40	24	-11
14	I-695	@ I-95*	Inner Loop	6.25	15	-1
15	I-495	@ MD 185	Inner Loop	5.97	44	-29
16	I-495	MD 355 to MD 185	Inner Loop	5.95	29	-13
17	I-695	MD 140 to I-795	Outer Loop	5.87	19	-2
18	MD-32	Great Star Dr to MD 108	Westbound	5.79	9	9
19	I-270	MD 124 to Middlebrook Rd	Northbound	5.66	37	-18
20	I-495	Clara Barton Pkwy to Cabin John Pkwy	Inner Loop	5.60	25	-5
21	I-695	@ I-95*	Outer Loop	5.58	21	0
22	US-50	@ MD 450	Eastbound	5.47	12	10
23	I-695	MD 146 to Providence Rd	Inner Loop	5.34	49	-26
24	I-95	MD 212 to I-495	Southbound	5.33	16	8
25	I-495	@ Clara Barton Pkwy	Inner Loop	5.32	39	-14
26	I-495	@ I-270Y Split	Inner Loop	5.31	30	-4
27	MD-100	MD 713 to MD 295	Westbound	5.25	41	-14
28	MD-295	MD 198 to MD 32[1]	Northbound	5.18	22	6
29	I-695	I-795 to MD 26*	Outer Loop	5.15	20	9
30	US-50	@ MD 70	Eastbound	5.13	23	7

[1] Owned by the National Park Service *Under or Nearby Construction

Figure 12


Maryland Top 30 Unreliable TMC Segments
2014 PM Peak Hour (5PM-6PM)
Legend
Top 30 Unreliable TMC Segments (PM)
National Park Service Road
N
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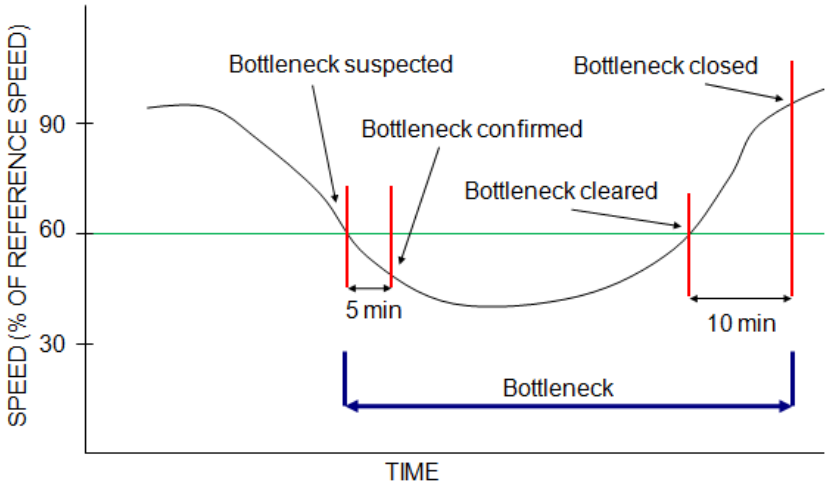
Top 30 Bottleneck Locations

Another measure of congestion is bottleneck locations. A bottleneck, as defined by the Vehicle Probe Project (VPP) Suite, occurs when, "the speeds observed for a roadway segment drop below 60% of the free flow speed for a period greater than 5 minutes. Adjacent roadway segments meeting this condition are joined together to form a bottleneck queue. The duration of the bottleneck is calculated till the time speeds are greater than 60% for more than 10 minutes. This definition uses minute-to-minute speeds available across the state highway system to determine congestion patterns for the entire day. The definition this report utilizes for a bottleneck is graphically shown below:



The top 30 bottleneck locations were identified in 2014. The analysis is based on INRIX probe data for interstates and major controlled access facilities available through the VPP Suite. This is based on speed observations used to calculate the number of bottleneck occurrences. The ranking of the segments is performed by computing the duration, intensity and frequency with which the bottlenecks occur during an entire average weekday. This is calculated by determining an impact factor (computed as the number of times a bottleneck occurs on a particular segment, times its duration times the average queue length). The following page identifies the Top 30 Bottlenecks. These are shown in Figure 13.

2014 TOP 30 BOTTLENECK LOCATIONS

2014 Rank	Location	Road	Direction	Q1	Q2	Q3	Q4	Average Duration	Average MAX Length	Impact Factor	2013 Rank	Rank Change 2013 to 2014
1	I-495 IL @ I-270 Spur	I-495	Inner Loop	225	201	160	176	168.75	12.3	1079316	1	0
2	I-95 OL @ Greenbelt Metro Dr/Exit 24**	I-95	Outer Loop	154	137	125	221	125.5	19.46	791840	7	-5
3	I-95 N @ MD-100/Exit 43	I-95	Northbound	133	229	158	139	120	9.41	704646	3	0
4	I-270 Spur S @ I-270	I-270	Southbound	95	106	106	119	111	10.78	479337	6	-2
5	MD-295 N @ I-195	MD-295	Northbound	74	94	71	78	138.5	13.21	472385	N/A	N/A
6	MD-295 N @ MD-175	MD-295	Northbound	116	80	83	96	150.5	8.66	444694	N/A	N/A
7	I-695 OL @ Edmondson Ave/Exit 14*	I-695	Outer Loop	142	156	112	98	121.5	8.82	414633	4	+3
8	I-695 IL @ I-795/Exit 19	I-695	Inner Loop	32	116	77	153	122.25	8.68	410551	276	-268
9	I-695 IL @ MD-147/Harford Rd/Exit 31*	I-695	Inner Loop	89	77	45	70	159.25	10.43	394232	2	+7
10	MD-295 N @ MD-197/EXIT 11[1]	MD-295	Northbound	116	73	91	108	169.75	6.33	386207	8	+2
11	I-695 IL @ MD-41/Perring Pkwy/Exit 30*	I-695	Inner Loop	65	108	145	161	107.25	7.59	357839	22	-11
12	I-95 OL @ US-50/Exit 19	I-95	Outer Loop	117	165	124	131	107.75	5.7	296350	30	-18
13	I-270 Local N @ MD 124	I-270	Northbound	168	147	139	145	126.5	4.17	262346	10	+3
14	I-95 S @ I-495/Exit 27-25	I-95	Southbound	206	189	176	163	92	5.43	250608	20	-6
15	I-95 IL @ MD-214/ Exit 15	I-95	Inner Loop	85	125	150	120	101.75	5.15	226712	27	-12
16	MD-295 S @ MD-193[1]	MD-295	Southbound	76	80	77	115	94.5	7.76	225998	11	+5
17	MD-295 S @ Powder Mill Rd[1]	MD-295	Southbound	112	133	125	113	97.5	5.12	221761	21	-4
18	I-695 IL @ I-83/MD-25/Exit 23	I-695	Inner Loop	122	110	136	83	86.5	6.6	217612	18	0
19	I-695 OL @ US-40/Exit 15	I-695	Outer Loop	65	89	128	145	82.5	6.68	214186	76	-57
20	I-270 N @ MD-80/Exit 26	I-270	Northbound	78	90	155	89	85.25	8.02	208159	9	+11
21	I-95 IL @ MD-4/Pennsylvania Ave/Exit 11	I-95	Inner Loop	51	87	43	74	105.25	7.25	193369	40	-19
22	MD-295 N @ MD-100[1]	MD 295	Northbound	76	137	126	70	87	6.11	191552	N/A	N/A
23	I-495 IL @ MD-97/Georgie Ave/Exit 31	I-495	Outer Loop	97	159	146	143	100.75	3.5	185054	24	-1
24	I-270 S @ MD-109/Exit 22	I-270	Southbound	124	172	156	108	78.5	4.15	168714	15	+9
25	I-270 N @ MD-109/Exit 22	I-270	Northbound	75	65	66	48	96.75	8.67	167063	70	-45
26	I-495 CCW @ MD-185/Connecticut Ave/Exit 33	I-495	Outer Loop	72	61	54	78	122.25	5.48	162545	17	+9
27	MD-295 N @ Powder Mill Rd[1]	MD-295	Northbound	166	163	173	144	85	3.16	157255	34	-7
28	I-270 N @ I-70/US-40	I-270	Northbound	114	106	180	108	68.75	8.06	155154	14	+14
29	I-270 Local S @ I-270	I-270	Southbound	131	159	133	145	82.5	4.53	153922	N/A	N/A
30	I-695 IL @ MD 26*	I-695	Inner Loop	47	67	78	59	107.75	6.24	152379	19	+11

Q1: Jan-Mar Q2: Apr-June Q3: July-Sept Q4: Oct-Dec

Occurrences: Number of Times Speed Dropped Below 60% of the Free Flow Speeds

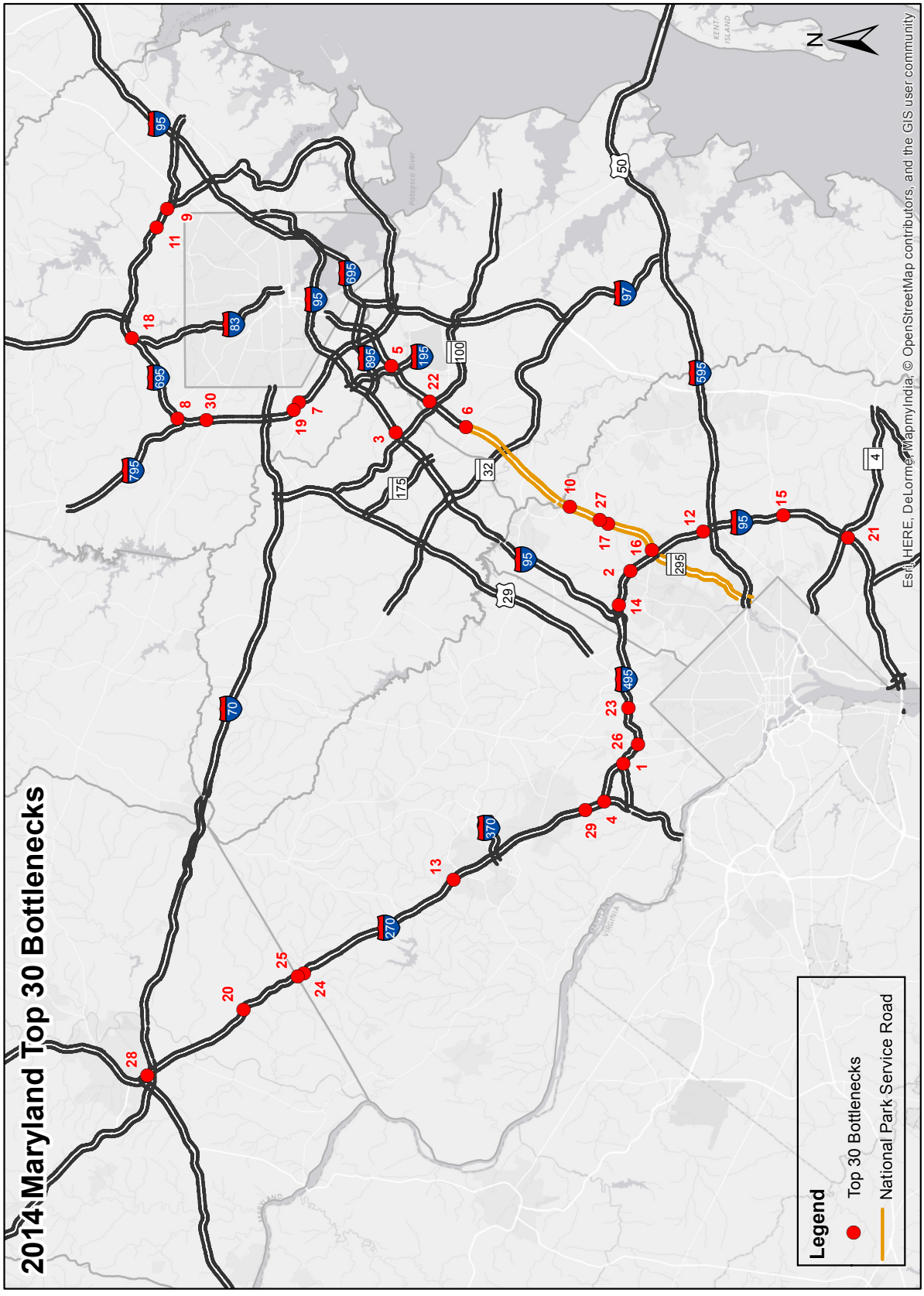
Impact Factor = Sum of Occurrence per Quarter x Avg. Duration per Quarter x Queue Length per Quarter

[1] Owned by National Park Service

* Under or Nearby Construction

** Under Review

Figure 13


2014 Maryland Top 30 Bottlenecks
Legend
Top 30 Bottlenecks
National Park Service Road
N
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D. Truck Trends

I-495 @ Truck Weigh Station

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I-495 @ Park and Ride Lot / Truck Weigh Station

Truck Trends

Substantial amounts of freight move to, from and through Maryland. In fact, it is estimated that freight just originating and terminating in Maryland is valued at $445 billion annually. This amounts to more than 346 million tons of goods movement. Maryland has an excellent system of highways, port infrastructure, airport, and rails to support the movement of freight.

Freight in Maryland moves via truck, water, rail and air. By far, the highest percentage is trucking with approximately 75% of the freight tonnage moving on highways. In order to support the economic vitality, SHA processed more than 136,000 oversize/overweight truckload permits last year for the movement of goods in or around Maryland. Our position as a "through" state related to the key corridors of I-95 and I-81 continues to require that freight congestion be minimized. For example, on sections of I-95 there are more than 27,000 trucks per day.

The movement of freight is impacted by the same reliability and congestion challenges that motorists on the network face. Unpredictable congestion and delay reduces the reliability of delivery times, which leads to costlier freight movement. The trend toward leaner supply chains and changes in on-line retail require efficient roadway networks, warehouses, and intermodal facilities to ensure timely and cost-effective delivery. Planners and policymakers are paying special attention to population growth related to freight demand, increases in warehouse and distribution facilities in heavily trafficked corridors, and growth in intermodal traffic, which is expected to increase with the completion of the Panama Canal expansion project in 2015. Numerous warehouse developments have occurred along the I-95 corridor including distribution giant Amazon opening a one million square foot distribution center in Southeast Baltimore in 2015.

MDOT has initiated a program to monitor overnight truck parking when it occurs along shoulders of highways and entrance/exit ramps. Trucks parking at appropriate rest areas decrease the potential for crashes between parked trucks and moving vehicles. A survey was performed on the major routes in the Maryland Truck Route System to identify locations where overnight truck parking is occurring. On a peak night, more than 750 trucks were parked on the mainline and ramps either directly on or near these roadways. I-95 was the leading route for truck parking with an average of more than 300 trucks parked during the given survey night. The average number of trucks parked overnight approximately doubled along I-95 due the reopening of the Maryland House Travel Plaza in Harford County. The I-95/I-495 truck weigh station and the I-95 northbound Welcome Center in Howard County with more than 60 trucks parked overnight were the highest recorded locations for overnight truck parking.

The American Transportation Research Institute (ATRI) evaluated congestion costs for trucking on the interstate system. Maryland was rated 7th highest among all states in congestion costs with the six higher states being much larger in size (California and Texas). The Washington DC metropolitan area experienced the 5th highest congestion costs for highway freight movement.

The Federal Highway Administration (FHWA) Office of Freight Management and Operations monitors interstate highways as part of the Freight Performance Measures (FPM) Initiative. A major monitoring area is the identification of bottlenecks on the nations interstate system. The ATRI developed the 2014 Congestion Impact Analysis of Freight Significant Highway Locations. This report identifies a "total freight congestion value" in a four step process which includes determining a free flow speed, the average truck speed, an hourly freight congestion based on speed and on volume. This is added together for the 24 hour period. Four of the top 100 locations at the junction of two interstates were in Maryland including:

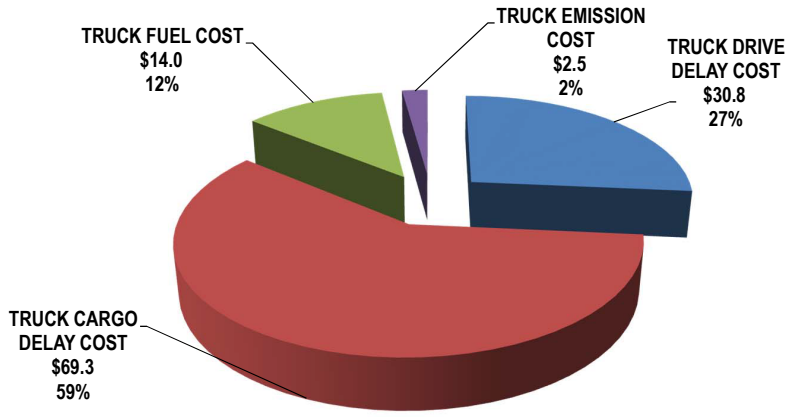
- I-95 @ I-495
- I-95 @ I-695 (South)
- I-495 @ I-270 (East)
- I-95 @ I-695 (North)

Congestion on truck routes throughout the State has an influence on the cost of the products we buy and impacts the environment and our safety. Delay and fuel costs are more significant to truckers than to motorists. Among the most problematic locations for truckers that are not at the junction of two interstate highways include:

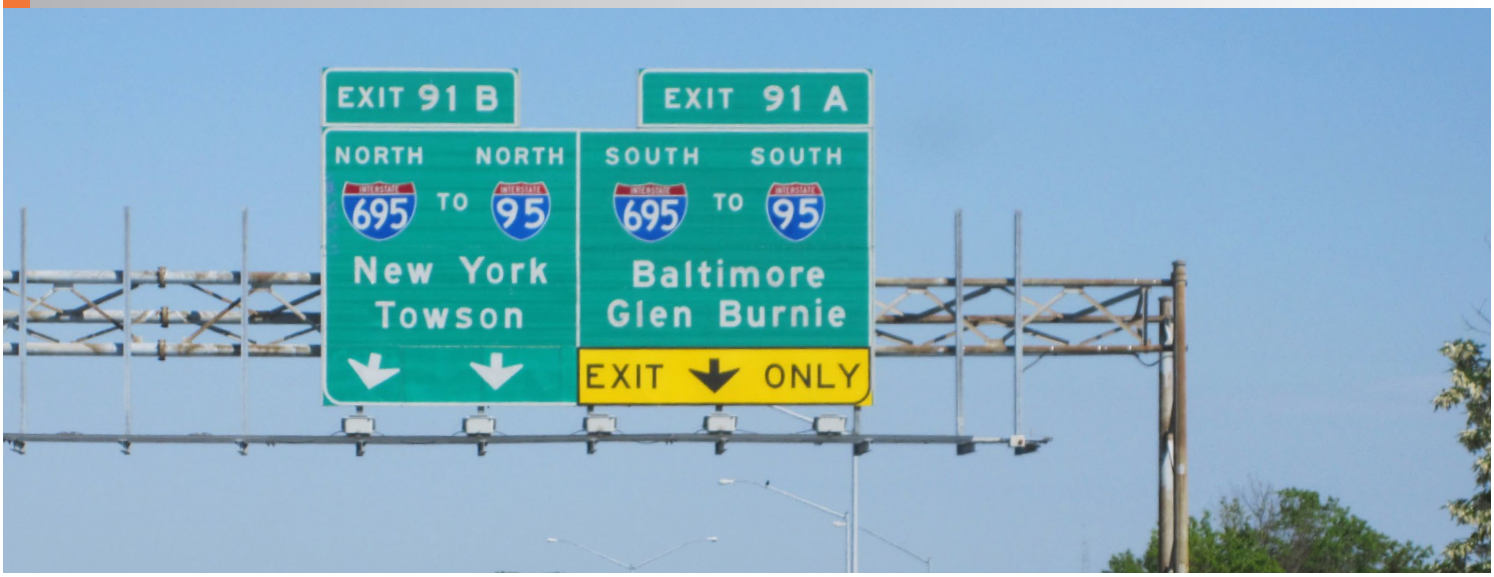
- I-95 Northbound @ MD 100
- I-695 Outer Loop @ Edmondson Ave.
- I-695 Inner Loop @ MD 147
- I-695 Inner Loop @ MD 41
- I-95 Outer Loop @ US 50
- I-270 Northbound @ C-D Road Merge
- I-695 Outer Loop @ US 40
- I-270 Northbound @ MD 80

Congestion on the freeway/expressway network results in driver delay costs, cargo delay costs, diesel costs and increased emissions. This amounts to an estimated $116.6 million in 2014. The following graph illustrate the cost breakdowns.

2014 FREIGHT CONGESTION COSTS ON MARYLAND'S FREEWAYS/EXPRESSWAYS ($ MILLIONS)



E. Regionally Significant Corridors



I-70 @ I-695

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I-270 North of the I-270 Split

Controlled Access Facilities

The highest volume of traffic on roadways throughout Maryland is on controlled access facilities, which includes freeways and expressways. Analysis was performed on these roadways to evaluate various measures such as mobility and reliability including the travel time index, planning time index, daily variability, speed and the location of the top bottlenecks along these roadways. The facilities evaluated include:

- I-70 (Pennsylvania Border to US 40 (Frederick))
- I-70 (US 40 (Frederick) to I-695)
- I-81
- I-83
- I-95 (Capital Beltway to I-695 North)
- I-95 (I-695 North to Delaware State Line)
- I-97
- I-270
- I-495 Capital Beltway
- I-695 Baltimore Beltway
- I-795
- I-895
- US-50 (D.C Line to William Preston Lane Bridge (Bay Bridge))
- MD 32
- MD 100
- MD 295

Appendix A contains more in-depth information about the mobility performance of these corridors.

MD 355 South of I-495

ARTERIALS

Arterial corridors function both as commuter routes and to provide access to collector streets/developments. Twenty-five (25) major arterial corridors were identified based on traffic volumes, regional significance and availability of data. Each of these corridors were reviewed and analyzed to determine the various operational characteristics. This included condition data such as the number of lanes, speed limits, signalized intersections and traffic/transit ridership data. The traffic analysis was performed to identify the most congested intersections and the accompanying levels of service for the roadway segments along these corridors. The following corridors were analyzed:

- US 1 - MD 410 to MD 198
- US 1 - Baltimore City Line to Honeygo Blvd
- US 29 - MD 97 to MD 650
- US 40 - I-70 to Cleveland Ave
- US 301 - Billingsley Road to MD 5
- MD 2 - 5th Ave to I-695
- MD 3 - US 50/301 to I-97
- MD 4 - Washington DC Line to Anne Arundel County Line
- MD 5 - I-95 to Washington D.C. Line
- MD 5 - US 301 to MD 223
- MD 24 - US 1 to US 40
- MD 26 - Baltimore City Line to MD 32
- MD 28 - MD 124 to MD 97
- MD 32 - MD 108 to MD 26
- MD 43 - I-695 to US 40
- MD 45 - Baltimore City Line to Shawan Rd
- MD 97 - Washington DC Line to MD 108
- MD 124 - MD 28 to MD 108
- MD 140 - Baltimore City Line to MD 97
- MD 175 - MD 32 to US 29
- MD 185 - Washington DC Line to MD 97
- MD 210 - MD 228 to I-95
- MD 214 - I-95 to Washington DC Line
- MD 228 - MD 210 to US 301
- MD 355 - Washington DC Line to MD 27

Appendix B contains additional information related to various characteristics and performance measures of the above major arterials.

INTERSECTIONS

SHA performs traffic data collection for on-going projects ranging from improving signal timing to corridor studies. This data is collected with equipment and personnel at numerous intersections throughout the state. Traffic data from the last three years is analyzed at the signalized intersections. The following locations have been defined to operate at failing conditions or level of service 'F'. It should be noted that the above list of failing intersections is not a complete list. SHA continues to expand on its data collection program and work with locals to obtain additional information on intersection and arterial performance:

ANNE ARUNDEL

- MD 2 @ Arnold Rd
- MD 2 @ Tarragon Lane
- MD 3 @ Crawford Blvd
- MD 3 @ MD 424
- MD 175 @ Llewellyn Ave/Blue Water Blvd

BALTIMORE

- MD 26 @ I-695 SB Ramps
- US 40 @ Rolling Rd
- MD 43 @ Honeygo Blvd
- MD 45 @ MD 131/Seminary Ave
- MD 45 @ Shawan Rd

CHARLES

- MD 5 @ Billingsley Rd
- US 301 @ MD 228/MD 5 Bus

HARFORD

- MD 24 @ Singer Rd
- MD 24 @ W. Ring Factory Rd
- MD 24 @ I-95 NB Ramps

HOWARD

- MD 175 @ Tamar Dr
- US 40 @ MD 144A/Pebble Beach Dr
- US 29 @ Rivers Edge Rd

MONTGOMERY

- MD 28 @ MD 97
- US 29 @ Blackburn Rd
- US 29 @ Greencastle Rd
- US 29 @ Musgrove Rd
- US 29 @ Stewart Lane
- MD 97 @ Old Baltimore Rd
- MD 97 @ Plyers Mill Rd
- MD 97 @ Ramp 6 from I-495 EB
- MD 119 @ Lakelands Drive
- MD 119 @ Muddy Branch Rd
- MD 185 @ MD 410
- MD 185 @ Jones Bridge Rd
- MD 185 @ MD 191
- MD 185 @ MD 192
- MD 190 @ MD 614
- MD 355 @ Cedar Lane
- MD 355 @ E&W Gude Dr
- MD 355 @ MD 124
- MD 355 @ Shady Grove Rd
- MD 650 @ Randolph Rd
- MD 650 @ Ramp 7 from US 29 WB

PRINCE GEORGE'S

- US 1 @ Cherry Hill Rd
- MD 4 @ Dower House Rd

- MD 4 @ MD 337
- MD 5 @ Brandywine Rd
- MD 5 @ MD 373
- MD 5 @ Surratts Rd
- MD 197 @ Montpelier Dr/Brock Bridge Rd
- MD 202 @ Brightseat Rd
- MD 210 @ Livingston Rd/Kerby Hill Rd
- MD 210 @ Livingston Rd/Palmer Rd
- MD 210 @ MD 373/Livingston Rd
- MD 210 @ Wilson Bridge Dr
- MD 212 @ Adelphi Rd
- MD 214 @ Brightseat Rd/Hampton Park Blvd
- MD 214 @ Ritchie Rd/Garret A. Morgan Blvd
- US 301 @ MD 197
- US 301 @ Clymer Dr
- US 301 @ Harbour Way/Governor Bridge Rd
- MD 637 @ Suitland Pkwy

SAINT MARY'S

- MD 235 @ MD 237
- MD 235 @ Shady Mile Dr
- MD 235 @ Town Creek Dr

WORCESTER

- US 50 @ MD 378/N. Division St

MDOT's
Focus on Mobility

I-695 @ MD 144

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A. Capital Projects

I-695 @ MD 144

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MD 355 North of Cedar Lane

Capital Projects

SHA employs a variety of strategies to address congestion and reliability challenges including major capital projects and programs that implement bottleneck solutions in a systematic and responsible manner. SHA implements a performance based approach to identify and plan/design/construct congestion mitigation solutions.

Major capital projects can be difficult to construct as they are limited by cost, right-of-way and environmental constraints. These projects often take years to complete to meet the Federal requirements. As a result, a major emphasis in recent years has been on system preservation. However, SHA is now in a financial position to evaluate major multi-modal capacity enhancement process. This was enhanced by the 2015 announcement that another 13 new projects will be funded to improve traffic operations. SHA continues to focus on alleviating congestion hotspots through a low cost congested intersection improvement program. Some of the most cost effective programs SHA implements to improve mobility involve signal system optimization projects and the CHART program. Signal optimization projects are low cost improvements to improve traffic flow where signal timing adjustments are made to minimize delay, reduce wasted fuel costs and maximize vehicular throughput on arterials. CHART, is Maryland's Intelligent Transportation Systems program, providing real-time information to the public and by providing quick response to reduce delay due to incidents.

Recurring congestion occurs at many locations throughout the State of Maryland. In order to address this congestion, SHA continues to provide capacity and operational enhancements. These range from the reconstruction of interstate highways and interchanges to minor geometric improvements at intersections. In addition, the Maryland Transportation Authority (MDTA) recently completed major construction projects; there were upgrades to the freight network; and new pedestrian and bicycle projects. There were eight SHA roadway projects completed in 2014 (five major projects and three minor congestion relief projects); MDTA also completed two major construction projects.

The location of the major and minor projects completed in 2014 is depicted on the following map:

1. MAJOR PROJECTS

MAJOR PROJECTS	MINOR PROJECTS
a. MD 175 @ Rockenbach Rd. & Disney Rd.	a. MD 145 @ MD 146
b. I-695 @ MD 144 (Frederick Rd.)	b. MD 197 @ Powder Mill Rd./American Holly Dr.
c. I-70 @ South Street/Monocacy Blvd.	c. US 50 @ Seahawk Rd./MD 452
d. US 40 @ MD 715	
e. US 40 @ MD 7/MD 159	

These projects provide the following annual user benefits:

- **Major Projects: $12.7 Million**
- **Minor Projects: $8.3 Million**

In order to address mobility issues throughout the State, various major construction projects were opened to traffic in 2014. These projects provide for congestion relief, improve safety and enhance traffic operations. In calendar year 2014, the major emphasis of the completed projects related to improving access to the additional employment created as part of the Base Realignment and Closure Act (BRAC). In addition, a number of other projects began such as the I-695/MD 147 interchange and associated I-695 widening. Five major projects were completed in calendar year 2014 including:

MD 175 @ MD 713

I-695 @ MD 144

I-70 @ South Street/Monocacy Boulevard

Maryland 175 @ Maryland 713 (Rockenbach Road/Ridge Road) and Disney Road (Anne Arundel County)

Fort Meade was a beneficiary of the Base Realignment and Closure Act (BRAC). This legislation relocated numerous personnel to Fort Meade. The Realignment was positive for the State of Maryland and economic development. MD 175 is one of the major access points to Fort Meade interchanging with the MD 295 expressway approximately one mile to the west of MD 713. The project consisted of widening MD 175 to four lanes and providing additional turn lanes at the intersections. A bike lane is provided along MD 175.

I-695 @ Maryland 144 (Frederick Road) (Baltimore County)

I-695/MD 144 is a diamond interchange located on the southwest side of the Baltimore Beltway. The bridge over I-695 was structurally deficient and needed to be reconstructed. The ramp from I-695 northbound to MD 144 was relocated and new left turn lanes were added along MD 144 in both directions. I-695 through this section is congested with over 183,000 vehicles per day using the roadway including more than 7,000 motorists in the peak hour. MD 144 carries approximately 20,000 vehicles per day.

I-70 @ South Street/Monocacy Boulevard (Frederick County)

The widening of I-70 through Frederick has been completed in several phases. East of I-270/US 15, the last section was constructed as part of this project. The construction widened I-70 from four to six lanes from East Patrick Street to west of Maryland 355. This project remedied the lane drop situation that occurred along I-70 westbound at East Patrick Street and made for a continuous six lane freeway on I-70 from US 40 in Howard County to I-270/US 15. The interchange at South Street/Monocacy Boulevard was reconstructed. I-70 carries more than 80,000 vehicles per day through this section with peak hour volumes exceeding 3,000 vehicles per hour in the peak direction. The volume for the South Street/Monocacy Boulevard ramps ranges from less than 1,000 vehicles per day to greater than 7,000 vehicles per day.

US 40 @ MD 715

US 40 @ Maryland 715 (Harford County)

Hundreds of new jobs were brought to Aberdeen Proving Grounds (APG) in the eastern portion of Harford County by BRAC. The increase in jobs caused an increase in traffic accessing APG. One of the major ways to access The Proving Grounds is via an interchange at US 40/MD 715. Traffic volumes from US 40 eastbound to MD 715 exceeds 1,500 vehicles in the peak hour. The interchange reconstruction consisted of widening the US 40 eastbound to MD 715 southbound ramp to multiple lanes, widening the MD 715 bridge over US 40 and providing for the movement from US 40 eastbound to MD 715 northbound. MD 715 was widened from four to six lanes south of the interchange. The intersection of MD 7/ MD 715 was widened and reconstructed.

US 40 @ MD 7/MD 159

US 40 @ Maryland 7/Maryland 159 (Harford County)

The final completed project associated with BRAC was at the intersection of US 40 and MD 7/MD 159. Motorists trying to access Aberdeen Proving Grounds exit I-95 at MD 543 and then turn left onto MD 7. They continue on MD 7 to the US 40 intersection where most motorists turn left on to US 40 to access the new US 40/ MD 715 interchange. Other motorists continue straight through on to MD 159 which ties into MD 715. Peak hour left turning volumes in the AM exceed 850 vehicles per hour. This project widened the MD 7 approach to US 40 to provide for an additional left turn lane to US 40 eastbound and a separate right turn lane to split out the through and right turn movements.

Major Project Benefits

The construction of these five projects provide benefits to the motorists that utilize these facilities. The benefits are related to the reduction in delay incurred by motorists and commercial vehicles, the reduction in fuel consumption, the safety benefit anticipated by the improvement and the benefit provided by increased reliability of the system. Traffic analysis was performed for the before and after conditions. Approximately $12.7 in annual user benefits are provided through these five projects.

Additional details about the above major projects are provided in Appendix C.

MAJOR CONGESTION RELIEF PROJECTS ANNUAL BENEFITS

Location	Reduction in Delay	Reliability Savings	Reduction in Fuel Consumption	Safety Savings	Annual Cost Savings ($ Millions)
	$ Savings (Thousands)	$ Savings (Thousands)	$ Savings (Thousands)	$ Savings (Thousands)	
MD 175 @ Rockenbach Rd. & Disney Rd.	3,976	2,982	73	281	7.3
I-695 @ MD 144	93	69	2	75	0.2
I-70 @ South Street/ Monocacy Blvd.	176	132	3	67	0.4
US 40 @ MD 715	1,595	1,196	30	27	2.8
US 40 @ MD 7/MD 159	1,092	819	19	24	2.0
Total	**6,931**	**5,199**	**127**	**474**	**12.7**

Of the $12.7 million annual benefits, $11.7 million annual benefits are experienced by automobile traffic while $1 million in benefits were realized by truck traffic.

2. MINOR CONGESTION RELIEF PROJECTS

The SHA Congested Intersection Program (CIP) is another funding source to improve mobility. The CIP addresses congestion issues at failing/near failing signalized intersections on state roadways using relatively low cost geometric improvements. These intersections are often characterized by frequent signal phase failures, turn bay spillovers, long queues blocking upstream intersections, and/or blocked or lack of left turn lanes. Intersections that routinely suffer from daily recurring congestion increase overall travel times, delays and have the potential for a higher number of crashes. The construction of left turn lanes can assist in reducing delays for queued through motorists and in reducing rear end crashes due to stopped vehicles in the through lanes. Turn bay extensions can assist in mitigating the occurrence of spillovers and blockages, while providing additional through lanes can reduce queues and increase intersection throughput. These projects not only provide congestion relief but also safety and environmental benefits and improvements to the pedestrian and bicycle facilities. The projects developed from the CIP have cost constraints and are typically limited to intersection type improvements for existing conditions (rather than corridor-wide improvements for future demand). Three CIP projects were completed in calendar year 2014 as follows:

MD 145 @ MD 146

Maryland 145 @ Maryland 146 (Baltimore County)

The intersection of MD 145 @ MD 146 is located in the Jacksonville area of Baltimore County. Both MD 145 and MD 146 are two lane roadways that are highly utilized by commuters. MD 146 provides north-south travel patterns between Towson and points in Harford County and towards the Pennsylvania State line. MD 145 is utilized by many motorists from residential areas such as in Bel Air to employment centers in Hunt Valley. There are high turning volume movements from MD 146 southbound to MD 145 westbound in the AM peak period and the reverse movement in the PM peak hour. MD 145 has a volume of more than 11,000 vehicles per day while MD 146 has an average daily traffic of approximately 17,000 vehicles per day. The high volume of traffic causes major queues both in the AM and PM peak period with the PM being the worse condition. The PM peak period congestion is especially deficient along MD 146 northbound and MD 145 eastbound. In order to alleviate that congestion a second MD 146 northbound and MD 145 eastbound through lane were constructed.

MD 197 @ Powder Mill Rd./American Holly Dr.

Maryland 197 @ Powder Mill Road/American Holly Drive (Prince George's County)

MD 197 intersects with Powder Mill Road to the south and American Holly Drive to the north approximately 1.5 miles west of MD 295 (Baltimore / Washington Parkway). MD 197 (Laurel Bowie Road) is a two lane roadway between S. Laurel Drive (approximately one mile to the west) to Lenons Bridge Road (approximately 3.5 miles to the east). Powder Mill Road intersects with MD 295 approximately 2.5 miles to the west and continues through to the Beltsville area while American Holly Drive is a gated entrance to Patuxent Research Refuge. The intersection is signalized and no turn lanes were present which caused substantial queuing along MD 197.

This improvement project consisted of widening MD 197 to provide an eastbound right and left turn lane and a westbound left turn lane. The eastbound right turn has a daily volume of approximately 1,000 vehicles per day. The MD 197 westbound left turn carries an average daily traffic of more than 1,300 vehicles per day. This project assists in reducing queuing at the intersection. It also reduces the possibility of rear end crashes along MD 197 eastbound and westbound due to stopped vehicles in the through lane.

US 50 @ Seahawk Rd./MD 452

US 50 @ Seahawk Road/MD 452 (Worcester County)

US 50 in Maryland extends from the Washington DC line to Ocean City. It is called the "Gateway to the Atlantic Ocean". The four lane divided roadway on the Eastern Shore is mainly rural in nature except during the peak summer travel season. As it approaches Ocean City, numerous commercial properties border the roadway, increasing traffic volumes and congestion in the area. One of the signalized intersections along this section is at Seahawk Road/MD 452 (Friendship Road). Seahawk Road provides access to Stephen Decatur Middle and High School and to Assateague Island. MD 452 provides a connection to US 113. One of the major movements at the intersection is the left turn from US 50 westbound to Seahawk Road southbound. This movement experienced queuing into the through lane especially during the summer season. The volume for the movement is almost 300 vehicles in the peak hour during the week. In order to address this operational issue, a second left turn lane was constructed.

Minor Congestion Relief Project Benefits

The three projects constructed as part of the Congested Intersection Program were analyzed to determine the annual user benefits. This included the reduction in the number of hours of delay, the savings in the amount of gallons of fuel, the safety benefit and the reliability benefit provided by each project. The analysis results of the three projects is shown in the following table:

MINOR CONGESTION RELIEF PROJECTS ANNUAL BENEFITS

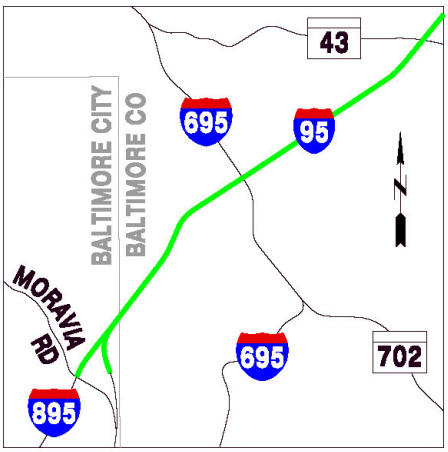
Location	Reduction in Delay	Reliability Savings	Reduction in Fuel Consumption	Safety Savings	Annual Cost Savings ($ Millions)
	$ Savings (Thousands)	$ Savings (Thousands)	$ Savings (Thousands)	$ Savings (Thousands)	
MD 145 @ MD 146	2,651	1,989	48	1	4.7
MD 197 @ Powder Mill Road/American Holly Drive	1,886	1,415	35	42	3.4
US 50 @ MD 452/ Seahawk Road	97	72	2	39	0.2
Total	**4,634**	**3,476**	**85**	**82**	**8.3**

Of the $8.3 annual benefits, $7.8 million was saved by automobile traffic while $0.5 was realized by truck traffic. Additional information about the minor projects are provided in Appendix C.

I-95 South of MD 43

3. MARYLAND TRANSPORTATION AUTHORITY PROJECTS

The Maryland Transportation Authority (MDTA) completed two major construction projects in 2014; the I-95 express toll lane project and the final section of the InterCounty Connector between I-95 and US 1.



I-95 Express Toll Lanes (Baltimore City and County)

The MDTA developed a Master Plan for I-95 from south of I-895 to the Delaware State Line. As part of the Master Plan, the roadway was split into four sections. The first area or Section 100 is located from just south of I-895 to north of MD 43, a distance of approximately eight miles. This is the most congested section for AM/PM peak hour traffic with the AM volume southbound and the PM volume northbound exceeding 7,000 vehicles per hour. PM peak hour volumes northbound on a Friday evening can approach 8,000 vehicles per hour.

MDTA recognized that adding general purpose lanes would solve the existing congestion but the same congestion issues could reappear in future years. In order to address future travel demands, the first express toll lane project in Maryland was constructed. The construction consisted of providing two additional barrier separated lanes on northbound and southbound I-95 for the express toll lanes. The interchanges of I-95 with I-895, I-695 and MD 43 and the I-895 interchange with Moravia Road were reconstructed. With the completion of the express toll lanes motorists have the option of utilizing the four free general purpose lanes or paying a fee via EZ-Pass to utilize the free flow express toll lanes. The express toll lanes are free for transit vehicles and improves their on-time performance.

The express toll lanes opened in December 2014. Initial volumes on the express toll lanes and travel times in the corridor show the project has been a success with more than 20,000 vehicles using the express toll lanes a day. A full analysis of the project will be included in the 2016 Mobility Report once travel patterns have been firmly established.

ICC West of US 1

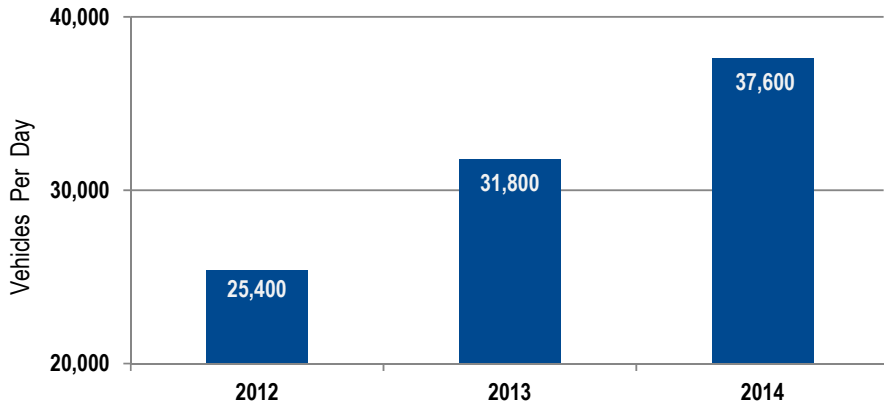
InterCounty Connector (Prince George's County)

The final section of the InterCounty Connector (ICC) was completed in 2014. The last section is a four lane facility located in Prince George's County just south of the City of Laurel. The final section extends approximately 1.5 miles from I-95 to US 1. The construction consisted of completing the remaining movement at the I-95 interchange, a new interchange at Virginia Manor Road, an at-grade intersection at US 1 plus construction of the mainline of the ICC. The ICC/US 1 intersection is unique since it is only the second displaced left turn intersection in the State of Maryland. Collector-distributor roads were created along I-95 for the ICC, Contee Road and Maryland 198 interchanges. The construction of this final section brings the total length of this toll facility to about 19 miles.

Since the opening did not occur until late 2014, only limited data is available. The analysis of the changes will be completed in the 2016 Mobility Report when additional data is available.

The first section of the ICC continues to serve as a vital east-west connection between I-270 and I-95. Traffic volumes have steadily increased over the three years the roadway has been in operations. Volumes in 2014 approach 40,000 vehicles per day on most sections. The growth in traffic volumes on the ICC is illustrated in the following chart.

ICC AVERAGE DAILY TRAFFIC VOLUMES BETWEEN I-95 AND I-370



I-95 SB Welcome Center

4. DEVELOPER PROJECTS

Economic developments generate higher traffic volumes that can cause operational issues such as failing intersections or traffic from turn lanes queuing into through lanes. In order to mitigate these additional traffic volumes, SHA works with developers to determine the improvements required to offset the additional traffic the development will generate. The improvements can range from acceleration and deceleration lanes, to a new traffic signal, to a major intersection enhancement. SHA works with the developer on the improvements to be implemented. Some of the locations where improvements were completed in 2014 include:

- US 301 @ Mitchellville Road (Prince George's County)
- US 40 over Cranberry Run (Harford County)
- MD 32 @ Raincliffe Road/Sandusky Road (Carroll County)
- MD 32 Westbound @ Cedar Lane (Howard County)

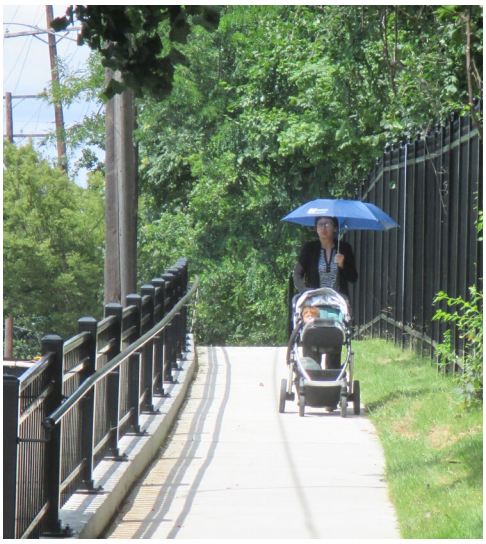
Traffic generated from these developments is mitigated by these improvements, funded by the development. These projects provide improvements in traffic operations thereby providing savings in user travel times and fuel costs.

5. FREIGHT PROJECTS

An increase in the number of trucks along the Maryland roadway system means the economy is expanding and more goods and services are being produced in the area and moved throughout the region. This increase in freight movement does bring safety issues including drowsy truck drivers and insufficient places to rest.

Truck parking is both a safety and infrastructure preservation issue, similar to the issue of overweight trucks, which can cause increased risk and damage to the system. In order to address truck parking, a project was developed to expand the truck parking capacity at the I-95 southbound Welcome Center in Laurel. This approximately doubled the number of spaces at this location to 61.

Another safety issue is at-grade railroad crossings. There are 633 public at-grade rail crossing and 22 pedestrians crossings in Maryland. Improvements include new flashing light signals, additional signal heads and improved crossing surfaces, both on State roads and County roads. In calendar year 2014 approximately 10 crossings were modified including along MD 550, Lander Road, Old Mill Bottom Road, Canal Road, South Division Street and Stone Chapel Road.



MD 355

To improve mobility for truckers SHAs' Motor Carrier Division has instituted a Virtual Weigh Station (VWS) program. This program uses technology to protect the reliability of the pavement and keep trucks moving smoothly. Maryland's VWS promotes the goals of safety, freight mobility and infrastructure preservation through an automated system of sensors and cameras that record activity of Commercial Motor Vehicles (CMV) traveling at high speeds. The VWS can record the speed, height and weight of a commercial vehicle without requiring the vehicle to stop, which reduces delay time for compliant vehicles. Overweight vehicles which damage roads and bridges can be identified for possible enforcement action or educational contact. Likewise, CMV exceeding the speed limit or height restrictions may lead to similar intervention. Each VWS also classifies vehicles and provides a traffic count; but unlike the older system of Automated Traffic Recorders (ATR), the VWS provide an image as well. The analytics feature of the VWS application allows better targeting of enforcement activities with real-time reports identifying traffic volumes, speeds, class and weight related trends. Currently, there are seven active VWS sites across the state. Thirteen more sites are anticipated to be constructed over the next four years. Ten of these sites will monitor Maryland Transportation Authority's bridges and tunnels. The goal is to establish a "blanket" across the state to electronically check a majority of CMV's, intercept the ones that are unsafe or overweight, and allow the legal ones to continue without delay.

6. PEDESTRIAN AND BICYCLE PROJECTS

Pedestrian and bicycle improvements are implemented through various funding mechanisms. As of September 2014, more than $48 million dollars is allocated to upgrade facilities.

Sidewalk improvements may involve the building of new sidewalks or the rehabilitation of existing sidewalks. Across the State, 11.4 miles of new sidewalk were installed in calendar year 2014, including:

- MD 17 - Eagle Bay Drive to Cedar Street (Frederick County)
- MD 355 - Grafton Street to MD 191 (Montgomery County)
- US 40 Alt. - Willow Circle to Kenley Ave (Washington County)

In addition, other upgrades include installing accessible pedestrian signals and constructing ADA compliant ramps. Accessible pedestrian signals are now provided at 66% of the intersections in Maryland, an annual increase of 6% of the total signals statewide. The number of sidewalks that are ADA compliant statewide is nearly 66%.

Bicycle facilities are incorporated into all SHA projects. Providing these facilities are an important part of the Complete Streets philosophy, which involves providing on-street bike lanes or off street facilities to encourage safe bicycle use. In 2014, 12.6 miles of marked bicycle facilities were constructed including:

- MD 222 - Cedar Corner Road to I-95 (Cecil County)
- MD 193 - 63rd Avenue to Lake Forest Drive (Prince George's County)
- MD 212 - Old Gunpowder Road to North of Ammendale Road (Prince George's County)

7. PAST PROJECT BENEFITS

Various projects have been completed along Maryland's freeway/expressway system to rehabilitate existing bridge structures (I-695 at MD 372), provide mobility relief or a combination. Projects such as I-695 at MD 26 was completed but another project (I-695 at Milford Mill Road) is presently on-going which impacts traffic operations in the area. Two projects were constructed that provided benefits to mobility were:

- MD 295 widening from I-195 to I-695
- I-695 westbound from MD 139 to I-83

The Travel Time Index (TTI) data was reviewed for 2011 and 2014. The year 2011 represented the oldest year that INRIX data was analyzed for travel time index. These projects were both under construction at that point. A comparison was made between the peak direction TTI for 2011 and 2014 data which shows the following:

LOCATION	2011 TTI	2014 TTI	2011 RANK	2014 RANK	CHANGE
MD 295 AM SB I-695 to W Nursery Rd	1.43	1.03	136	490	+354
MD 295 AM SB I-695 @ W Nursery Rd	1.06	1.01	519	646	+127
MD 295 PM NB I-195 to W Nursery Rd	1.86	1.02	92	681	+589
MD 295 PM NB W Nursery Rd to I-695	2.23	1.03	41	626	+585
MD 295 PM NB W @ I-695	1.37	1.07	308	536	+228
I-695 AM WB MD 45 to MD 139	1.24	1.13	209	267	+58
I-695 AM WB MD 139 to I-83	1.16	1.08	275	365	+90

The MD 295 widening significantly reducing travel time by as much as 53% during the PM peak hour. All travel times in the peak hour are approximately the same as in the off peak with TTI values of just over 1.0. The I-695 at MD 139 (Charles St.) improvements provided moderate benefit to motorists in the morning commute period with the modification to the ramp movement to I-83 by approximately 8%.

B. Programs and Policies

I-270 @ I-370

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I-95

1. CHART TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS

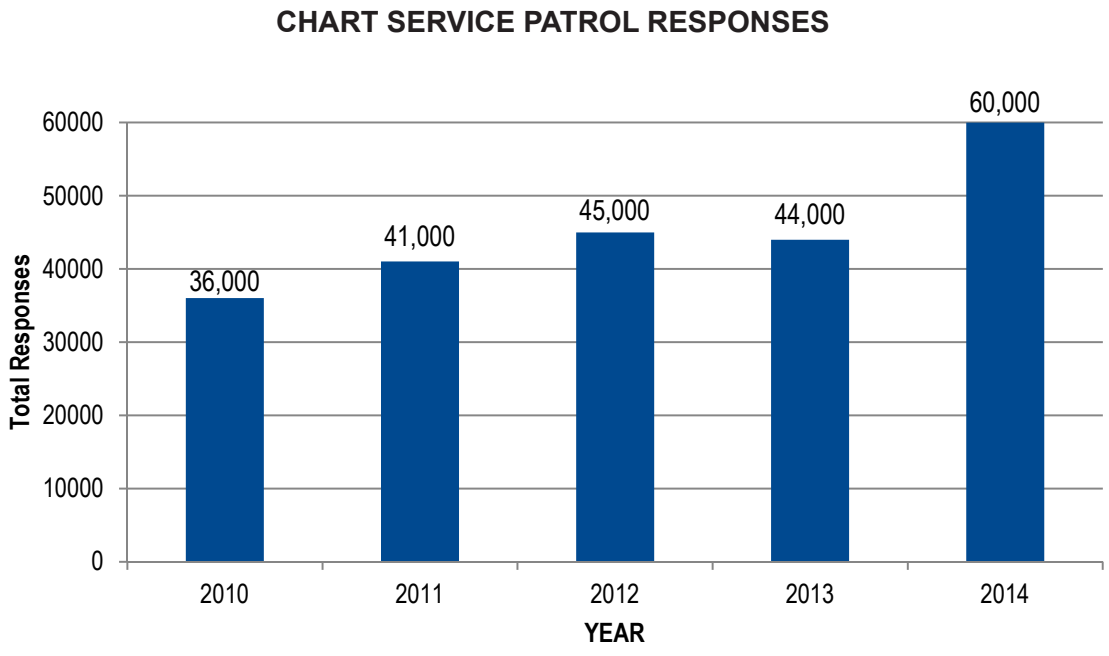
The Coordinated Highway Action Response Team (CHART) started in the mid-1980s' as the "Reach The Beach" initiative to improve traffic operations for motorists travelling to and from Ocean City and other Eastern Shore points. The success of the program led to the formation of CHART which evolved into a statewide program anchored by the Statewide Operations Center (SOC) in Hanover. CHART's mission is to improve mobility and safety using intelligent transportation systems (ITS) devices and interagency teamwork to address non-recurring congestion. Non-recurring congestion includes crashes, vehicle breakdowns, work zones, special events, and weather events. Non-recurring congestion is estimated to account for about 50 percent of all delays on Maryland roadways. The importance of avoiding secondary crashes and providing emergency response in a timely manner is critical both for safety and mobility. From a safety standpoint, minimizing incident clearance times reduces the potential for secondary incidents. Proper incident management benefits the environment by reducing the amount of emissions, including greenhouse gases. CHART, a joint effort between the Maryland Department of Transportation (MDOT) and Maryland State Highway Administration (SHA), in partnership with the Maryland State Police (MSP), and the Maryland Transportation Authority (MDTA), improves real-time operations for Maryland's highway system through communication, system integration, incident response and management, service patrols, and advanced traffic management systems. CHART is involved in:

- Emergency and Weather Operations
- Emergency Preparedness
- Incident Management
- Traffic and Roadway Monitoring
- Traffic Management
- Traveler Information

a. CHART Incident Management

A major emphasis for CHART is incident management. One of the goals of CHART is to improve response times to crashes and clear incidents quickly. This is accomplished by providing emergency traffic patrols (ETP) along major roadways to assist drivers when their vehicles become disabled or when involved in a crash. SHA also recently partnered with State Farm Insurance to expand CHART's emergency traffic patrol coverage. These daily patrols supplement CHART's current coverage and optimize incident response in identified high-volume/high-incident locations. As of July 2014, CHART doubled the size of its service patrol fleet and expanded its patrol operations to a 24 hour a day/seven days a week schedule. There are currently 48 full-time ETP's in the Baltimore, Washington, Frederick and Annapolis regions that offer various types of motorist assistance on the freeways. In addition, from May through September, extra patrols are assigned in response to the increased traffic volume traveling to and from Maryland's Eastern Shore. At the SOC near BWI Airport in Hanover and regional operations centers located in College Park, Baltimore and Annapolis, traffic is monitored through closed-circuit television (CCTV) cameras, speed sensors, and weather stations. When an incident occurs, the necessary information is relayed to emergency service personnel tasked with responding to an incident. With the use of various ITS technologies, travel time information is available to motorists along the major roadways. As a result of all of the incident management and traveler information system initiatives, CHART saves billions of dollars for roadway users in terms of lost time, wasted fuel, and emissions.

The CHART Program responded to and cleared more than 23,000 incidents and assisted almost 37,000 stranded motorists in 2014. CHART increased coverage to 24/7 operations resulted in significant motorist assistance compared to previous years. This meant an approximate 35% increase both in responding to incidents and stranded motorists. The total number of CHART responses on a yearly basis is illustrated in the following graph.



I-695 South of I-795

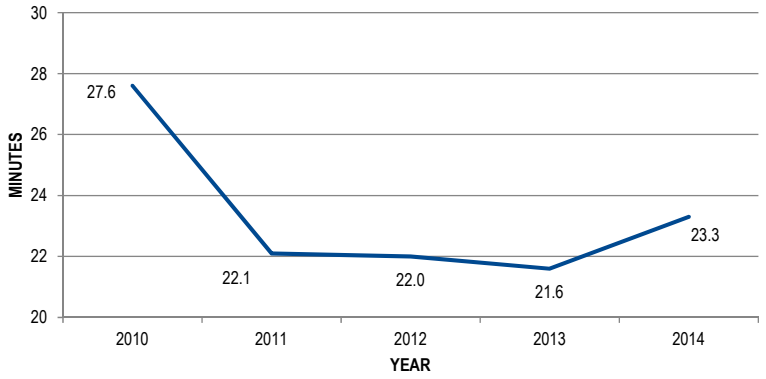
A key goal of CHART is to reduce the potential of secondary incidents by providing a timely response and efficient management once an incident has been identified. The quicker an incident is cleared from the roadway the greater the benefits in reducing delay, improving mobility, and providing safer conditions. Once the traffic and roadway monitoring system has identified an incident, an immediate response is initiated to clear the problem and re-open lanes as quickly as possible. This is accomplished while protecting the safety of those involved in the incident, the emergency personnel responding, and other travelers in the vicinity. CHART operates a nationally recognized incident management program with the cooperation of SHA, MSP, MDTA and other agencies.

The equipment and policies used for incident management include:

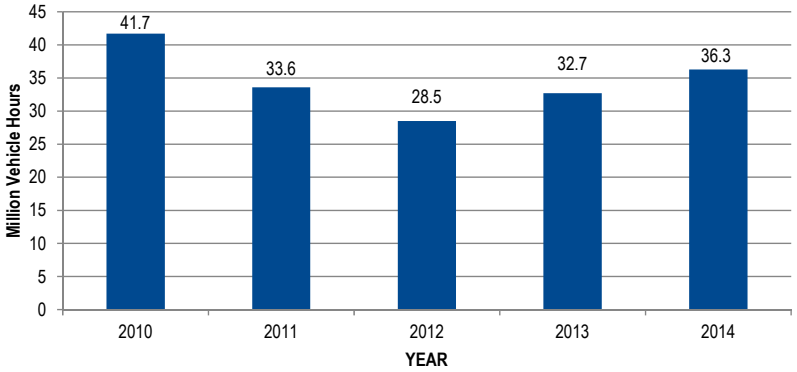
- Emergency Traffic Patrols (ETP's), which are used to provide emergency motorist assistance and to clear disabled vehicles from the travel lanes.
- Emergency Response Units (ERU's), which establish overall traffic control at crash locations.
- Freeway Incident Traffic Management (FITM) trailers, which are pre-stocked with traffic control tools including detour signs, cones, and trailblazer signs and are used to quickly set up pre-planned detour routes when incidents require full roadway closure.
- A "Clear the Road" policy, which provides direction for the rapid removal of vehicles from the travel lanes rather than waiting for a private towing services or time-consuming off-loading of disabled vehicles which are blocking traffic.
- An Information Exchange Network (IEN) Clearinghouse, provided by an I-95 Corridor Coalition workstation at the SOC, which shares regional incident and traveler information to member agencies along the corridor.

A reduction in the time required to clear an incident translates into a reduction in delay and a cost savings to motorists. In 2014, CHART's average response time was 11 minutes, and the average incident took 23 minutes to clear. This saved almost 36.3 million vehicle hours in delay to motorists. The following graphs depict the trends of average incident duration and reduction in delay for the last five years.

AVERAGE INCIDENT DURATION

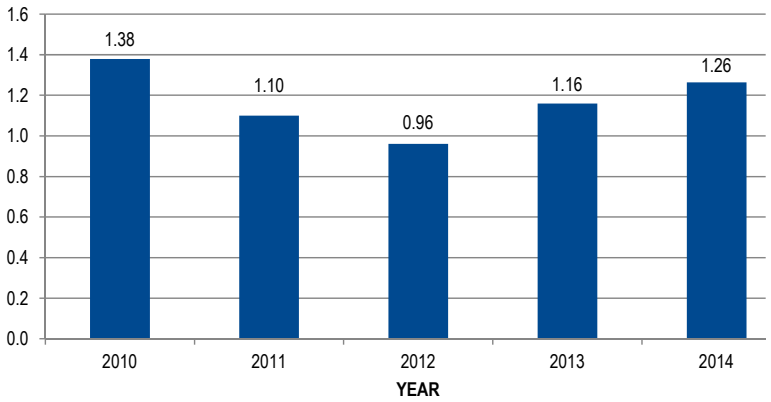


REDUCTION IN DELAY



A quick response time helps reduce delays which results in a savings in annual user costs. The following graph depicts the savings to motorists due to the CHART system in 2014, nearly $1.26 billion.

ANNUAL USER COST SAVINGS



I-95 South of MD 32

b. ITS/511

ITS devices deployed throughout the state assist motorists of traffic operations and incidents. These ITS devices include:

- 700+ CCTV Cameras which include video feeds from other agencies.
- 200+ Speed Detectors.
- 85+ Dynamic Message Signs (DMS).
- 50+ Roadway Weather Information Systems.
- 35+ Traveler Advisory Radios.

CHART is involved in:

- Emergency Preparedness - Redundant Power and Communication, Decentralized Communications and Department of Transportation Emergency Operations (DOTOPs).
- Emergency Weather Operations - Automatic Vehicle Location Fleet Management System and Resource Tracking System.
- Incident Management - Emergency Traffic Patrols, CHART Operations Center, and Emergency Response Units.
- Traffic Management - Special Event and Work Zone Management.
- Traffic and Roadway Monitoring - Cell phone #77, CCTV, and Public/Private Partnerships.
- Traveler Information - Maryland 511 Traveler Information System - High-quality, Timely, and Comprehensive Travel Information to Motorists, CCTV Camera Video Sharing with First Responders, and Internet (www.traffic.md.gov).

The success of the systems CHART has implemented means further areas are evaluated to expand the network. Each year improvements to the CHART system are analyzed and implemented as funding is available. The expansion of the CHART system will further assist travelers by providing better traffic operations statewide. Travel time information is made available based on the analysis of INRIX probe data on more than 100 DMS signs owned by SHA and MDTA. The Maryland 511 Travel Information System continues to provide useful, high-quality, timely, and comprehensive travel information. In 2014, an enhancement customized information to support the commercial vehicle industry was implemented in the Maryland 511 system.

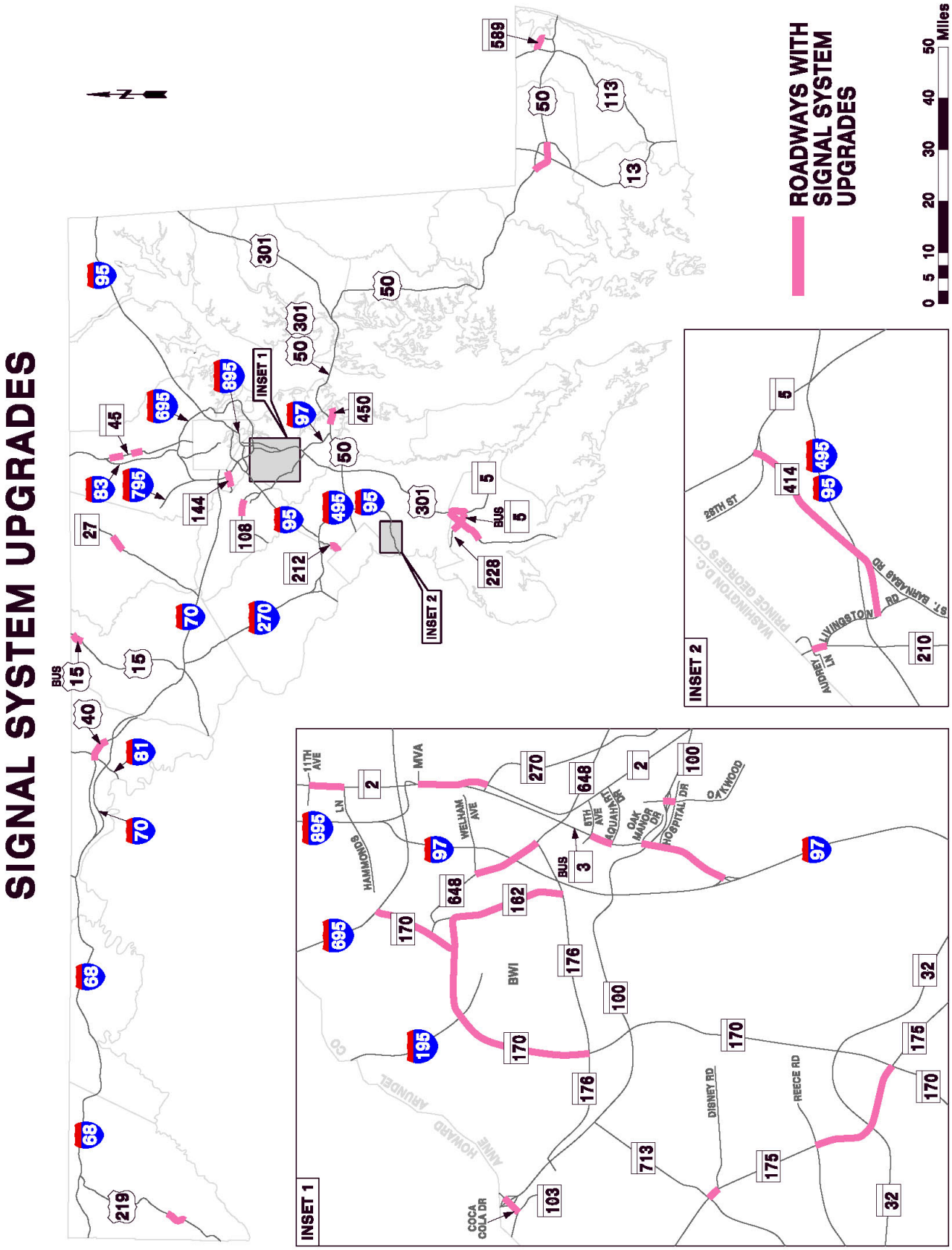
MD 187 South of I-270

c. Signal Operations

One of the most cost effective ways to improve mobility on arterial highways is to improve signal system performance. Traffic signal optimization projects provide improved safety and increased person throughput on arterial corridors. This is accomplished by the retiming of signals to be more responsive to traffic flows, thereby reducing delay to motorists and decreasing automobile emissions. In addition, re-timings not only improve traffic progression but also provide a more walkable environment. In studies from around the country, the benefit cost ratio of improving signal timings range up to 40:1 by providing reduction in travel time delays, number of stops and fuel consumed.

The SHA operates and maintains 1,541 signals in 252 systems. The process of upgrading signal timing includes gathering new traffic volume data, performing traffic modeling, developing adjustments to the timing patterns and conducting travel time analysis to evaluate the before and after results. The major emphasis of the signal system optimization program projects in the last few years is to increase the rate of traffic signal timing modifications that were installed in the controllers at the intersections after the analysis was completed. In 2014, new signal timings were implemented into 65% of the controllers with many of the remaining intersections expected to be installed in early 2015.

In calendar year 2014, a total of 409 signals were reviewed and 221 signals were proposed to be retimed, including 29 signal systems. The signal systems that were retimed and new signal timings were implemented are included on the following map:


SIGNAL SYSTEM UPGRADES
ROADWAYS WITH SIGNAL SYSTEM UPGRADES
0 5 10 20 30 40 50 Miles
INSET 1
INSET 2
BWI
MVA
HAMMONDS LN
WELHAM AVE
OAKWOOD
OAK MANOR DR
HOSPITAL DR
AQUAHART RD
8TH AVE
11TH AVE
DISNEY RD
REECE RD
COCA COLA DR
HOWARD ARUNDEL CO
ANNE ARUNDEL CO
PRINCE GEORGES CO
WASHINGTON D.C.
28TH ST
AUDREY LN
LIVINGSTON RD
ST. BARNABAS RD

MD 166 Park and Ride

The MD 175 project in Odenton provided the highest benefits associated with any of the 29 signal system upgrades. The network delay reduction associated with this project amounted to an estimated 102,000 vehicle hours annually. Overall, the signal retiming and optimization modifications provided an estimated reduction of 866,000 hours of delay for motorists and saving almost 300,000 gallons of gasoline. The fuel, delay and emissions savings resulted in approximately $29.6 million total annual user cost savings.

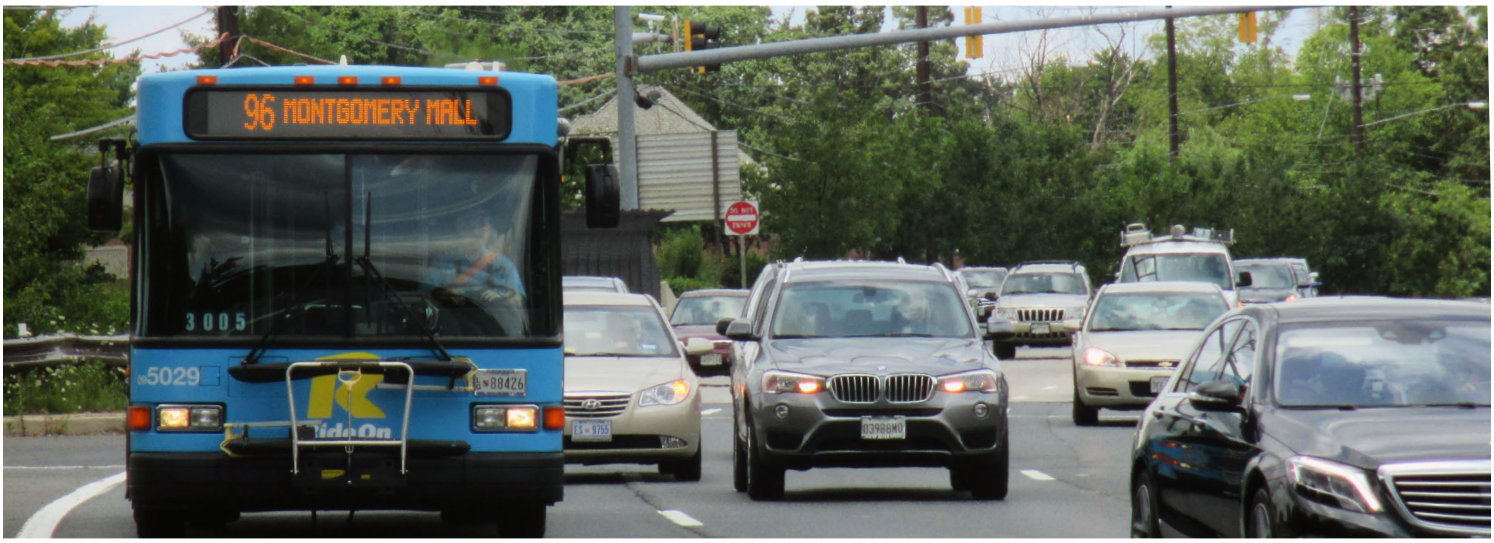
2. MULTI-MODAL

a. Park and Ride

Park and ride lots reduce single occupant vehicles on the roadway network and encourage transit use and ride-sharing. The SHA and MDTA have established a park and ride lot network in Maryland. SHA partners with the Maryland Transit Administration and local transit agencies to encourage transit connections to the lots. The mutually beneficial relationship increases transit trips and reduces congestion. Together SHA and MDTA operate 104 park and ride lots in 20 counties providing a total of 13,062 spaces, ranging in size from less than 15 spaces to more than 800 spaces (MD 5 in the Waldorf area of Charles County and MD 665 at Riva Road in the Annapolis area of Anne Arundel County are the largest). A new 98 space park and ride lot was constructed in 2014 in Washington County at I-81 and MD 68. Other expansions include 75 new spaces at MD 4 at MD 408 in Anne Arundel County, 50 additional spaces at the I-83 at MD 439 lot in northern Baltimore County and 99 new spaces at I-70 at MD 17 in Frederick County. The lot in Charles County at MD 231 and the County Fairgrounds was eliminated resulting in a loss of 20 spaces. Other minor adjustments occurred in the number of spaces in the network.

The 104 lots were surveyed during the spring and fall of 2014 to determine the number of occupied spaces. Over 7,500 spaces were utilized on a given day accounting for about 60% of the total spaces. The park and ride lots which saw the largest increase in the number of motorists parking were:

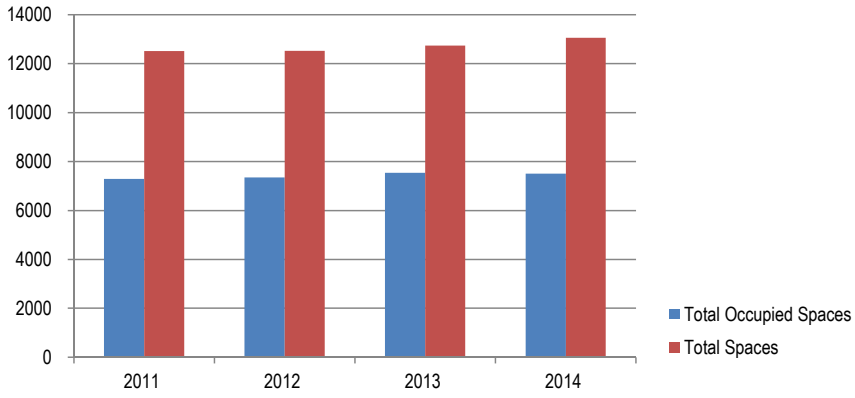
- MD 210 @ MD 373
- I-70 @ MD 65
- I-195 @ MD 166
- I-95 @ I-495
- MD 32 @ Broken Land Parkway
- I-95 @ MD 152



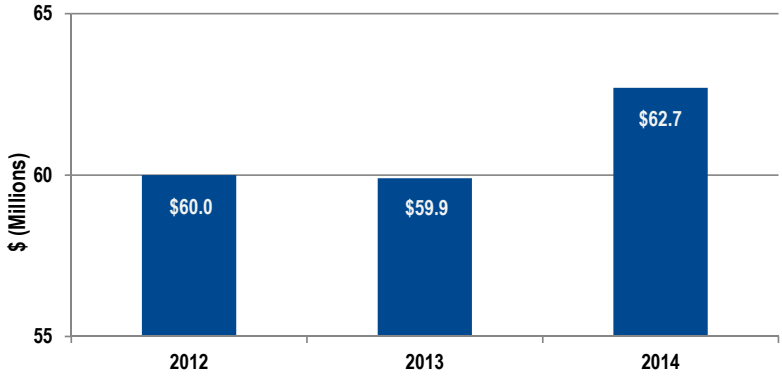
MD 187 South of I-270

The surveys at these six lots indicate a minimum of a 25 vehicle increase in usage and up to 115 vehicles at the MD 210 and MD 373 lot in southern Prince George's County. It is estimated SHA and MDTA park and ride lot facilities result in a 112 million reduction in VMT on roadways. This mileage reduction amounts to a savings of approximately $63 million in annual user costs. The total occupied spaces and total number of spaces are illustrated in the following graph along with the annual user savings over the past three years.

SHA/MDTA PARK AND RIDE LOT SPACES AND USERS



SHA/MDTA PARK AND RIDE SAVINGS TO MOTORISTS (MILLIONS)



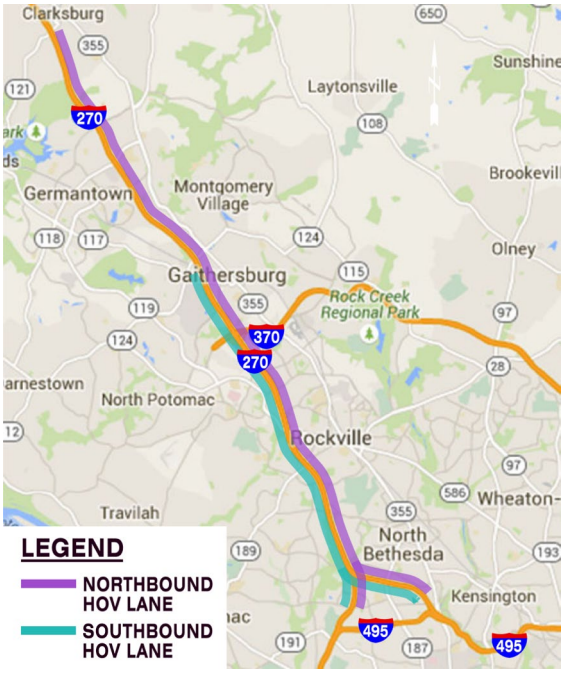
I-270 North of Rockledge Drive

b. HOV Lane Operation

High occupancy vehicle lanes (HOV) are in use in two locations in Maryland. These lanes maximize person throughput by offering a travel time savings for multiple occupant vehicles over single occupant vehicles. In Maryland, HOV lanes restrict access to vehicles with two or more occupants, transit vehicles, motorcycles or plug-in electric vehicles (permits required). The goal of this mobility measure is to allow the HOV lanes to operate near free flow speeds when the general purpose lanes experience congestion and lower travel speeds. The HOV lanes are mostly separated by pavement markings from the general purpose lanes although, a few sections along I-270 have a physical separation between the lanes.

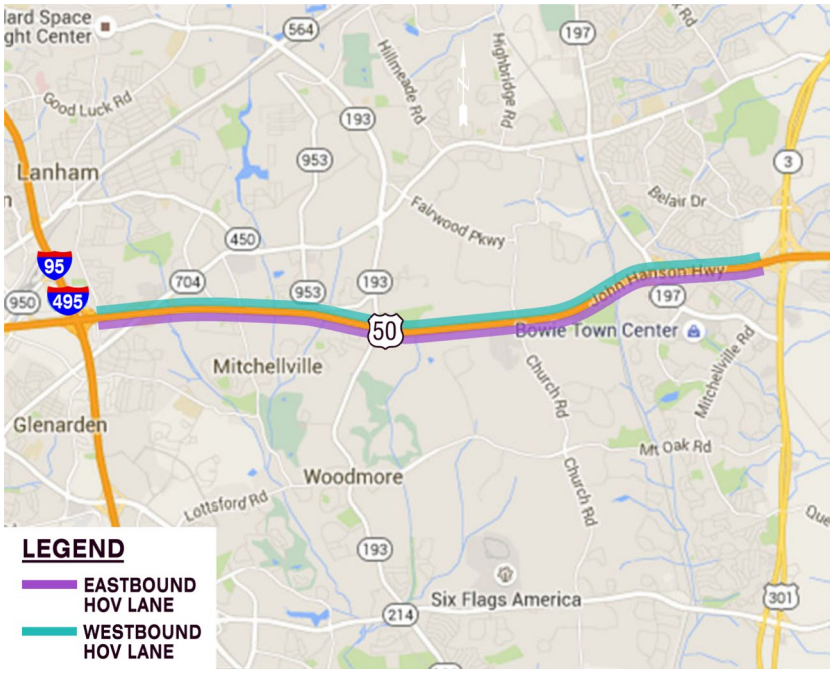
The I-270 HOV lanes operate southbound from 6:00 to 9:00 AM and northbound from 3:30 to 6:30 PM while the US 50 HOV lanes function the entire day. HOV lanes, in combination with park and ride lots, increase person throughput and provide a viable alternative transportation mode for commuters in Maryland. This provides an effective Active Travel Demand Management (ATDM) strategy.

HOV LOCATIONS



I-270 Northbound I-495 to MD 121

I-270 Southbound MD 117 to I-495

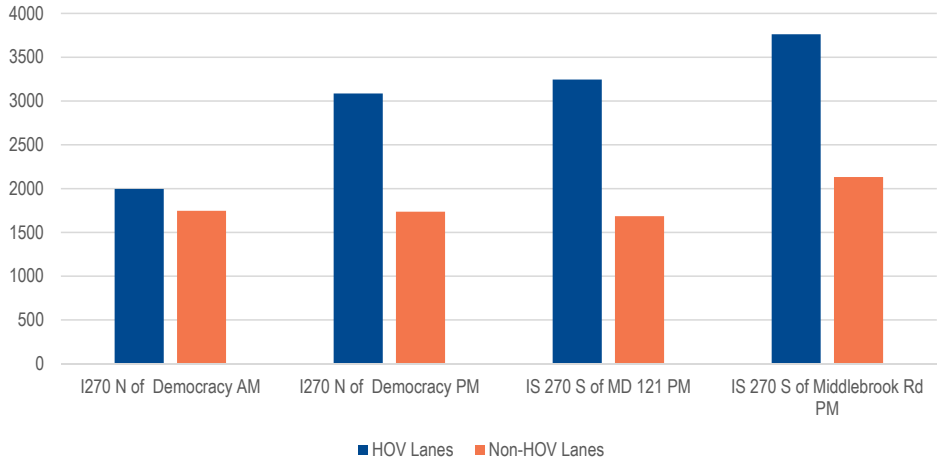


US 50 - US 301 to I-95

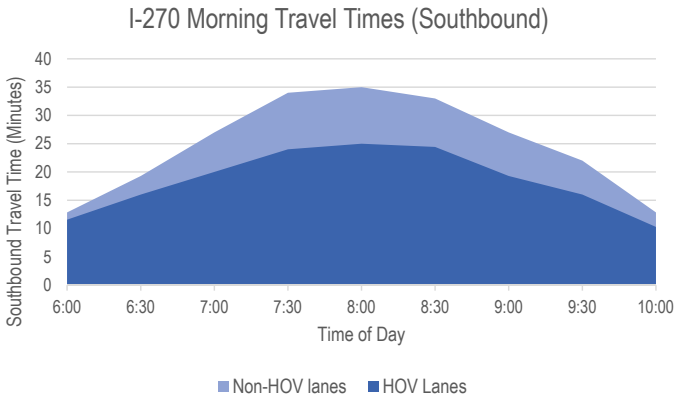
Surveys were performed along I-270 to evaluate the effectiveness of the HOV lanes, including analyzing person throughput and travel time savings. Person throughput evaluates the total number of people moved in each lane. On I-270 the HOV lanes transported approximately 200 to 1,500 additional people compared to an average general purpose lane.

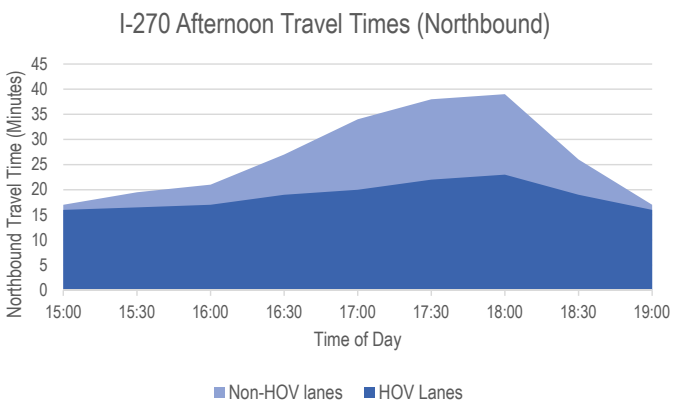
The HOV lane carries as much as 3,500 persons per lane per hour as shown in the following chart:

I-270 PERSON THROUGHPUT PER LANE PER HOUR

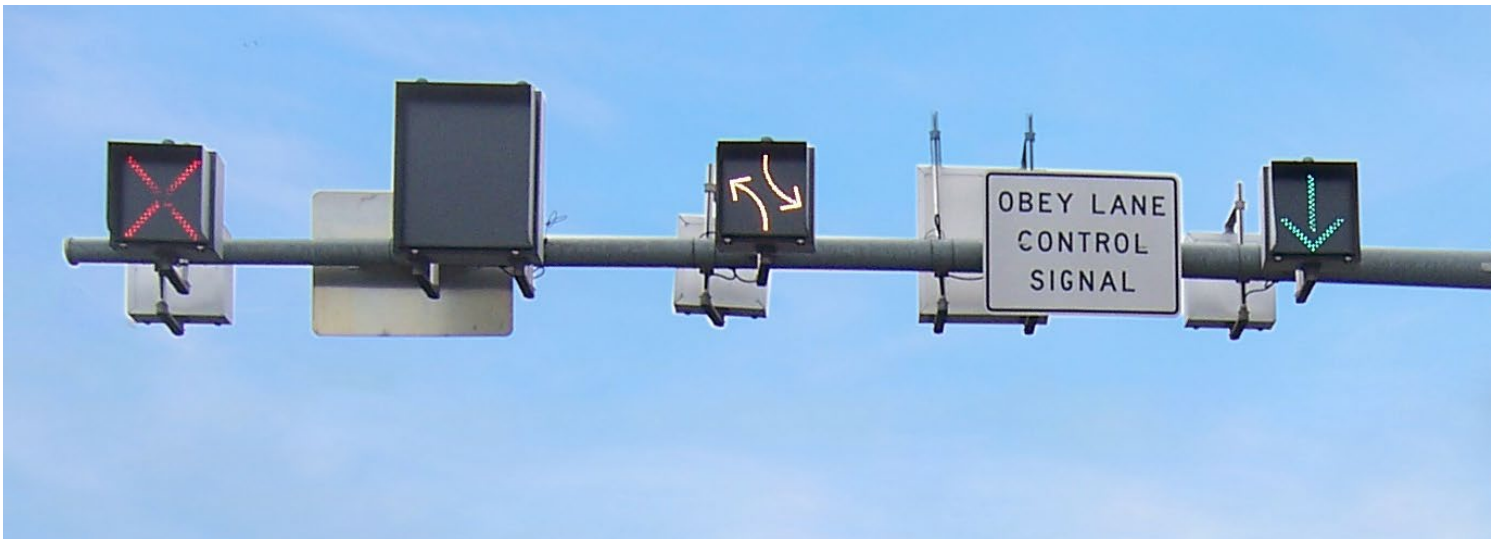


Motorists utilizing the I-270 HOV lanes experienced a significant savings in travel time. In the morning peak period, this amounted to up to 10 minutes with an average of 6 minutes. The afternoon peak period provided even greater travel time savings with a maximum of approximately 16 minutes and an average of 8 minutes. This resulted in a 131,000 person-hour time savings amounting to $4.75 million dollars. These savings were calculated using travel time data collected from permanent Bluetooth sensors on I-270. It is estimated that 182,000 gallons of gasoline were saved by the HOV lanes. The following figures show the average travel time savings on the HOV lanes during the AM and PM peak period of operation.





The travel time savings on US 50 for the HOV lanes versus the non-HOV lanes is relatively nominal. It is estimated that the HOV lanes on US 50 provide $380,000 in annual benefits. This means a total of over $5.13 million in savings for both HOV facilities in Maryland.



MD 177

c. Reversible Lane Operation

There are selected corridors in Maryland with high directional traffic volumes in the peak periods. In order to maximize vehicle throughput, reversible lanes are utilized. Reversible lanes operate through the use of overhead lane control signals designating the middle lane(s) to alternate with the peak flow of traffic. This improves capacity in the section where the reversible lanes are utilized, decreases congestion and can assist in reducing congestion related crashes. The reversible lanes are usually limited to certain hours of the day.

Reversible lane operations are in use along:

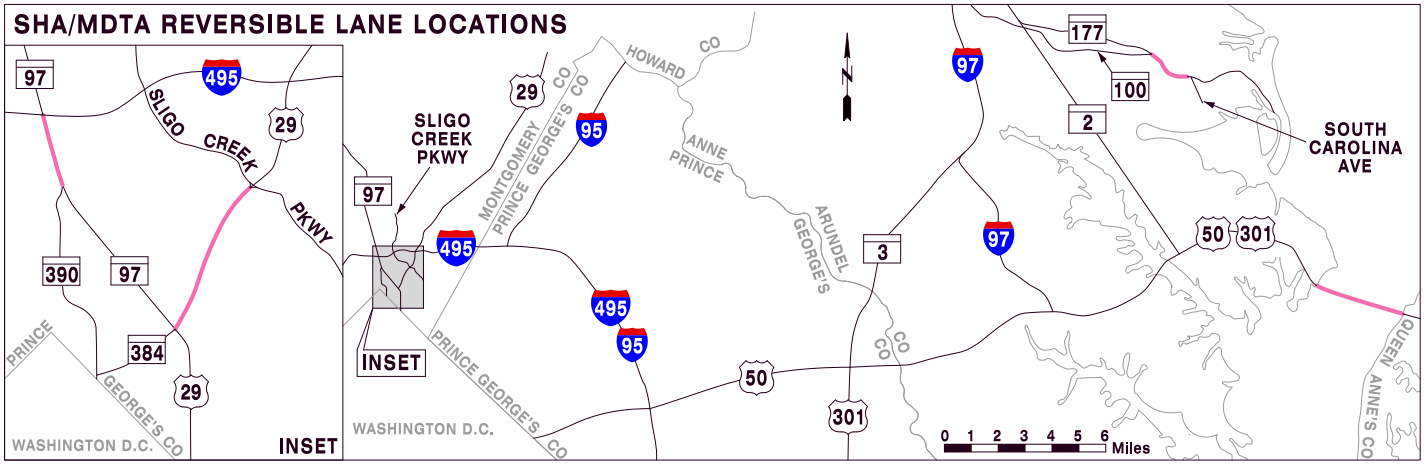
- US 29 from Sligo Creek Parkway to MD 97 (Georgia Ave) (Montgomery County) - 1.0 miles
- US 50/US 301 Bay Bridge (Anne Arundel/Queen Anne's County) - 4.5 miles
- MD 97 from I-495 to MD 390 (16th Street) (Montgomery County) - 0.5 miles
- MD 177 from MD 100 to West of South Carolina Avenue (Anne Arundel County) - 1.6 miles

The most recognizable reversible lane operation is on the US 50/US 301 Bay Bridge. Traffic on the two lane eastbound span and the three lane westbound span alternates through the use of overhead lane signing. This allows for three eastbound lanes and two westbound lanes. The changeover occurs as needed during the PM peak period and on Saturdays mornings during the summer. The US 29 and MD 97 reversible lane operations improve traffic flow from residential areas into the downtown Silver Spring employment center and the WMATA METRO Red Line. The lanes operate southbound in the morning and returning northbound in the PM peak period. MD 177 is the main roadway leading to Lake Shore and Gibson Island. Traffic volumes are directional leading off the island in the morning and returning home in the evening. This three lane roadway is converted from two lanes westbound in the AM peak period to two lanes eastbound in the PM peak period.

The following are the number of motorists in the peak hour that utilize the reversible lane or lanes:

Location	AM (PM) Volume Traveling in General Lanes (Vehicles Per Hour)	AM (PM) Volume Traveling in Reversible Lane(s) in Peak Direction (Vehicles Per Hour)
US 29	1,550 (1,350)	1,050 (1,350)
US 50/301	N/A (3,000)	N/A (1,550)
MD 97	2,700 (3,100)	650 (800)
MD 177	1,075 (1,375)	375 (325)

The use of reversible lanes allows for increased person throughput and reduced congestion without significant capital investment. This reduces the need to widen the roadway and impact surrounding residents, businesses and environmental resources. It should be noted that Maryland 2 (Hanover Street) bridge over the Patapsco River in Baltimore City operates with reversible lanes but is maintained by the Baltimore City Department of Transportation. The reversible lane locations for SHA/MDTA facilities are shown on the following map.



MD 144 West of I-695

d. Bicycles and Pedestrians

Safe and efficient bicycle and pedestrian accommodations are crucial to creating a transportation network that accommodates all users of the road. Bicycle and pedestrian facilities are increasingly important in urban areas and near transit stations where there are significant numbers of pedestrians and cyclists. MDOT completed the "Maryland Twenty Year Bicycle and Pedestrian Master Plan" in January 2014. The master plan provides the vision and direction for bicycle and pedestrian improvements in Maryland.

The Maryland SHA incorporates a Complete Streets policy to create a transportation system that balances all users of the roadway, including pedestrians, transit, bicyclists, and motorists. By incorporating a Complete Streets policy, this impacts all areas in SHA. The construction of bicycle and pedestrian facilities is implemented through the planning, design, and construction phases from project development to design to construction.

Maryland SHA has developed various programs to implement the planning, design, and construction of bicycle and pedestrian facilities throughout the state, including:

Sidewalk Retrofit

The sidewalk retrofit program improves mobility for the general population and persons with disabilities by removing barriers that impede movement of citizens and lower potential safety risks. This program advances MDOT's vision of multi-modal transportation by providing pedestrian facilities and enhancing access along state routes in existing communities as viable and safe modes of transportation. The major emphasis is to provide new sidewalks as part of a request from a local government, or due to a high rate of pedestrian crashes at a location.

Bicycle Retrofit

The Bicycle Retrofit program ensures bicycling remains a viable mode of transportation. The program identifies projects along state roadways that enhance bicycle mobility and safety while minimizing the impacts to environmental features or requiring private property (right-of-way). The range of improvements could include minor enhancements to safety such as signing and marking corridors for bicycle access, remarking wide curb lanes or shoulders as bike lanes, changing the typical section of the roadway to accommodate bicyclists or creating new off-road bike trails parallel to a roadway within the context of performing practical design.

Bicycle and Pedestrian Priority Areas (BPPA)

Safe and efficient bicycle and pedestrian accommodations are important to creating a transportation network that accommodates all users of the road. These facilities become increasingly important in urban areas and at transit stations where there are significant numbers of pedestrians and cyclists. MDOT completed the "Maryland Twenty Year Bicycle and Pedestrian Master Plan" in January 2014. The master plan provides the direction for bicycle and pedestrian improvements for the State of Maryland including the Bicycle and Pedestrian Priority Areas (BPPA's). The designation allows the state and the local counties to emphasize bicycle and pedestrian improvements and requires a plan be developed in cooperation between the counties and MDOT. MDOT will release further guidance and criteria for designation by the end of 2015.

Transportation Alternatives Program

This program involves various projects including the construction of bicycle/pedestrian facilities, construction of safe routes for non-drivers, converting abandoned rail lines to bicycle/pedestrian trails and the planning/design of pedestrian/bicycle facilities. The projects associated with this program provides for the enhancement of cultural, aesthetic, historic and environmental aspects of the intermodal transportation system.

Recreational Trails Program

The construction of new trails or the maintenance/rehabilitation of existing trails is the primary purpose of the Recreational Trails Program. The program is federally funded and can be utilized for trails that support hiking, biking, water sports, snow sports, in-line skating and equestrian usage. It is part of the Transportation Alternatives Program but has its own dedicated funding source at SHA.

Safe Routes to School Program

The promotion and safety for children in kindergarten to eighth grade to walk to school is the goal of the Safe Routes To School Program. Elements of this program include education, enforcement near schools and public awareness campaigns. Construction projects could include sidewalk improvements, traffic calming, bike/pedestrian crossing improvements, on and off street paths and traffic diversion. This program is included as part of the Transportation Alternatives Program.

ADA Retrofit Program

This fund was established to upgrade existing sidewalks, curb ramps, intersections and driveway entrances along state roadways for compliance with the Americans With Disabilities Act (ADA). The location of these projects are not limited to priority funding areas.

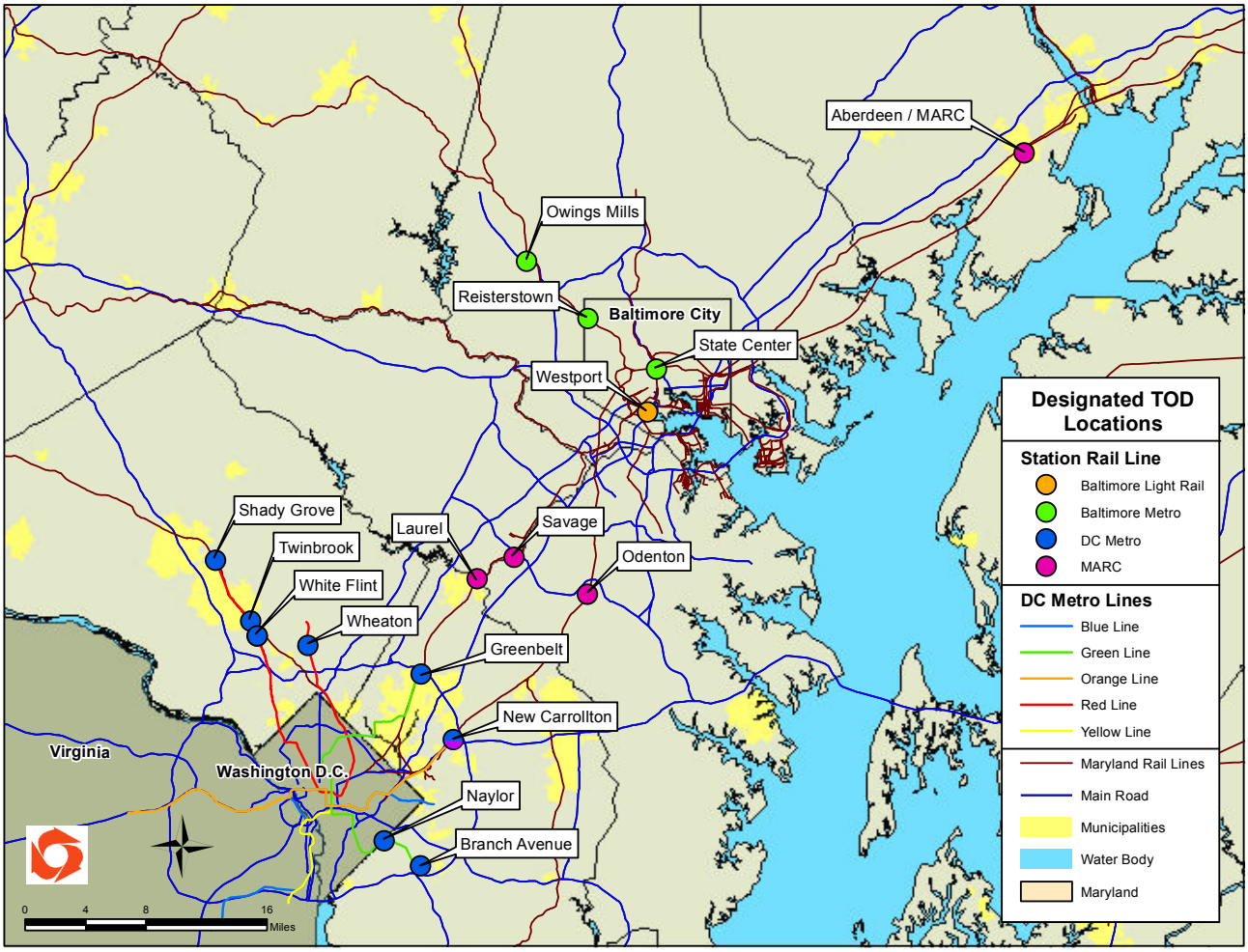
Urban Reconstruction Program

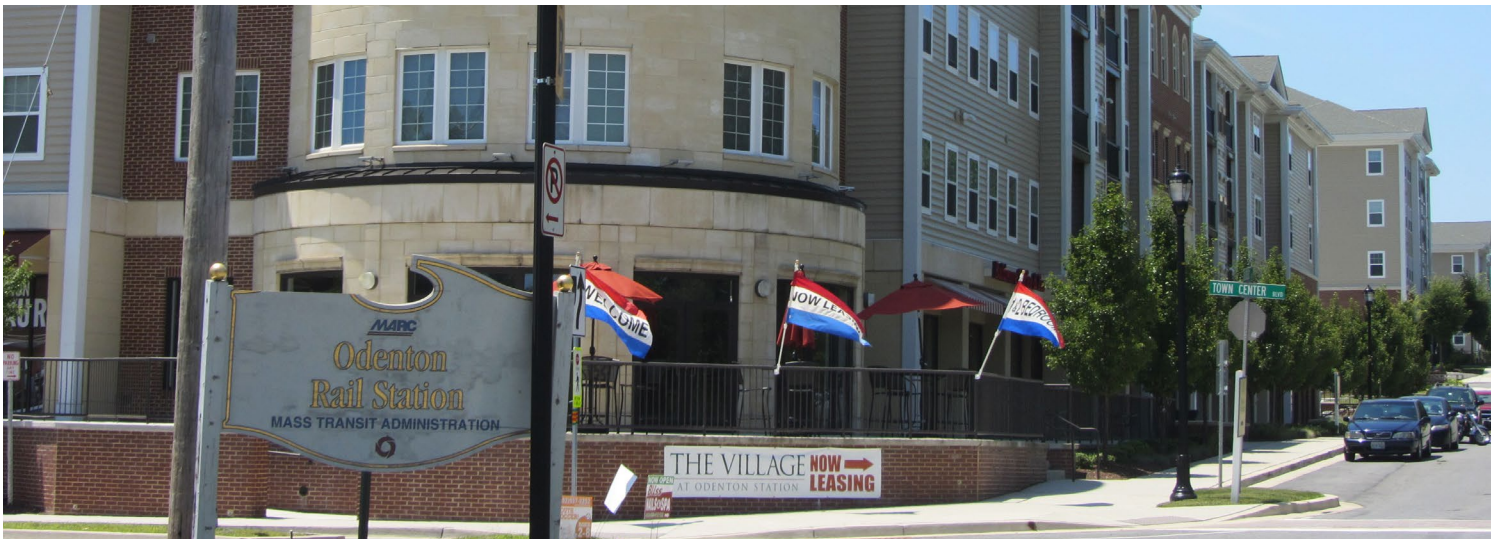
Urban Reconstruction Program projects are located in priority funding areas. These projects promote safety and economic development in communities. The local entity must support the project through maintenance of the sidewalks after completion of the construction.

e. Transit Oriented Development

The creation of Smart Growth policies led to the implementation of Transit Oriented Developments (TOD). These incorporate a mix of land-uses that is physically and functionally integrated with transit, reduce auto dependency, increase pedestrian and bicycle trips, foster safer station areas, offer attractive public spaces, enhance public transportation ridership and encourage revitalization. TODs offer many positive elements including reducing traffic congestion, fuel consumption, air pollution, greenhouse gas emissions, sprawl, and local infrastructure costs, while increasing the mobility of citizens by providing more convenient access to mass transit.

State designated TOD projects allows for funds and resources, financing assistance, tax credits, prioritization for the location of State offices, and support from MDOT on access improvements. The program started in 2008. There are now 16 sites which have been designated as TOD's with the latest being the Greenbelt Metro Station in 2013.





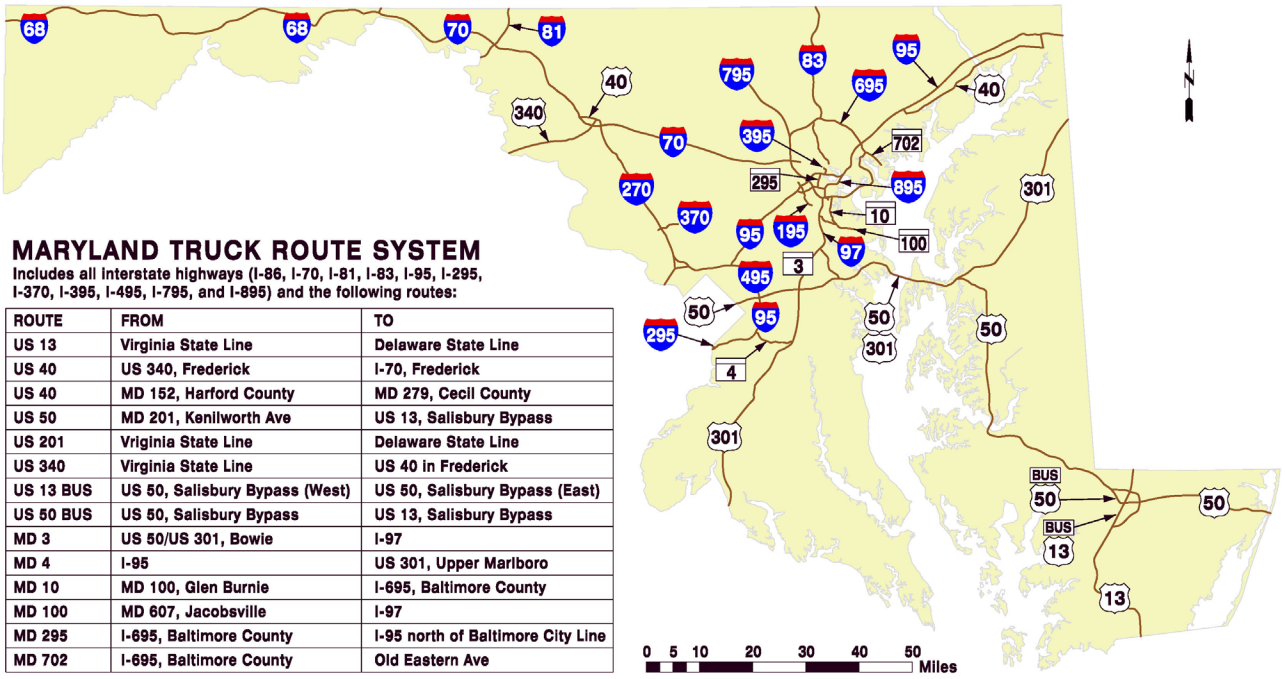
Odenton TOD

A joint effort has been established by MDOT and the Washington Metropolitan Area Transit Authority (WMATA) to develop and refine processes and policies to support TOD development. These documents detail the State's role in promoting TOD's and provide guidance to developers, county and local jurisdictions, and citizens on the TOD process in Maryland. This was developed not only for official designated sites but also for TOD at non-designated transit stations.

Various TODs are at different stages of occupancy and construction. The Owings Mills Metro Station is one of the most active TOD's. The Baltimore County Library and the Baltimore Community College have branches at this TOD. The first phase of the METRO Crossing Apartments are being rented. A new parking garage was constructed in 2014. Another on going TOD project is at Odenton/Annapolis Junction. Construction is taking place on a mixture of housing and retail, set to open in 2015. The remainder of the development will proceed as the market dictates.

3. FREIGHT

The movement of freight is critical to distributing goods and services throughout Maryland and the East Coast. Although this is vital to the economy, residents often prefer to prohibit trucks near their homes. Maryland established the Maryland Truck Route System which consists of approximately 900 miles of roadways throughout the State. This includes all interstate routes (481 miles), seven segments of U.S. Routes (320 miles) including US 13, US 40, US 50, US 301, US 340, US 13 Business and US 50 Business and seven segments of Maryland state routes (99 miles). The state routes include sections of MD 3, MD 4, MD 10, MD 100, MD 201, MD 295 and MD 702. Maryland SHA is in the process of updating its truck route system to further address intermodal movements, truck network gaps, improve connections and identify other routes experiencing a high-severity index related to truck crashes. Other programs and policies include improving at-grade railroad crossings through the Highway-Rail Crossing Program, programs to construct virtual weigh stations and CVISN facilities and the on-going development of the Maryland One Hauling Permit System.



MARYLAND TRUCK ROUTE SYSTEM

Includes all interstate highways (I-86, I-70, I-81, I-83, I-95, I-295, I-370, I-395, I-495, I-795, and I-895) and the following routes:

ROUTE	FROM	TO
US 13	Virginia State Line	Delaware State Line
US 40	US 340, Frederick	I-70, Frederick
US 40	MD 152, Harford County	MD 279, Cecil County
US 50	MD 201, Kenilworth Ave	US 13, Salisbury Bypass
US 201	Vriginia State Line	Delaware State Line
US 340	Virginia State Line	US 40 in Frederick
US 13 BUS	US 50, Salisbury Bypass (West)	US 50, Salisbury Bypass (East)
US 50 BUS	US 50, Salisbury Bypass	US 13, Salisbury Bypass
MD 3	US 50/US 301, Bowie	I-97
MD 4	I-95	US 301, Upper Marlboro
MD 10	MD 100, Glen Burnie	I-695, Baltimore County
MD 100	MD 607, Jacobsville	I-97
MD 295	I-695, Baltimore County	I-95 north of Baltimore City Line
MD 702	I-695, Baltimore County	Old Eastern Ave

Freight is integrated into highway project planning as a result of the SHA/MDTA Freight Implementation Plan. This document provides direction for future transportation investments to enhance the safe and efficient movement of commercial vehicle freight.

Appendix

I-695 @ MD 144

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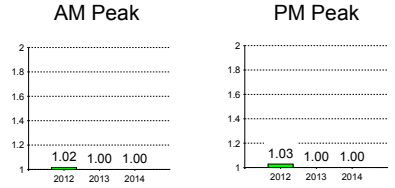
A. Regionally Significant Freeway Corridors

I-695 North of MD 122

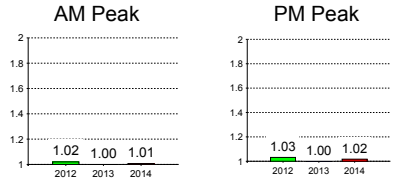
I-70 (Part 1)

Trends[a]

Travel Time Index[b]
measure of average delay

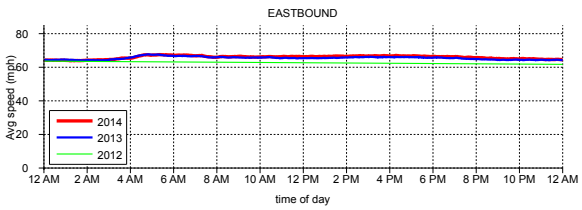


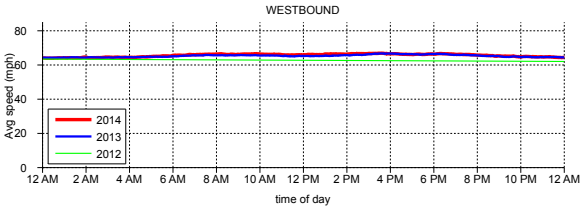
Planning Time Index[c]
measure of worst-case delay



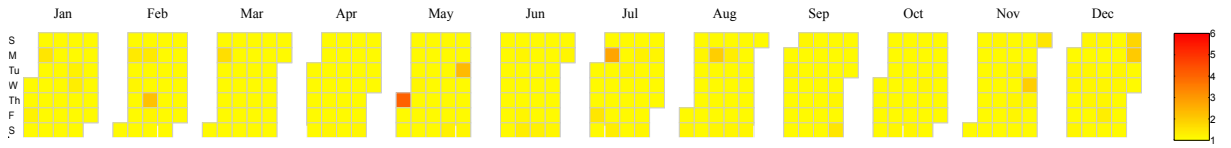
49 center miles carrying 51,000 vehicles every day

Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
124	I-70 W @ MD-66/EXIT 35	Westbound	38	36	25	20	76	10.1	0.5	262	-138
163	I-70 W @ US-40/EXIT 32	Westbound	22	16	12	10	67	14.3	0.3	760	-597
168	I-70 E @ MD-17/EXIT 42	Eastbound	51	25	32	44	56	4.7	0.3	292	-124
199	I-70 E @ MD-63/EXIT 24	Eastbound	18	15	24	8	72	6.8	0.3	172	27
207	I-70 W @ MD-68/EXIT 18	Westbound	33	29	15	3	45	9.7	0.2	95	112
212	I-70 W @ MD-17/EXIT 42	Westbound	16	14	8	11	70	7.7	0.2	467	-255
295	I-70 E @ MD-68/EXIT 18	Eastbound	14	17	11	7	62	8.1	0.1	775	-480
321	I-70 W @ FREDERICK--WASHINGTON COUNTY BORDER	Westbound	52	33	37	27	21	4.7	0.1	908	-587
350	I-70 W @ MD-632/DOWNSVILLE PIKE/EXIT 28	Westbound	33	25	22	23	42	3.0	0.1	227	123
354	I-70 E @ MD-632/DOWNSVILLE PIKE/EXIT 28	Eastbound	9	13	22	15	52	3.8	0.1	515	-161

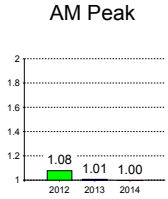
Notes

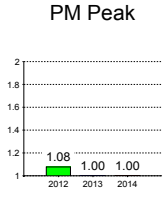
a - **Peak Hours** are considered as 8-9am and 5-6pm..
b - **Travel Time Index** (TTI) is the ratio of the *average* travel time during the peak hour to the time required under free flow.
c - **Planning Time Index** (PTI) is the ratio of the *worst-case* travel time (95th percentile) during peak hour to the free-flow time.
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
e- Variability of worst-case travel experience along facility for each day of year, shown as plot of PTI by day of week and month, showing seasonal and weekly trends.
f - Top 10 bottlenecks on the facility, ranked by impact factor.
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

I-70 (Part 2)

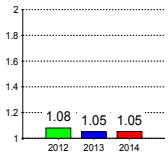
Trends[a]

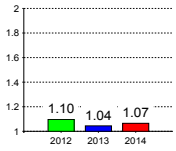
Travel Time Index[b]
measure of average delay



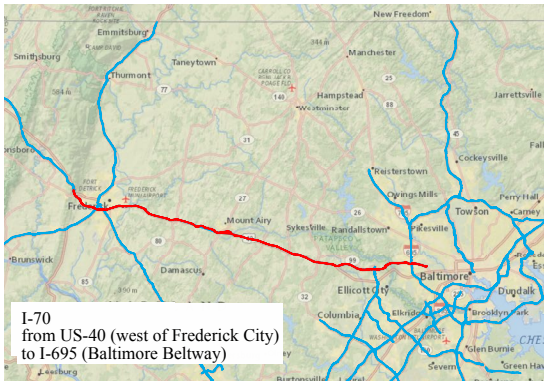


Planning Time Index[c]
measure of worst-case delay

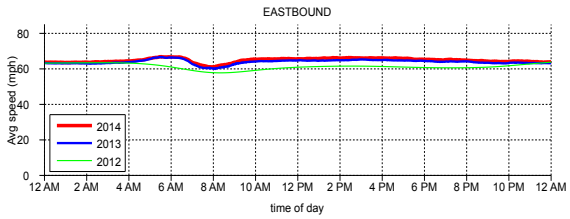


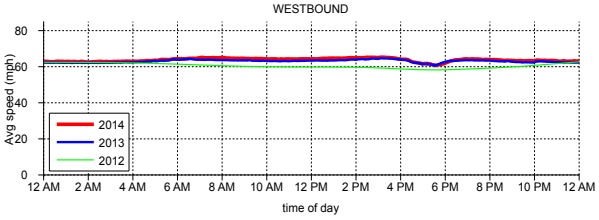


43 center miles carrying 64,000 vehicles every day

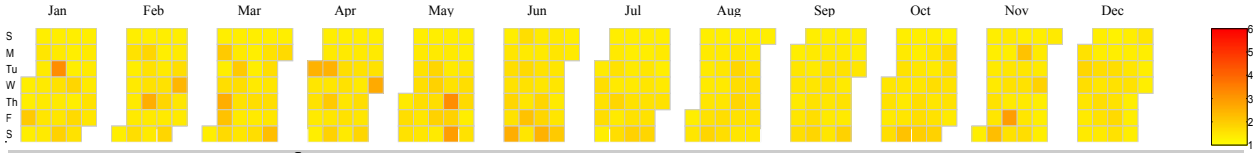


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
51	I-70 E @ I-695/EXIT 91	Eastbound	166	243	282	205	38	5.6	1.0	48	3
55	I-70 E @ US-29/EXIT 87	Eastbound	54	62	40	48	84	6.0	0.9	41	14
108	I-70 W @ US-29/EXIT 87	Westbound	93	88	84	97	81	2.1	0.5	126	-18
173	I-70 W @ US-15/US-340/EXIT 52	Westbound	49	60	60	49	89	1.7	0.3	182	-9
219	I-70 E @ US-40/EXIT 82	Eastbound	18	3	5	4	30	18.5	0.2	1337	-1118
238	I-70 E @ US-15/US-340/EXIT 52	Eastbound	31	14	26	26	47	6.7	0.2	483	-245
253	I-70 W @ MD-32/EXIT 80	Westbound	47	10	8	3	31	6.6	0.2	809	-556
276	I-70 E @ MARRIOTTSVILLE RD/EXIT 83	Eastbound	52	33	56	26	59	2.3	0.2	372	-96
294	I-70 W @ I-695/EXIT 91	Westbound	9	186	344	45	19	1.3	0.1	1530	-1236
387	I-70 E @ MD-144/EXIT 59	Eastbound	15	6	10	4	24	12.1	0.1	1542	-1155

Notes

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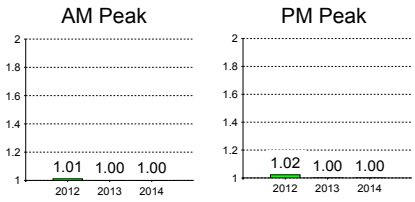
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

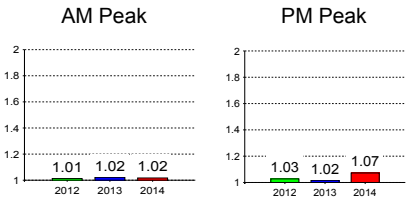
I-81

Trends[a]

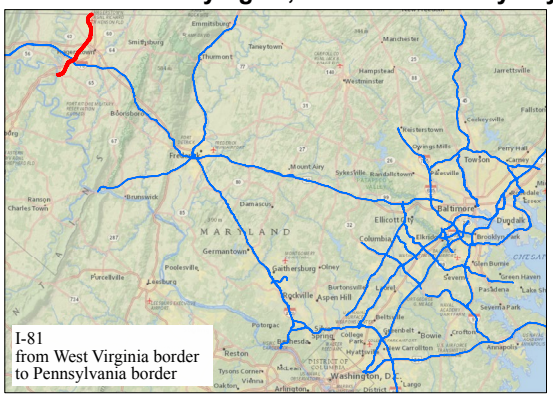
Travel Time Index[b]
measure of average delay



Planning Time Index[c]
measure of worst-case delay

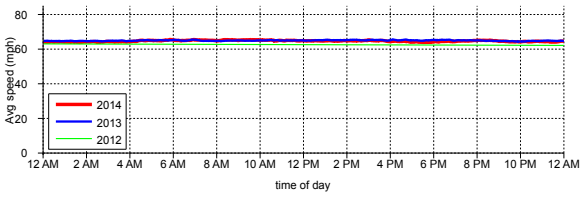


12 center miles carrying 55,000 vehicles every day

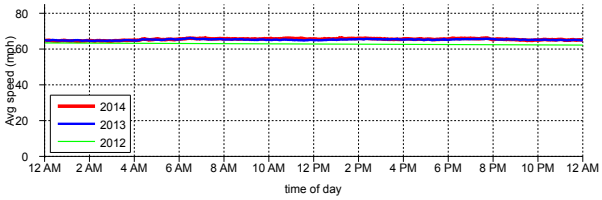


Speed Profiles[d]

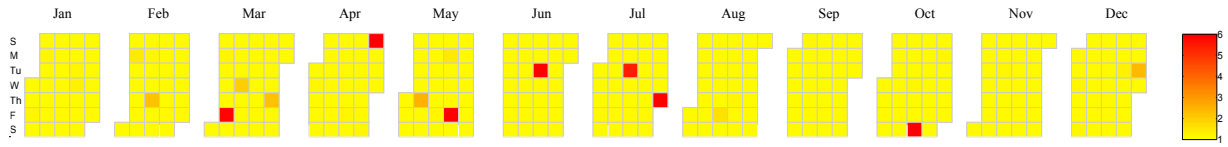
Northbound



Southbound



Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
433	I-81 S @ Maryland/West Virginia St Line	Southbound	43	18	15	3	35	2.8	0.1	444	-11
446	I-81 N @ US-40/EXIT 6	Northbound	18	15	13	8	57	2.9	0.1	954	-508
496	I-81 N @ Maryland Pennsylvania State Ln	Northbound	33	12	14	11	36	2.7	0.1	361	135
624	I-81 N @ US-11/EXIT 2	Northbound	9	3	2	4	97	2.1	0.0	1481	-857
683	I-81 S @ MD-58/EXIT 7	Southbound	2	3	3	3	66	3.7	0.0	1213	-530
725	I-81 S @ US-40/EXIT 6	Southbound	15	7	5	10	35	2.1	0.0	1031	-306
755	I-81 S @ MD-63/MD-68/EXIT 1	Southbound	9	4	3	3	28	3.5	0.0	1272	-517
797	I-81 N @ HALFWAY BLVD/EXIT 5	Northbound	20	9	3	9	29	1.4	0.0	1115	-318
861	I-81 N @ MD-63/MD-68/EXIT 1	Northbound	11	21	4	10	29	0.7	0.0	1474	-613
874	I-81 S @ SHOWALTER RD/EXIT 10	Southbound	15	3	6	3	27	1.4	0.0	1373	-499

Notes

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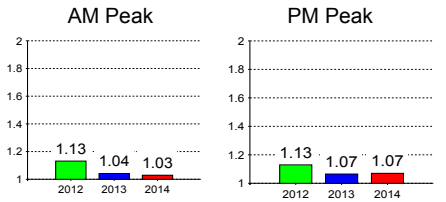
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

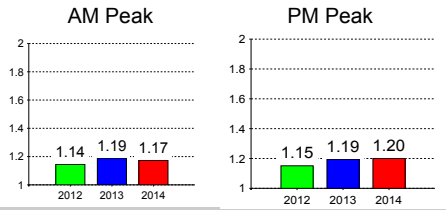
I-83

Trends[a]

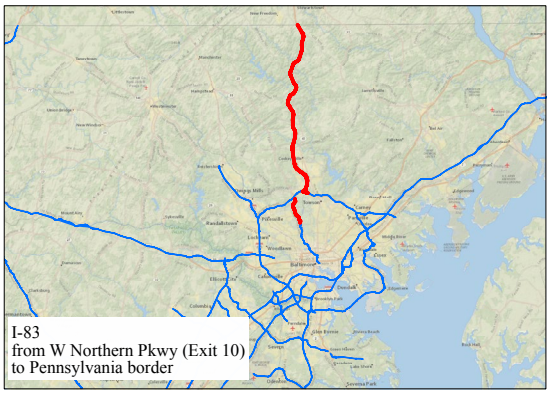
Travel Time Index[b]
measure of average delay



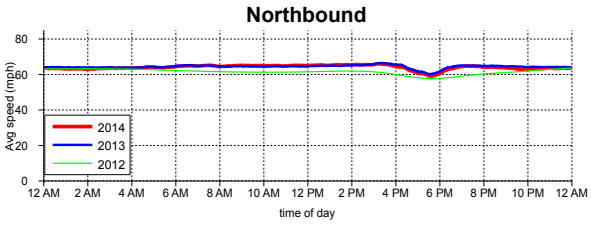
Planning Time Index[c]
measure of worst-case delay

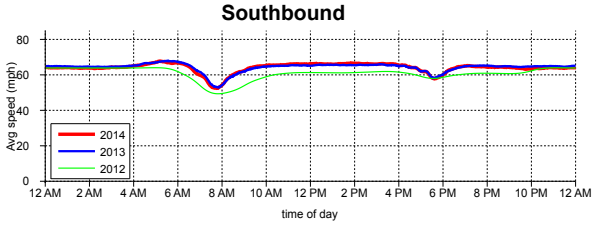


27 center miles carrying 86,000 vehicles every day

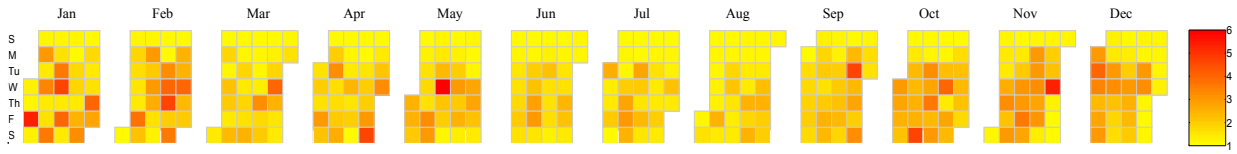


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
39	I-83 S @ I-695	Southbound	122	102	110	100	79	5.3	1.1	51	-12
74	I-83 S @ BELFAST RD/EXIT 24	Southbound	69	56	15	68	58	7.3	0.7	105	-31
103	I-83 N @ I-695/JONES FALLS EXPY/EXIT 23	Northbound	80	55	57	69	63	4.3	0.6	120	-17
115	I-83 N @ MD--PA STATE BORDER	Northbound	73	24	45	41	35	10.2	0.5		115
118	I-83 S @ MD-137/MOUNT CARMEL RD/EXIT 2	Southbound	71	58	28	39	53	6.9	0.5	269	-151
126	I-83 S @ FAYETTE ST/EXIT 1	Southbound	918	1015	1207	993	47	0.3	0.5	133	-7
139	I-83 N @ BELFAST RD/EXIT 24	Northbound	38	48	29	56	56	4.6	0.4	118	21
165	I-83 S @ US-1/NORTH AVE/EXIT 6	Southbound	111	69	59	43	43	3.6	0.3	170	-5
172	I-83 N @ MIDDLETOWN RD/EXIT 31	Northbound	66	60	45	48	42	3.9	0.3	149	23
175	I-83 S @ COLD SPRING LN/EXIT 9	Southbound	78	59	66	72	47	3.0	0.3	308	-133

Notes

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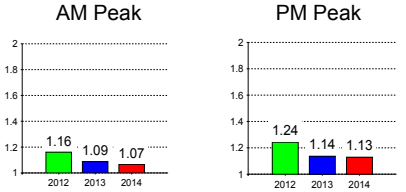
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

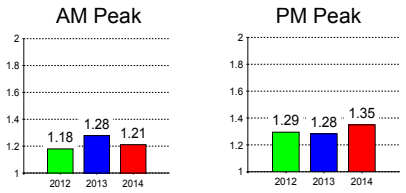
I-95 (Part 1)

Trends[a]

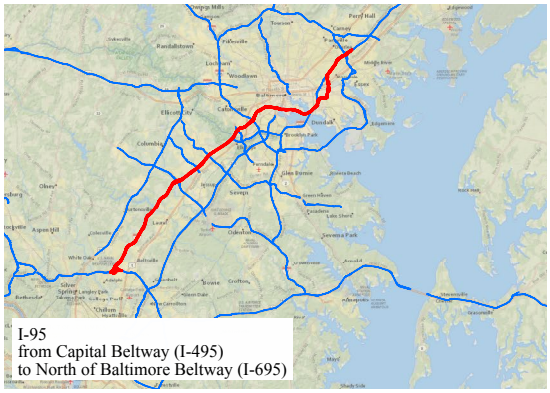
Travel Time Index[b]
measure of average delay



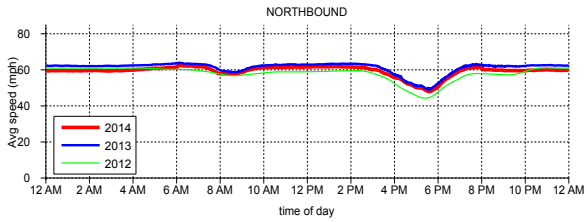
Planning Time Index[c]
measure of worst-case delay

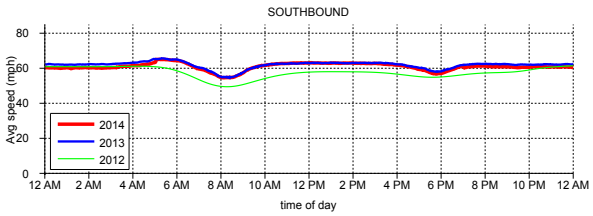


41 center miles carrying 154,000 vehicles every day

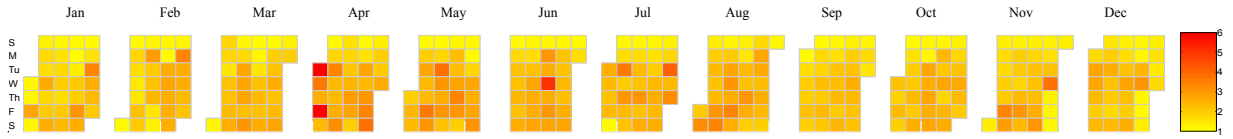


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
3	I-95 N @ MD-100/EXIT 43	Northbound	133	229	158	139	120	9.4	**7.0**	3	0
14	I-95 S @ I-495/EXIT 27-25	Southbound	206	189	176	163	92	5.4	**2.5**	20	-6
45	I-95 S @ I-695/EXIT 64	Southbound	57	55	62	66	82	7.1	**1.1**	53	-8
48	I-95 S @ I-895/62ND ST/EXIT 62	Southbound	36	29	17	28	109	9.1	**1.0**	131	-83
65	I-95 N @ MD-295/BALTIMORE WASHINGTON PKWY/EXIT 52	Northbound	43	182	193	89	69	2.1	**0.8**	474	-409
70	I-95 S @ MD-198/EXIT 33	Southbound	64	47	49	68	64	9.1	**0.7**	210	-140
73	I-95 N @ I-695/EXIT 64	Northbound	45	88	67	49	74	4.3	**0.7**	54	19
83	I-95 S @ MD-175/EXIT 41	Southbound	48	65	70	85	70	4.7	**0.7**	96	-13
86	I-95 N @ FORT MCHENRY TUNNEL TOLL PLAZA	Northbound	78	296	393	622	30	2.4	**0.7**	536	-450
94	I-95 N @ I-895/EXIT 46	Northbound	14	33	22	11	93	7.9	**0.6**	97	-3

Notes

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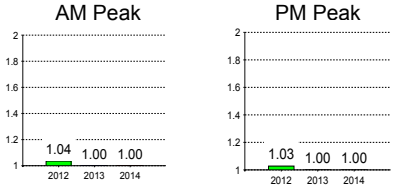
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

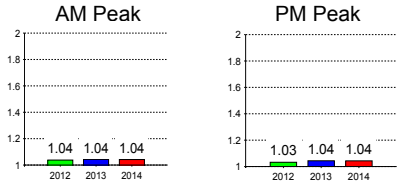
I-95 (Part 2)

Trends[a]

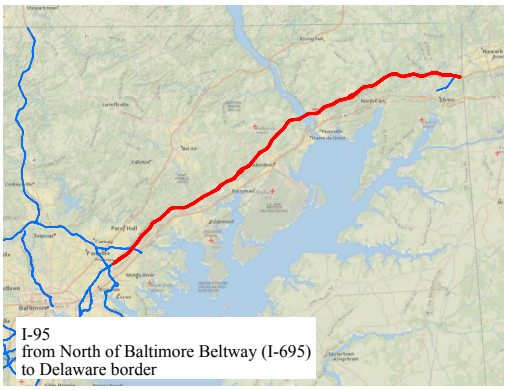
Travel Time Index[b]
measure of average delay



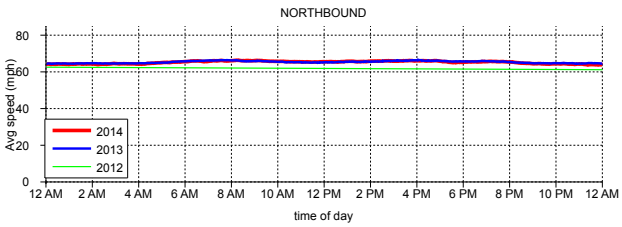
Planning Time Index[c]
measure of worst-case delay

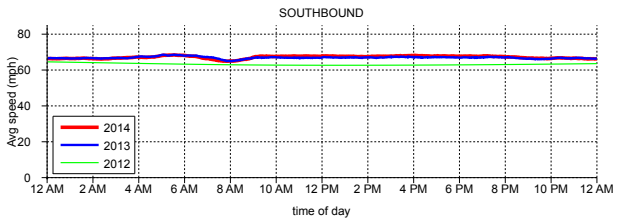


45 center miles carrying 106,000 vehicles every day

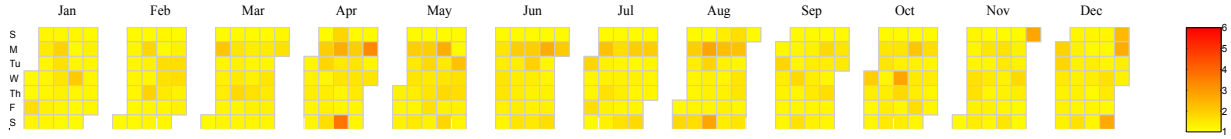


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
33	I-95 S @ MD-24/EXIT 77	Southbound	13	30	34	48	112	13.4	1.4	32	1
36	I-95 N @ MD-43/WHITEMARSH BLVD/EXIT 67	Northbound	55	105	133	57	83	5.9	1.3	13	23
82	I-95 N @ MD-222/EXIT 93	Northbound	137	136	1412	630	32	1.5	0.7	593	-511
109	I-95 S @ MD-43/WHITEMARSH BLVD/EXIT 67	Southbound	33	105	70	61	43	7.4	0.5	206	-97
117	I-95 N @ MD-152/EXIT 74	Northbound	21	11	20	24	81	9.9	0.5	39	78
143	I-95 N @ MD-24/EXIT 77	Northbound	19	61	68	30	73	3.3	0.4	184	-41
147	I-95 S @ MD-543/EXIT 80	Southbound	15	27	42	25	81	5.3	0.4	604	-457
174	I-95 N @ MD-DE STATE BORDER	Northbound	40	11	6	4	54	10.8	0.3	109	65
177	I-95 N @ TYDINGS MEMORIAL BRIDGE TOLL PLAZA	Northbound	99	365	102	79	26	3.5	0.3	145	32
209	I-95 N @ MD-543/EXIT 80	Northbound	18	11	18	9	83	6.3	0.2	301	-92

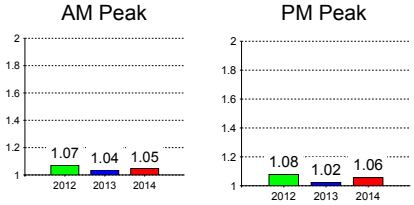
Notes

a - **Peak Hours** are considered as 8-9am and 5-6pm..
b - **Travel Time Index** (TTI) is the ratio of the *average* travel time during the peak hour to the time required under free flow.
c - **Planning Time Index** (PTI) is the ratio of the *worst-case* travel time (95th percentile) during peak hour to the free-flow time.
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
e- Variability of worst-case travel experience along facility for each day of year, shown as plot of PTI by day of week and month, showing seasonal and weekly trends.
f - Top 10 bottlenecks on the facility, ranked by impact factor.
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

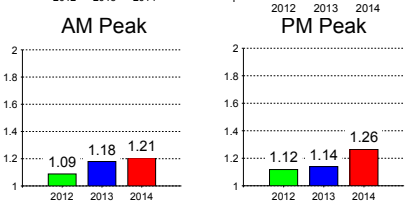
I-97

Trends[a]

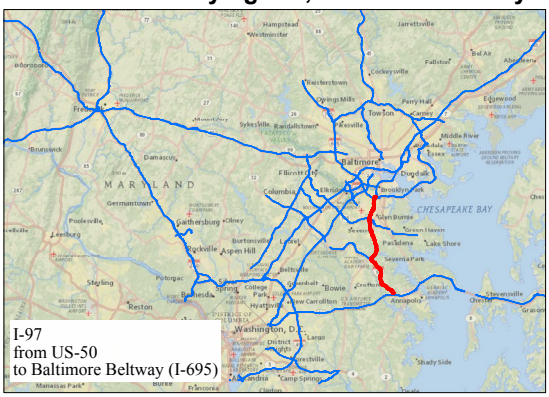
Travel Time Index[b]
measure of average delay



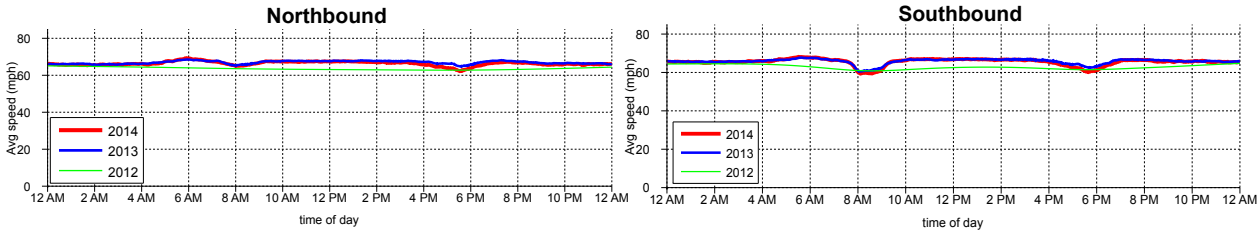
Planning Time Index[c]
measure of worst-case delay



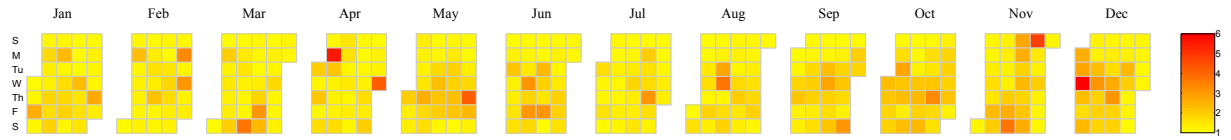
18 center miles carrying 114,000 vehicles every day



Speed Profiles[d]



Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
47	I-97 S @ US-301/US-50	Southbound	58	30	15	18	90	11.7	1.0	479	-432
102	I-97 S @ MD-178/EXIT 5	Southbound	88	109	104	128	57	2.6	0.6	166	-64
195	I-97 N @ I-895 SPUR	Northbound	36	13	25	20	46	8.7	0.3	617	-422
205	I-97 N @ I-695/EXIT 17	Northbound	53	54	51	59	44	5.4	0.3	394	-189
292	I-97 N @ MD-178/EXIT 5	Northbound	30	31	21	30	32	4.5	0.1	398	-106
297	I-97 S @ MD-3 BUS/NEW CUT RD/EXIT 12	Southbound	23	28	6	38	89	2.1	0.1	845	-548
340	I-97 S @ MD-3/EXIT 7	Southbound	38	23	21	21	45	3.3	0.1	584	-244
427	I-97 S @ BENFIELD BLVD/EXIT 10	Southbound	12	8	11	22	65	2.5	0.1	837	-410
561	I-97 N @ MD-32/EXIT 7	Northbound	13	15	7	13	28	3.9	0.0	1042	-481
566	I-97 N @ MD-3/EXIT 7	Northbound	18	21	32	26	33	1.7	0.0	1009	-443

Notes

a - **Peak Hours** are considered as 8-9am and 5-6pm..
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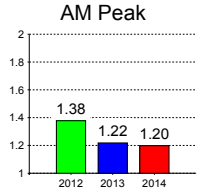
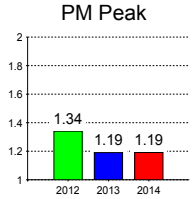
c - **Planning Time Index** (PTI) is the ratio of the *worst-case* travel time (95th percentile) during peak hour to the free-flow time.
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
e- Variability of worst-case travel experience along facility for each day of year, shown as plot of PTI by day of week and month, showing seasonal and weekly trends.
f - Top 10 bottlenecks on the facility, ranked by impact factor.
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

I-270

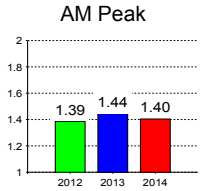
Trends[a]

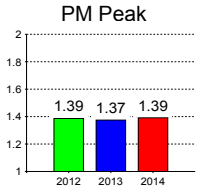
Travel Time Index[b]
measure of average delay



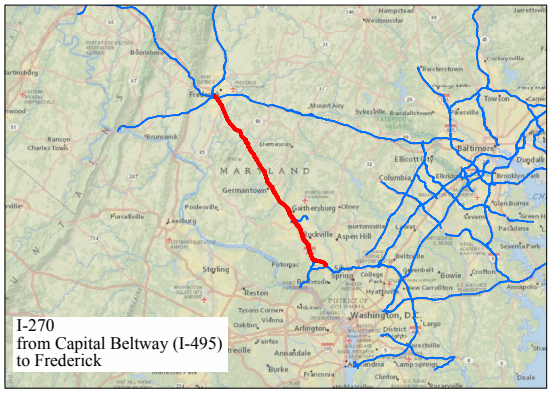


Planning Time Index[c]
measure of worst-case delay

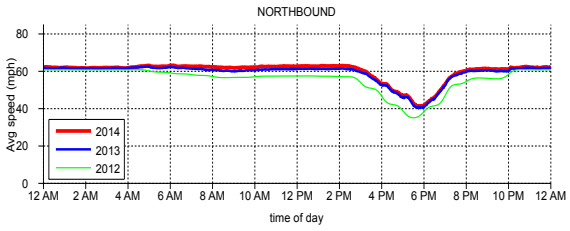


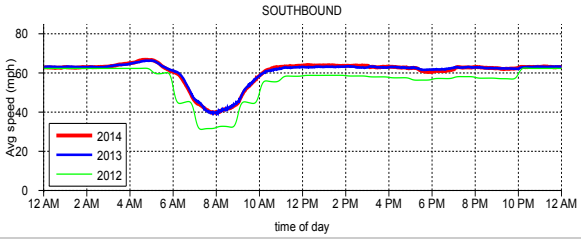


41 cener miles carrying 176,000 vehicles every day

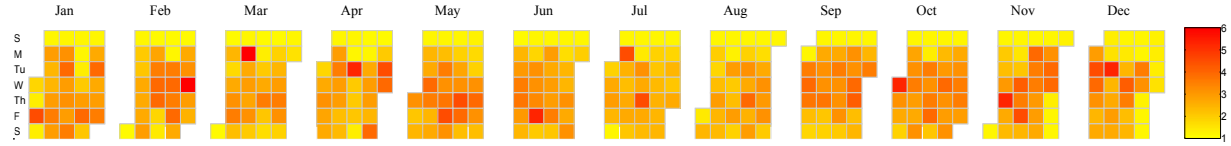


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
4	I-270 S @ I-270	Southbound	95	106	106	119	111	10.8	**4.8**		↑ 4
13	I-270 Local N @ I-270/WASHINGTON NATIONAL PIKE	Northbound	168	147	139	145	127	4.2	**2.6**	10	↑ 3
20	I-270 N @ MD-80/EXIT 26	Northbound	78	90	155	89	85	8.0	**2.1**	9	↑ 11
24	I-270 S @ MD-109/EXIT 22	Southbound	124	172	156	108	79	4.2	**1.7**	15	↑ 9
25	I-270 N @ MD-109/EXIT 22	Northbound	75	65	66	48	97	8.7	**1.7**	70	↓ -45
28	I-270 N @ I-70/US-40	Northbound	114	106	180	108	69	8.1	**1.6**	14	↑ 14
29	I-270 Local S @ I-270	Southbound	131	159	133	145	83	4.5	**1.5**		↑ 29
41	I-270 SPUR S @ I-495	Southbound	157	170	132	173	106	1.7	**1.1**		↑ 41
43	I-270 SPUR N @ I-270	Northbound	131	85	93	94	145	2.0	**1.1**		↑ 43
59	I-270 N @ MD-85/EXIT 31	Northbound	32	66	112	22	64	9.0	**0.8**	67	↓ -8

Notes

a - **Peak Hours** are considered as 8-9am and 5-6pm..
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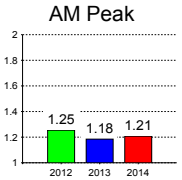
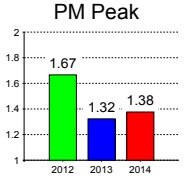
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
e- Variability of worst-case travel experience along facility for each day of year, shown as plot of PTI by day of week and month, showing seasonal and weekly trends.
f - Top 10 bottlenecks on the facility, ranked by impact factor.
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

Capital Beltway

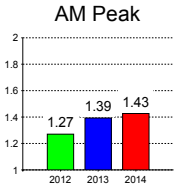
Trends[a]

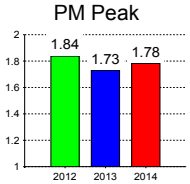
Travel Time Index[b]
measure of average delay



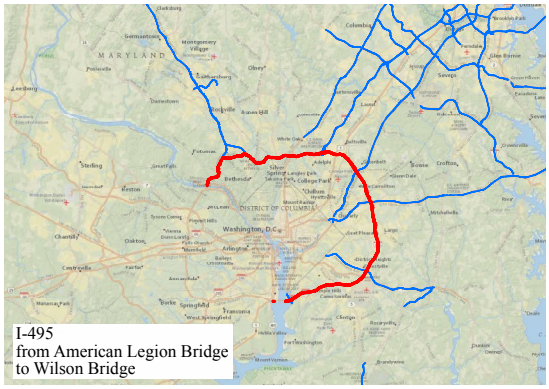


Planning Time Index[c]
measure of worst-case delay

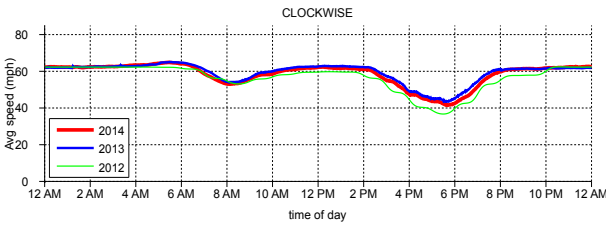


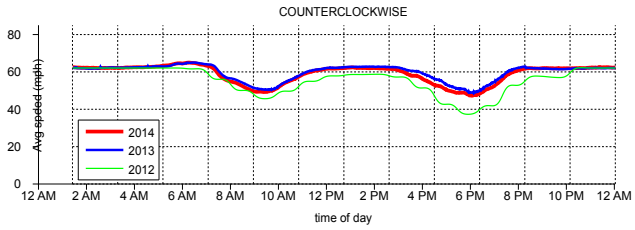


42 center miles carrying 199,000 vehicles every day

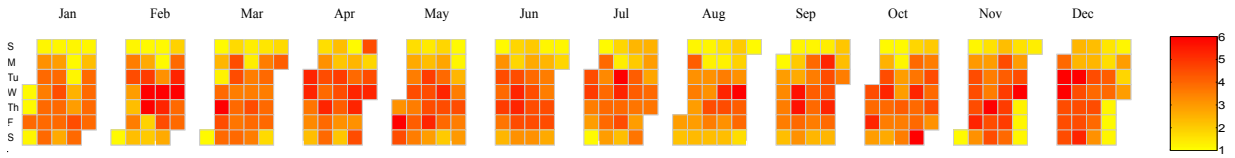


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
1	I-495 CW @ I-270/EXIT 35	Innerloop	225	201	160	176	169	12.3	10.8	1	0
2	I-495 CCW @ GREENBELT METRO DR/EXIT 24	Outerloop	154	137	125	221	126	19.5	7.9	7	-5
12	I-495 CCW @ US-50/EXIT 19	Outerloop	117	165	124	131	108	5.7	3.0	30	-18
15	I-495 CW @ MD-214/CENTRAL AVE/EXIT 15	Innerloop	85	125	150	120	102	5.2	2.3	27	-12
21	I-495 CW @ MD-4/PENNSYLVANIA AVE/EXIT 11	Innerloop	51	87	43	74	105	7.3	1.9	40	-19
23	I-495 CCW @ MD-97/GEORGIA AVE/EXIT 31	Outerloop	97	159	146	143	101	3.5	1.9	24	-1
26	I-495 CCW @ MD-185/CONNECTICUT AVE/EXIT 33	Outerloop	72	61	54	78	122	5.5	1.6	17	9
34	I-495 CCW @ MD-190/RIVER RD/EXIT 39	Outerloop	56	113	87	126	112	4.1	1.4	812	-778
46	I-495 CW @ WOODROW WILSON MEMORIAL BRIDGE	Innerloop	133	45	48	18	65	7.5	1.0	44	2
49	I-495 CCW @ MD-214/CENTRAL AVE/EXIT 15	Outerloop	41	51	83	48	74	6.8	1.0	83	-34

Notes

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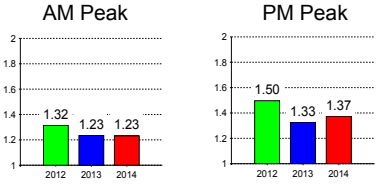
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

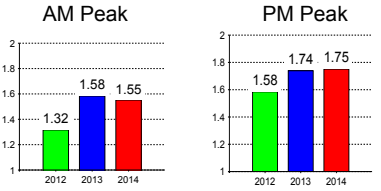
INTERSTATE 695 Baltimore Beltway

Trends[a]

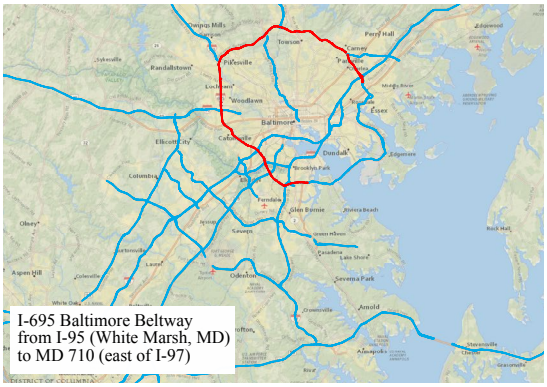
Travel Time Index[b]
measure of average delay



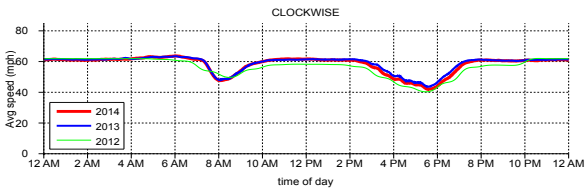
Planning Time Index[c]
measure of worst-case delay

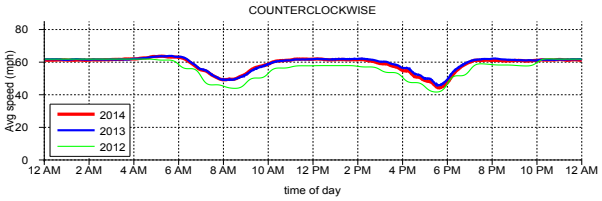


35 center miles carrying 153,000 vehicles every day

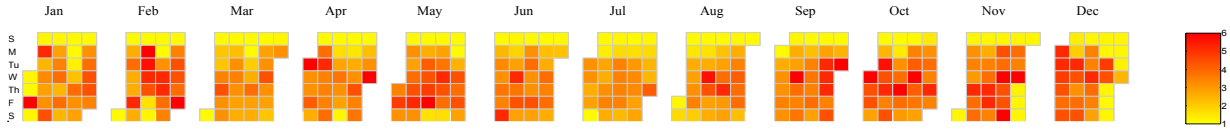


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
7	I-695 CCW @ EDMONDSON AVE/EXIT 14	Outerloop	142	156	112	98	122	8.8	**4.1**	4	3
8	I-695 CW @ I-795/EXIT 19	Innerloop	32	116	77	153	122	8.7	**4.1**	276	-268
9	I-695 CW @ MD-147/HARFORD RD/EXIT 31	Innerloop	89	77	45	70	159	10.4	**3.9**	2	7
11	I-695 CW @ MD-41/PERRING PKWY/EXIT 30	Innerloop	65	108	145	161	107	7.6	**3.6**	22	-11
18	I-695 CW @ I-83/MD-25/EXIT 23	Innerloop	122	110	136	83	87	6.6	**2.2**	18	0
19	I-695 CCW @ US-40/EXIT 15	Outerloop	65	89	128	145	83	6.7	**2.1**	76	-57
30	I-695 CW @ MD-26/EXIT 18	Innerloop	47	67	78	59	108	6.2	**1.5**	19	11
35	I-695 CCW @ PROVIDENCE RD/EXIT 28	Outerloop	67	90	88	75	104	4.3	**1.3**	37	-2
38	I-695 CW @ SECURITY BLVD/EXIT 17	Innerloop	138	103	110	54	83	4.2	**1.2**	12	26
40	I-695 CCW @ MD-144/FREDERICK RD/EXIT 13	Outerloop	40	67	29	32	121	6.1	**1.1**	16	24

Notes

a - **Peak Hours** are considered as 8-9am and 5-6pm..
b - **Travel Time Index** (TTI) is the ratio of the *average* travel time during the peak hour to the time required under free flow.
c - **Planning Time Index** (PTI) is the ratio of the *worst-case* travel time (95th percentile) during peak hour to the free-flow time.
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
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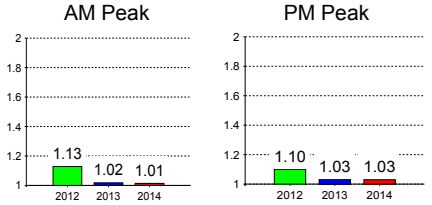
f - Top 10 bottlenecks on the facility, ranked by impact factor.
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

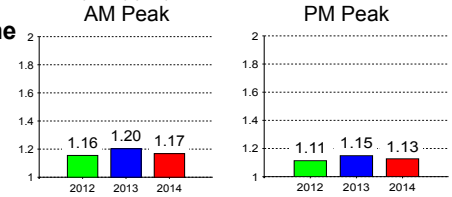
I-795

Trends[a]

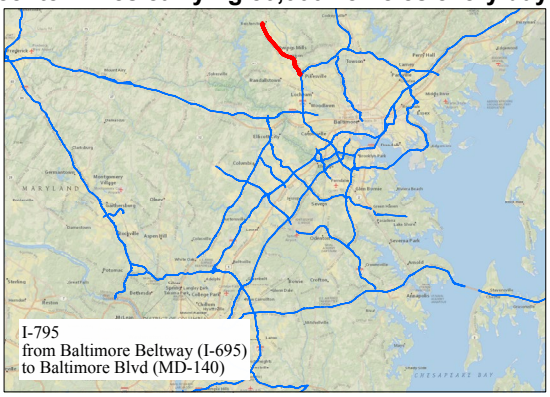
Travel Time Index[b]
measure of average delay



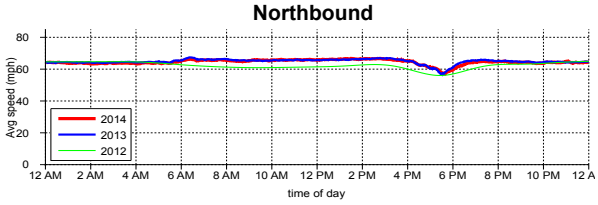
Planning Time Index[c]
measure of worst-case delay

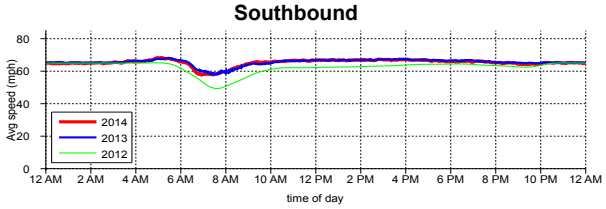


9 center miles carrying 80,000 vehicles every day

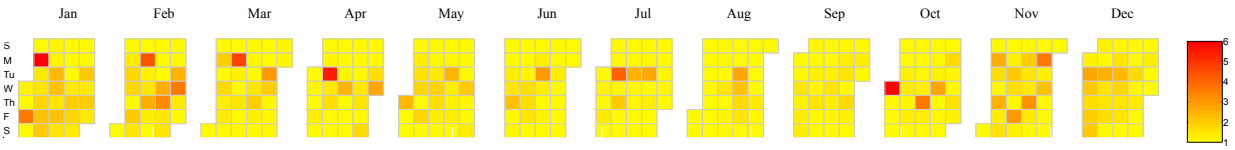


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
101	I-795 S @ I-695	Southbound	79	52	42	61	55	5.1	0.6		101
255	I-795 N @ OWINGS MILLS BLVD/EXIT 4	Northbound	83	52	57	61	33	2.3	0.2	341	-86
335	I-795 N @ FRANKLIN BLVD/EXIT 7	Northbound	27	14	14	19	50	3.6	0.1	618	-283
445	I-795 N @ MD-128/MD-140/MD-30/EXIT 9	Northbound	28	13	12	12	31	4.2	0.1	684	-239
543	I-795 S @ OWINGS MILLS BLVD/EXIT 4	Southbound	22	12	18	26	26	2.8	0.0	721	-178
553	I-795 S @ FRANKLIN BLVD/EXIT 7	Southbound	33	38	29	42	24	1.4	0.0	916	-363

Notes

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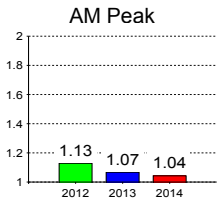
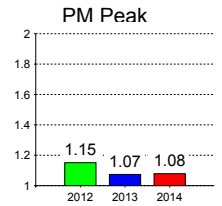
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

I-895

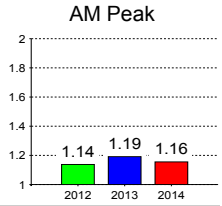
Trends[a]

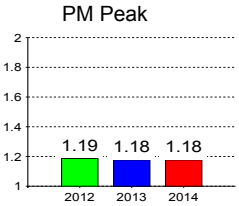
Travel Time Index[b]
measure of average delay



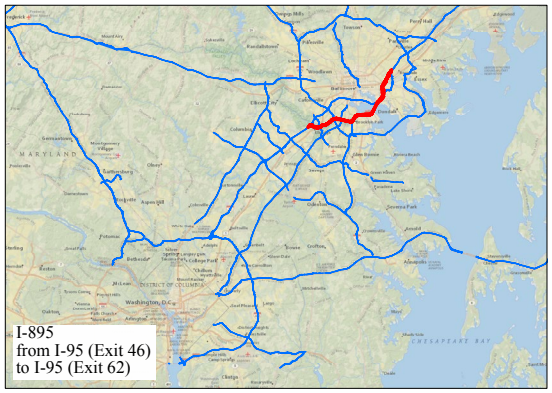


Planning Time Index[c]
measure of worst-case delay

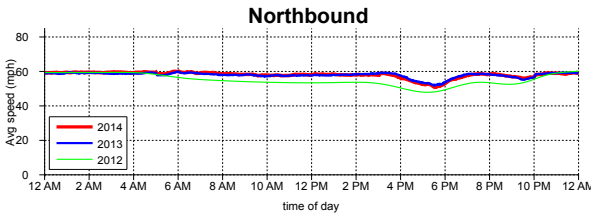


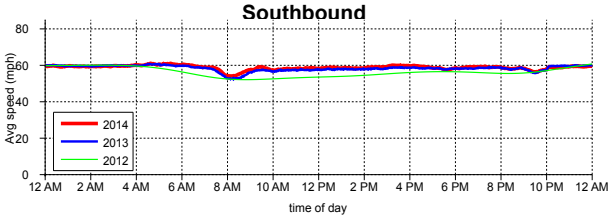


16 center miles carrying 51,000 vehicles every day

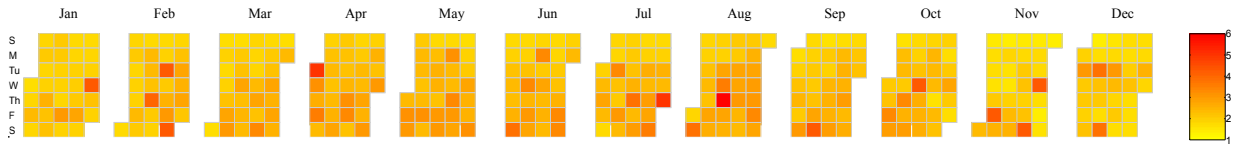


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
66	I-895 N @ HARBOR TUNNEL TOLL PLAZA	Northbound	679	1621	1012	865	55	0.4	0.8	207	-141
90	I-895 N @ I-95/62ND ST/EXIT62	Northbound	83	87	84	73	102	2.1	0.6	60	30
96	I-895 S @ CHILDS ST/EXIT 9	Southbound	938	1544	1523	1161	37	0.3	0.6	1117	-1021
133	I-895 N @ CHILDS ST/EXIT 9	Northbound	765	1463	1004	1077	40	0.3	0.4		133
240	I-895 S @ FRANKFURST AVE/SHELL RD/EXIT 8	Southbound	704	1151	1412	601	26	0.2	0.2	71	169
258	I-895 S @ HOLABIRD AVE/EXIT 10	Southbound	161	172	144	73	34	0.9	0.2	359	-101
274	I-895 SPUR N @ I-895	Northbound	34	66	108	47	43	1.4	0.2	525	-251
311	I-895 S @ MD-2/POTEE ST/EXIT 7	Southbound	53	156	221	105	47	0.9	0.1	420	-109
391	I-895 N @ I-695/EXIT 3	Northbound	43	99	184	83	24	1.1	0.1	927	-536
402	I-895 S @ I-95/EXIT 46	Southbound	130	99	69	137	25	1.1	0.1	1180	-778

Notes

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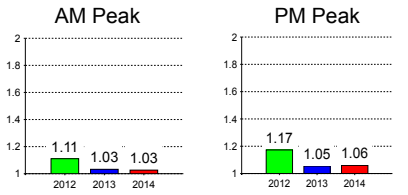
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

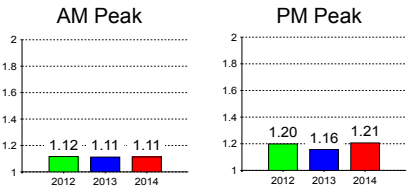
50 US-50

Trends[a]

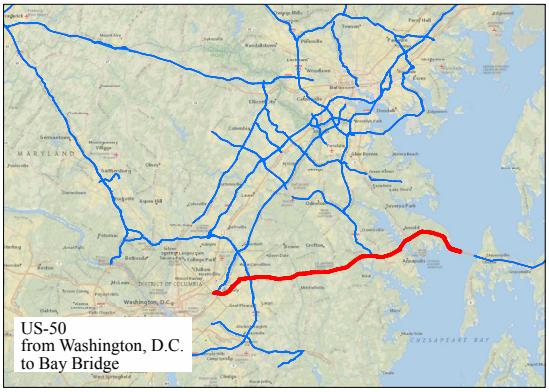
Travel Time Index[b]
measure of average delay



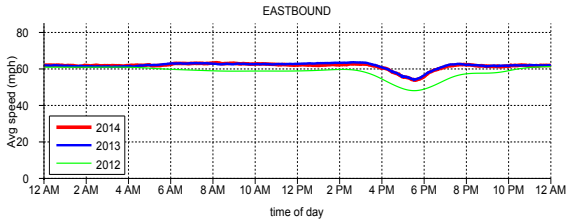
Planning Time Index[c]
measure of worst-case delay

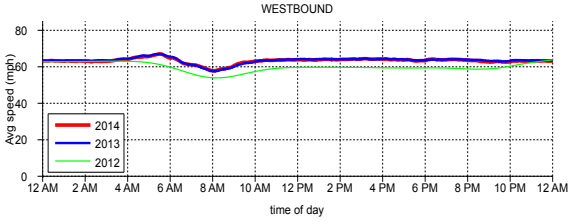


38 center miles carrying 99,000 vehicles every day

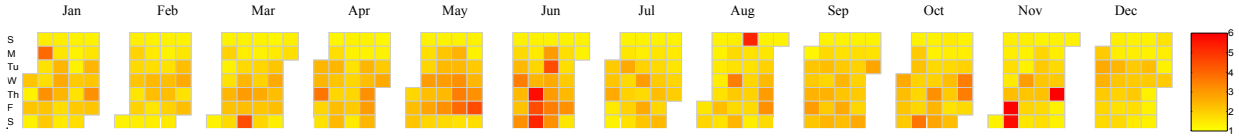


Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
58	US-50 E @ SEVERN RIVER BRIDGE	Eastbound	58	79	79	62	99	3.5	0.8	82	-24
119	US-50 E @ MD-202/LANDOVER RD	Eastbound	103	175	127	92	62	1.7	0.5	718	-599
196	US-50 W @ MD-295/KENILWORTH AVE	Westbound	52	54	99	58	52	2.0	0.3	240	-44
234	US-50 W @ I-495/I-95/CAPITAL BELTWAY/EXIT 7	Westbound	88	69	62	86	36	3.4	0.2	404	-170
277	US-50 E @ MD-197/COLLINGTON RD/EXIT 11	Eastbound	20	14	15	13	47	6.2	0.2	409	-132
303	US-50 W @ COLUMBIA PARK RD	Westbound	28	16	14	13	48	4.9	0.1	730	-427
319	US-50 W @ MD-665/ARIS ALLEN BLVD/EXIT 21-22	Westbound	42	46	56	55	48	2.7	0.1	637	-318
341	US-50 W @ MD-202/LANDOVER RD	Westbound	44	33	43	23	71	1.2	0.1	925	-584
349	US-50 E @ MD-2/MD-450/RITCHIE HWY/EXIT 27	Eastbound	9	13	12	16	66	4.1	0.1	834	-485
378	US-50 E @ MD-410/EXIT 5	Eastbound	20	23	25	9	61	1.9	0.1	769	-391

Notes

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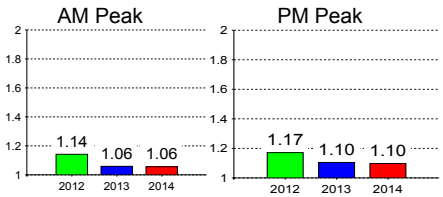
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

MARYLAND 32

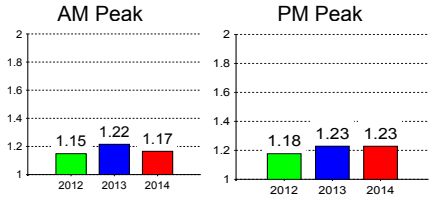
MD-32

Trends[a]

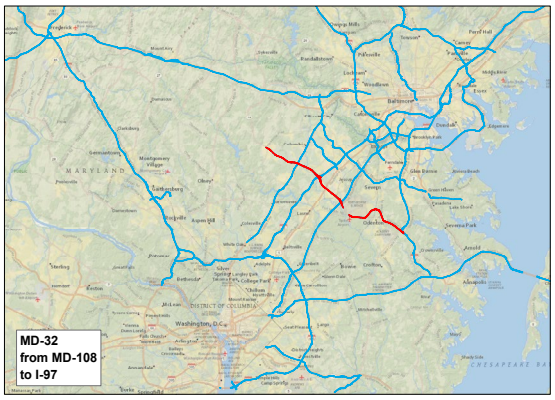
Travel Time Index[b]
measure of average delay



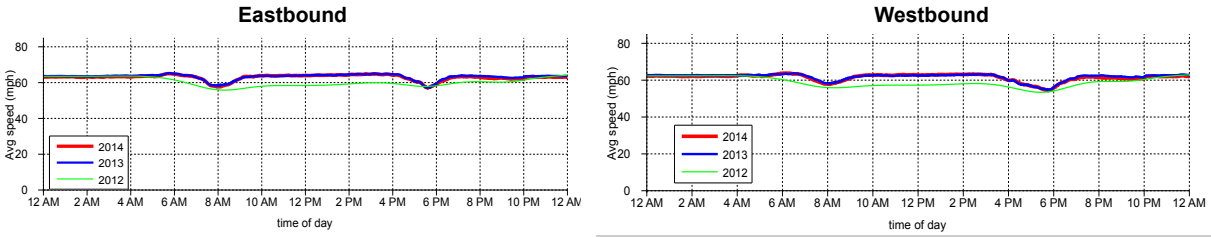
Planning Time Index[c]
measure of worst-case delay



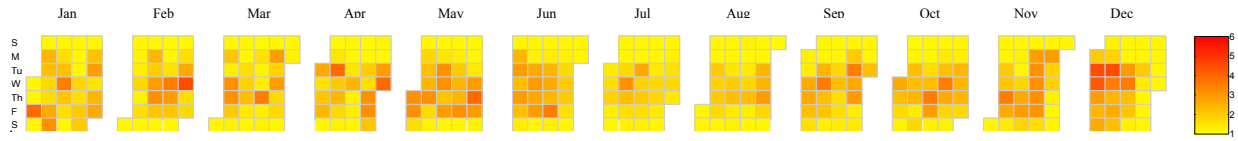
22 center miles carrying 66,000 vehicles every day



Speed Profiles[d]



Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
95	MD-32 W @ MD-108	Westbound	146	106	100	74	102	3.2	0.6	287	-192
100	MD-32 E @ MD-198/FORT MEADE RD	Eastbound	76	66	55	55	86	3.6	0.6	72	28
122	MD-32 W @ I-95	Westbound	76	60	33	67	72	3.0	0.5		122
157	MD-32 E @ I-95	Eastbound	71	92	72	84	50	2.6	0.3		157
176	MD-32 W @ MD-175/ANNAPOLIS RD	Westbound	62	86	119	53	59	2.1	0.3	237	-61
215	MD-32 E @ MD-295/BALTIMORE WASHINGTON PKWY (LAUREL)	Eastbound	67	33	49	24	30	6.4	0.2	802	-587
216	MD-32 E @ MD-175/ANNAPOLIS RD	Eastbound	17	19	19	30	68	5.0	0.2	624	-408
225	MD-32 W @ MD-198/FORT MEADE RD	Westbound	44	26	18	22	61	3.5	0.2	261	-36
254	MD-32 E @ I-97	Eastbound	60	75	76	100	31	5.3	0.2	640	-386
284	MD-32 W @ US-1	Westbound	44	58	70	50	42	1.7	0.2	595	-311

Notes

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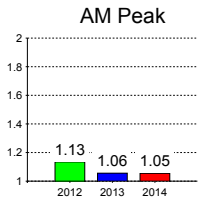
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

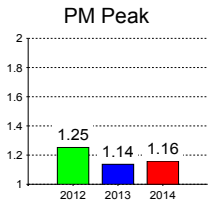
MARYLAND 100

MD-100

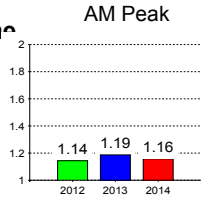
Trends[a]

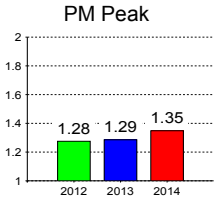
Travel Time Index[b]
measure of average delay



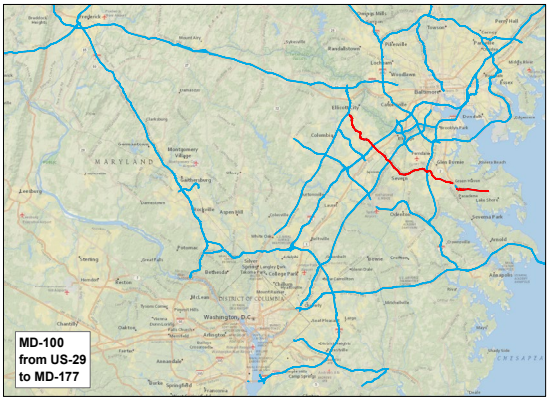


Planning Time Index[c]
measure of worst-case delay

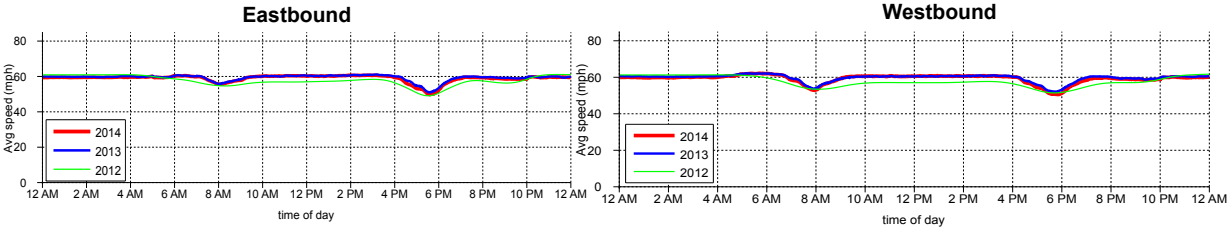




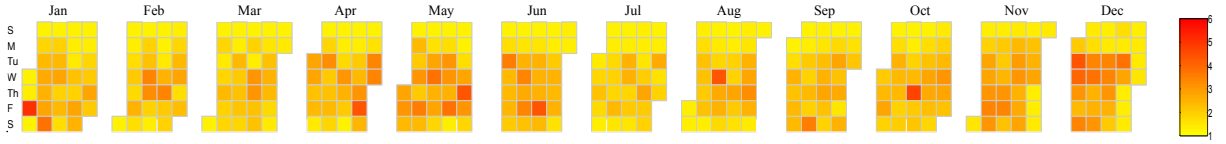
22 center miles carrying 69,000 vehicles every day



Speed Profiles[d]



Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
62	MD-100 E @ MD-170/TELEGRAPH RD/EXIT 11	Eastbound	74	99	87	72	62	4.3	0.8	58	4
127	MD-100 W @ MARC DORSEY STATION ACCESS RD/EXIT 7	Westbound	82	79	69	56	81	2.3	0.5	215	-88
131	MD-100 W @ US-29	Westbound	103	52	48	78	61	4.8	0.5	303	-172
144	MD-100 E @ MARC DORSEY STATION ACCESS RD/EXIT 7	Eastbound	64	69	74	95	62	2.1	0.4	228	-84
153	MD-100 W @ MD-607/MAGOTHY BRIDGE RD	Westbound	437	819	881	650	28	0.6	0.4	392	-239
158	MD-100 W @ MD-295/BALTIMORE WASHINGTON PKWY	Westbound	82	69	60	71	47	3.4	0.3		158
182	MD-100 E @ MD-10	Eastbound	50	27	25	21	46	6.4	0.3	1419	-1237
194	MD-100 W @ I-95/EXIT 5	Westbound	119	127	64	111	44	1.9	0.3	205	-11
198	MD-100 E @ OAKWOOD RD	Eastbound	46	33	31	49	62	2.9	0.3	216	-18
202	MD-100 E @ MD-174/QUARTERFIELD RD	Eastbound	46	43	71	35	68	3.8	0.3	510	-308

Notes

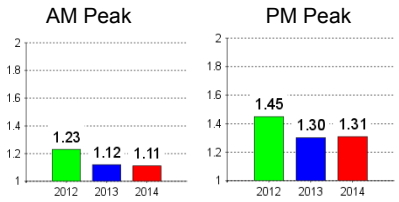
a - **Peak Hours** are considered as 8-9am and 5-6pm..
b - **Travel Time Index** (TTI) is the ratio of the *average* travel time during the peak hour to the time required under free flow.
c - **Planning Time Index** (PTI) is the ratio of the *worst-case* travel time (95th percentile) during peak hour to the free-flow time.
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
e- Variability of worst-case travel experience along facility for each day of year, shown as plot of PTI by day of week and month, showing seasonal and weekly trends.
f - Top 10 bottlenecks on the facility, ranked by impact factor.
Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

MARYLAND 295

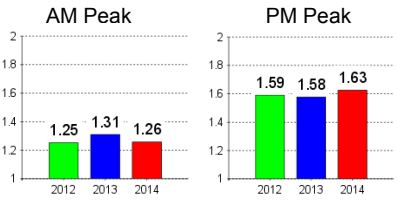
MD-295

Trends[a]

Travel Time Index[b]
measure of average delay

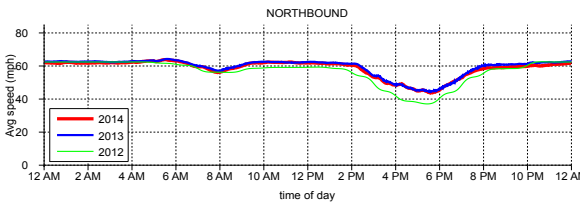


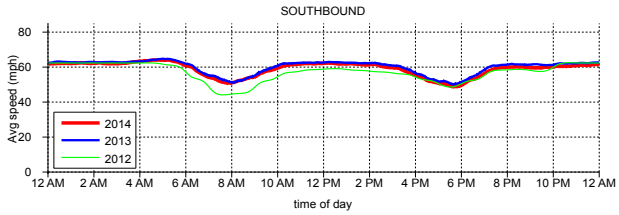
Planning Time Index[c]
measure of worst-case delay



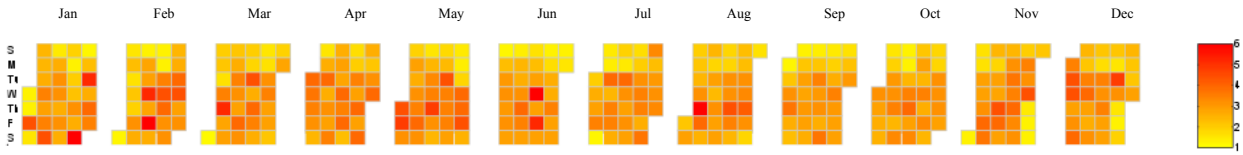
30 center miles carrying 104,000 vehicles every day

Speed Profiles[d]





Daily Variability[e]



Top Bottlenecks[f]

2014 Rank	LOCATION	Direction	Number of Occurences Q1	Q2	Q3	Q4	Average Duration (minute)	Average Length (mile)	Impact Factor	2013 Rank	Change
5	MD-295 N @ I-195	Northbound	74	94	71	78	139	13.2	4.7		5
6	MD-295 N @ MD-175	Northbound	116	80	83	96	151	8.7	4.4		6
10	MD-295 N @ MD-197/EXIT 11	Northbound	116	73	91	108	170	6.3	3.9	8	2
16	MD-295 S @ MD-193	Southbound	76	80	77	115	95	7.8	2.3	11	5
17	MD-295 S @ POWDER MILL RD	Southbound	112	133	125	113	98	5.1	2.2	21	-4
27	MD-295 N @ POWDER MILL RD	Northbound	166	163	173	144	85	3.2	1.6	34	-7
44	MD-295 S @ MD-198	Southbound	103	126	127	85	86	3.0	1.1	29	15
50	MD-295 S @ RIVERDALE RD	Southbound	90	69	100	98	67	4.6	1.0	50	0
56	MD-295 N @ I-495/I-95	Northbound	109	139	123	136	60	3.0	0.9		56
61	MD-295 S @ GODDARD RD	Southbound	71	53	62	57	74	5.1	0.8	117	-56

Notes

a - **Peak Hours** are considered as 8-9am and 5-6pm..
b - **Travel Time Index** (TTI) is the ratio of the *average* travel time during the peak hour to the time required under free flow.
c - **Planning Time Index** (PTI) is the ratio of the *worst-case* travel time (95th percentile) during peak hour to the free-flow time.
d - Typical work day speeds, calulcuated as the average speed of all weekdays for the entire year and shows it as varies by time-of-day.
e- Variability of worst-case travel experience along facility for each day of year, shown as plot of PTI by day of week and month, showing seasonal and weekly trends.
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Impact factor is multiplication of total annual number of bottleneck occurences by their average duration and by their average length.
Bottlenecks are said to occur when speeds drop below 60% of free-flow speed for a period longer than 5 minutes.
Q1: Jan-Mar Q2: Apr-Jun Q3: Jul-Sep Q4: Oct-Dec

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B. Regionally Significant Arterial Corridors

US 50 @ the Choptank River Bridge

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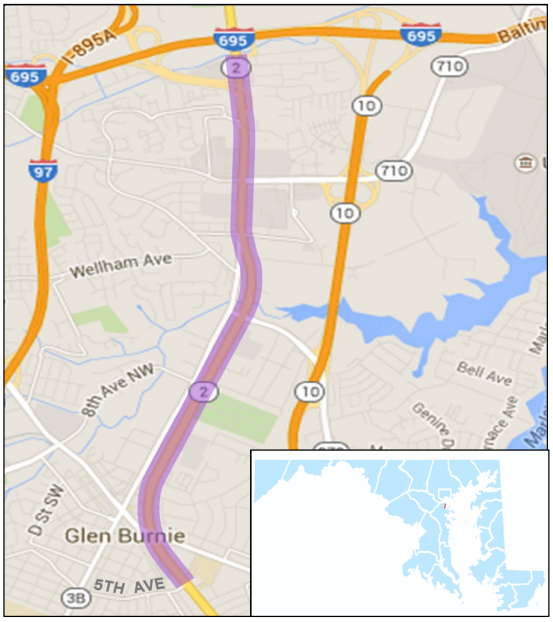
MD 2

Limits:	5th Ave to I-695
Study Area Length:	3.7 miles
Speed Limit:	35 - 45 MPH
Travel Lanes:	(2-3) Northbund (2-3) Southbound
Signal Controlled Intersections:	14
Grade Separated Interchanges:	2
Major Cross Streets:	I-695, I-895, E. Ordnance Rd, E. Furnace Branch Rd, MD 648, 5th Ave



Routes and Ridership	Routes	Avg. Daily Ridership	2014 ADT	Trucks	Peak Hour Traffic
	MTA 14	4,127	24,000 - 40,000 vpd	3% - 6%	7.5% - 8.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	5	5
LOS E	0	0
LOS F	0	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	2.0 / 0.5	3.2 / 0.4
LOS E	1.7 / 3.2	0.5 / 2.8
LOS F	0.0 / 0.0	0.0 / 0.5

LOS 'E' Intersections

LOS 'F' Intersections

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	I-695 - I-895 Ramp	0.5					W		W	W
	I-895 Ramp - Ordnance Rd. (MD-710)	0.5								
	Ordnance Rd(MD-710)-Furnance Branch Rd(MD-270)	0.8								
	Furnance Branch Rd. (MD-270) - 8th Ave.	0.5								
	8th Ave. - Baltimore Annapolis Blvd. (MD-648)	1.0					W		W	W
	Baltimore Annapolis Blvd. (MD-648) - 5th Ave.	0.4					W	W	W	W

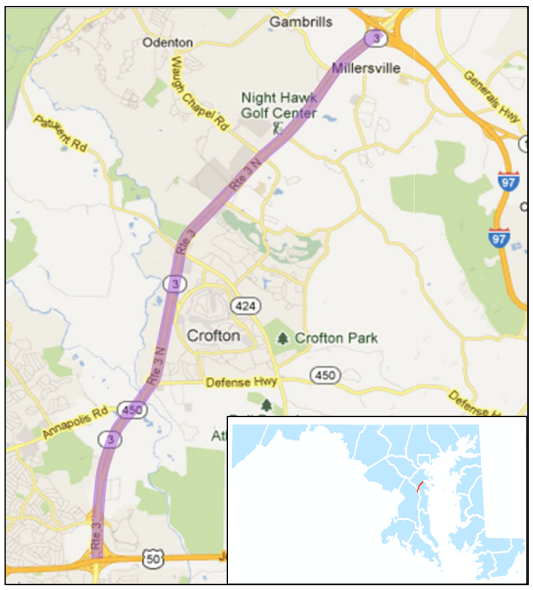
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 3

Limits:	US 50/301 to I-97
Corridor Length:	8.8 miles
Speed Limit:	45 - 50 MPH
Travel Lanes:	(2 - 4) Northbound (2 - 4) Southbound
Signal Controlled Intersections:	12
Grade Separated Interchanges:	3
Major Cross Streets:	I-97, MD 175, MD 424, Waugh Chapel Rd, Defense Hwy, MD 450, Belair Rd, US 50



Routes and Ridership		2014 AADT	Trucks	Peak Hour Traffic
Routes	Avg. Daily Ridership			
METRO B29, 31	265	60,000 - 75,000 vpd	5% - 8%	7.5% - 8%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	5	2
LOS E	1	2
LOS F	0	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	4.8 / 2.2	2.9 / 1.6
LOS E	1.5 / 0.8	3.7 / 4.8
LOS F	2.5 / 5.8	2.2 / 2.4

LOS 'E' Intersections

MD 3 at MD 450 (AM,PM)

MD 3 at Riedel / Waugh Chapel Rd (PM)

LOS 'F' Intersections

MD 3 at Crawford Blvd / Cronson Blvd (PM)

MD 3 at MD 424 / Conway Rd (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Patuxent Fwy (MD-32) - Annapolis Rd (MD-175)/Millersville Rd	0.8						W		I
	Annapolis Rd (MD-175)/Millersville Rd - St. Stephens Ch Rd	1.2			I		I		I	
	St. Stephens Church Rd - Waugh Chapel Rd/Riedel Rd	0.5		W			I		I	
	Waugh Chapel Rd/Riedel Rd - John Hopkins Rd	0.8						I	I	
	Johns Hopkins Rd - Conway Rd/Davidsonville Rd (MD-424)	0.9				W				
	CnwayRd/DvdsonvilleRd(MD-424)-CrawfordBlvd/CrnsnBlvd	0.7						W		
	Crawford Blvd/Cronson Blvd - Defense Hwy (MD-450)	1.3								
	Defense Hwy (MD-450) - Annapolis Rd (MD-450)	0.5								W
	Annapolis Rd (MD-450) - Belair Drive/Melford Blvd	1.6							W	
	Belair Drive/Melford Blvd - US-50	0.5							W	W

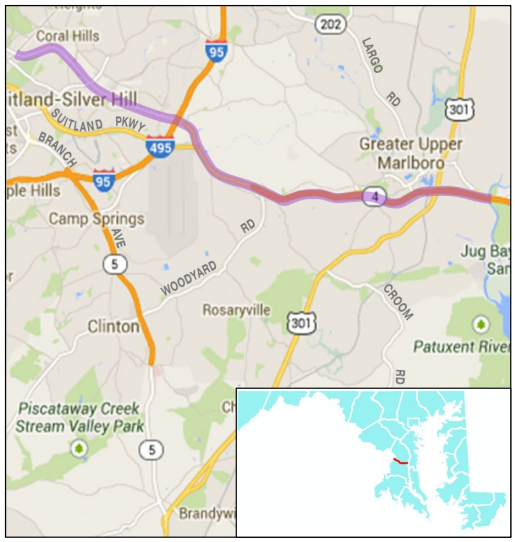
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 4

Limits:	Washington DC Line to Anne Arundel County Line
Study Area Length:	14.1 miles
Speed Limit:	35 - 55 MPH
Travel Lanes:	(2 - 3) Northbound (2 - 3) Southbound
Signal Controlled Intersections:	12
Grade Separated Interchanges:	7
Major Cross Streets:	MD 458, Forestville Rd, I-95, MD 337, MD 223, US 301, MD 725, Westphalia Rd



Routes and Ridership	Routes	Avg. Daily Ridership
	METRO K12, K13	2,028
	The Bus Route 20	1,065

2014 ADT	Trucks	Peak Hour Traffic
24,000 - 70,000 vpd	4% - 9%	7% - 9%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	5	5
LOS E	2	2
LOS F	2	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	12.0 / 10.5	11.2 / 13.7
LOS E	1.5 / 1.7	1.1 / 0.4
LOS F	0.6 / 1.9	1.8 / 0.0

LOS 'E' Intersections

MD 4 at Forestville Rd (AM,PM)

MD 4 at Westphalia Rd / Old Marlboro Pike (AM,PM)

LOS 'F' Intersections

MD 4 at MD 337 / Presidential Pkwy (AM,PM)

MD 4 at MD 4PB / Dower House Rd (AM,PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Southern Ave - Alton St/ Shadyside Ave.	0.8								
	Alton St/ Shadyside Ave. - Spaulding Ave./Quarter Ave.	0.5					W		W	
	Spaulding Ave./Quarter Ave. - Brooks Dr.	0.4								
	Brooks Dr. - Silver Hill Rd. (MD-458)	0.7								
	Silver Hill Rd. (MD-458) - Parkland Dr.	0.3								
	Parkland Dr. - Walters Ln.	0.8								
	Walters Ln. - Donnell Dr.	0.4								
	Donnell Dr. - Forestville Rd.	0.6								
	Forestville Rd. - I95/I495	0.4							I	
Urban Freeway Expressway	I95/I495 - Old Marlboro Pike/ Westphalia Rd.	0.3							I	
	Old Marlboro Pike/ Westphalia Rd. - MD-337	0.6					W			
	MD-337 - Dowerhouse Rd.	0.8								
	Dowerhouse Rd. - Woodyard Rd. (MD-223)	1.4						I	I	
	Woodyard Rd. (MD-223) - Ritchie Marlboro Rd.	2.7								
	Ritchie Marlboro Rd. - Water St (MD-717)	1.4								
	Water St (MD-717) - US-301	0.6								
	US-301 - Marlboro Pike (MD-725)	0.9								
Rural Other Principal Arterial	Marlboro Pike (MD-725) - Anne Arundel County	0.5								

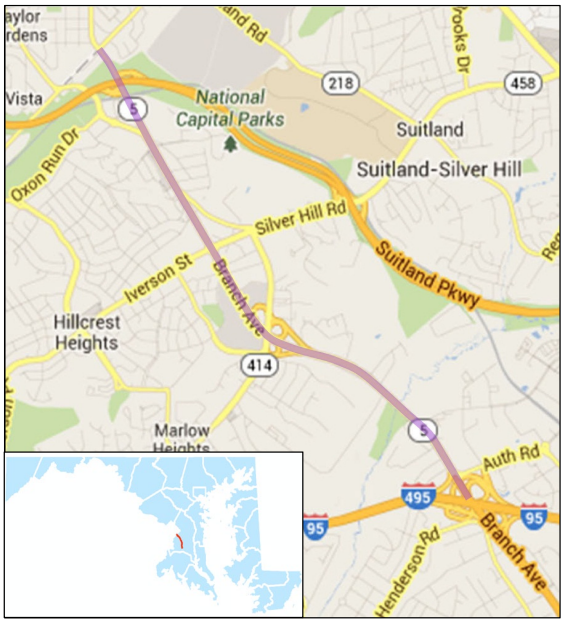
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 5

Limits:	I-95 to Washington DC Line
Study Area Length:	3.1 miles
Speed Limit:	30 - 35 MPH
Travel Lanes:	(1 - 4) Northbound (1 - 4) Southbound
Signal Controlled Intersections:	10
Grade Separated Interchanges:	3
Major Cross Streets:	Suitland Pkwy, MD 458, MD 414, I-95



Routes and Ridership

Routes	Avg. Daily Ridership
Green Line Naylor Rd	2,886
Green Line Suitland Rd	5,419
Green Line Branch Ave	6,219
METRO C12, C14	774
METRO H11, H12, H13	1,521
The Bus Route 32	1,241
MTA Routes	

Through October 31	Avg. Daily Ridership	Beginning November 1	Avg. Daily Ridership
		MTA 705	901
MTA 903	555	MTA 715	661
MTA 905	1,734	MTA 725	280
MTA 909	314	MTA 735	436

2014 ADT	Trucks	Peak Hour Traffic
27,000 - 67,000	3%	7.5%

NOTE: The Green Line ridership data represents boardings

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	4	4
LOS E	0	0
LOS F	0	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	0.0 / 0.6	0.6 / 0.6
LOS E	1.5 / 1.0	2.5 / 2.5
LOS F	1.6 / 1.5	0.0 / 0.0

LOS 'E' Intersections

LOS 'F' Intersections

Color Key

TTI	PTI
1.0 - 1.5	1.00 - 1.15
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Freeway Expressway	Suitland Pkwy - Naylor Rd. (MD-637)	0.3					I	W		
	Naylor Rd. (MD-637) - Iverson St/Silver Hill Rd (MD-458)	0.7								
	Iverson St/Silver Hill Rd (MD-458) - St. Barnabas Rd. (MD-414)	0.6								
	St. Barnabas Rd. (MD-414) - I-95/I-495	1.5					W	W		W

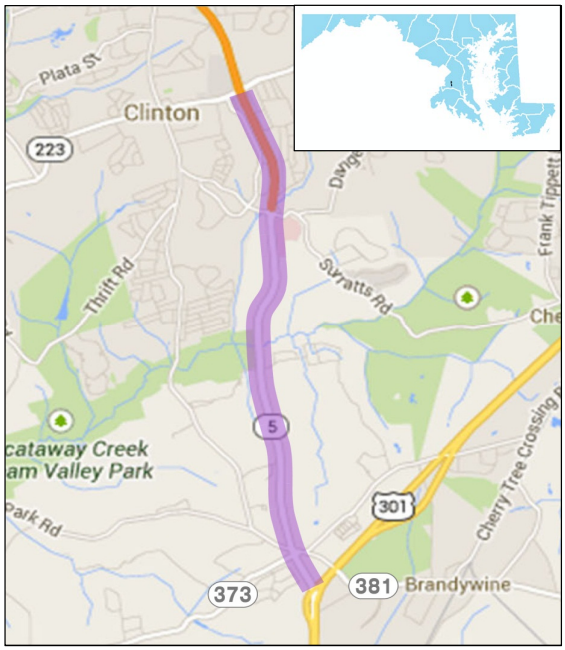
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 5

Limits:	US 301 to MD 223
Study Area Length:	4.1 miles
Speed Limit:	55 MPH
Travel Lanes:	(2 - 3) Northbound (2 - 3) Southbound
Signal Controlled Intersections:	3
Grade Separated Interchanges:	2
Major Cross Streets:	I-95, MD 223, MD 381 / MD 373, US 301



Routes and Ridership

Routes	Avg. Daily Ridership
METRO C11, C13	472

MTA Routes

Through October 31	Avg. Daily Ridership	Beginning November 1	Avg. Daily Ridership
		MTA 705	901
MTA 903	555	MTA 715	661
MTA 905	1,734	MTA 725	280
MTA 909	314	MTA 735	436

2014 ADT	Trucks	Peak Hour Traffic
56,000 - 80,500 vpd	5% - 7%	6.5% - 8%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	0	2
LOS E	0	1
LOS F	3	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	1.3 / 4.8	5.4 / 0.0
LOS E	0.0 / 0.6	0.0 / 1.6
LOS F	4.1 / 0.0	0.0 / 3.8

LOS 'E' Intersections

MD 5 at Brandywine Rd (PM)

LOS 'F' Intersections

MD 5 at Brandywine Rd (AM)
MD 5 at MD 373 (AM)
MD 5 at Surratts Rd (AM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Freeway Expressway	Woodyard Rd. (MD-223) - Surratts Rd.	1.3								I
	Surratts Rd. - Burch Hill Rd/Earnshaw Dr.	1.6								
	Burch Hill Rd/Earnshaw Dr. -Brandywine Rd./ Accpleel Rd (MD-373)	1.9								I
Rural Other Princ. Arterial	Brandywine Rd./ Accpleel Rd (MD-373)-Crain Hwy. (US-301)	0.6					W			

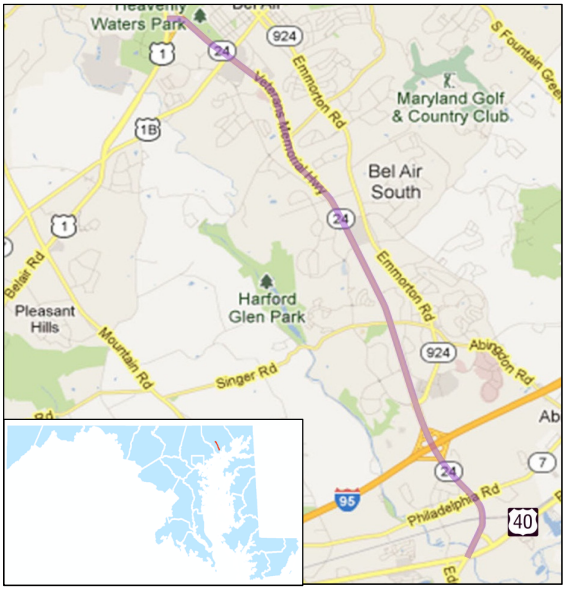
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 24

Limits:	US 40 (Pulaski Highway) to US 1 (Bel Air Bypass)
Study Area Length:	7.9 miles
Speed Limit:	40 - 55 MPH
Travel Lanes:	(2 - 3) Northbound (2 - 3) Southbound
Signal Controlled Intersections:	15
Grade Separated Interchanges:	3
Major Cross Streets:	US 40, I-95, MD 7, MD 924, US 1 BU, US 1



Routes and Ridership	Routes	Avg. Daily Ridership
	MTA 410	278

2014 ADT	Trucks	Peak Hour Traffic
21,000 - 72,000 vpd	2% - 5%	7.5% - 8.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	10	6
LOS E	0	1
LOS F	0	3

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	6.4 / 1.2	6.3 / 3.1
LOS E	1.5 / 3.2	1.6 / 3.2
LOS F	0.0 / 3.5	0.0 / 1.6

LOS 'E' Intersections

MD 24 at Wheel Rd (PM)

LOS 'F' Intersections

MD 24 at I-95 NB Ramps (PM)

MD 24 at Singer Rd (PM)

MD 24 at W. Ring Factory Rd (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Freeway Expressway	Bel Air Bypass (US-1) - Baltimore Pike (Bus US-1)	0.5						W		W
	Baltimore Pike (Bus US-1) - Ring Factory Rd.	1.3								W
	Ring Factory Rd. - Plumtree Rd.	0.9							W	
	Plumtree Rd. - Bel Air Pkwy	0.4				W			I	W
	Bel Air Pkwy - Wheel Rd.	0.3								
	Wheel Rd. - Singer Rd.	1.0							W	W
	Singer Rd. - Tollgate Rd./Emmorton Rd (MD-924)	1.0							W	
	Tollgate Rd./Emmorton Rd (MD-924) - I-95	0.6								
	I-95 - Edgewood Rd.	0.4						W		W
	Edgewood Rd. - Philadelphia Rd. (MD-7)	0.4			W				W	W
	Philadelphia Rd. (MD-7) - Pulaski Hwy (US-40)	0.5							W	
	Pulaski Hwy (US-40) - Edgewood Rd. (MD-775)	0.6							W	W

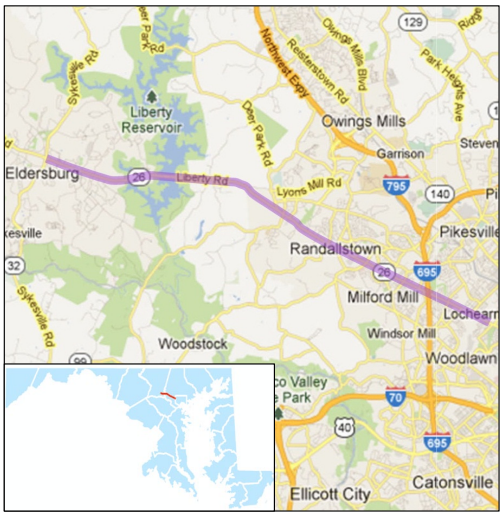
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 26

Limits:	Baltimore City Line to MD 32 (Sykesville Road)
Study Area Length:	14.1 miles
Speed Limit:	35 - 50 MPH
Travel Lanes:	(1 - 2) Eastbound (1 - 3) Westbound
Signal Controlled Intersections:	27
Grade Separated Interchanges:	1
Major Cross Streets:	I-695, Rolling Rd, Old Court Rd, MD 32



Routes and Ridership	Routes	Avg. Daily Ridership
	MTA 52	5,930
	MTA 54	8,872
	MTA 77	4,500
	MTA 99	635

2014 ADT	**Trucks**	**Peak Hour Traffic**
9,000 - 48,000 vpd	4% - 5%	7% - 9%

Intersection Operations

Signalized Intersections*:	**AM Peak Hour**	**PM Peak Hour**
LOS D or Better	16	17
LOS E	0	0
LOS F	1	0

Segment Operations

Level of Service	**Northbound AM / PM (Miles of Roadway)**	**Southbound AM / PM (Miles of Roadway)**
LOS D or Better	10.8 / 7.9	10.8 / 7.9
LOS E	2.8 / 5.3	2.4 / 4.2
LOS F	0.5 / 0.9	0.9 / 2.0

LOS 'E' Intersections

LOS 'F' Intersections

MD 26 at I-695 SB Ramps (AM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	**Roadway Segment North to South**	**Length (miles)**	**TTI AM NB**	**TTI AM SB**	**TTI PM NB**	**TTI PM SB**	**PTI AM NB**	**PTI AM SB**	**PTI PM NB**	**PTI PM SB**
Urban Other Principal Arterial	Sykesville Rd. (MD-32) -Georgetown Blvd.	0.3								W
	Georgetown Blvd.- Ridge Rd./ Oklahoma Rd	0.7								
	Ridge Rd./ Oklahoma Rd. - Oakland Mills Rd.	2.0								
Rural Minor Arterial	Oakland Mills Rd. - Wards Chapel Rd.	1.7								
	Wards Chapel Rd. - Lyons Mill Rd.	1.2								W
Urban Other Principal Arterial	Lyons Mill Rd. - Deer Park Rd.	1.3								
	Deer Park Rd. - Marriottsville Rd.	0.2								
	Marriottsville Rd. - Offutt Rd.	1.5								
	Offutt Rd.- Greens Ln/McDonogh Rd.	0.2							W	W
	Greens Ln/McDonogh Rd. - Brenbrook Dr.	0.6								
	Brenbrook Dr. - Old Court Rd.	0.3					W		W	W
	Old Court Rd. - Rolling Rd.	0.8								
	Rolling Rd. - Milford Mill Rd.	0.4				W		W		W
	Milford Mill Rd. - Washington Ave.	0.5	W						W	W
	Washington Ave. - I-695	0.3					W		W	W
	I-695 -St. Lukes Lane	1.0								
	St. Lukes Lane - Patterson Ave.	0.3								
	Patterson Ave. - Northern Parkway/Baltimore City	0.8								

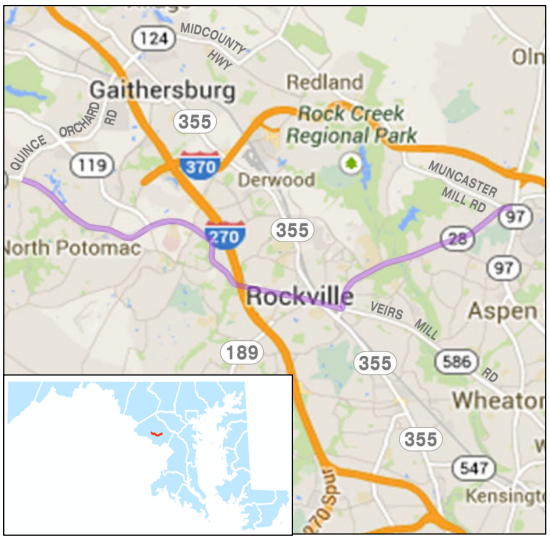
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 28

Limits:	MD 124 to MD 97
Study Area Length:	11.4 miles
Speed Limit:	40 - 50 MPH
Travel Lanes:	(1 - 3) Northbound (1 - 3) Southbound
Signal Controlled Intersections:	30
Grade Separated Interchanges:	1
Major Cross Streets:	MD 124, MD 119, Shady Grove Dr, Gude Dr, I-270, MD 189, MD 355, MD 115, MD 97



Routes and Ridership	Routes	Avg. Daily Ridership
	Ride On 52	157
	Ride On 54	2,039
	Ride On 63	660

2014 ADT	Trucks	Peak Hour Traffic
14,000 - 47,000 vpd	4% - 7%	7.5 - 9%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	11	11
LOS E	1	2
LOS F	1	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	4.8 / 2.5	4.3 / 4.3
LOS E	4.3 / 5.2	3.0 / 4.4
LOS F	2.3 / 3.7	4.1 / 2.7

LOS 'E' Intersections

MD 28 at E. Gude Dr (AM,PM)

MD 28 at Baltimore Rd (West Leg) (PM)

LOS 'F' Intersections

MD 28 at MD 97 (AM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Quince Orchard Rd (MD-124) - Muddy Branch Rd.	2.1								
	Muddy Branch Rd. - Great Seneca Hwy (MD-119)	0.8							W	W
	Great Seneca Hwy (MD-119) - Shady Grove Rd.	0.9					W	W	W	
	Shady Grove Rd. - Fallsgrove Dr/ Gude St.	0.4							W	W
	Fallsgrove Dr/ Gude St. - Darnestown Rd.	0.5						W	W	W
	Darnestown Rd. - I-270	0.7					W			W
	I-270 - Great Falls Rd. / Van Buren St.	0.9								
	Great Falls Rd. / Van Buren St. - Rockville Pike (MD-355)	0.6							W	W
	Rockville Pike (MD-355)-Veirs Mill Rd (MD-586)/1stSt(MD-911)	0.4							W	W
	Veirs Mill Rd (MD-586)/ 1st St (MD-911) - Gude Dr.	0.9		I				I		
	Gude Dr. - Baltimore Rd.	1.0							W	
	Baltimore Rd. - Bel Pre Rd.	0.7						W		
	Bel Pre Rd. - Muncaster Mill Rd. (MD-115)	1.3						W		
	Muncaster Mill Rd. (MD-115)- Georgia Ave. (MD-97)	0.2								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

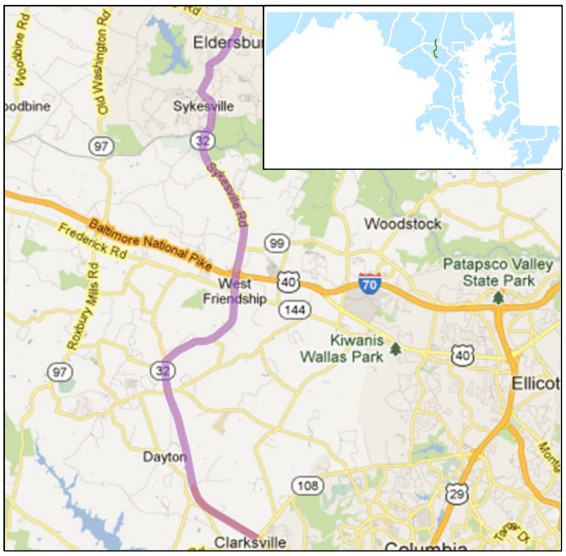
PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 32

Limits:	MD 108 (Clarksville Pike) to MD 26 (Liberty Road)
Study Area Length:	16.3 miles
Speed Limit:	40 - 50 MPH
Travel Lanes:	(1 - 2) Northbound (1 - 2) Southbound
Signal Controlled Intersections:	11
Grade Separated Interchanges:	3
Major Cross Streets:	MD 108, Burntwoods Rd, MD 144, MD 26

Routes and Ridership	Routes	Avg. Daily Ridership
	N/A	N/A



2014 ADT	**Trucks**	**Peak Hour Traffic**
20,000 - 26,000 vpd	7% - 11%	8%

Intersection Operations

Signalized Intersections*:	**AM Peak Hour**	**PM Peak Hour**
LOS D or Better	3	3
LOS E	0	0
LOS F	0	0

Segment Operations

Level of Service	**Northbound AM / PM (Miles of Roadway)**	**Southbound AM / PM (Miles of Roadway)**
LOS D or Better	15.5 / 3.0	7.7 / 15.5
LOS E	0.0 / 3.7	3.2 / 0.8
LOS F	0.8 / 9.6	5.4 / 0.0

LOS 'E' Intersections

LOS 'F' Intersections

Color Key

TTI	**PTI**
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	**Roadway Segment North to South**	**Length (miles)**	**TTI AM NB**	**TTI AM SB**	**TTI PM NB**	**TTI PM SB**	**PTI AM NB**	**PTI AM SB**	**PTI PM NB**	**PTI PM SB**
Urban Other Principal Arterial	Liberty Rd. (MD-26) - Springfield Ave. (MD-851)	2.2								
	Springfield Ave. (MD-851) - Sandosky Rd./Raincliffe Rd.	0.7								W
	Sandosky Rd./Raincliffe Rd. - Friendship Rd. (MD-851)	0.8						I	W	W
Rural Minor Arterial	Friendship Rd. (MD-851) - River Rd.	1.7							W	
	River Rd. - Old Frederick Rd. (MD-99)	1.3								
	Old Frederick Rd. (MD-99) - I-70/US-40	0.8								
Rural Other Principal Arterial	I-70/US-40 - Frederick Rd. (MD-144)	0.4			W				W	
	Frederick Rd. (MD-144) - Burntwoods Rd./ Andrea Dr.	3.0								
	Burntwoods Rd./ Andrea Dr. - Clarksville Pike (MD-108)	5.4						I	I	

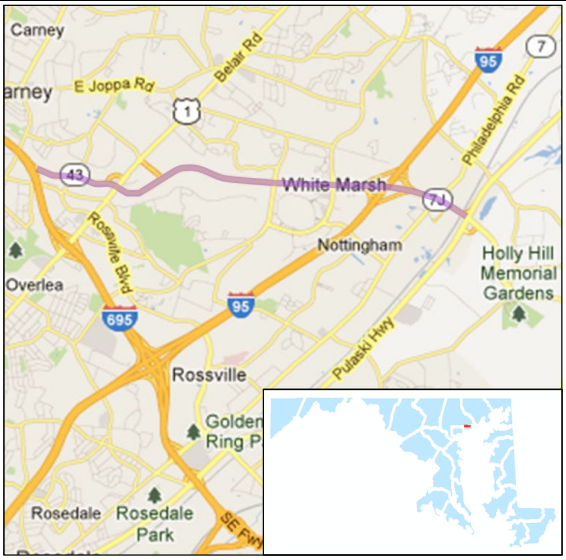
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 43

Limits:	I-695 to US 40
Study Area Length:	6.0 miles
Speed Limit:	45 - 50 MPH
Travel Lanes:	2 Eastbound 2 Westbound
Signal Controlled Intersections:	6
Grade Separated Interchanges:	4
Major Cross Streets:	I-695, US 1, Perry Hall Blvd, Honeygo Blvd, I-95, US 40



Routes and Ridership	Routes	Avg. Daily Ridership
	MTA 58	2,128

2014 ADT	Trucks	Peak Hour Traffic
29,000 - 56,000 vpd	2% - 8%	7.5% - 8.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	3	2
LOS E	0	0
LOS F	0	1

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	3.4 / 2.8	2.8 / 2.8
LOS E	2.6 / 1.5	0.7 / 1.6
LOS F	0.0 / 1.7	2.5 / 1.6

LOS 'E' Intersections

LOS 'F' Intersections

MD 43 at Honeygo Blvd (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Freeway Expressway	I-695 - Walther Blvd	0.6								
	Walther Blvd - Belair Rd (US-1) SB	0.4		W						
	Belair Rd (US-1) SB - Belair Rd (US-1) NB	0.6					I	I	I	W
	Belair Rd (US-1) NB - Perry Hall Blvd	1.8								
	Perry Hall Blvd - Honeygo Blvd	0.7								W
	Honeygo Blvd - I-95	0.9								
	I-95 - Philadelphia Rd	0.6								
	Philadelphia Rd - Pulaski Hwy (US-40)	0.4								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

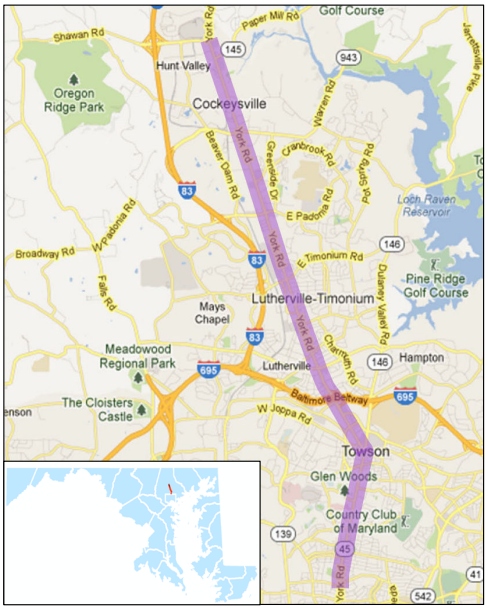
TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 45

Limits:	Baltimore City Line to Shawan Road
Study Area Length:	9.3 miles
Speed Limit:	35 - 40 MPH
Travel Lanes:	(1 – 2) Northbound (1 – 2) Southbound
Signal Controlled Intersections:	31
Grade Separated Interchanges:	1
Major Cross Streets:	Stevenson Ln, Towsontown Blvd, Joppa Rd, Fairmount Ave, I-695, MD 131, Timonium Rd, Padonia Rd, Warren Rd, Shawan Rd

Routes and Ridership

Routes	Avg. Daily Ridership
Light Rail - Hunt Valley	835
Light Rail - Pepper Rd	181
Light Rail - McCormick Rd	498
Light Rail - Gilroy Rd	255
Light Rail - Warren Rd	316
Light Rail - Timonium Rd	1,107
Light Rail - Timonium BP	355
Light Rail - Lutherville	906
MTA 8	11,428
MTA 9	1,412
MTA 12	299



2014 ADT	Trucks	Peak Hour Traffic
19,000 - 42,000 vpd	2% - 9%	6.5% - 9%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	20	17
LOS E	0	3
LOS F	1	1

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	2.9 / 1.6	5.1 / 0.5
LOS E	6.4 / 1.5	3.4 / 3.6
LOS F	0.0 / 6.2	0.8 / 5.2

LOS 'E' Intersections

MD 45 at Fairmount Ave/Ent. To Carver Voc Tech Center (PM)
MD 45 at Shawan Rd (PM)
MD 45 at Timonium Rd (PM)

LOS 'F' Intersections

MD 45 at Shawan Rd (AM)
MD 45 at MD 131 / Seminary Ave (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Shawan Rd. - Paper Mill Rd. (MD-145)	0.3					W		W	W
	Paper Mill Rd. (MD-145) - Warren Rd. (MD-483)	1.2								
	Warren Rd. (MD-483) - Cranbrook Rd.	0.8							W	W
	Cranbrook Rd. - Padonia Rd.	0.5								
	Padonia Rd. - Timonium Rd.	1.1				W			W	W
	Timonium Rd. - Ridgely Rd	0.8							W	
	Ridgely Rd. - Bellona Ave./Margate Rd.	0.5							W	
	Bellona Ave./Margate Rd. - Seminary Ave. (MD-131)	0.2								W
	Seminary Ave. (MD-131) - I-695	0.5								
	I-695 - Fairmount Ave	0.3	I		I		I	I	I	I
	Fairmount Ave. - Bosley Ave.	0.2								
Urban Minor Arterial	Bosley Ave. - Dulaney Valley Rd. (MD-146)/ Joppa Rd.	0.4				W				
Urban Other Principal Arterial	Dulaney Valley Rd. (MD-146)/ Joppa Rd. - Towsontown Blvd.	0.3			W			W		
	Towsontown Blvd. - Burke Ave.	0.2								
	Burke Ave. - Stevenson Ln.	0.8					W	W	W	W
	Stevenson Ln. - Regester Ave.	0.4				W	W		W	W
	Regester Ave. - Lake Ave.	0.8			W		W	W	W	W

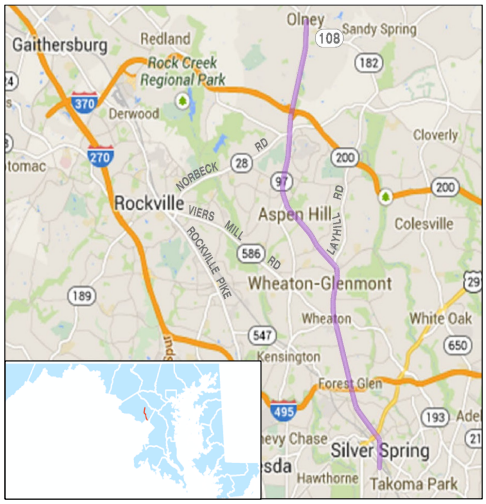
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 97

Limits:	Washington DC Line to MD 108
Corridor Length:	12.7 miles
Speed Limit:	30 - 45 MPH
Travel Lanes:	(3 - 4) Northbound (3 - 4) Southbound
Signal Controlled Intersections:	48
Grade Separated Interchanges:	1
Major Cross Streets:	US 29, I-495, MD 586, Randolph Rd, MD 193, MD 182, MD 28, MD 200, MD 108



Routes and Ridership	Routes	Avg. Daily Ridership
	METRO Y5, Y7, Y8, Y9	8,373
	Ride On 33	346
	Ride On 52	157
	Ride On 53	357

2014 AADT	Trucks	Peak Hour Traffic
30,000 - 64,000 vpd	4% - 6%	6.5% - 8%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	29	32
LOS E	4	3
LOS F	4	1

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	7.4 / 1.8	1.8 / 1.2
LOS E	4.4 / 3.1	6.0 / 7.6
LOS F	0.9 / 7.8	4.9 / 3.9

LOS 'E' Intersections

MD 97 at Emory Ln (AM)
MD 97 at MD 192 / Forest Glen Rd (AM)
MD 97 at MD 586 (AM)
MD 97 at Randolph Rd (AM)
MD 97 at Dennis Ave (PM)
MD 97 at Seminary Rd / Columbia Blvd (PM)
MD 97 at Arcola Ave (PM)

LOS 'F' Intersections

MD 97 at Ramp 6 from I-495 EB (AM,PM)
MD 97 at Old Baltimore Rd (AM)
MD 97 at Plyers Mill Rd (AM)
MD 97 at MD 28 (AM)

* Avaialable count data.

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Olney Sandy Spring/ Laytonsville Rd. (MD-108)-Emroy Lane	1.9								W
	Emroy Lane - Norbeck Rd. (MD-28)	1.2		W			W	W		W
	Norbeck Rd. (MD-28) - Rossmoor Blvd.	0.5						W		
	Rossmoor Blvd. - Bel Pre Rd.	0.6								
	Bel Pre Rd. - Connecticut Ave. (MD-185)	0.7								
	Connecticut Ave. (MD-185) - Hewitt Ave.	0.6								W
	Hewitt Ave. - May St./Rippling Brook Dr.	0.5								
	May St./Rippling Brook Dr. - Layhill Rd.(MD-182)	1.1						W		
	Layhill Rd.(MD-182) - Randolph Rd.	0.2								
	Randolph Rd. - Shorefield Rd.	0.4								
	Shorefield Rd. - Arcola Ave.	0.4							W	
	Arcola Ave. - University Blvd. (MD-193)	0.4					W			
	University Blvd. (MD-193)- Veirs Mill Rd. (MD-586)	0.4								W
	Veirs Mill Rd. (MD-586) - Dennis Ave.	0.8								
	Dennis Ave. - I-495	0.8								
	I-495 - 16th St. (MD-390)	0.5		I	I		W	I	I	
	16th St. (MD-390) - Spring St	0.6								
	Spring St. - Colesville Rd (US-29)	0.3								
	Colesville Rd (US-29) - Silgo Ave.	0.4								
	Silgo Ave. - East-West Hwy/Philadelphia Ave. (MD-410)	0.2		I				I		W
	East-West Hwy/Philadelphia Ave(MD-410) - Eastern Ave./ DC Line	0.2								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

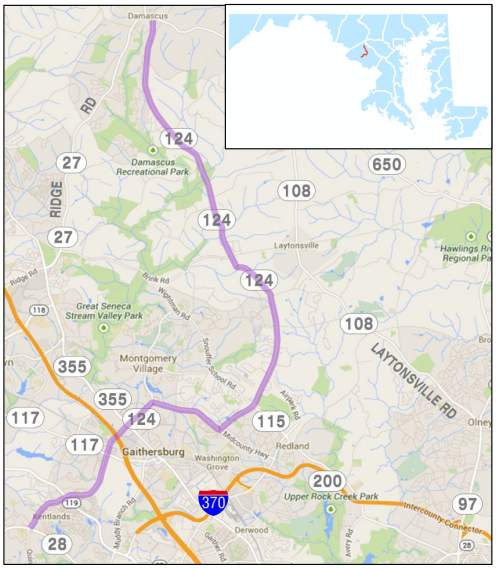
TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 124

Limits:	MD 28 to MD 108
Corridor Length:	16.7 miles
Speed Limit:	30 - 50 MPH
Travel Lanes:	(1 - 4) Northbound (1 - 4) Southbound
Signal Controlled Intersections:	31
Grade Separated Interchanges:	1
Major Cross Streets:	MD 28, MD 119, MD 117, I-270, MD 335, MD 115, MD 108

Routes and Ridership

Routes	Avg. Daily Ridership
Ride On 56	1,957
Ride On 57	2,255
Ride On 58	1,293
Ride On 59	3,823
Ride On 61	2,834
Ride On 65	194
Ride On 90	865



2014 AADT	Trucks	Peak Hour Traffic
11,000 - 75,000 vpd	3% - 8%	7% - 9%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	11	9
LOS E	1	3
LOS F	0	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	11.4 / 10.2	10.0 / 10.2
LOS E	4.8 / 4.2	3.1 / 4.2
LOS F	0.5 / 2.3	3.6 / 2.3

LOS 'E' Intersections

MD 124 at MD 119 (AM,PM)
MD 124 at Christopher Ave / Lost Knife Rd (PM)
MD 124 at Montgomery Village Ave (PM)

LOS 'F' Intersections

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Minor Arterial	Main St. (MD-108) - Hawkins Creamery Rd.	1.0								
	Hawkins Creamery Rd. - Log House Rd/ Low Meadow Dr.	1.2								
	Log House Rd/ Low Meadow Dr. - Rocky Rd.	2.4								
	Rocky Rd. - Brink Rd.	1.4					W	W		W
	Brink Rd. - Warfield Rd.	1.3						W		W
	Warfield Rd. - Fieldcrest Rd./ Hadley Farms Dr.	0.7					W			
	Fieldcrest Rd./ Hadley Farms Dr. - Airpark Rd.	1.1								
	Airpark Rd. - Snouffer School Rd./Muncaster Mill Rd (MD-115)	0.7								
	SnoufferSchlRd/MncterMillRd(MD115) - MdctyHwy/WoodfieldRd.	0.9	W		W	W	W		W	
Urban Other Principal Arterial	Midcounty Hwy./Woodfield Rd. - Goshen Rd.	1.1		W				W		W
	Goshen Rd. - Montgomery Village Dr /Midcounty Hwy	0.6					W		W	W
	MontgomeryVillage/MidcountyHwy - Frederick Rd/Ave(MD-355)	0.7								
	Frederick Rd/Ave (MD-355) - I-270	0.4						W	W	W
	I-270 - Clopper Rd. /Diamond Av (MD-117)	0.5					W		W	W
	Clopper Rd./Diamond Av(MD-117) - Gt Seneca Hwy(MD-119)	1.5								W
	Great Seneca Hwy. (MD-119) - Darnestown Rd. (MD-28)	1.2					W		W	W

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 140

Limits:	Baltimore City Line to MD 97
Corridor Length:	20.4 miles
Speed Limit:	30 - 55 MPH
Travel Lanes:	(1 - 3) Northbound (1 - 2) Southbound
Signal Controlled Intersections:	51
Grade Separated Interchanges:	3
Major Cross Streets:	Old Court Rd, I-695, MD 130, Painters Mill Rd, MD 940, MD 30, I-795, MD 91, MD 97

Routes and Ridership

Routes	Avg. Daily Ridership
MTA 53	4,527
MTA 56	2,445
MTA 59	2,030

2014 AADT	Trucks	Peak Hour Traffic
17,000 - 53,000 vpd	2% - 9%	8% - 8.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	22	22
LOS E	1	1
LOS F	0	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	16.3 / 7.7	12.5 / 11.3
LOS E	4.1 / 10.1	7.9 / 4.7
LOS F	0.0 / 2.6	0.0 / 4.4

LOS 'E' Intersections

MD 140 at MD 91 (AM,PM)

LOS 'F' Intersections

* Avaialable count data.

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB/NB	TTI AM EB/SB	TTI PM WB/NB	TTI PM EB/SB	PTI AM WB/NB	PTI AM EB/SB	PTI PM WB/NB	PTI PM EB/SB
Urban Other Principal Arterial	New Washington Rd (MD-97) Malcom Dr. - Reese Rd.	2.5								
	Reese Rd. - Green Mill Rd./Suffolk Rd.	2.2								
	Green Mill Rd./Suffolk Rd. - Emroy/Gamber Rd (MD-91)	1.9								
Urban/Rural Other P. Arterial	Emroy/Gamber Rd (MD-91) - Butler Rd. (MD-795)	3.4								
Urban Other Principal Arterial	Butler Rd. (MD-795) - Hanover Rd. (MD-30)	0.4					W	W	W	W
	Hanover Rd. (MD-30) - Glyndon Dr/ Glyndon Trace Dr.	0.7							W	
	Glyndon Dr/ Glyndon Trace Dr. - Berrymans Ln.	0.4					W	W		W
	Berrymans Ln. - Franklin Blvd./Cherry Hill Rd.	0.7						W		
	Franklin Blvd./Cherry Hill Rd. - Dolfield Blvd/ Richmar Rd.	1.2								
	Dolfield Blvd/ Richmar Rd. - Pleasant Hill Rd.	0.5							W	
	Pleasant Hill Rd. - Owings Mills Blvd. (MD-240) -	1.0					W			W
	Owings Mills Blvd. (MD-240) - Painters Mill Rd. -	0.4					W		W	W
	Painters Mill Rd. - Greenspring Valley Rd (MD-130)	1.2							W	W
	Greenspring Valley Rd (MD-130) - McDonogh Rd./ Craddock Ln.	0.6							W	
	McDonogh Rd./ Craddock Ln. - I-695	1.2						W		W
	I-695 - Old Court Rd.	0.6					W		W	W
	Old Court Rd. - Sudbrook Ln	0.4							W	W
	Sudbrook Ln. - Slade Ave/ Milford Mill Rd.	0.5					W		W	W
	Slade Ave/ Milford Mill Rd. - Baltimore City Line/ Fallstaff Rd	0.6						W		W

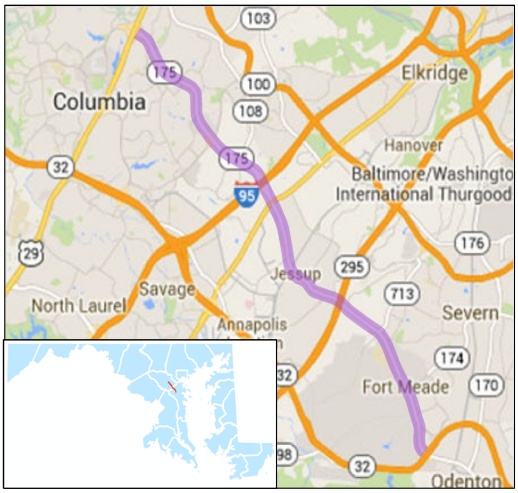
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 175

Limits:	MD 32 (Patuxent Freeway) to US 29 (Columbia Pike)
Corridor Length:	12.2 miles
Speed Limit:	35 - 50 MPH
Travel Lanes:	(1 - 3) Northbound (1 - 4) Southbound
Signal Controlled Intersections:	19
Grade Separated Interchanges:	5
Major Cross Streets:	MD 32, MD 174, MD 713, MD 295, US 1, I-95, Snowden River Pkwy, US 29



Routes and Ridership	Routes	Avg. Daily Ridership	2014 AADT	Trucks	Peak Hour Traffic
	MTA 310	330	18,000 - 73,000 vpd	2% - 11%	7.5% - 9%
	MTA 320	233			

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	7	5
LOS E	1	2
LOS F	0	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	5.6 / 4.1	5.8 / 4.5
LOS E	6.6 / 5.3	6.4 / 5.2
LOS F	0.0 / 2.8	0.0 / 2.5

LOS 'E' Intersections

MD 175 at MD 108 (AM,PM)

MD 175 at Reece Rd (PM)

LOS 'F' Intersections

MD 175 at Llewellyn Ave / Blue Water Blvd (PM)

MD 175 at Tamar Dr (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB NB	TTI AM EB SB	TTI PM WB NB	TTI PM EB SB	PTI AM WB NB	PTI AM EB SB	PTI PM WB NB	PTI PM EB SB
Urban Freeway Expressway	Columbia Pike (US-29) - Thunder Hill Rd.	0.6								W
	Thunder Hill Rd. - Tamar Dr	1.1								
	Tamar Dr - Dobbin Rd.	0.9			W					
	Dobbin Rd - Snowden River Pkwy	0.6								
	Snowden River Pkwy - Waterloo Rd (MD-108)	0.8								
	Waterloo Rd (MD-108)- I-95	0.7								
	I-95 - Washington Blvd (US-1)	0.5								W
Urban Minor Arterial	Washington Blvd (US-1) - Dorsey Run Rd.	1.3							W	
	Dorsey Run Rd. - MD-295	1.6								
	MD-295 - Ridge Rd/Rockenbach Rd (MD-713)	1.1								
	Ridge Rd/Rockenbach Rd. (MD-713) - Reece Rd	1.3				W	W	W	I	
	Reece Rd - Charter Oaks Blvd.	0.6								
	Charter Oaks Blvd.- MD-32	1.1								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

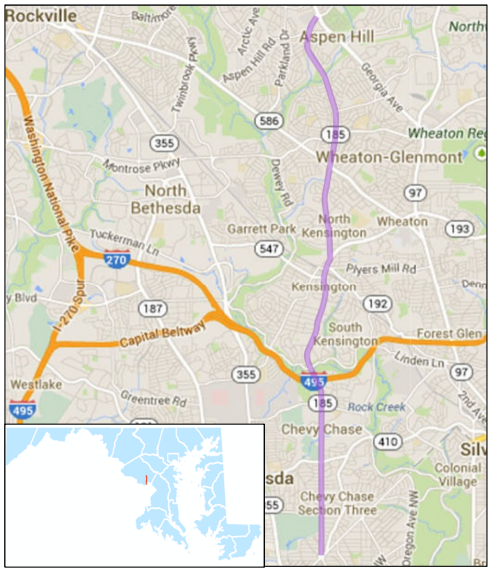
TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 185

Limits:	Washington DC Line to MD 97
Corridor Length:	8.3 miles
Speed Limit:	30 - 45 MPH
Travel Lanes:	(1 - 3) Northbound (3 - 4) Southbound
Signal Controlled Intersections:	26
Grade Separated Interchanges:	1
Major Cross Streets:	MD 410, I-495, MD 547, MD 193, MD 586, Randolph Rd, MD 97

Routes and Ridership

Routes	Avg. Daily Ridership
METRO L8	2,654
Ride On 1	2,156
Ride On 11	829
Ride On 26	3,089
Ride On 34	2,701
Ride On 41	876



2014 AADT	Trucks	Peak Hour Traffic
36,000 - 64,000 vpd	3% - 5%	7.5% - 8.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	7	7
LOS E	3	4
LOS F	3	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	7.5 / 0.6	0.0 / 2.6
LOS E	0.8 / 4.0	4.7 / 4.6
LOS F	0.0 / 3.7	3.6 / 1.1

LOS 'E' Intersections

MD 185 at Manor Rd (AM,PM)
MD 185 at MD 586 (AM,PM)
MD 185 at Randolph Rd (AM,PM)
MD 185 at MD 410 (PM)

LOS 'F' Intersections

MD 185 at MD 410 (AM)
MD 185 at Jones Bridge Rd / Kensington Pkwy (AM)
MD 185 at MD 191 / Bradley Ln (PM)
MD 185 at MD 192 (AM,PM)

* Avaialable count data.

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB/NB	TTI AM EB/SB	TTI PM WB/NB	TTI PM EB/SB	PTI AM WB/NB	PTI AM EB/SB	PTI PM WB/NB	PTI PM EB/SB
Urban Other Principal Arterial	Georgia Ave. (MD-97) - Aspen Hill Rd.	0.3	W			W	W	W	W	W
	Aspen Hill Rd. - Randolph Rd.	0.4					W			W
	Randolph Rd. - Veirs Mill Rd. (MD-586)	1.7								
	Veirs Mill Rd. (MD-586) - University Blvd. (MD-193)	1.4					W			
	University Blvd (MD-193) - Saul Rd.	1.2					W	I		
	Saul Rd. - I495	0.6		I				I		
	I-495-Jones Bridge Rd.	0.5		I				I		
	Jones Bridge Rd. - East West Hwy (MD-410)	0.8		W	I		W		I	W
	East West Hwy (MD-410) - Bradley Ln. (MD-191)	0.8					W		I	W
	Bradley Ln. (MD-191) -Western Ave/ DC Line	0.6					W		W	W

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

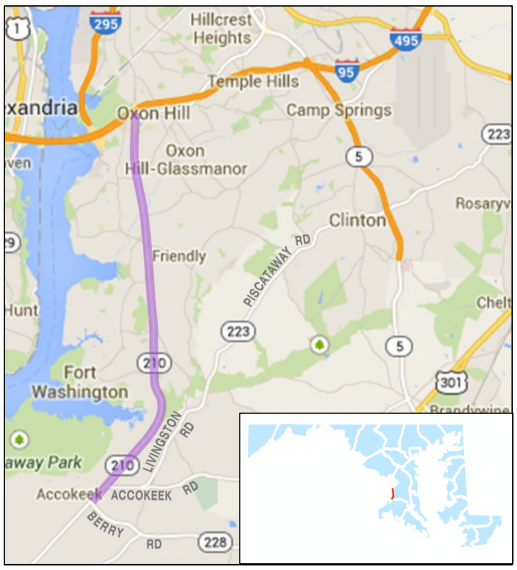
TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 210

Limits:	MD 228 to I-95
Corridor Length:	10.2 miles
Speed Limit:	40 - 45 MPH
Travel Lanes:	(2 - 3) Northbound (2 - 4) Southbound
Signal Controlled Intersections:	10
Grade Separated Interchanges:	1
Major Cross Streets:	I-95, Livingston Rd, MD 373, MD 228

Routes and Ridership

Routes	Avg. Daily Ridership
METRO D13, D14	4,840
METRO W15	318
METRO W19	358
MTA 610	835
MTA 620	830
MTA 630	482
MTA 650	655



2014 AADT	Trucks	Peak Hour Traffic
27,000 - 70,000 vpd	4% - 7%	7% - 8%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	5	7
LOS E	3	2
LOS F	4	3

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	6.5 / 7.7	10.2 / 6.7
LOS E	0.0 / 1.8	0.0 / 0.0
LOS F	3.7 / 0.7	0.0 / 3.5

LOS 'E' Intersections

MD 210 at Old Fort Rd (South) (AM,PM)
MD 210 at Farmington Rd (AM)
MD 210 at MD 373 / Livingston Rd (PM)
MD 210 at Swan Creek Rd / Livingston Rd (AM)

LOS 'F' Intersections

MD 210 at Livingston Rd / Kerby Hill Rd (AM, PM)
MD 210 at Livingston Rd / Palmer Rd (AM, PM)
MD 210 at Wilson Bridge Dr (AM,PM)
MD 210 at MD 373 / Livingston Rd (AM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB NB	TTI AM EB SB	TTI PM WB NB	TTI PM EB SB	PTI AM WB NB	PTI AM EB SB	PTI PM WB NB	PTI PM EB SB
Urban Freeway Expressway	I-495/I-95 - Livingston Rd. /Kerby Hill Rd.	1.8								W
	Livingston Rd. /Kerby Hill Rd. - Palmer Rd.	1.0	I			I	I			I
	Palmer Rd. - Old Fort Rd.	0.7	W			I	I			I
	Old Fort Rd. - Fort Washington Rd.	0.9	W				W			
	Fort Washington Rd. - Livingston Rd. /Swan Creek Rd.	1.1	W				W			
	Livingston Rd/Swan Creek Rd. - Washington Ln.	0.8								
	Washington Ln. - Farmington Rd.	2.1								
	Farmington Rd. - Livingston Rd. (MD-373)	1.4								
	Livingston Rd. (MD-373)- Berry Rd. (MD-228)	0.5								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 214

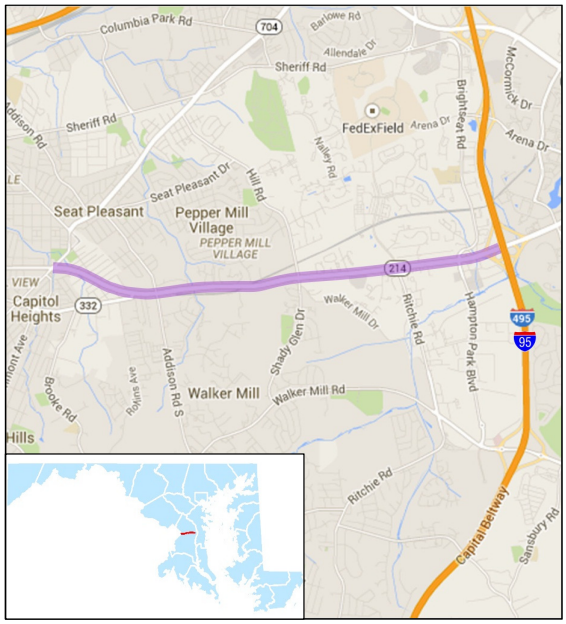
Limits:	Washington DC Line to I-95
Corridor Length:	10.9 miles
Speed Limit:	30 - 40 MPH
Travel Lanes:	(2 - 3) Eastbound 3 Westbound
Signal Controlled Intersections:	9
Grade Separated Interchanges:	1
Major Cross Streets:	Southern Ave SE, Addison Rd S, Shady Glen DR / Hill Rd, Garret A Morgan Blvd / Ritchie Rd, Brightseat Rd / Hampton Park Blvd, I-95

Routes and Ridership

METRO Routes	Avg. Daily Ridership
A11, A12	3,020
C21, C22, C29	2,590
F14	2,493

The Bus Routes	Avg. Daily Ridership
22	316
23	569
24	1,034
25	222
26	551

Silver / Blue Line Routes	Avg. Daily Ridership
Morgan Blvd	2,317
Addison Rd	3,266
Capitol Heights	2,102



2014 AADT	Trucks	Peak Hour Traffic
21,000 - 51,000 vpd	3% - 5%	7.5% - 8.5%

NOTE: The Silver / Blue Line ridership data represents boardings.

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	3	2
LOS E	2	1
LOS F	0	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	10.0 / 7.0	9.1 / 7.3
LOS E	0.9 / 3.9	0.9 / 2.7
LOS F	0.0 / 0.0	0.9 / 0.9

LOS 'E' Intersections

MD 214 at Brightseat Rd / Hampton Park Blvd (AM)
MD 214 at Ritchie Rd / Garret A Morgan Blvd (AM)
MD 214 at Kingdom Square Shopping Center (PM)

LOS 'F' Intersections

MD 214 at Brightseat Rd / Hampton Park Blvd (PM)
MD 214 at Ritchie Rd / Garret A Morgan Blvd (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Southern Ave. - Addison Rd.	0.9								W
	Addison Rd. - Hill Rd./Shady Glen Dr.	1.1								
	Hill Rd./Shady Glen Dr. - Ritchie Rd.	0.8								
	Ritchie Rd. - I-495/I-95	0.9					W			
	I-495/I-95 - MD-202/Landover Rd./Largo Rd	0.9								W
	MD-202/Landover Rd/Largo Rd. - MD-193/Watkins Park Dr/Enterprise Rd.	2.1								
	MD-193/Watkins Park Dr/Enterprise Rd. - Church Rd.	1.9								
	Church Rd. - US-301 Crain Hwy	2.3								

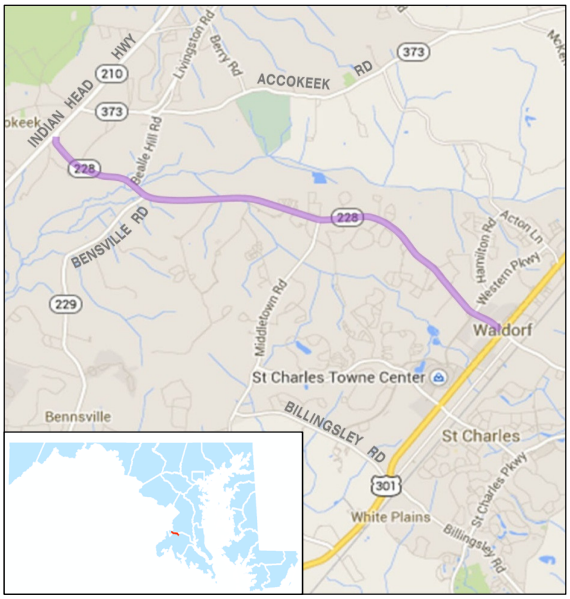
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 228

Limits:	MD 210 to US 301
Corridor Length:	6.8 miles
Speed Limit:	35 - 50 MPH
Travel Lanes:	(2 - 3) Eastbound 2 Westbound
Signal Controlled Intersections:	11
Grade Separated Interchanges:	0
Major Cross Streets:	MD 210, MD 229, US 301



Routes and Ridership	Routes	Avg. Daily Ridership
	MTA 610	835
	MTA 620	830
	MTA 630	482
	MTA 650	655

2014 AADT	**Trucks**	**Peak Hour Traffic**
38,000 - 39,000 vpd	2% - 4%	8%

Intersection Operations

Signalized Intersections*:	**AM Peak Hour**	**PM Peak Hour**
LOS D or Better	4	4
LOS E	1	0
LOS F	0	1

Segment Operations

Level of Service	**Northbound AM / PM (Miles of Roadway)**	**Southbound AM / PM (Miles of Roadway)**
LOS D or Better	6.8 / 2.3	6.8 / 6.8
LOS E	0.0 / 3.0	0.0 / 0.0
LOS F	0.0 / 1.5	0.0 / 0.0

LOS 'E' Intersections

MD 228/MD 5 Bus at US 301 (AM)

LOS 'F' Intersections

MD 228/MD 5 Bus at US 301 (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	**Roadway Segment North to South**	**Length (miles)**	**TTI** AM WB/NB	AM EB/SB	PM WB/NB	PM EB/SB	**PTI** AM WB/NB	AM EB/SB	PM WB/NB	PM EB/SB
Urban Other Principal Arterial	Indian Head Hwy (MD-210) - Manning Rd	0.5								
	Manning Rd - Bensville Rd (MD-229)	1.0								
	Bensville Rd (MD-229) - Bunker Hill Rd.	1.3								
	Bunker Hill Rd. - Middletown Rd./Ironwood Dr.	1.0								
	Middletown Rd./Ironwood Dr. - Western Pkwy	2.6								
	Western Pkwy - Crain Highway (US-301)	0.4								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

MD 355

Limits:	Washington DC Line to MD 27
Corridor Length:	19.7 miles
Speed Limit:	25 - 45 MPH
Travel Lanes:	(2 - 4) Northbound (2 - 4) Southbound
Signal Controlled Intersections:	80
Grade Separated Interchanges:	3
Major Cross Streets:	MD 191, MD 410, MD 547, MD 187, Montrose Pkwy, MD 28, Shady Grove Rd, I-370, MD 117, MD 124, Middlebrook Rd, MD 118, MD 27

Routes and Ridership

Ride On Routes	Avg. Daily Ridership
Ride On 5	1,862
Ride On 30	713
Ride On 46	3,405
Ride On 55	7,622
Ride On 59	3,823
Ride On 67	128
Ride On 75	504
Ride On 81	189
Ride On 83	505

Red Line Routes	Avg. Daily Ridership
Shady Grove	1,265
Rockville	4,552
Twinbrook	4,310
White Flint	3,719
Grosvenor	5,516
Medical Center	5,877
Bethesda	10,420

2014 AADT	Trucks	Peak Hour Traffic
11,000 - 66,000 vpd	2% - 4%	7.5% - 8.5%

NOTE: The Red Line ridership data represents boardings.

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	54	55
LOS E	3	3
LOS F	3	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	9.5 / 4.6	9.8 / 2.5
LOS E	6.4 / 6.6	3.2 / 6.5
LOS F	3.8 / 8.5	6.7 / 10.7

LOS 'E' Intersections

MD 355 at Edmonston Dr / W. Edmonston Dr (AM)
MD 355 at Mannakee St (AM)
MD 355 at MD 124 (AM)
MD 355 at E. Middle Ln/Park Rd (PM)
MD 355 at Middlebrook Rd (PM)
MD 355 at Shady Grove Rd (PM)

LOS 'F' Intersections

MD 355 at Cedar Ln (AM,PM)
MD 355 at East & West Gude Dr (AM)
MD 355 at MD 124 (PM)
MD 355 at Shady Grove Rd (AM)

* Avaialable count data.

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	Ridge Rd. (MD-27) -Germantown Rd. (MD-188)	0.9					W		W	
	Germantown Rd. (MD-188) - Middlebrook Road	0.8					W	W	W	W
	Middlebrook Road - Christopher Ave.	2.3							W	W
	Christopher Ave. - Montgomery Village Ave (MD-124)	0.3						W		W
	Montgomery Village Ave. (MD-124) - Odendhal Ave.	0.4				W				W
	Odendhal Ave - Summit Ave.	1.0							W	W
	Summit Ave. - Shady Grove Rd./ I-370	1.2								W
	Shady Grove Rd./ I-370 - Redland Blvd.	1.0								W
	Redland Blvd. - Gude Dr.	0.8		I				I		
	Gude Dr. - Washington St.	1.0						I	W	
	Washington St. - Veirs Mill Rd/ Jefferson St (MD-28)	0.9		I				I		W
	Veirs Mill Rd/ Jefferson St (MD-28) - Wootton Pkwy (MD-911)	0.4						W		W
	Wootton Pkwy (MD-911) - Montrose Pkwy	2.1								
	Montrose Pkwy - Strathmore Ave (MD-547)	1.3					W			
	Strathmore Ave (MD-547) -Grosvenor Lane	0.9							W	
	Grosvenor Lane - I-495	0.3								
	I-495 - Cedar Lane	0.9		I				I	W	W
	Cedar Lane - Jones Bridge Rd.	0.6					W		W	
	Jones Bridge Rd - Montgomery Lane(MD-410)	0.9					W		W	W
	Montgomery Lane(MD-410) - Bradley Blvd./ Lane (MD 191)	0.5	W	W	W	W	W	W	W	W
	Bradley Blvd./ Lane (MD 191) - Dorset Ave	0.7					I		W	W
	Dorset Ave. - DC Line	0.5								

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

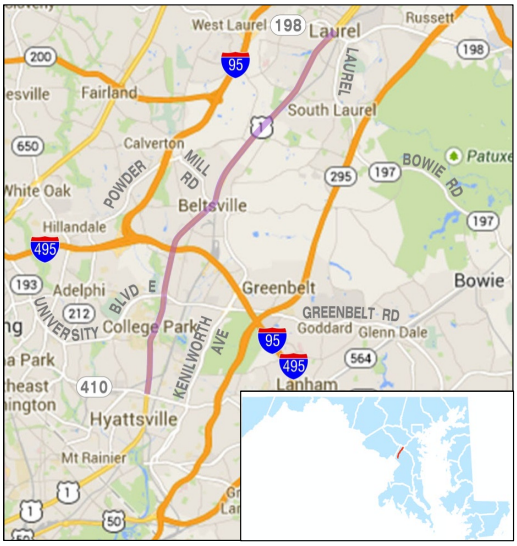
US 1

Limits:	MD 410 to MD 198
Corridor Length:	10.7 miles
Speed Limit:	35 - 50 MPH
Travel Lanes:	(2 - 4) Northbound (2 - 4) Southbound
Signal Controlled Intersections:	40
Grade Separated Interchanges:	3
Major Cross Streets:	MD 410, MD 193, I-95, Rhode Island Ave, Ewing Rd, MD 212, Muirkirk Rd, Contee Rd, Cherry Lane

Routes and Ridership

Routes	Avg. Daily Ridership
Green Line Greenbelt	6,259
Green Line College Park	4,452
METRO 81, 83, 86	4,445
METRO 87, 88	735
METRO 89, 89M	886
The Bus Route 17	588

NOTE: The Green Line ridership data represents boardings



2014 AADT	Trucks	Peak Hour Traffic
19,000 - 49,000 vpd	3% - 6%	6.5% - 8%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	20	20
LOS E	0	1
LOS F	1	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	7.7 / 1.8	8.0 / 1.7
LOS E	2.4 / 3.6	2.7 / 3.5
LOS F	0.6 / 5.3	0.0 / 5.5

LOS 'E' Intersections

US 1 (NB/L) at MD 198 (Talbot Ave) (PM)

LOS 'F' Intersections

US 1 at Cherry Hill Rd (AM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB NB	TTI AM EB SB	TTI PM WB NB	TTI PM EB SB	PTI AM WB NB	PTI AM EB SB	PTI PM WB NB	PTI PM EB SB
Urban Other Principal Arterial	Gorman Ave (MD-198) - Cherry Ln.	0.6							W	
	Cherry Ln. - Cypress St.	0.7								W
	Cypress St. - Contee Rd.	0.5								
	Contee Rd. - Muirkirk Rd.	1.3								
	Muirkirk Rd. - Ritz Way	0.4								
	Ritz Way - Powder Mill Rd. (MD-212)	1.8								
	Powder Mill Rd. (MD-212) - Rhode Island Ave.	0.6						W		W
	Rhode Island Ave. - I-495/I-95	1.0						I		
	I-495/I-95 - Cherry Hill Rd.	0.3								
	Cherry Hill Rd. - Greenbelt Rd./ Metzerott Rd.	1.1								
	Greenbelt Rd./ Metzerott Rd. - Campus Dr./ Painted Branch Pkwy	0.7						W		W
	Campus Dr./ Painted Branch Pkwy - Guilford Rd/Dr	0.8					W		W	
	Guilford Rd/Dr - East West Hwy (MD-410)	0.9								

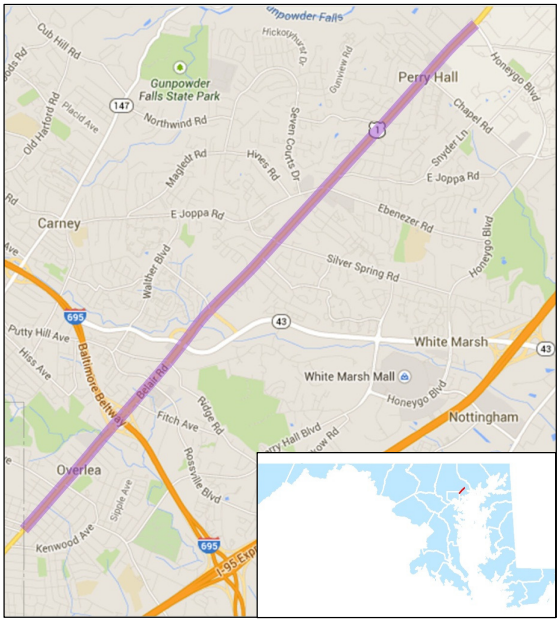
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

US 1

Limits:	Baltimore City Line to Honeygo Blvd
Corridor Length:	5.6 miles
Speed Limit:	35 - 40 MPH
Travel Lanes:	(2 - 3) Northbound (2 - 3) Southbound
Signal Controlled Intersections:	23
Grade Separated Interchanges:	2
Major Cross Streets:	Fleetwood Ave / Spruce St, Taylor Ave, Fullerton Ave, I-695, Rossville Blvd, Putty Hill Ave / Ridge Rd, MD 43, Silver Spring Rd, E. Joppa Rd / Ebenezer Rd, Honeygo Blvd



Routes and Ridership	Routes	Avg. Daily Ridership
	METRO 15	14,006
	METRO 15x	256
	METRO 47	1,365
	METRO 58	2,128

2014 AADT	Trucks	Peak Hour Traffic
24,000 - 37,000 vpd	2% - 3%	7.5% - 8.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	11	11
LOS E	0	0
LOS F	0	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	2.9 / 0.0	0.6 / 1.7
LOS E	1.9 / 4.8	3.5 / 3.9
LOS F	0.8 / 0.8	1.5 / 0.0

LOS 'E' Intersections

LOS 'F' Intersections

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB NB	TTI AM EB SB	TTI PM WB NB	TTI PM EB SB	PTI AM WB NB	PTI AM EB SB	PTI PM WB NB	PTI PM EB SB
Urban Other Principal Arterial	Chapel Rd. - Joppa Rd.	1.3						W		
	Joppa Rd. - Silver Spring Rd.	0.6							W	W
	Silver Spring Rd. - Whitemarsh Blvd. (MD-43)/Dunfield Rd.	1.2						W		
	Whitemarsh Blvd. (MD-43)/Dunfield Rd. - Rossville Blvd.	0.8			W		W	W	W	
	Rossville Blvd. - I-695	0.4							W	
	I-695 - Fullerton Ave.	0.7						W		
	Fullerton Ave. - Fleetwood Ave.	0.6								W

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

US 29

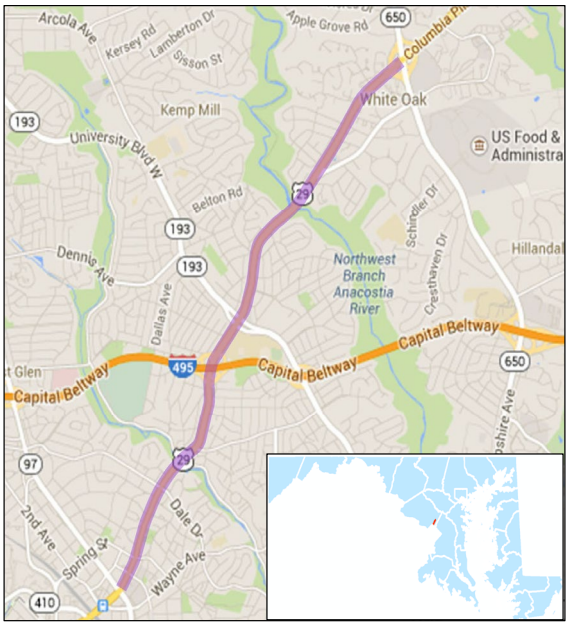
Limits:	MD 97 to MD 650
Corridor Length:	3.8 miles
Speed Limit:	35 - 45 MPH
Travel Lanes:	(3 - 4) Northbound (2 - 4) Southbound
Signal Controlled Intersections:	13
Grade Separated Interchanges:	2
Major Cross Streets:	MD 97, Spring St / Cedar St, Dale Dr, Sligo Creek Pkwy / St Andrews Way, I-495, MD 193, Lockwood Dr, MD 650

Routes and Ridership

Ride On Routes	Avg. Daily Ridership	METRO Routes	Avg. Daily Ridership
Ride On 8	660		
Ride On 9	1,272	Z2	969
Ride On 13	247	Z6	3,027
Ride On 14	953	Z8	3,237
Ride On 21	229	Z9, Z29	770
Ride On 22	395	Z11, Z13	855

MTA Routes

Through August 31	Avg. Daily Ridership	Beginning September 1	Avg. Daily Ridership
MTA 915	761	MTA 305	692
MTA 929	827	MTA 315	513
MTA 995	951	MTA 325	303



2014 AADT	Trucks	Peak Hour Traffic
33,000 - 66,000 vpd	4% - 7%	7.5% - 8%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	13	14
LOS E	3	2
LOS F	0	0

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	2.8 / 0.5	0.0 / 0.0
LOS E	0.7 / 2.0	1.2 / 2.8
LOS F	0.3 / 1.3	2.6 / 1.0

LOS 'E' Intersections

US 29 at Lockwood Dr/Ent. To Choice Center (AM,PM)
US 29 at Southwood Ave (AM, PM)
US 29 at MD 193 (EB/L) (AM)

LOS 'F' Intersections

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM NB	TTI AM SB	TTI PM NB	TTI PM SB	PTI AM NB	PTI AM SB	PTI PM NB	PTI PM SB
Urban Other Principal Arterial	New Hampshire Ave. (MD-650) - Lockwood Dr.	0.9							W	
	Lockwood Dr. - University Blvd. (MD-193)	1.1								
	University Blvd. (MD-193) - I-495	0.3				W				
	I-495 - Franklin Ave.	0.5								W
	Franklin Ave. - Dale Dr.	0.3		I					W	
	Dale Dr. - Cedar St./Spring St.	0.5							W	W
	Cedar St./Spring St. - Georgia Ave. (MD-97)	0.2								

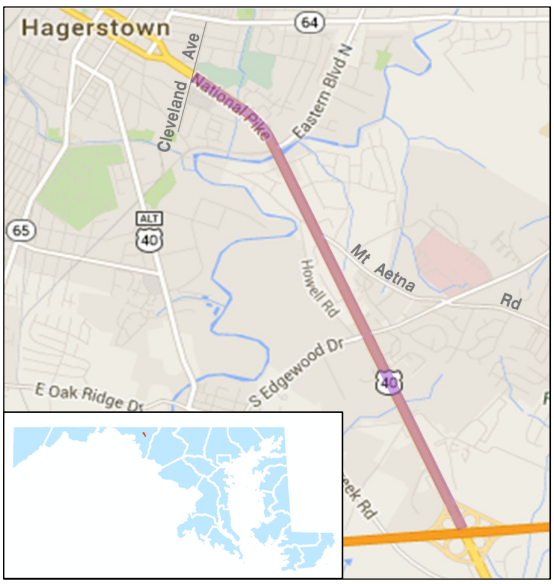
I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

US 40

Limits:	I-70 to Cleveland Ave
Study Area Length:	3.4 miles
Speed Limit:	35 - 45 MPH
Travel Lanes:	(2 - 3) Northbound (2 - 3) Southbound
Signal Controlled Intersections:	6
Grade Separated Interchanges:	1
Major Cross Streets:	I-70, Edgewood Dr, Mt. Aetna Rd, Eastern Blvd, Cleveland Ave



Routes and Ridership	Routes	Avg. Daily Ridership
	N/A	N/A

2014 ADT	**Trucks**	**Peak Hour Traffic**
26,000 - 38,000 vpd	3% - 4%	7.5% - 8.5%

Intersection Operations

Signalized Intersections*:	**AM Peak Hour**	**PM Peak Hour**
LOS D or Better	0	0
LOS E	0	0
LOS F	0	0

Segment Operations

Level of Service	**Northbound AM / PM (Miles of Roadway)**	**Southbound AM / PM (Miles of Roadway)**
LOS D or Better	1.6 / 1.6	1.0 / 2.0
LOS E	1.8 / 1.1	2.4 / 1.4
LOS F	0.0 / 0.7	0.0 / 0.0

LOS 'E' Intersections

LOS 'F' Intersections

Color Key

TTI	**PTI**
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	**Roadway Segment North to South**	**Length (miles)**	**TTI AM NB**	**TTI AM SB**	**TTI PM NB**	**TTI PM SB**	**PTI AM NB**	**PTI AM SB**	**PTI PM NB**	**PTI PM SB**
Urban Other Principal Arterial	Cannon Ave (MD-64) - Cleveland Ave.	0.3							W	
	Cleveland Ave. - Eastern Blvd.	0.6			W		W	W	W	
	Eastern Blvd. - Mt. Aetna Rd./ Birch Knoll Rd.	0.5								
	Mt. Aetna Rd./ Birch Knoll Rd - Edgewood Dr.	0.7			W			W	W	
	Edgewood Dr. - I-70	1.3						W		

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

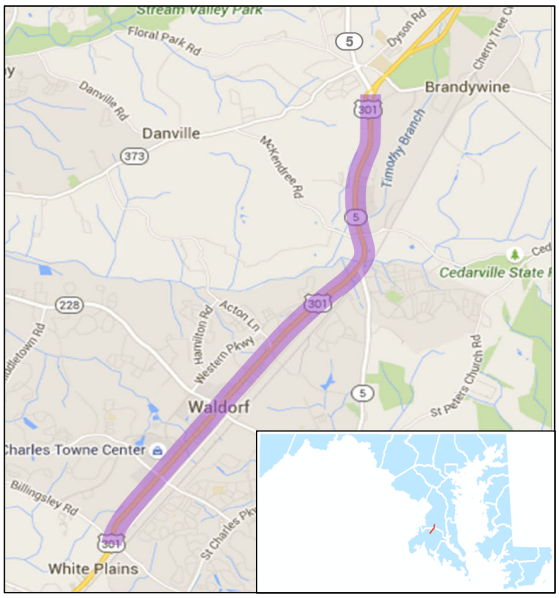
PTI: planning time index (95th percentile travel time / freeflow travel time) TTI: travel time index (50th percentile travel time / freeflow travel time)

US 301

Limits:	Billingsley Rd to MD 5
Corridor Length:	7.8 miles
Speed Limit:	45 - 55 MPH
Travel Lanes:	(2 - 4) Northbound (2 - 4) Southbound
Signal Controlled Intersections:	16
Grade Separated Interchanges:	0
Major Cross Streets:	Billingsley Rd, Smallwood Dr, MD 228, Acton Ln, MD 5, Cedarville Rd/McKendree Rd

Routes and Ridership

MTA Routes			
Through October 31	Avg. Daily Ridership	Beginning November 1	Avg. Daily Ridership
		MTA 705	901
		MTA 715	661
MTA 905	1,734	MTA 725	280
MTA 909	314	MTA 735	436



2014 AADT	Trucks	Peak Hour Traffic
37,000 - 95,000 vpd	6% - 12%	7.5%

Intersection Operations

Signalized Intersections*:	AM Peak Hour	PM Peak Hour
LOS D or Better	15	12
LOS E	1	2
LOS F	0	2

Segment Operations

Level of Service	Northbound AM / PM (Miles of Roadway)	Southbound AM / PM (Miles of Roadway)
LOS D or Better	5.4 / 3.1	1.7 / 5.9
LOS E	0.5 / 3.0	5.7 / 0.0
LOS F	1.9 / 1.7	0.4 / 1.9

LOS 'E' Intersections

US 301 at MD 5 Bus / MD 228 (AM)

US 301 at Cedarville Rd/McKendree Rd (PM)

US 301 at Chadds Ford Dr/Timothy Branch Dr (PM)

LOS 'F' Intersections

US 301 at MD 5 Bus / MD 228 (PM)

US 301 at Clymer Dr / Matapeake Business Dr (PM)

Color Key

TTI	PTI
1.00 - 1.15	1.0 - 1.5
1.15 - 1.30	1.5 - 2.5
1.30 - 2.00	> 2.5
> 2.00	
No data	

* Avaialable count data.

Functional Class	Roadway Segment North to South	Length (miles)	TTI AM WB NB	TTI AM EB SB	TTI PM WB NB	TTI PM EB SB	PTI AM WB NB	PTI AM EB SB	PTI PM WB NB	PTI PM EB SB
Rural Other Principal Arterial	Branch Ave. (MD-5) - Timothy Branch/Chadds Ford Dr.	1.1			I	W	W			W
	TmthyBranch/ChaddsFordDr-CedarvilleRd/McKendreeRd	0.8								
	CedarvilleRd./McKendree Rd.-MattawmnBeantownRd(MD-5)	0.5		I	I	I	W	I		
Urban Other Principal Arterial	Mattawoman Beantown Rd. (MD-5) - Sub-Station Rd.	0.4	I		W		I	W	W	
	Sub-Station Rd. - Acton Ln.	1.3		I	I		I		I	
	Acton Ln. - Berry Rd. (MD-228)/Leonardtown Rd. (Bus-5)	1.2								
	Berry Rd. (MD-228)/Leonardtown Rd. (Bus-5)-St Patricks Dr.	0.7		W				W		
	St Patricks Dr. - Smallwood Dr.	0.6								
	Smallwood Dr. - Billingsley Rd.	1.2		I				I		

I = Improvement from 2014 W = Worsened from 2014 (blank) = No significant change from 2014

PTI: planning time index (95th percentile travel time / freeflow travel time)

TTI: travel time index (50th percentile travel time / freeflow travel time)

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C. 2014 Capital Project Fact Sheets

MD 145 West of MD 146

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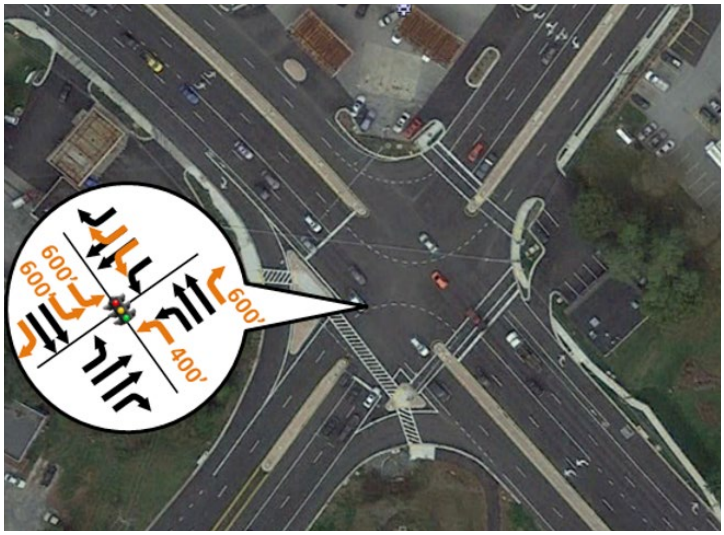
BEFORE - MD 175/ROCKENBACH ROAD



AFTER

BEFORE - MD 175/DISNEY ROAD

AFTER

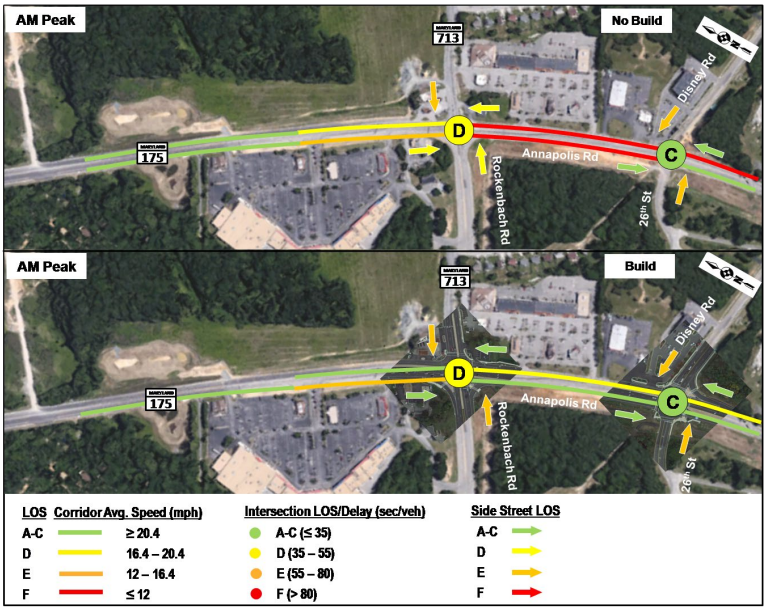
MD 175 (Annapolis Road) at Rockenbach Road and Disney Road

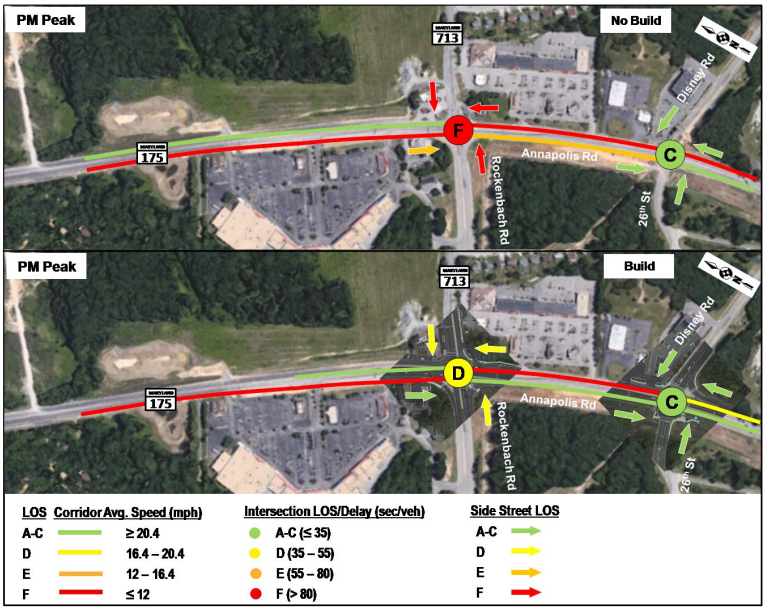
LOCATION: ANNAPOLIS JUNCTION, ANNE ARUNDEL COUNTY

Capacity improvements were constructed at the MD 175/Rockenbach Road and MD 175/Disney Road intersections and along MD 175, west of Rockenbach Road. Mainline improvements, west of Rockenbach Road,included widening from a two lane roadway to a four lane roadway. Intersection improvements included:

- MD 175/Rockenbach Road: Constructing an additional left turn lane and an exclusive right turn lane along MD 175 in both directions. MD 175 eastbound right turn lane was improved from a yield condition to a free flow right.
- MD 175/Disney Road: Constructing an additional MD 175 eastbound left turn lane and MD 175 westbound right turn lane.
- A bike lane was provided along MD 175 in each direction between McCarron Ct/Ballentines Way and MacArthur Road.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$3,976	$2,982	$73	$281	$10.7	11.5





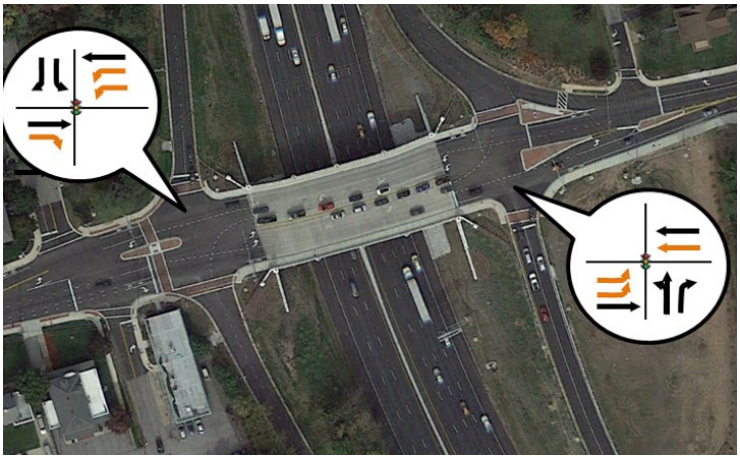
Intersection Details

- MD 175 and Rockenbach Road operated at LOS 'F' during PM peak.
- Rockenbach Road approach operated at LOS 'E' and 'F' during AM and PM peak respectively.
- AM and PM peak hours have significant queuing along westbound MD 175 at MD 713.

Benefits

- PM peak overall LOS has improved from 'F' to 'D' and side street approaches improved from 'F' to 'D' for MD 175 and MD 713 intersection.
- PM delay decreased by 60%.
- Network AM and PM peak travel time decreased by 43% and 10% respectively.
- AM and PM peak WB MD 175 thru queues at MD 713 reduced by approximately 580 ft and 790 ft respectively.
- AM peak EB MD 175 thru queue at MD 713 reduced by approximately 200'.
- PM peak WB MD 175 left queue at MD 713 reduced by 515'.
- AM and PM peak EB MD 175 left queues at Disney Road reduced by approximately 275' and 185' respectively.
- AM and PM peak EB MD 175 thru queues at Disney Road reduced by approximately 465' and 420' respectively.
- Network AM and PM peak average speeds improved by 8 mph and 1 mph respectively.

BEFORE



AFTER

I-695 at MD 144 (Frederick Road)

LOCATION: CATONSVILLE, BALTIMORE COUNTY

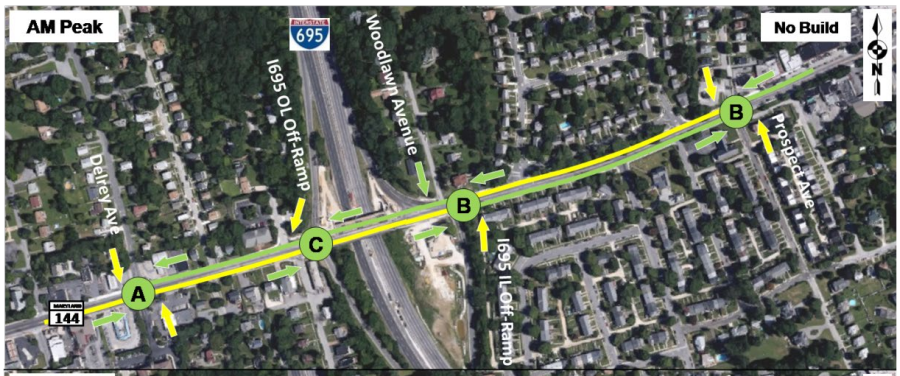
The purpose of the project was to replace a structurally deficient bridge and to improve safety, traffic operations and consolidate access points. The project also allows for the ultimate I-695 Baltimore Beltway widening.

This project involved the reconstruction of the MD 144 bridge over I-695, the relocation of the off ramp from the I-695 inner loop to MD 144 and the addition of left-turn lanes in both directions on MD 144, installing a new traffic signal system, and providing bicycle and pedestrian enhancements.

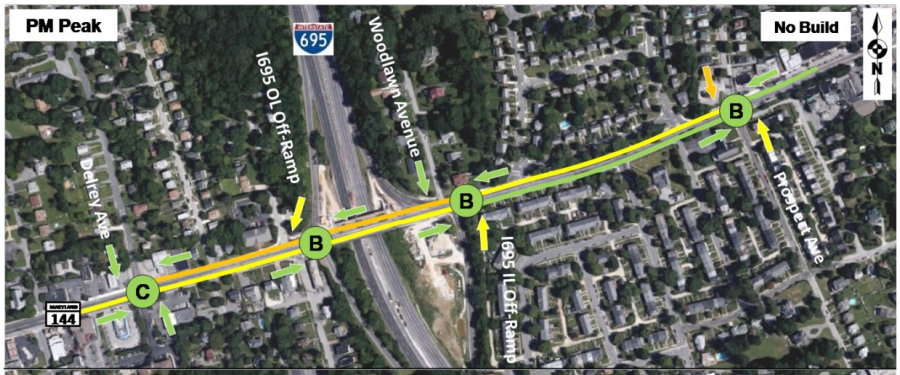
Benefits

- AM and PM peak delay decreased by 25% and 23% respectively at MD 144 and I-695 Outerloop intersection.
- AM peak travel time decreased by 7%.
- AM peak thru queue along eastbound MD 144 at I-695 Outerloop intersection reduced by approximately 325 ft.
- PM peak thru queue along eastbound MD 144 at I-695 Outerloop intersection reduced by approximately 215 ft.
- PM peak thru queue along westbound MD 144 at I-695 Innerloop intersection reduced by approximately 250 ft.
- AM peak average speed improved by 1 mph.

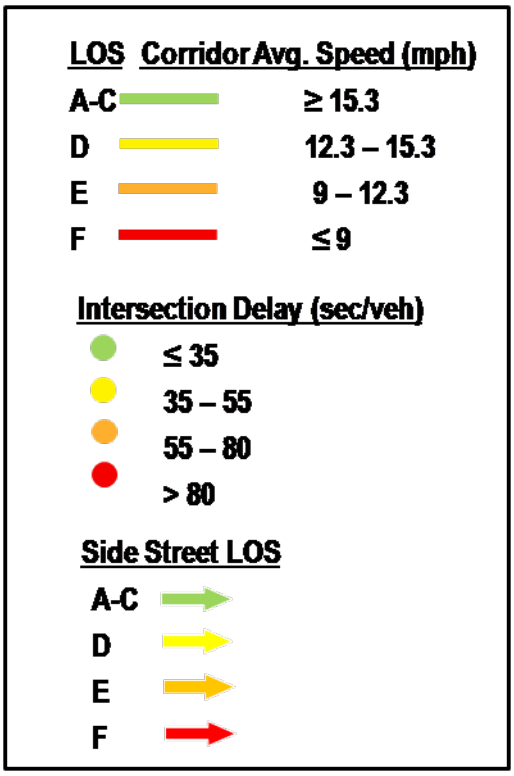
Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$93	$69	$2	$75	$13.7	0.3


AM Peak
No Build
695
Woodlawn Avenue
I695 OL Off-Ramp
Delrey Ave
Prospect Ave
I695 IL Off-Ramp
144
A
B
C
N

AM Peak
Build
695
Woodlawn Avenue
I695 OL Off-Ramp
Delrey Ave
Prospect Ave
I695 IL Off-Ramp
144
A
B
N


PM Peak
No Build
695
Woodlawn Avenue
I695 OL Off-Ramp
Delrey Ave
Prospect Ave
I695 IL Off-Ramp
144
A
B
C
N

PM Peak
Build
695
Woodlawn Avenue
I695 OL Off-Ramp
Delrey Ave
Prospect Ave
I695 IL Off-Ramp
144
A
B
C
N


LOS Corridor Avg. Speed (mph)
A-C ≥ 15.3
D 12.3 – 15.3
E 9 – 12.3
F ≤ 9
Intersection Delay (sec/veh)
≤ 35
35 – 55
55 – 80
> 80
Side Street LOS
A-C
D
E
F

BEFORE

AFTER

I-70 from East Patrick Street to West of South Street/Monocacy Boulevard

LOCATION: FREDERICK, FREDERICK COUNTY

This project completed the widening of I-70 to six lanes from I-270 to US 40 in Howard County including the reconstruction of the South Street/Monocacy Boulevard interchange. This construction addresses substandard roadway elements and improves safety. Previously, the interchange had short acceleration and deceleration lanes, sharp curves, short merging and weaving sections, and missing movements.

The project commenced east of MD 144 (East Patrick Street) and ended west of South Street. The scope of the project included widening of I-70 for approximately one mile (adding one through lane and one auxiliary lane in each direction), ramp realignments/replacements, and adjusting the vertical profile of mainline I-70 and ramps. The project also included the replacement of the two (eastbound and westbound) I-70 bridges and the alignment of two ramps and the relocation of a railroad bridge.

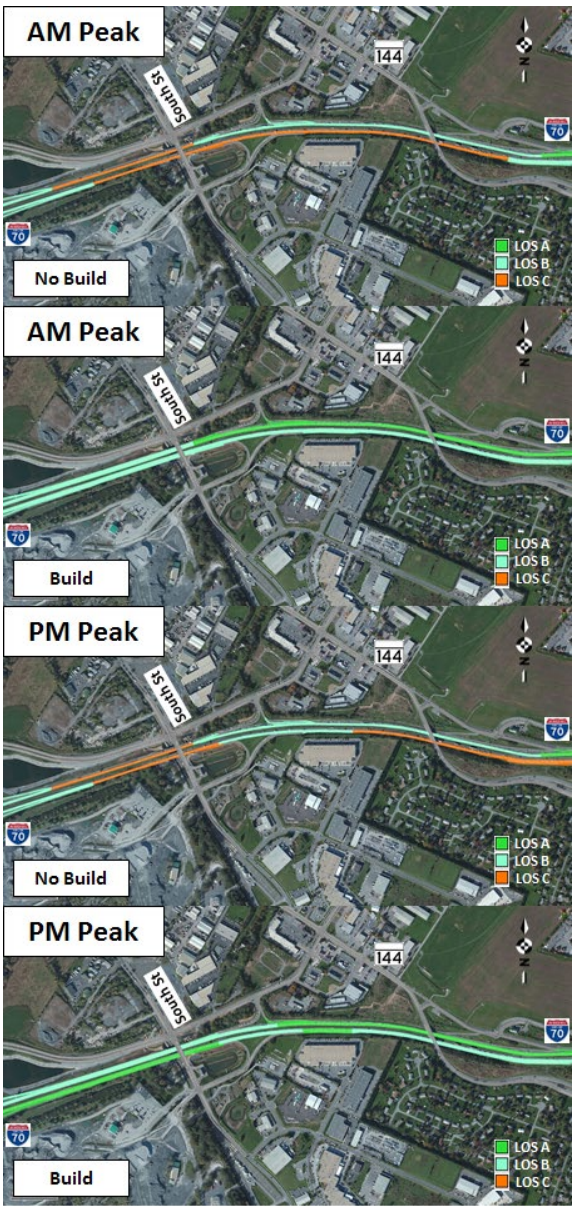
Mainline Operations

- I-70 westbound mainline east of MD 144 improved from LOS 'B' to 'A' during both AM and PM peak hours.
- I-70 westbound mainline east of South St improved from 'B' to 'A' during AM peak hour.
- I-70 eastbound mainline between MD 85/East St and South St improved by two LOS during the PM peak hour.
- I-70 eastbound mainline east of South St improved by one LOS during both AM and PM peak hours.

Ramp Junction Operations

- I-70 westbound merge from Monocacy Blvd improved by one LOS during both AM and PM peak hours.
- I-70 eastbound merge from MD 85/East St improved by one LOS during PM peak hour.
- I-70 eastbound merge from South St/Reich's Ford Road improved by one LOS during both AM and PM peak hours.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$176	$132	$3	$67	$45	0.1



Benefits

- The project provides for a continuous six lanes section along I-70.
- The project eliminates substandard roadway design elements and improves corridor safety.
- The projected reduction in crashes are upwards of 75% due to the improvements ranging from widening, increased acceleration and deceleration lanes, and providing auxiliary lanes.
- The total AM network delay is reduced from 223 hours to 138 hours. The improvement in PM total network delay is 31 hours.

BEFORE

AFTER

US 40 (Pulaski Highway) at MD 715 (Aberdeen Thruway)

LOCATION: ABERDEEN, HARFORD COUNTY

The purpose of this project was to improve safety, reduce congestion and improve access to the Aberdeen Proving Grounds (APG) and was completed to accommodate the projected traffic volumes due to BRAC.

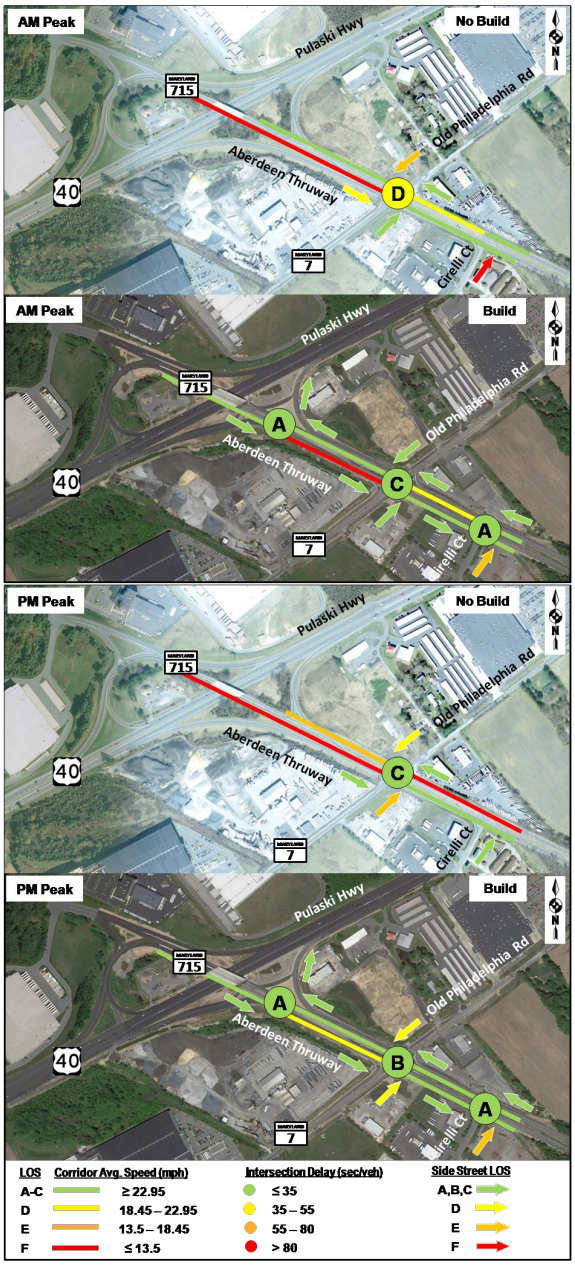
The scope of this project included:

- Upgrading the existing US 40 / MD 715 partial interchange to a full interchange.
- Widening the US 40 eastbound off ramp to MD 715 from one lane to three lanes.
- Improving the MD 715 and MD 7 intersection to provide exclusive thru, right and left movements on Old Philadelphia Road.
- Widening MD 715 from four to six lanes between the bridge over Amtrak and the APG Gate.
- Widening the MD 715 bridge over US 40.
- Restriping lanes along the MD 715 bridge over Amtrak to create three lanes in each direction.

Intersection Details

- MD 715 and MD 7 intersection operated at LOS 'D' during AM peak.
- AM peak hour has significant queuing along eastbound MD 715 at MD 7.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$1,595	$1,196	$30	$27	$20	2.3



Benefits

- AM peak hour overall LOS has improved from 'D' to 'C' for the MD 715 and MD 7 intersection.
- AM peak hour side street approaches for the MD 715 and MD 7 intersection improved from 'E' to 'C'.
- PM delay decreased by 30%.
- AM and PM peak hour travel time decreased by 33% and 55% respectively.
- AM peak hour queue along eastbound MD 715 at MD 7 was reduced.
- PM peak hour queue along westbound MD 715 at MD 7 was reduced.
- AM and PM peak hour thru queue along southbound MD 7 reduced by approximately 61' and 168' respectively.
- Network AM and PM peak hour average speeds improved by 11 mph and 15 mph respectively.

BEFORE

AFTER

US 40 at MD 7 (Philadelphia Road)/MD 159 (Old Philadelphia Road)

LOCATION: ABERDEEN, HARFORD COUNTY

Capacity improvements were provided at this intersection as part of a BRAC project. The MD 7 southbound approach was altered from a left turn lane and shared left/thru/right lane to double left turn lanes, one thru lane, and one channelized right turn lane.

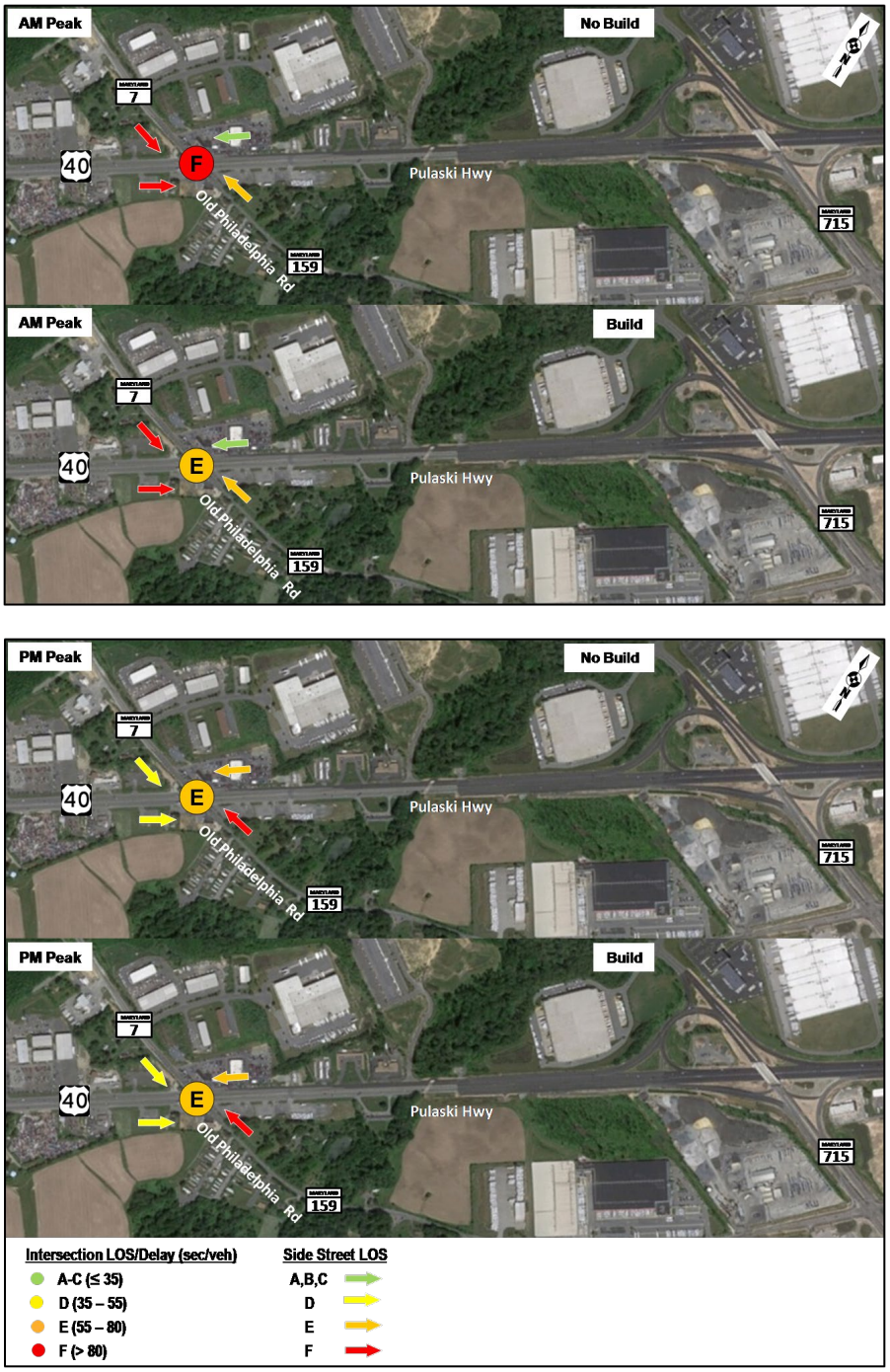
Intersection Details

- The intersection operated at LOS 'F' during AM peak hour.
- Significant queuing along MD 7 southbound occurred in the AM peak hour.

Benefits

- AM peak hour overall LOS has improved from 'F' to 'E'.
- AM delay decreased by 23%.
- AM and PM peak hour queue along southbound MD 7 reduced by 1025 ft and 145 ft, improving safety, thereby reducing the potential for rear-end crashes.
- Network AM and PM peak hour average speeds improved by 4 mph and 2 mph respectively.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$1,092	$819	$19	$24	$1.9	19



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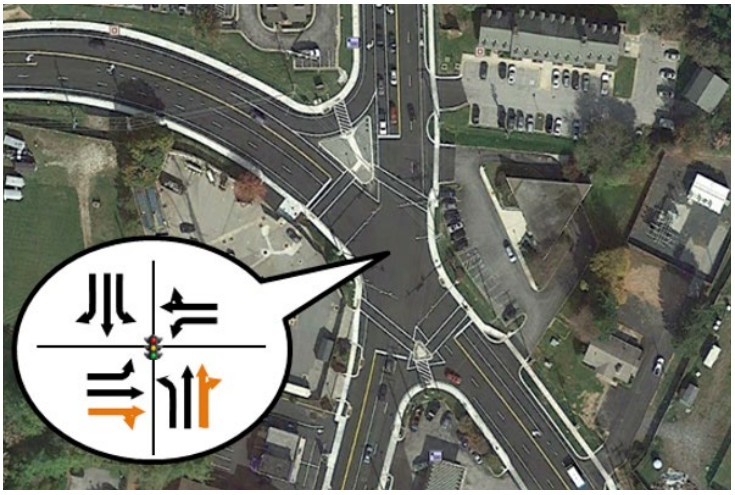


AFTER

MD 145 (Sweet Air Road) at MD 146 (Jarrettsville Pike)

LOCATION: JACKSONVILLE, BALTIMORE COUNTY

The improvements included:

- MD 146 northbound exclusive right turn lane was converted into a shared right/thru lane and this lane was also extended by 400'. A second 700' MD 146 northbound receiving lane on was constructed north of the intersection.
- One 350' thru lane was added to MD 145 eastbound and an 1,100' receiving lane was constructed east of the intersection.
- The MD 145 westbound left lane was extended by 100'.

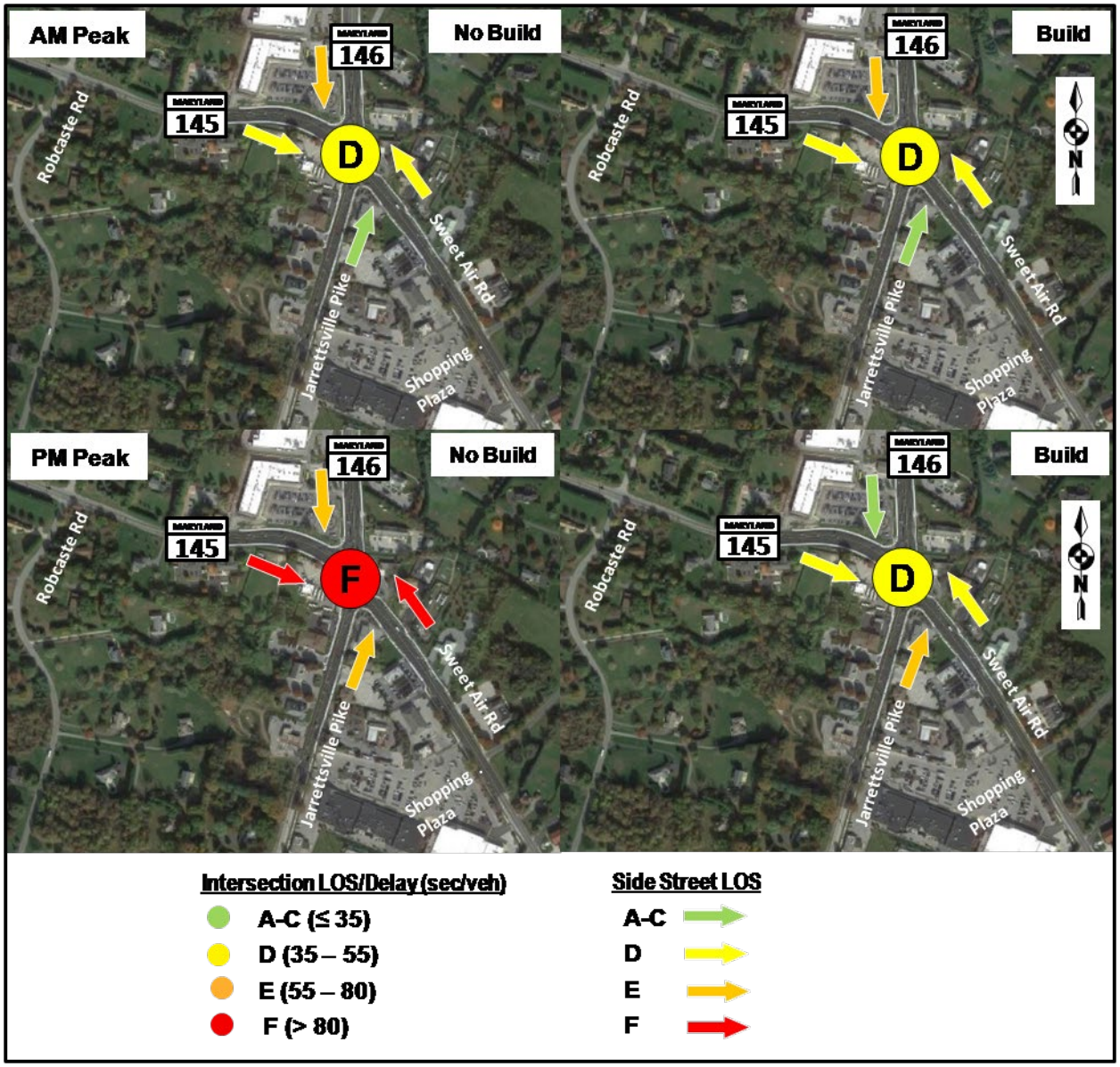
Intersection Details

- The intersection operated at LOS 'F' during PM peak.
- Side street approaches operated at LOS 'E' during PM peak.
- PM has significant queuing along eastbound and westbound MD 145 at MD 146.

Benefits

- PM peak hour overall LOS has improved from 'F' to 'D'.
- PM delay decreased by 43%.
- PM peak hour travel time decreased by 47%.
- PM peak hour thru queues along eastbound and westbound MD 145 at MD 146 reduced by approximately 550' and 750' respectively.
- PM peak hour left queues along westbound MD 145 reduced by approximately 400'.
- Network PM peak average speed improved by 11 mph.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$2,651	$1,989	$48	$1	$2.5	31.2



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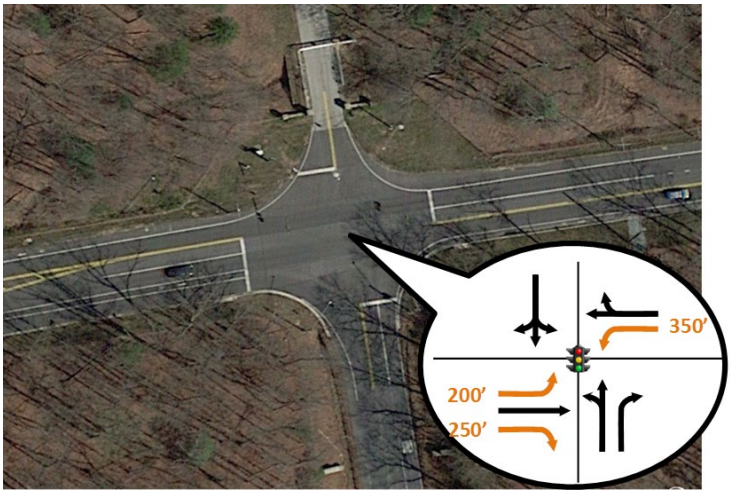


AFTER

MD 197 (Laurel Bowie Road) at Powder Mill Road/American Holly Drive

LOCATION: SOUTH LAUREL, PRINCE GEORGE'S COUNTY

The improvements included:

- Left turn lanes were provided along both MD 197 approaches.
- A right turn lane was provided along MD 197 eastbound.

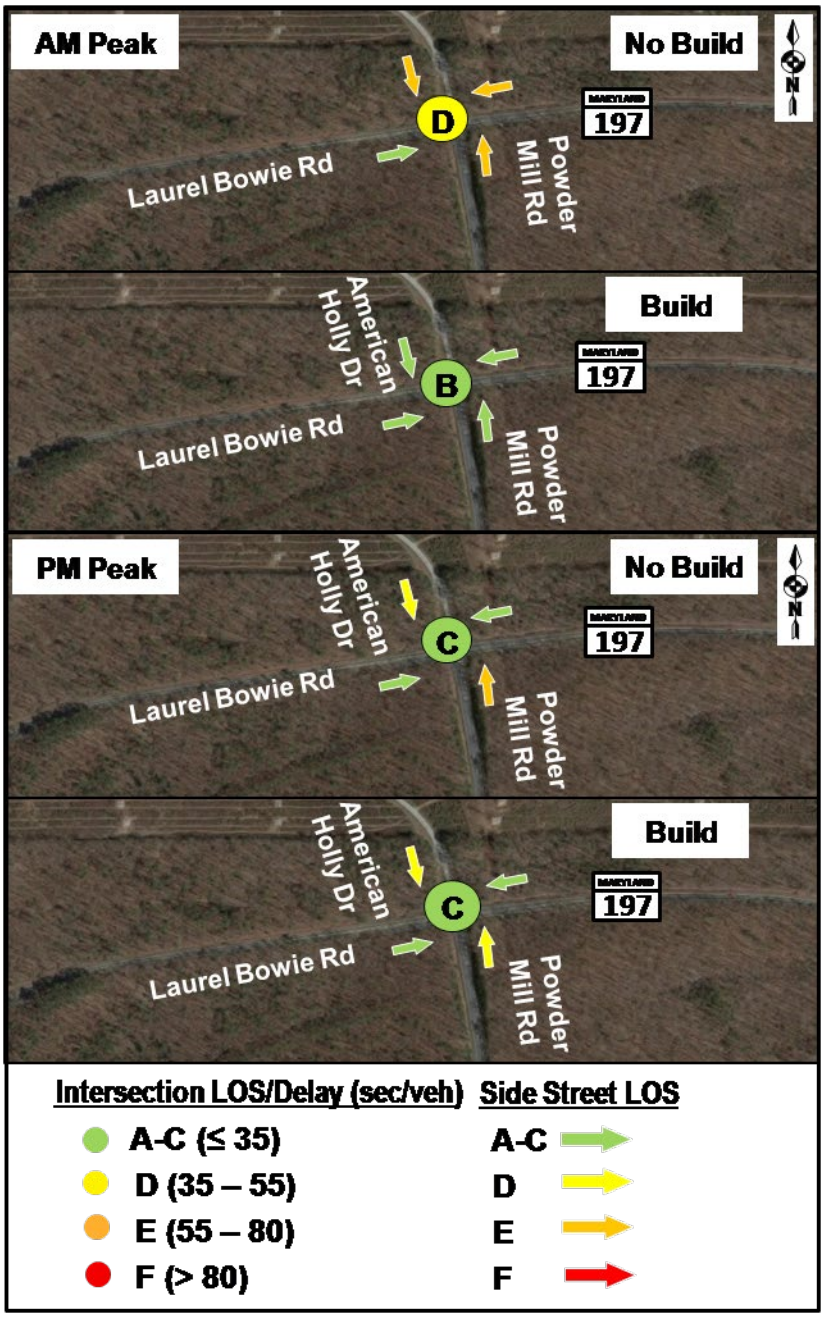
Intersection Details

- The intersection operated at LOS 'D' during AM peak hour.
- Side street approaches operated at LOS 'E' during AM peak hour.
- AM peak hour has significant queuing along westbound MD 197.
- AM and PM peak average speeds are 11 mph and 10 mph respectively.

Benefits

- AM peak hour overall LOS improved from 'D' to 'B'.
- AM peak hour side street approaches improved from LOS 'E' to 'C'.
- AM delay decreased by 77%.
- AM and PM peak hour travel time decreased by 82% and 78% respectively.
- AM and PM peak hour queues along westbound MD 197 at Powder Mill Road were reduced significantly.
- AM and PM peak hour queues along eastbound MD 197 at Powder Mill Road were reduced by approximately 370' and 305' respectively.
- AM and PM peak hour average speeds improved by 17 mph and 15 mph respectively.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$1,886	$1,415	$35	$42	$1.1	51.8



BEFORE

AFTER

US 50 at Seahawk Road/MD 452

LOCATION: BERLIN, WORCESTER COUNTY

This intersection upgrade involved widening:

- US 50 westbound to allow for a 750' second left turn lane.

Intersection Details

- US 50 and Seahawk Road/MD 452 operated at a LOS 'E' during the AM peak.
- AM peak hour has significant queuing along westbound US 50.

Benefits

- AM peak hour overall LOS has improved from 'E' to 'D'
- AM delay decreased by 21%.
- AM and PM peak hour queues along westbound US 50 decreased by 40% and 27% respectively, thereby improving safety, by reducing the potential for rear-end crashes.

Savings Cost (in Thousands)				Cost Estimate (Millions)	Benefit/Cost
Annual Reduction in Delay	Reliability	Reduction in Fuel Consumption	Safety		
$97	$72	$2	$39	$0.7	4.8

FOR FURTHER INFORMATION, PLEASE CONTACT:

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