

Biennial Report 2019

*Surface Transportation
Performance in Virginia*



Office of
INTERMODAL
Planning and Investment

The Honorable Ralph Northam
Members of the General Assembly
Members of the Commonwealth Transportation Board (CTB)

Dear Governor Northam, Members of the General Assembly, and Members of the CTB,

In an effort to remain transparent and accountable in the use of transportation funds, Virginia Code § 33.2-232 requires the Office of Intermodal Planning and Investment (OIPI), an Office of the Secretary of Transportation, to provide a Biennial Report that illustrates these requirements. The enclosed 2019 Biennial Report address the following requirements listed under Virginia Code § 33.2-232:

1. A list of transportation projects approved or modified during the prior fiscal year, including whether each such project was evaluated pursuant to § 33.2-214.1 and the program from which each such project received funding;
2. The results of the most recent project evaluations pursuant to § 33.2-214.1, including a comparison of (i) projects selected for funding with projects not selected for funding, (ii) funding allocated by district and by mode of transportation, and (iii) the size of projects selected for funding;
3. The current performance of the Commonwealth's surface transportation system, the targets for future performance, and the progress toward such targets based on the measures developed pursuant to § 2.2-229;
4. The status of the Virginia Transportation Infrastructure Bank, including the balance in the Bank, funding commitments made over the prior fiscal year, and performance of the current loan portfolio;
5. The status of the Toll Facilities Revolving Account, including the balance in the account, project commitments from the account, repayment schedules, and the performance of the current loan portfolio; and
6. Progress made toward achieving the performance targets established by the Commonwealth Transportation Board.

The Biennial Report is available on the CTB and OIPI websites, and as an official Report to the General Assembly on the Legislative Information System.

The Biennial Report highlights implementation of the SMART SCALE project prioritization process over three rounds of funding allocations, tracks performance of the surface transportation network from 2014-2018, and describes transportation projects and programs designed to provide reliable, efficient, and safe movement of people and goods across the Commonwealth.

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,
Shannon Valentine

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1.0 REPORT PURPOSE AND REQUIREMENTS

In 2018, the General Assembly updated reporting requirements of the Office of Intermodal Planning and Investment (OIPI) and the Virginia Department of Transportation (VDOT), establishing a biennial reporting process for each organization. The purpose of these reports is to ensure transparency and accountability in the use of transportation funds.

The Secretary of Transportation has provided this Report in writing to the Governor, General Assembly, and Commonwealth Transportation Board (CTB). The Report is also available online at ctb.virginia.gov and oipi.virginia.gov.

Each section of the Report fulfills the requirements within the Code of Virginia ([Section 33.2-232](#)¹), including the following information:

- » **Section 2** - Highlights OIPI's roles and responsibilities, and includes a performance snapshot covering the last five years.
- » **Section 3** - Provides an inventory and summary statistics for the Commonwealth's multimodal transportation system.
- » **Section 4** - Summarizes the current Six-Year Improvement Program.
- » **Section 5** - Details the first three rounds of SMART SCALE, Virginia's project prioritization process, including project highlights.
- » **Section 6** - Presents information on surface transportation system performance and targets, highlighting why performance has changed and what we are doing to improve performance.
- » **Section 7** - Summarizes the performance of the Virginia Transportation Infrastructure Bank (VTIB) and Toll Facilities Revolving Account (TFRA).
- » **Technical Appendix** - Presents a performance measure methodology and source summary.

This Report also satisfies the U.S. Department of Transportation requirement for a System Performance Report. The System Performance Report evaluates the condition and performance of Virginia's transportation system with respect to performance measures defined by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) (23 CFR 450.206) and corresponding targets adopted by the CTB. This Report includes statewide performance trends for applicable measures to meet that requirement. In a future companion document, OIPI will provide current performance for trends for each of the 15 metropolitan planning organizations (MPOs) in Virginia.

¹ <https://law.lis.virginia.gov/vacode/title33.2/chapter2/section33.2-232/>



2.0 BIENNIAL REPORT SUMMARY

OIPI Roles and Responsibilities

OIPI is located within the Office of the Secretary of Transportation and was created in 2002 to support and advise the Secretary as chairperson of the CTB. OIPI has three major program areas—VTrans, the state’s long-range transportation plan; SMART SCALE, Virginia’s project prioritization process; and performance management.

OIPI’s goals and responsibilities are specified in § 2.2-229 of the Code of Virginia. The goals are to promote

transparency and accountability of the programming of transportation funds; to ensure that the Commonwealth has a multimodal transportation system; to encourage the use of innovation and best practices to improve the efficiency of the Commonwealth’s surface transportation network; and to promote the coordination between transportation investments and land use planning.

OIPI takes a leadership role across three key steps within the performance-based planning and programming process—Plan, Invest, and Manage. In this role, OIPI convenes stakeholders and engages the public, conducts planning studies and technical analysis, prioritizes investments, and tracks system performance. Recent examples of OIPI’s work include the I-81 and I-95 corridor studies requested by the General Assembly in 2018 and 2019, respectively; completing Round 3 of SMART SCALE by scoring and recommending 134 projects totaling \$869 million in Federal, state, and local funding; and launching in 2019 the development of a new long-range transportation plan, the VTrans Update.



Making the best use of Virginia's limited transportation dollars to ensure Virginia's transportation system will be *Good for Business*, *Good for Communities*, and *Good to Go*.

VTRANS | VIRGINIA'S TRANSPORTATION PLAN

Establish a sustainable, long-term vision for a safe and reliable multimodal surface transportation network



Monitor and evaluate performance of investments to ensure progress is being made and allow for course-corrections



Prioritize capacity, operations, and TDM investments to improve and strengthen the network

Goals and Objectives

Virginia's multimodal transportation network is the platform upon which the economy functions, and our residents capitalize on the unique opportunities in Virginia for employment, education, health care, and recreation. Continued strategic investment in the system helps maintain and grow these opportunities, leverages existing assets, and creates a transportation system resilient to new and emerging trends in how we travel. The VTrans2040 Vision, adopted by the CTB in December 2015, envisions a future in which:

Virginia's transportation system will be Good for Business, Good for Communities, and Good to Go. Virginians will benefit from a transportation system that advances Virginia businesses, attracts a 21st century workforce, and promotes healthy communities where Virginians of all ages and abilities can thrive.

The VTrans Update maintains this vision statement and retains the five distinct goals supporting this vision. The goals communicate the key values driving planning, policy, and investment decisions. Virginia and Federal performance measures are organized within these goals in order to evaluate performance at both the goal and performance measure level.

VTrans Goals



Report Highlights

The Report summarizes all facets of Virginia's diverse, multimodal surface transportation system performance by providing information about recent, ongoing, and planned investments. It is informed by detailed trend analyses that consider internal and external factors while highlighting forward-thinking projects within the Commonwealth to address critical needs. The below highlights and the chart on the next page summarize key findings of this Report.

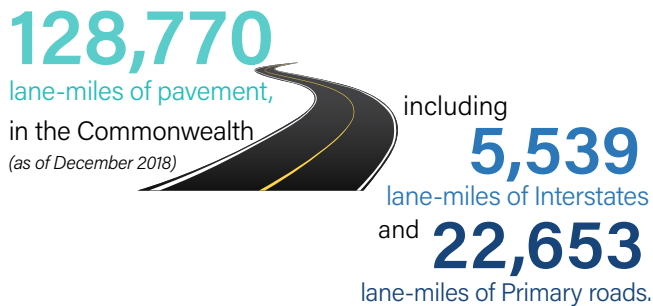
- » **The I-81 and I-95 Corridor Improvement Plans**, along with projects like the Atlantic Gateway, I-95 Express Lanes Fredericksburg Extension (FredEx), and the Hampton Roads Bridge Tunnel (HRBT), will help address congestion and reliability challenges on Virginia's Interstates over the next 10 years.
- » **The DC2RVA project Record of Decision** completes the National Environmental Protection Act (NEPA) process and enables the Department of Rail and Public Transportation (DRPT) and partners to proceed into design and implementation for higher speed and more reliable rail between D.C. and Richmond.
- » **Transit ridership increased across 19 of 41 Virginia operators** in Fiscal Year (FY) 2019, including a 14 percent increase for the Greater Richmond Transit Company (GRTC) due to a bus system redesign and implementation of the Pulse (Broad Street Bus Rapid Transit (BRT)).
- » **Traffic safety is a public health issue in Virginia.** Governor Northam has established the Executive Leadership Team on Highway Safety charged with reducing the rising number of fatalities on Virginia's roadways.
- » **Bridge and pavement condition continue to improve** based on targeted investment by the General Assembly and CTB. VDOT also is required to assess a sustainable approach to maintaining assets, including special structures.
- » **VDOT, DRPT, and Department of Environmental Quality (DEQ) are investing in new technologies** to mitigate emissions (which have decreased over 30 percent since 2014) and greenhouse gases, including EV charging stations and alternative fuel transit and school buses while expanding travel demand management programs and incentives.

Performance Summary

Page	Performance Measures	Direction	Trend
A. Economic Competitiveness and Prosperity:			
22	Congestion—Limited Access	Challenging	Reliability and congestion on Virginia's roadways show declining performance since 2014, with some improvement in 2017 and 2018 compared to 2016.
22	Congestion—Non-Limited Access	Challenging	
24	Travel Time Reliability	Challenging	
26	Passenger Rail On-Time Performance	Maintaining	VRE service continues to operate at 80-90 percent on time, while Amtrak operates around 75 percent on time.
B. Accessible and Connected Places:			
30	Accessibility to Activity Centers	Maintaining	This Report presents baseline 2018 accessibility for driving and transit to identified VTrans activity centers.
33	Transit Ridership	Maintaining	Transit ridership in FY 2019 increased by 0.2 percent, the first annual increase in reported ridership in more than 5 years.
C. Safety For All Users:			
37	Fatalities and Fatality Rate	Challenging	Gradual increase in total fatalities and fatality rate since 2014, with 819 fatalities in 2018. 2018 did show improved performance compared to 2017.
37	Serious Injuries and Serious Injury Rate	Improving	Slight decrease in total serious injuries since 2014, while the serious injury rate has decreased steadily. There were 7,442 serious injuries in 2018.
40	Bicycle and Pedestrian Fatalities and Serious Injuries	Challenging	This measure has remained steady the last five years, with 709 people killed or injured in 2018. Pedestrian fatalities continue to increase in Virginia.
D. Proactive System Management:			
42	Interstate Bridge Condition	Improving	Bridge condition has trended upward since 2014. The Interstate system has the highest percentage of bridges in fair or good condition, while the secondary system has the lowest. Based on current data, all measures are meeting CTB targets.
42	Primary Bridge Condition	Improving	
42	Secondary Bridge Condition	Maintaining	
44	Interstate Pavement Condition	Improving	Since 2014 the share of sufficient lane miles has increased 5.4 percentage points on Interstates and 2.0 percentage points on the Primary system. Based on current data, Interstate and Primary roads meet CTB targets, while Secondary roads fall below the target.
44	Primary Pavement Condition	Improving	
44	Secondary Pavement Condition	Maintaining	
46	Transit Vehicle Condition	Maintaining	The results vary across Virginia's 41 eligible transit operators. In most cases, each operator is meeting or exceeding established targets. Where there are exceptions, operators have established plans to replace fleet vehicles and equipment, or improve facilities in order to improve performance.
46	Transit Equipment Condition	Maintaining	
46	Rail Infrastructure Condition	Maintaining	
46	Transit Facilities Condition	Maintaining	
E. Healthy Communities and Sustainable Transportation Communities:			
50	Vehicle Miles Traveled (VMT) and VMT per Capita	Maintaining	VMT typically has grown faster than population over the last five years, with over 85 billion miles traveled in 2018. Note, VMT per capita did decrease in 2018 for the first time in five years.
52	Electric Vehicle Fleet	Improving	Annual EV registrations have more than doubled since 2014, while the EV share of registrations has remained steady.
54	Statewide On-Road Mobile Emissions	Improving	Clean Air Act controlled pollutants have steadily decreased since 2014, by over 30 percent for all key pollutants.

3.0 MULTIMODAL TRANSPORTATION SYSTEM INVENTORY

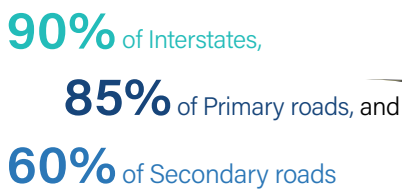
Virginia's Roadways



Through an extensive monitoring effort, VDOT continuously tracks pavement condition to determine the pavement rating, known as the critical condition index.

Any pavement in fair or better condition is considered "sufficient."

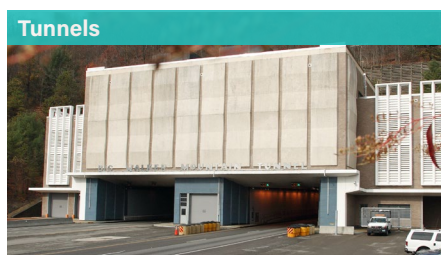
2018 data indicates that:



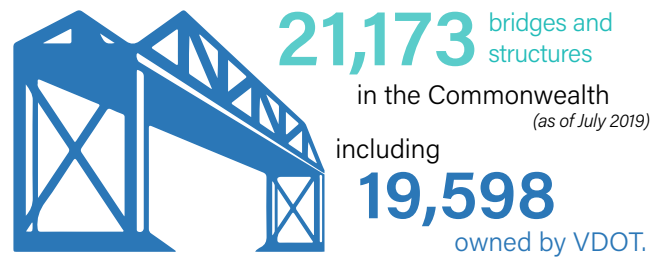
are considered **sufficient**.

Special Structures

As part of its asset management approach, VDOT identified critical structures that, if allowed to deteriorate to poor condition or fail, would pose significant risks to the efficient movement of people and goods. These structures have been assigned the term **Special Structures**, which includes **tunnels, movable bridges, and large complex fixed-span structures**. As of fall 2018, 25 structures throughout the Commonwealth met this definition. These 25 structures were built as recently as one year ago to as far back as 80 years ago.

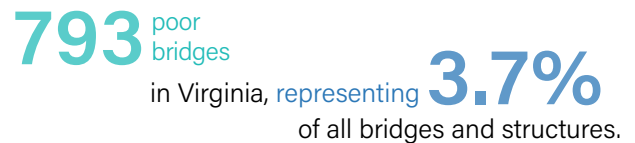


Virginia's Bridges



VDOT conducts between **10,000** and **11,000** bridge inspections each year.

In 2019, there are approximately



Virginia has the 3rd largest state-owned highway network in the United States, trailing only Texas and North Carolina. Virginia also has the 3rd largest state-owned bridge inventory in the United States.

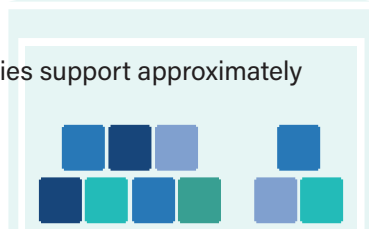
Virginia's Multimodal Freight System

Movement of freight supports over

\$192 billion of Virginia's
26 percent of the entire statewide economy.
Gross State Product annually,

Freight-related industries support approximately

70 percent of jobs
in Virginia.



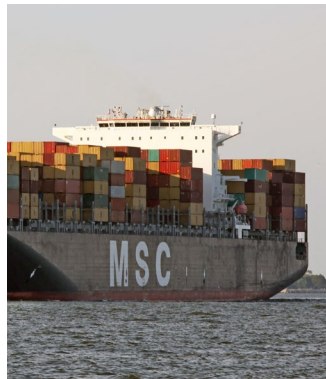
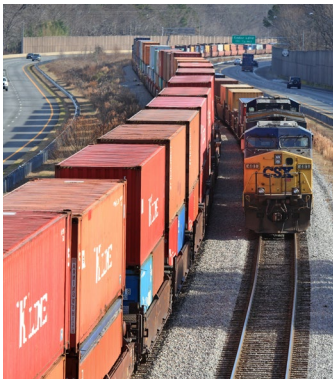
Freight infrastructure in Virginia includes two Class I railroads, one of the nation's leading seaports (Port of Virginia), nine shortline railroads, heavily used truck corridors, and four significant air cargo airports.

Virginia's growing economy is the **13th largest among all states** in the nation. Continued growth depends on reliable, accessible transportation systems to produce and deliver goods in a competitive global environment.²

Virginia's freight movement is expected to increase to more than 1 billion tons, valued at \$1.4 trillion by 2040, from 658 million tons, valued at \$801 billion in 2012.³

This translates to a
forecasted 84% growth in the value of Virginia freight
from **2012 to 2040.**

Trucks account for most freight movement in the Commonwealth and are expected to continue to do so. As roadway congestion increases, there are opportunities for more freight to be moved by rail.



Mode Highlights

Highways: Virginia highways are supported by a strong focus on corridor management, mobility, and technology solutions. They receive dedicated funding with SMART SCALE, State of Good Repair, and the new I-81 Corridor Improvement Fund, which provides new funding for Virginia's Interstate system. Virginia's highways provide access to ports, major airports, and large populations centers on the Eastern seaboard and the Midwest.

Ports and Waterways: Virginia has the only U.S. East Coast port with congressional authorization for 55-foot depth channels and creates an economic impact of \$60 billion in total revenue to the Commonwealth.

Aviation: Dulles International Airport (IAD) offers 24-hour operations, no night-time flight restrictions, climate-controlled warehousing, and direct service to 50 international markets. Both IAD and Richmond (RIC) are home to a Foreign Trade Zone, allowing for expedited processes and reduction or avoidance of duties on cargo.

Freight Rail: Virginia's rail system includes 3,037 miles of rail lines operated by the 11 freight railroads – two Class I railroads and nine shortline railroads.

² Based on 2018 Bureau of Economic Affairs annual estimates of Gross Domestic Product.

³ VTrans 2040 Freight Element, <http://www.vtrans.org/resources/VTrans2040-Freight-Element.pdf>

Virginia's Rail and Transit Network

The DRPT supports the Commonwealth's vast rail and transit network, as well as Commuter Services Programs. Many of Virginia's counties and cities operate public transit systems, with a

TOTAL OF
41 Transit Agencies

and 82 Human Service Organizations providing bus, mass transit, and/or paratransit service in the Commonwealth. In fact, 3 out of the 75 largest transit agencies in the country are located in Virginia. WMATA's Metrorail system is the third busiest subway system in the nation.

Virginia is home to two passenger rail operators.



Amtrak provides intercity train service on the Northeast Regional, Cardinal, and Silver/Palmetto services and serves a number of Virginia's towns and cities with 20 stations.



Virginia Railway Express (VRE) operates commuter service between Washington, D.C. and Fredericksburg and Manassas.



The **Virginia Breeze** carried **5,851** passengers in the second quarter of **2019**.

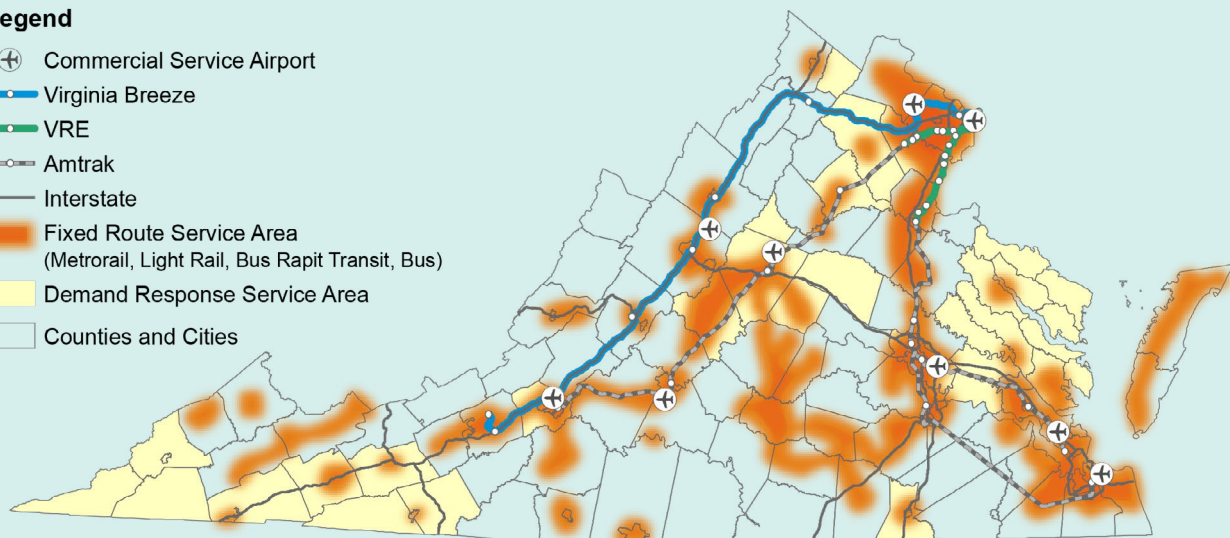
This is a **36%** increase in ridership compared with the second quarter of **2018**.

Virginia Breeze The DRPT launched Virginia Breeze in 2017 to allow a new and easy travel option between Union Station in Washington, DC and Blacksburg, VA. The service includes nine stops along the I-66 and I-81 corridors including: Christiansburg, Lexington, Staunton, Harrisonburg, Front Royal, Dulles Airport, and Arlington.

Virginia's Rail and Transit Network

Legend

- Commercial Service Airport
- Virginia Breeze
- VRE
- Amtrak
- Interstate
- Fixed Route Service Area (Metrorail, Light Rail, Bus Rapid Transit, Bus)
- Demand Response Service Area
- Counties and Cities



Virginia's Bicycle and Pedestrian System

In 2018, according to the U.S. Census Bureau, on an average weekday,

2.6% of Virginia workers **bike or walk** to work totaling nearly

110,000 daily roundtrips

for the over

4.2 million people employed in Virginia.

There are a total of

2,428 bicycle lane miles

in Virginia (on and off-road) supporting both **commuting and recreational activity**, including

857 miles of dedicated bicycle facilities

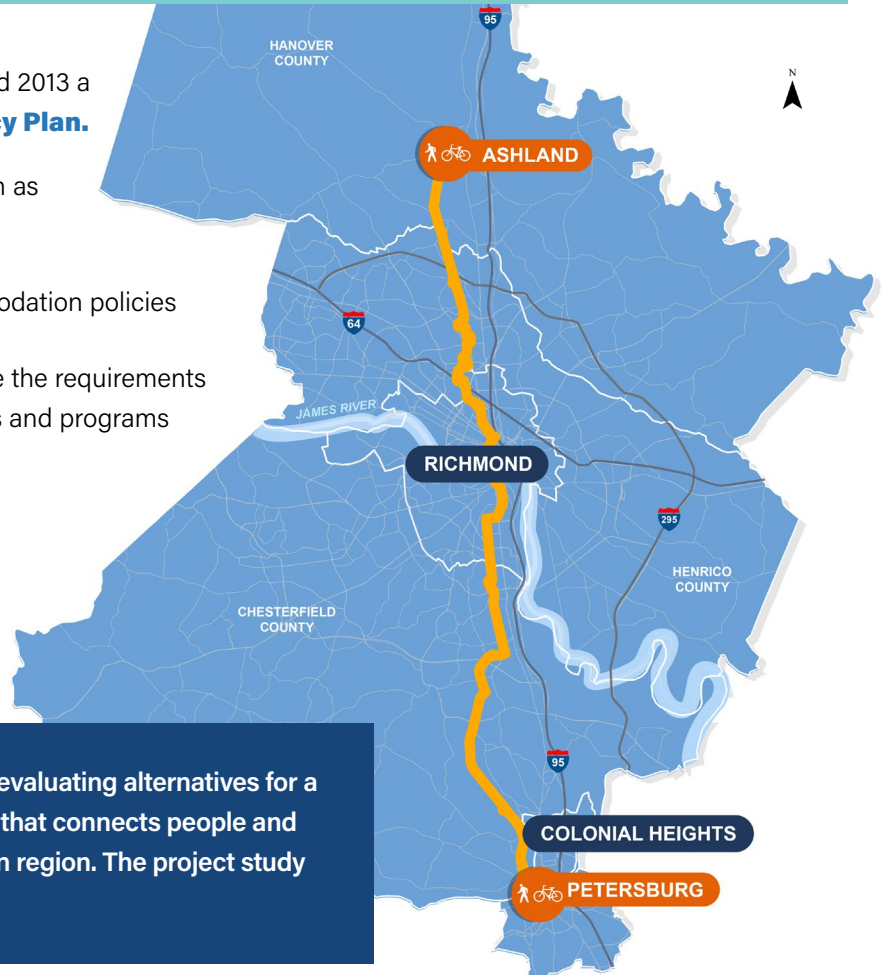


VDOT's Bicycle and Pedestrian Program provides planning assistance to state and local transportation planners. At VDOT, the program plays a leadership role in advancing bicycle and pedestrian accommodations throughout Virginia.

VDOT and stakeholders developed in 2011 and 2013 a **Bicycle Policy Plan** and **Pedestrian Policy Plan**.

VDOT is tracking implementation of each plan as it relates to the recommendations, including:

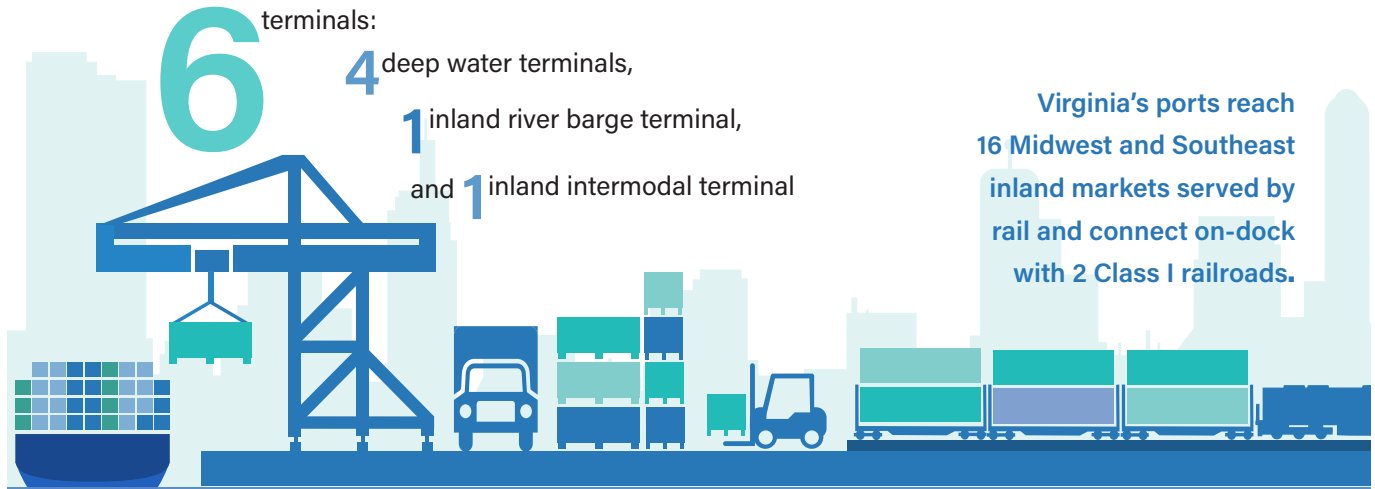
1. Clarify bicycle and pedestrian accommodation policies
2. Provide staff with resources to integrate the requirements of bicyclists and pedestrians in projects and programs
3. Improve outreach and coordination
4. Measure and evaluate progress



The Ashland to Petersburg Trail Study is evaluating alternatives for a preferred 40-mile multi-use trail corridor that connects people and places across the Richmond metropolitan region. The project study will complete in early 2020.

The Port of Virginia

The Virginia Port Authority oversees operations of the following terminals in the Commonwealth: Norfolk International Terminals, Virginia International Gateway, Newport News Marine Terminal, Portsmouth Marine Terminal, Richmond Marine Terminal, and the Virginia Inland Port in Front Royal, Virginia.



The Norfolk Harbor is the deepest on the U.S. East Coast and shelters the world's largest naval base, a robust shipbuilding and repair industry, the largest coal exporter in the nation, and the fifth largest containerized cargo complex in the United States.

The Port of Virginia set a new annual record for container cargo volume having handled nearly **3 million twenty-foot equivalent units, or TEUs**, in FY 2019.

In FY 2019, the Port of Virginia generated **2,800 new jobs** and the development of **2,950,000 square feet of space** that had a total investment value of over **\$2 billion**.

The Port of Virginia uses its **trucker reservation system, or TRS**, to manage truck flow at the gates, creating efficiency for terminal operations teams and for drivers.



Construction for the **Wider, Deeper, Safer project** is scheduled to begin by January 2020 and will deepen and widen the Norfolk Harbor's shipping channels to 55-feet deep and as wide as 1,400 feet, maintaining Virginia as the deepest port on the U.S. East Coast.

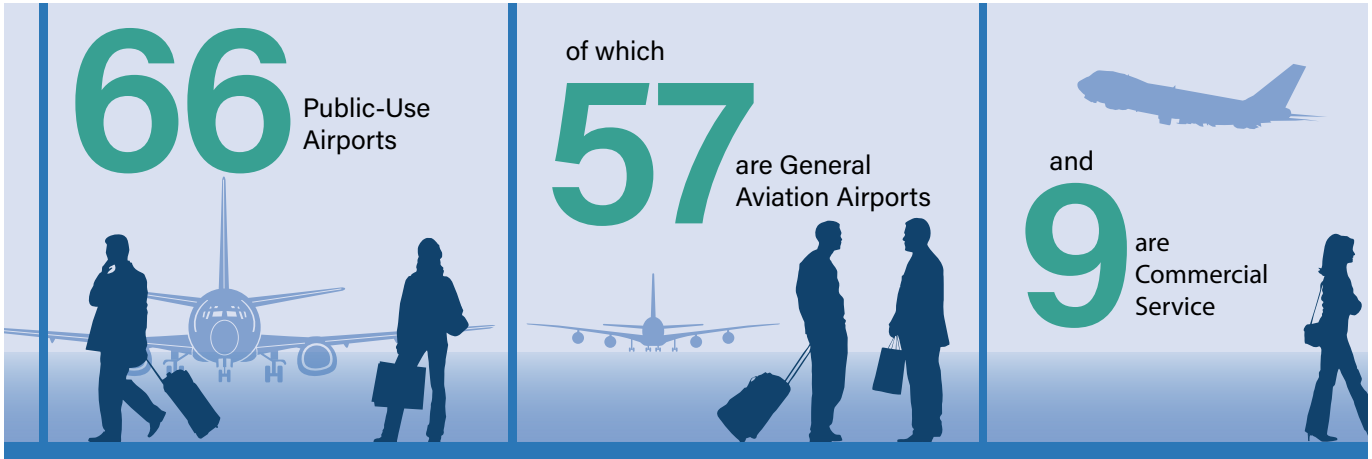
The Virginia International Gateway expansion project doubled the on-dock rail operation, totaling **more than 20,000 feet of track**. More than one-third of cargo currently arrives and departs the port by rail, the largest percentage of any U.S. East Coast port.

Barge operations at Richmond Marine Terminal and the intermodal terminal, Virginia Inland Port, **promote economic activity** at inland markets. Operating inland terminals reduces congestion, emissions, and maintenance on Virginia roadways.

Virginia's Airports

Virginia's airports are gateways to the world.

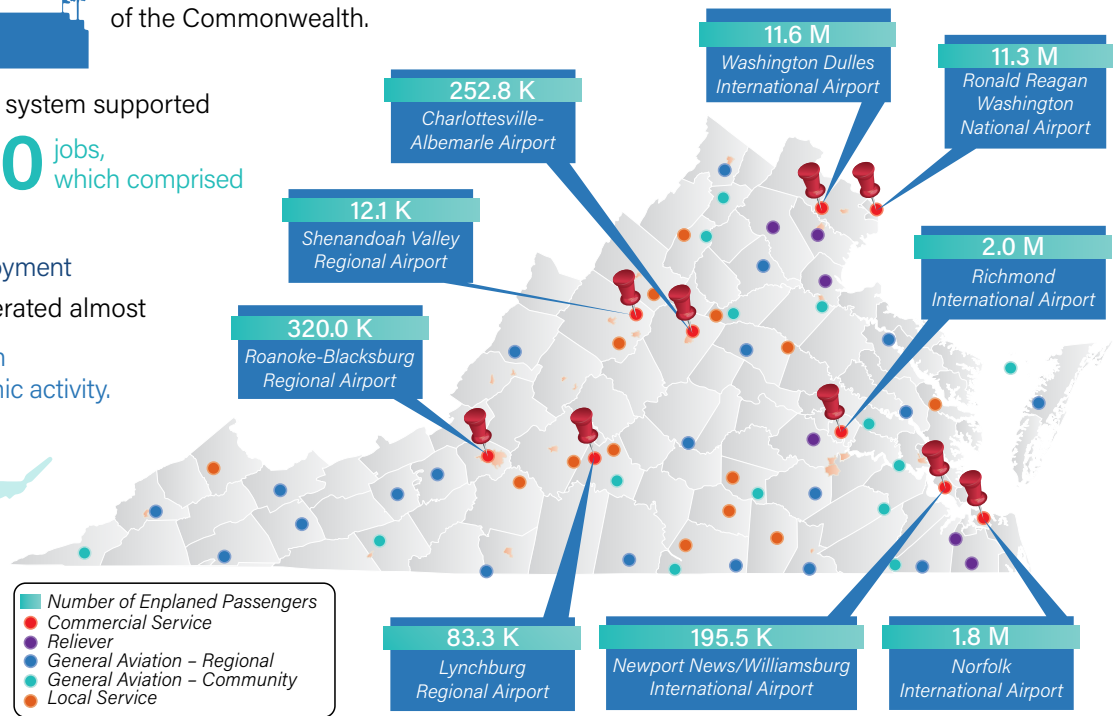
Virginia's **66 public-use airports** provide convenient and efficient access to global markets. The Commonwealth's airport system consists of nine commercial service and **57 general aviation airports**, providing critical services and vital economic activity to Virginia. The airport system provides safe, secure services to our largest cities and the smallest of our communities.



Virginia's **66** public-use airports create jobs and contribute to the overall economic development of the Commonwealth.

The **commercial service airports** are highlighted, along with their 2018 passenger enplanements.

In 2016, the aviation system supported **144,660** jobs, which comprised **3.6** percent of total employment in Virginia, and generated almost **\$23** billion in economic activity.





Virginia's Department of Motor Vehicles (DMV) has more daily face-to-

face contact with Virginia's citizens than any other state organization, and its responsibilities are broad,

including: vehicle titling and registration, driver licensing and maintenance of driver and vehicle records, collecting Virginia's fuel tax, monitoring the state's trucking industry, and serving as Virginia's Highway Safety Office.

OIPI and VDOT work closely with DMV on highway safety initiatives designed to reduce fatalities and serious injuries on Virginia roadways. The agencies also collaborate on setting safety performance targets on all public roads in Virginia (performance and targets available on Pages [42-49](#) of this Report).

Virginia's Highway Safety Office focuses on:

- » Administering Federal transportation safety grant programs,
- » Collecting, maintaining, and analyzing traffic records and crash statistics,
- » Providing assistance to communities in identifying transportation safety issues and solutions,
- » Developing and implementing effective, integrated programs to address traffic safety, and
- » Tracking and supporting Federal and state traffic safety legislation and initiatives.

In FY 2018, DMV disbursed more than \$26.8 million in transportation safety grants to fund enforcement and education efforts targeting impaired driving and speeding, seat belt usage campaigns, youth outreach, and driver education.



The Virginia Commercial Space Flight Authority, also known as "Virginia Space,"

owns and operates the Mid-Atlantic Regional Spaceport (MARS) and the MARS Unmanned Systems Airfield on Wallops Island on Virginia's Eastern Shore. Virginia Space provides full-service launch and drone testing facilities for commercial, government, scientific, and academic users.

Virginia Space's mission is to serve as a driver for Virginia's new economy by providing safe, reliable, and responsive space access at competitive prices and secure facilities for testing unmanned vehicles.

MARS is one of only four spaceports in the United States that is currently licensed to launch to orbit, and is one of two on the East Coast. The Spaceport services Medium, Small, and Venture class rockets and offers three launch pads. Pad 0A is the homeport of the Northrop Grumman Antares launch vehicle, providing cargo resupply to the International Space Station; Pad 0B currently services Minotaur I, IV, and V solid fuel rockets; and Pad 0C will service the Venture class Rocket Lab Electron rocket.

In July 2019, a new MARS Payload Processing Facility opened that will eliminate processing bottlenecks, enabling Virginia Space to serve multiple customers simultaneously. Located on the north end of Wallops Island, the state-of-the-art facility provides segregated launch and space vehicle processing space as MARS prepares for an increase in launch and satellite processing activity over the coming years.



4.0 SIX-YEAR IMPROVEMENT PROGRAM

OIPI is providing information on the transportation projects approved or modified during the prior fiscal year, including whether each such project was evaluated within SMART SCALE and the ultimate program from which each such project received funding.

Each year the CTB must approve a Six-Year Improvement Program (SYIP) showing all funded transportation projects proposed for development or study for the next six years. The following link accesses the SYIP database, which contains the approved projects.

<http://syip.virginiadot.org/Pages/allProjects.aspx>

The database is menu-driven, user-friendly, and provides easy access to details for each project, such as a brief description, the VDOT District in which the project is located, the locality in which the project is located, estimated cost of the project, and the road system on which the project is located.

There is also a data field that flags whether a project was selected for funding through the prioritization process of § 33.2-214.1 (SMART SCALE), so the project list can be filtered to show, by District, SMART SCALE projects only.

SMART SCALE Round 1 (FY 2017)

All projects selected through SMART SCALE that were approved in FY 2017 are preceded by #HB2. Type #HB2 in the SYIP database Keyword box and click the Search button. FY 2017 SMART SCALE projects are inclusive of projects selected in SMART SCALE Round 1.

SMART SCALE Round 2 (FY 2018)

For the list of FY 2018 SMART SCALE projects, type #SMART18 in the Keyword box. FY 2018 Projects are inclusive of projects selected in SMART SCALE Round 2 that were originally programmed in the FY 2018-2023 SYIP adopted by the CTB in June 2017.

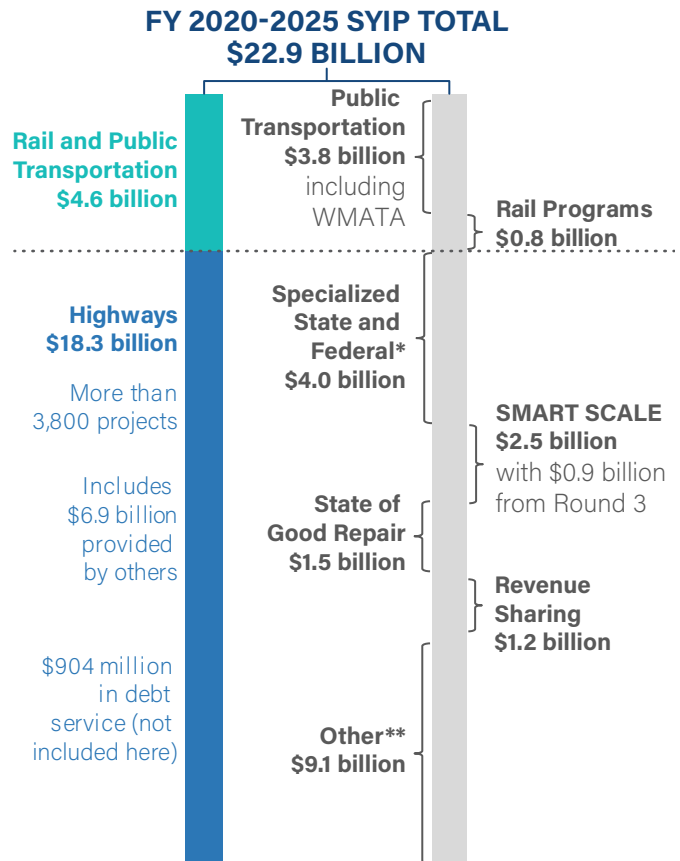
SMART SCALE Round 3 (FY 2020)

For the list of FY 2020 SMART SCALE projects, type #SMART20 in the Keyword box. FY 2020 Projects are inclusive of projects selected in SMART SCALE Round 3. Note, SMART SCALE Round 3 projects were programmed in the FY 2020-2025 SYIP adopted by the CTB in June 2019.

More information on CTB actions regarding SMART SCALE and the SYIP is available on the CTB website, at the below link:

http://www.ctb.virginia.gov/public_meetings/agendas_and_meeting_minutes/default.asp

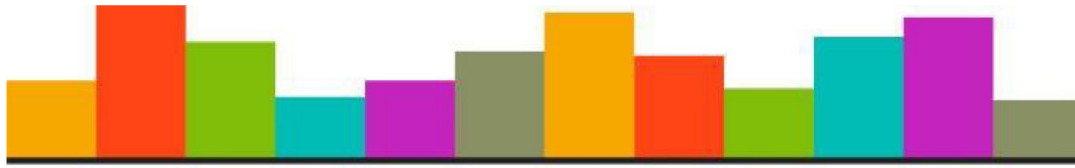
FY 2020-2025 SYIP Summary



* Construction program from Federal, State, bond, and local sources.

** Includes regional funds, legacy construction, and research and planning.

5.0 SMART SCALE



SMART SCALE

*Funding the Right
Transportation Projects
in Virginia*

Overview

What is SMART SCALE?

Virginia's SMART SCALE (§33.2-214.1) is about picking the right transportation projects for funding and ensuring the best use of limited tax dollars. It is the method of evaluating projects for consideration for full funding within the Six-Year Improvement Program (SYIP). There are two programs within SMART SCALE – the construction District Grants Program (DGP) and the High-Priority Projects Program (HPPP). **Projects are scored based on an objective, outcome-based process that is transparent to the public and allows decision-makers to be held accountable to taxpayers.** Once projects are scored and prioritized, the CTB uses the information to select the right projects for funding. For more information visit vasmartscale.org.

History

SMART SCALE was established by the Virginia General Assembly in 2014 (§33.2-214.1) to ensure a transparent decision-making process. The Secretary's Office, in partnership with VDOT and DRPT, worked with Virginia's 15 MPOs and 21 Planning District Commissions (PDCs) as well as local partners including counties, cities, towns, and transit operators, to develop the process, seek input on the proposed methodology, and test implementation.

By The Numbers

Three rounds of SMART SCALE application solicitations and project selections were successfully completed in 2016, 2017, and 2019, funding over \$3.3 billion in multimodal transportation investments across 443 projects.






Summary by Round

Project Applications	Round 1	Round 2	Round 3
Submitted	321	436	468
Scored	287	404	433
Funded	162	147	134
Total Funded \$	\$1.42B	\$1.03B	\$0.87B
Portfolio Value	\$2.66B	\$2.35B	\$5.08B
Success Rate	56%	36%	31%

As SMART SCALE has evolved, over each round, more projects have been submitted and scored. The combination of this trend with reduced available funding has led to fewer projects selected for funding and a lower success rate.

Across the three rounds, SMART SCALE funding of \$3.3 billion has been leveraged by additional Federal, State, and local funding sources to advance \$10.1 billion in total project costs. As available funding has decreased by round, the increasing role of leveraged regional, local, and private funding has impacted project competitiveness and cost effectiveness.

Share of Funding by Mode

Mode	Round 1	Round 2	Round 3
 Highway	92.0%	81.3%	67.4%
 Bicycle & Pedestrian	3.3%	4.5%	14.2%
 Bus Transit	1.9%	4.1%	14.2%
 Rail Transit	0.7%	9.0%	2.9%
 TDM	2.1%	1.1%	1.4%

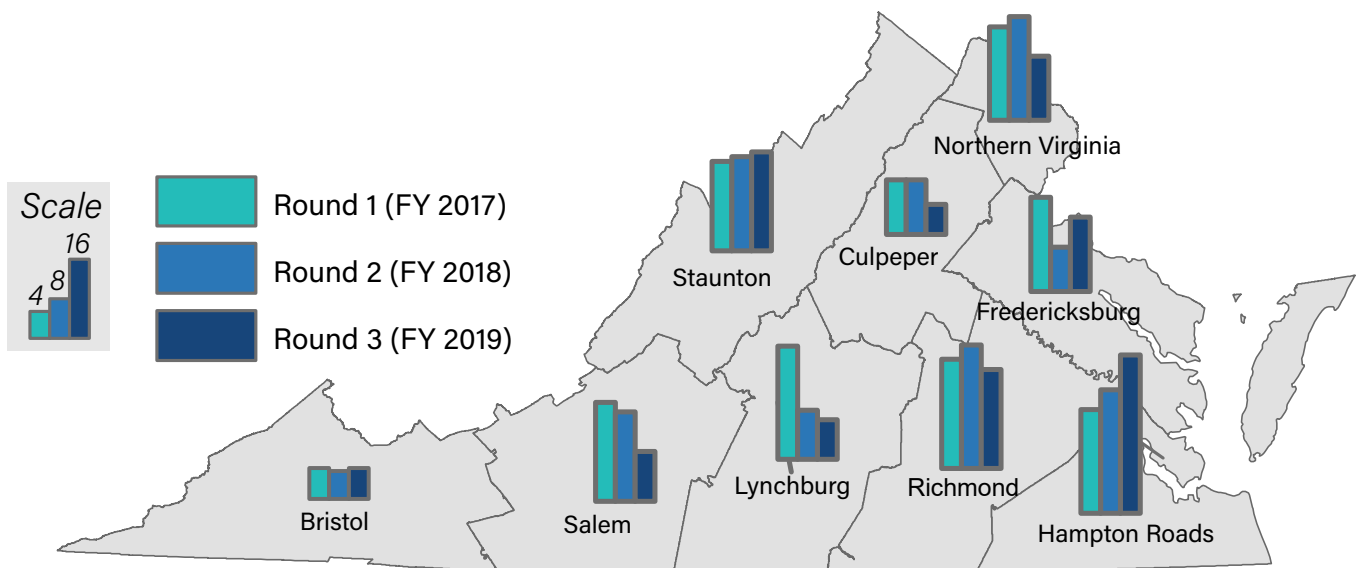
SMART SCALE is truly a multimodal investment program. The share of funding by mode has continued to show more balance over each round while still meeting the most critical needs and funding the most cost-effective projects.

Share of SMART SCALE Funding by Project Size

The first three rounds of SMART SCALE totals \$3.3 billion in funded projects, supporting a total portfolio value of \$10.1 billion. Within the \$3.3 billion, the share of project cost by project size is nearly evenly distributed (with a third of project cost on projects less than \$10 million, a third on projects \$10 - \$50 million, and another third on projects greater than \$50 million). When looking at the total portfolio value, nearly 75 percent of total cost is associated with projects over \$50 million. Projects in this size range represent some of the most complex, multimodal investments in Virginia's history and are leveraged significantly by other Federal, State, regional, local, and private funds.

This map presents the number of funded SMART SCALE projects by District for each of the three rounds.
The results show the variability of funded projects for each round by District, indicating that success in a prior round is not always indicative of success in the next round.

Number of Funded SMART SCALE Projects Per Year by District



The below table summarizes the number of projects funded by SMART SCALE cost range (the cost to the program, not including leveraged funds).

Funded Projects by SMART SCALE Cost

SMART SCALE Cost	Round 1	Round 2	Round 3
Under \$1M	30	31	19
\$1M-\$5M	68	71	76
\$5M-\$10M	28	21	24
\$10M-\$50M	32	19	12
Over \$50M	4	5	3

The next table presents the number of projects funded by the total cost range (total project cost includes leveraged Federal, State, local, or private sources).

Funded Projects by Total Project Cost

Total Project Size	Round 1	Round 2	Round 3
Under \$1M	27	27	19
\$1M-\$5M	59	66	68
\$5M-\$10M	31	20	26
\$10M-\$50M	33	25	17
Over \$50M	12	9	4

As shown in the tables above, the distribution of funded projects by cost has varied through the first three rounds. As available funding relative to the number of projects submitted has decreased, fewer large projects and more smaller projects are funded. However, as discussed on the prior page, the majority of total funding is associated with the largest projects. This relationship is in part driven by the two funding programs within SMART SCALE – HPPP and DGP, which result in a 50/50 funding split between projects competing statewide and projects competing within each District.

Measuring Project Benefits

Estimated SMART SCALE Project Benefits (Funded Projects)

A key facet of the data-driven approach to analyzing and prioritizing each project in SMART SCALE is a focus on quantifying the expected project benefits. Projects are evaluated based on 14 measures across six factor areas, consistent with VTrans goals and objectives. The projects selected through the SMART SCALE program are expected to yield significant benefits, such as reductions in hours of delay and the number of crashes on Virginia roadways.

Some of the estimated SMART SCALE project benefits for Round 3 funded projects include:*

42,730
Expected increase in
peak period person throughput

11,663
Hours of delay expected to be saved

971
Total fatal or injury crashes anticipated
to be avoided on Virginia roads

42,058
Total fatal and injury crashes anticipated to be
avoided at project locations per 100 million VMT

* Due to differences in the definition of measures to estimate benefits for SMART SCALE projects, the above measures should not be compared to other performance measures in this Report.

OIPI, working with VDOT and DRPT, are initiating a process to assess SMART SCALE projects before and after implementation as a means to better understand how well the prioritization methodology is matching up with real world project results. This effort would include targeted before and after studies of a representative list of projects to assist in improving the SMART SCALE methodology in future rounds.

Project Delivery

Completed SMART SCALE Projects (2016-2019)

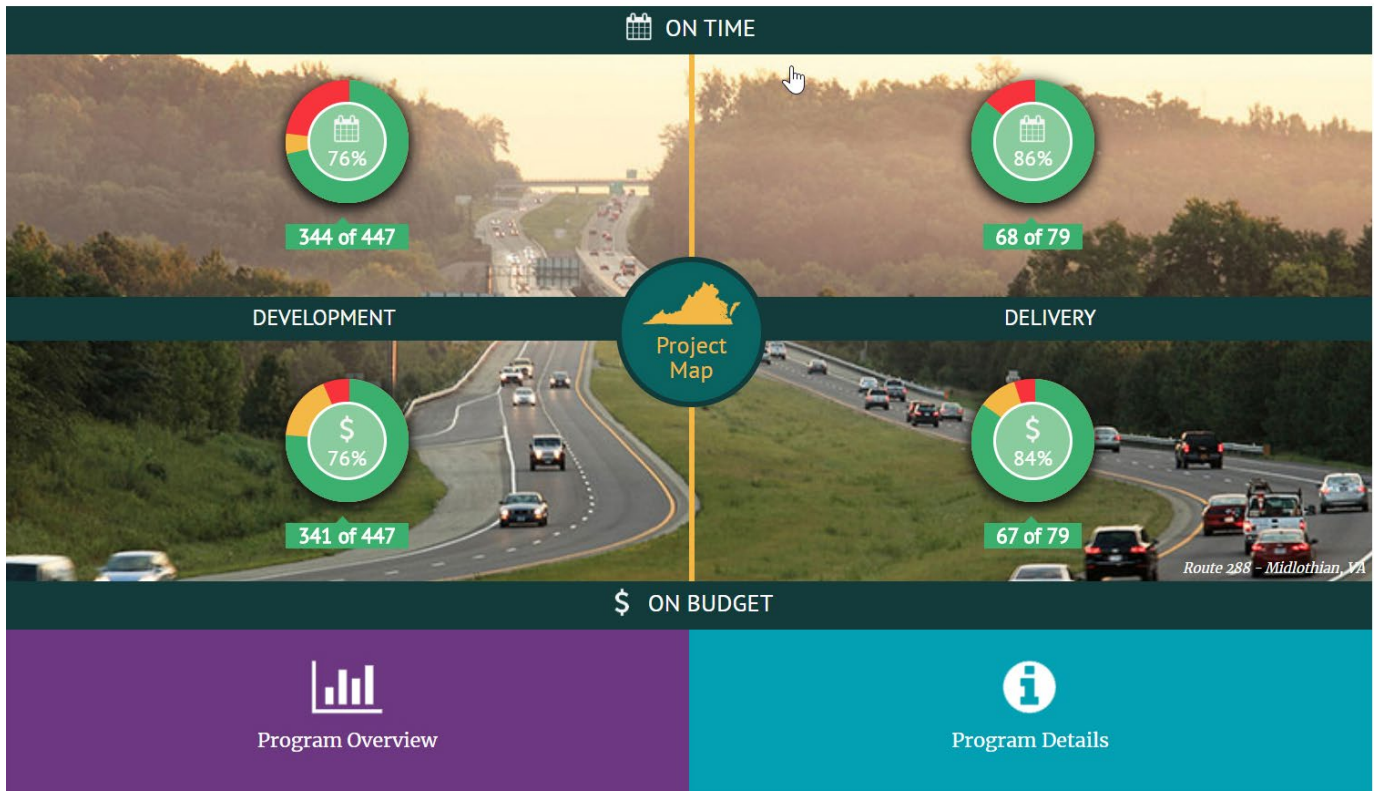
District	Number of Completed Projects
Bristol	5
Culpeper	2
Fredericksburg	2
Hampton Roads	5
Lynchburg	6
Northern Virginia	3
Richmond	4
Salem	5
Staunton	11
Grand Total	43

As of August 2019, 43 SMART SCALE funded projects have already been completed and are open to use by Virginia travelers.

These projects are multimodal and across different systems, including safety, capacity and operational improvements on Interstates, primary, and secondary roadways, as well as TDM program investments in specific corridors, transit vehicle purchases, park-and-ride lots, and shared use paths.

There are 129 funded SMART SCALE projects that will be completed, are under construction, or will be under construction through 2020. This means, in total, that 172 funded projects, out of a total of 310 projects funded in Round 1 and Round 2 (55 percent) are complete, soon to be completed, or under construction.

OIPI, VDOT, and DRPT collaboratively track “on-time” and “on-budget” measures to ensure transparency to the public as it relates to project delivery and schedule. This information is regularly updated through the SMART SCALE Dashboard, available at the following link: <http://dashboard.vasmartscale.org/>.



Key Outcomes

OIPI, VDOT, and DRPT have committed to a regular process of review, lessons learned, and continuous improvement to the entirety of the SMART SCALE process, from application, to scoring, to presentation of results, to programming decisions. Key outcomes from the overall process, since 2016, include:

- » Links planning and programming – creates a distinct connection to VTrans and supports regional and local plans
- » Provides a high-level of transparency to decision makers and the public
- » Fosters stronger partnerships between applicants, VDOT, and DRPT – early coordination has led to better identification of project risks and feasibility concerns
- » Encourages more targeted and cost-effective transportation investments
- » Commits to fully funding and implementing the projects selected for SMART SCALE funding
- » Promotes greater accountability – focuses how VDOT, DRPT, and applicants track project development progress to ensure on-time/on-budget completion
- » Leverages regional and local funding sources– prior rounds have allocated \$3.3 billion in SMART SCALE funding for \$10.1 billion in operational and capacity transportation improvements



I-64 Widening

VDOT completed the \$46.4 million Interstate 64 widening project between Interstate 295 (mile marker 200) in Henrico and Bottoms Bridge (mile marker 205) in New Kent under budget and ahead of schedule. Construction began in August 2017 to widen I-64 from two to three travel lanes in both directions to accommodate current and future traffic volumes and lessen travel times to and from Virginia Beach.

Dynamic Flashers for Intersection of Route 460 & Route 626 (Town of Prospect)

VDOT installed dynamic flashers and warning signs along Route 460 in advance of the intersection at Prospect Road/Peaks Road in Prospect. These flashers are activated when there is a vehicle at the Route 626 or median stop signs, providing a real-time warning to Route 460 drivers of traffic that may be entering the intersection.

New Route 460 Business Ramp (Town of Christiansburg)

VDOT completed construction of a new ramp to access Route 460 Business from Peppers Ferry Road and North Franklin Street in Christiansburg. The \$2.1 million project is intended to alleviate congestion on Peppers Ferry Road and was completed ahead of schedule.

6.0 SURFACE TRANSPORTATION SYSTEM PERFORMANCE

Overview

This section provides insight on performance of Virginia's surface transportation system, the targets for future performance, and the progress toward such targets based on measures developed through VTrans and required by Federal transportation performance management rules.

Performance Management is intended to create a data-driven process within transportation planning and programming, answering four fundamental questions:

- » Where do we want to go?
- » How are we going to get there?
- » What will it take?
- » How did we do?

This Report focuses on the “How Did We Do?”

question. It presents performance trends, interpretation of the reasons why performance has changed, and information on proactive strategies and solutions deployed by OIPI, VDOT, DRPT, and their partners to help push towards performance goals.

Investments identified in the SYIP, the findings of planning studies such as the I-81 and I-95 Corridor Improvement Plans, and the priorities and needs identified through VTrans, collectively will impact current and future performance.

This Report also references national and statewide economic, demographic, societal, and technology trends that impact transportation, many of which OIPI, VDOT, and DRPT have little to no control over. For example, Virginia's economy continues to expand, and the combination of a healthy job market and low travel costs, have created more opportunity and more overall travel demand for Virginia residents.



It is the responsibility of OIPI in cooperation with VDOT and DRPT to develop measures and targets related to the performance of Virginia's surface transportation network for CTB approval. These targets are incorporated as goals and objectives into Virginia's long-range transportation plan, VTrans.

The CTB, OIPI, VDOT, and DRPT adopts additional measures to address the Federal requirements as well as other measures consistent with their missions and key policies.

This Report includes a performance trend evaluation across 39 performance measures, 17 Virginia-specific measures, 11 unique Federal measures, and 11 measures that meet both Virginia and Federal requirements.

Performance management is a strategic approach that uses system information to inform investment and policy decisions to achieve transportation system performance goals. Virginia transportation agencies have successfully implemented a performance management approach for decades across the entirety of the system. This includes, for example:

- » **VDOT and DMV's commitment to improving safety on all Virginia roads**, through a comprehensive approach including education and awareness, as well as innovative infrastructure design to improve roadway and near roadway safety for all users.
- » **VDOT's implementation of asset management principles** to manage VDOT owned and maintained infrastructure, from pavement and bridges, to roadside infrastructure, lighting, stormwater management, and VDOT's vehicle fleet.
- » **DRPT's cooperation with local transit providers to optimize management** of transit assets (revenue vehicles, maintenance equipment, and infrastructure) to ensure state of good repair and service reliability goals are met.
- » **VDOT's system management strategies** to disseminate traveler information through On the Go in Virginia and VDOT's 511 service in addition to Safety Service Patrols, dynamic message signs, and active traffic management through cameras and traffic operations centers.

The recent alignment of new performance-based programming approaches in Virginia ([SMART SCALE](http://vasmartscale.org/)⁴ and [MERIT](http://www.drpt.virginia.gov/transit/merit/)⁵ for example), the Federal performance management requirements, improved real-time data sources, and new performance management and trade-off analysis tools have created more external attention on the process and its outcomes.

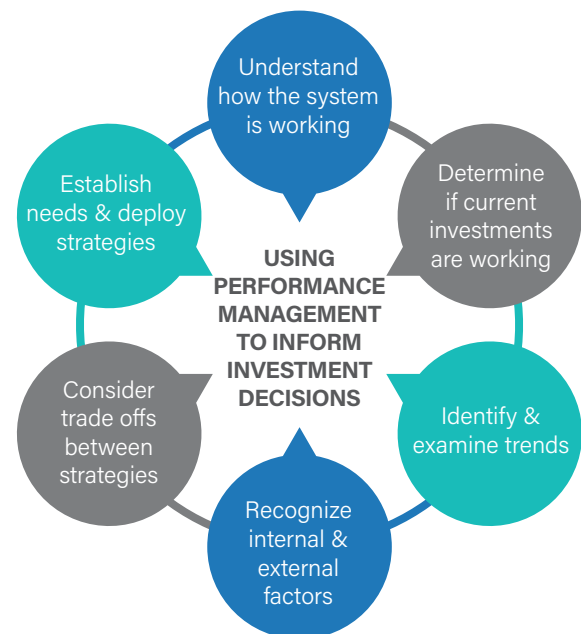
Recent efforts led by OIPI, VDOT, and DRPT, along with their performance management partners, serve as key resources for the content in this Report.

⁴ <http://vasmartscale.org/>

⁵ <http://www.drpt.virginia.gov/transit/merit/>

- » [VTrans Update](http://www.vtrans.org)⁶
- » [Highway Safety Improvement Program \(2020\)](http://www.virginiadot.org/business/ted_app_pro.asp)⁷
- » [VDOT's Asset Management Plan for the National Highway System \(2019\)](http://www.virginiadot.org/projects/resources/legstudies/2019_-_Final_TAMP.pdf)⁸
- » [DRPT Transit Asset Management Plan \(2017\)](http://www.drpt.virginia.gov/transit/major-initiatives/transit-asset-management-plan/)⁹
- » [Commissioner of Highways Biennial Report \(2018\)](http://www.virginiadot.org/projects/resources/legstudies/2018_VDOT_FINAL_Biennial_Report_-_VDOT_website.pdf)¹⁰
- » [Performance-Based Planning Requirements in the Federal 2018-2021 Statewide Transportation Improvement Program \(STIP\)](http://www.virginiadot.org/about/stip.asp)¹¹
- » [Virginia Strategic Highway Safety Plan \(2017\)](https://www.virginiadot.org/info/hwysafetyplan.asp)¹²
- » [FHWA State Performance Dashboard](https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Virginia)¹³

Transportation organizations in Virginia use performance information to inform investment decisions through the following simplified process. Examples are included of how this works in practice and how OIPI, VDOT, and DRPT use performance information to set goals and implement strategies to support improving Virginia's economy and quality of life.



⁶ <http://www.vtrans.org>

⁷ http://www.virginiadot.org/business/ted_app_pro.asp

⁸ http://www.virginiadot.org/projects/resources/legstudies/2019_-_Final_TAMP.pdf

⁹ <http://www.drpt.virginia.gov/transit/major-initiatives/transit-asset-management-plan/>

¹⁰ http://www.virginiadot.org/projects/resources/legstudies/2018_VDOT_FINAL_Biennial_Report_-_VDOT_website.pdf

¹¹ <http://www.virginiadot.org/about/stip.asp>

¹² <https://www.virginiadot.org/info/hwysafetyplan.asp>

¹³ <https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Virginia>

Federal Performance

The CTB established a performance management framework to assess performance of the transportation system in December 2015, when it adopted goals, objectives, and guiding principles for VTrans2040. In 2016 and 2017, performance management rules based on the last two Federal surface transportation authorizations (MAP-21 and the FAST Act) were required as part of state DOT and MPO transportation planning and programming.

OIPI, VDOT, DRPT, and Virginia's 15 MPOs have worked together since 2016 to incorporate the new Federal requirements into planning and programming activities. The CTB has established targets for each of the Federal performance measures presented below and on the next page.

The Federal safety measures and the transit asset measures align with the goals and objectives adopted within VTrans2040. As a result, these Federal measures are highlighted consistent with the approach for other VTrans measures (Goal C – Safety for All Users, and Goal D – Proactive System Management).

The other Federal measures support the VTrans goals and objectives; however, OIPI, VDOT, and DRPT have identified alternative Virginia-specific measures to better represent statewide performance (beyond the National Highway System covered by the Federal measures, which represents approximately 15 percent of Virginia's roadway network). Details on these other Federal measures, performance, and targets, are provided on the next page.



Federal Highway Administration

Federal Transit Administration

Safety Measures	Bridge/Pavement Measures	System Performance Measures	Transit Asset Measures
<ol style="list-style-type: none"> Number of Fatalities Fatality rate (per 100 million VMT) Number of serious injuries Serious injury rate (per 100 million VMT) Number of non-motorized fatalities and serious injuries <p>2020 targets adopted Targets set annually*</p> <p><small>* The first three safety measures require coordination with DMV and NHTSA to agree on targets.</small></p>	<ol style="list-style-type: none"> % of pavements on the Interstate system in good condition % of pavements on the Interstate system in poor condition % of pavements on the non-Interstate NHS in good condition % of pavements on the non-Interstate NHS in poor condition % of pavements on the non-Interstate NHS in poor condition NBI NHS bridges in good condition by % of deck area NBI NHS bridges in poor condition by % of deck area <p>2019 and 2021 statewide targets set in 2018, progress reviewed in 2020</p>	<ol style="list-style-type: none"> % of person miles on the Interstate system that are reliable % of person miles on the non-Interstate NHS that are reliable Truck travel time reliability index Annual hours of peak-hour excessive delay per capita** Percent of non-single** occupant vehicle travel Total emissions reduction (CMAQ projects)** <p>2019 and 2021 statewide targets set in 2018, progress reviewed in 2020</p> <p><small>** Currently only required in Northern Virginia.</small></p>	<ol style="list-style-type: none"> % of revenue vehicles that have met or exceeded its useful life baseline (ULB) % of maintenance vehicles that have met or exceeded its useful life baseline (ULB) % of track segments with performance restrictions % of facilities by group with a degraded condition rating <p>2018 and 2019 targets set in 2017 for Virginia's 41 eligible transit providers***</p> <p><small>*** Tier 1 providers (agencies with rail transit like WMATA, VRE, and HRT or over 100 vehicles) set their own targets. All other providers are part of a group plan developed by DRPT.</small></p>

FEDERAL PERFORMANCE MEASURES

Measure	Target	Measure Performance		
		2017	2018	
Bridge and Pavement (VTrans Goal D)				
Percent of pavement in Good Condition (Interstate)	2021 - 45.0%	56.9%	55.9%	Declining Performance Meeting Target
		<i>Increase desired</i>		
Percent of pavement in Poor Condition (Interstate)	2021 - 5.0%	0.6%	0.3%	Improving Performance Meeting Target
		<i>Decrease desired</i>		
Percent of pavement in Good Condition (Non-Interstate NHS)	2019 - 25.0% 2021 - 25.0%	33.6%	34.3%	Improving Performance Meeting Target
		<i>Increase desired</i>		
Percent of pavement in Poor Condition (Non-Interstate NHS)	2019 - 5.0% 2021 - 5.0%	1.3%	0.8%	Improving Performance Meeting Target
		<i>Decrease desired</i>		
Percent of NHS Bridges in Good Condition	2019 - 33.5% 2021 - 33.0%	33.1%	32.7%	Declining Performance Not Meeting Target
		<i>Increase desired</i>		
Percent of NHS Bridges in Poor Condition	2019 - 3.5% 2021 - 3.0%	3.3%	2.4%	Improving Performance Meeting Target
		<i>Decrease desired</i>		
System Performance (VTrans Goal A and Goal E)				
Percent of person-miles traveled on the Interstate that are reliable	2019 - 82.2% 2021 - 82.0%	81.8%	82.8%	Improving Performance Meeting Target
		<i>Increase desired</i>		
Percent of person-miles traveled on the Non-Interstate NHS that are reliable	2021 - 82.5%	86.8%	88.0%	Improving Performance Meeting Target
		<i>Increase desired</i>		
Truck Travel Time Reliability Index (Interstate)	2019 - 1.53 2021 - 1.56	1.49	1.59	Declining Performance Not Meeting Target
		<i>Decrease desired</i>		
Annual Hours of Peak Hour Excessive Delay per Capita (Northern Virginia)	2021 - 26.7	23.0	24.2	Declining Performance Meeting Target
		<i>Decrease desired</i>		
Percentage Non-SOV Travel (Northern Virginia)	2019 - 36.9% 2021 - 37.2%	36.6%	36.6%	No Change Not Meeting Target
		<i>Increase desired</i>		

Note: There is one outstanding Federal requirement regarding transit safety. By July 2020, transit operators must establish transit safety targets for review by FTA.



GOAL A:

ECONOMIC COMPETITIVENESS AND PROSPERITY



Measure

Person Miles Traveled in Excessively Congested Conditions (Interstates & Limited Access) Travel Time Index (All Other Roadways)

The congestion and reliability measures presented in this Report represent a new approach for assessing statewide performance. OIPI and VDOT are continuing to evaluate best practice data analysis and measure options to accurately depict Virginia’s performance trend at the systemwide and corridor level. As these methods mature, OIPI and VDOT will update performance measures and brief the CTB on best practices.



Measure Explanation and Importance

A heavily-used road system is a sign of a productive, booming economy. However, when vehicle travel reaches the point of severe congestion, it increases the cost of mobility for everyone and reduces the effectiveness of the transportation network. This reduces productivity for workers, freight carriers and retail stores, among others, leading to losses that impact Virginia’s residents and businesses.

There are multiple performance measures for congestion reflecting different aspects including extent, duration and intensity, as well as the source of congestion, recurring versus non-recurring. **Based on analysis conducted by VDOT for 2016 through 2018, 70 percent of congestion on Interstate highways in Virginia is considered as “recurring congestion.”** Recurring congestion occurs as a result of total vehicle travel approaching or exceeding the total capacity of the road. This can occur during the morning or late afternoon commutes, but can also occur during peak travel times during the weekend.

For the purposes of this Report, two measures have been utilized to describe the severity of congestion. For both measures, a lower value is better.

» **For Interstates and limited access facilities in Virginia, the measure estimates the percent of person miles traveled during the peak hour at travel times that are 75 percent longer than free flow travel time.** This measure is referred to as person miles traveled in excessively congested conditions (PECC).

» **For other roadways in Virginia where data is available, the travel time index (TTI) measure reports the average ratio of congested travel time during the peak hour to free flow travel time.** For example, if the average travel time between two points in free flow conditions is 20 minutes, and during the AM peak hour, it takes 40 minutes, the travel time index would equal 2.0.

These measure definitions and performance outcomes represent interim results and will be updated as data continues to improve.

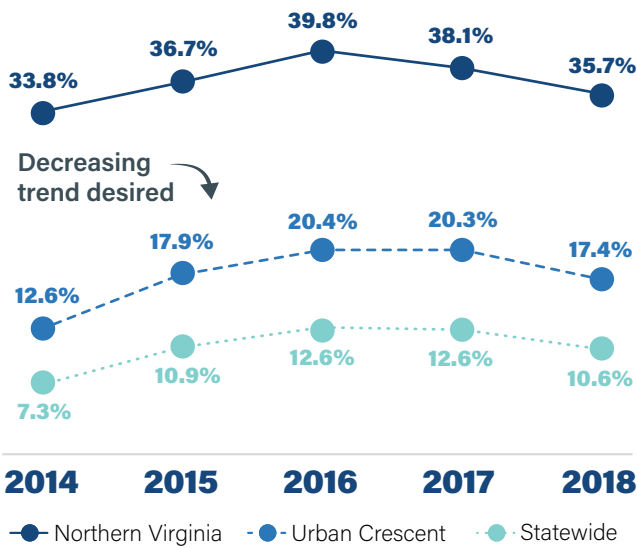


Measure Performance

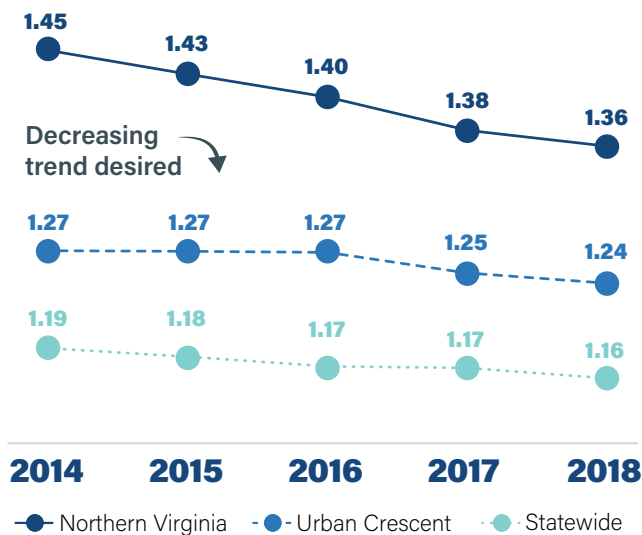
Both measures rely on traffic volume data from VDOT’s Traffic Monitoring System (TMS) and INRIX observed speed data for a representative set of roadway links across Virginia. Performance results for both measures are segmented geographically into Statewide, Northern Virginia, and the Urban Crescent. The Urban Crescent includes facilities within the Hampton Roads, Richmond, Fredericksburg, and Washington D.C. metropolitan areas.

Both measures show improvements in congested conditions. Since 2016, the PECC measure shows a slight decrease in the share of person miles operating in excessively congested conditions. The TTI measure shows a similar improvement, with the average peak hour travel time index decreasing slightly or maintaining performance since 2014.

Percent of Person Miles in Excessively Congested Conditions (Limited Access)



Peak Hour Average Travel Time Index (Non-Limited Access)



These measure results reflect conditions during peak travel periods (the worst of the AM, midday, or PM periods on each segment within the network studied). These measures tell one part of the story regarding congestion trends in Virginia. For example, a review of total daily delay during congested conditions was also conducted. The results show that the duration of congestion increases between 2014 and 2018 on both limited and non-limited access facilities. So while the severity of the congestion levels presented in the above charts may have shown improvement, the duration (or total time spent in congestion) has generally increased over time.

Why Did Performance Change?

Performance improvements appear to be more substantial on limited access facilities since 2016. Ongoing implementation in the last five years of mega-projects in Northern Virginia, such as the I-495 and I-95 express lanes, I-66 inside the Beltway improvements, and the Silver Line Metrorail opening support the improvement (as well as concluding construction, which often is a factor impacting congestion). Capacity improvements in key bottlenecks throughout Virginia have also helped address some of the highest volume delay segments in the system and provided alternatives, including new HOT lanes on I-64 in Norfolk and the completion of Segment 1 and Segment 2 of the I-64 widening in Newport News, and James City and York Counties.

How Are We Improving Performance?

OIPI, VDOT, and DRPT work together to manage various aspects of congestion while providing safe and efficient travel options. Based on action by the General Assembly and direction provided by the CTB in 2019, VDOT has identified over \$1.5 billion through 2025 for interstate improvements through the I-81 Corridor Improvement Program and Fund. Major corridor improvement programs and public private partnerships are underway in Interstate corridors including I-81, I-95, I-64, and I-66. Operational, capital, and travel demand management improvements are being implemented that will help reduce delay and improve safety in these corridors.

Beyond the Interstate corridors, a number of improvement programs are targeting delay on arterials. The Arterial Preservation Program includes a toolbox of safety, preservation and enhancement strategies. The STARS (Strategically Targeted Affordable Roadway Solutions) Program has also identified a range of solutions to relieve congestion bottlenecks and solve critical traffic and safety challenges in communities. VDOT's traffic signal program is investing in state of art signal control technologies to facilitate actively managed real-time signal operations.



Measure

Person Miles Traveled in Reliable and Unreliable Conditions



Measure Explanation and Importance

Virginia tracks travel time reliability in order to understand the variability in travel conditions experienced by passenger and commercial vehicles. Travel time reliability is important to all transportation system users across all modes. Freight carriers require predictable travel times in order to remain competitive. Reliable travel times are correlated to improved safety and improved quality of life. Travel time reliability measures are used to better manage and operate transportation systems.

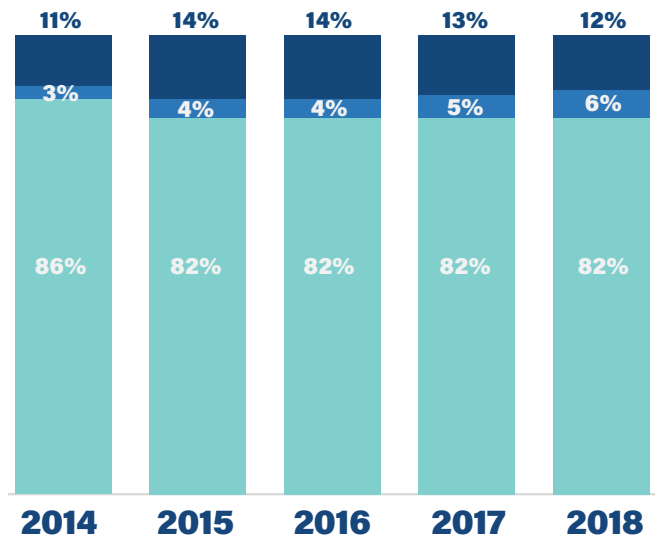
Roadway reliability is calculated using the Level of Travel Time Reliability (LOTTR), defined as the ratio of the 80th percentile travel time compared to the 50th percentile travel time. This measure relies on observed speed data at locations on limited-access roadways. It estimates person miles traveled (PMT) at different levels of LOTTR, during the 14-hour period from 6AM to 8PM on both weekdays and weekends. Conditions are considered unreliable when the LOTTR for an hour is above a ratio of 1.5 (in other words, 20 percent of the time, the trip takes 50 percent longer than the average trip). For this measure, a greater percentage of PMT on segments with LOTTR below 1.5 is better.



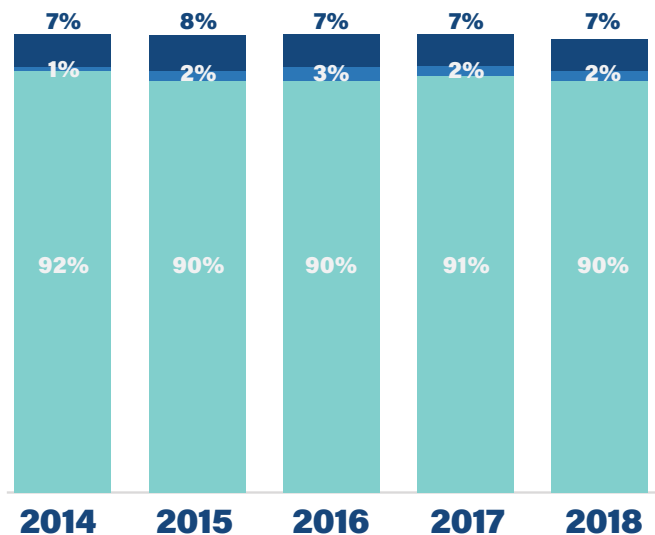
Measure Performance

During the weekday time periods, the share of PMT above 1.5 was highest in 2015, at 14 percent, and was down slightly in 2018, at 12 percent. The share of PMT in the range of LOTTR from 1.3 to 1.5 has increased over time to 6 percent in 2018. During the weekend, the share of PMT above 1.5 was highest in 2015, at 8 percent, and was down slightly in 2018, at 7 percent. The share of reliable PMT generally is greater on the weekends than weekdays.

Weekday Share of Person Miles Traveled (PMT) in Reliable vs. Unreliable Conditions on Limited Access Roadways (Statewide)



Weekend Share of Person Miles Traveled (PMT) in Reliable vs. Unreliable Conditions on Limited-Access Roadways (Statewide)



Extremely Unreliable Travel (80th percentile travel time is 50 percent higher than median travel time)

Moderately Unreliable Travel (80th percentile travel time is between 30 to 50 percent higher than median travel time)

Reasonably Reliable Travel (80th percentile travel time is less than 30 percent higher than median travel time)

The LOTTR measure covers the same 14-hour period of the day as the congestion measure, while also looking at the weekend. The occurrence of extremely unreliable travel can occur at any time of the day. Of course, more travelers are susceptible to its impacts if it occurs during peak travel periods, depending on the severity of the incident.

remove vehicles and cargo from travel lanes. For example, between FY 2017 and FY 2018, the average roadway (travel lane) clearance time for tractor trailer crashes dropped 5 minutes from 108 minutes to 103 minutes.

Why Did Performance Change

The results generally show that the portion of travel occurring in unreliable conditions has remained steady over the past five years. Recent improvements have been made in Northern Virginia, such as the opening of I-495 and I-95 express lanes. These Express Lane expansions provide alternatives to traveling in unreliable conditions by paying a toll, carpooling or taking public transportation. Also, the more widespread use of mobile travel applications is helping more people to change their routes, their time of travel, or their modes to avoid unreliable corridors.

Reliability is also directly tied to incident management. Operations is a core part of VDOT's mission. VDOT's five Transportation Operations Centers monitor traffic and travel conditions, dispatch personnel to respond to incidents and events, coordinate traffic information, coordinate traffic signals, and guide travelers to make informed choices about when and how they travel.

In 2017, the General Assembly passed legislation helping to enhance traffic incident response and management. These amendments facilitated more rapid deployment of VDOT and its contractors to incidents and improved their ability to

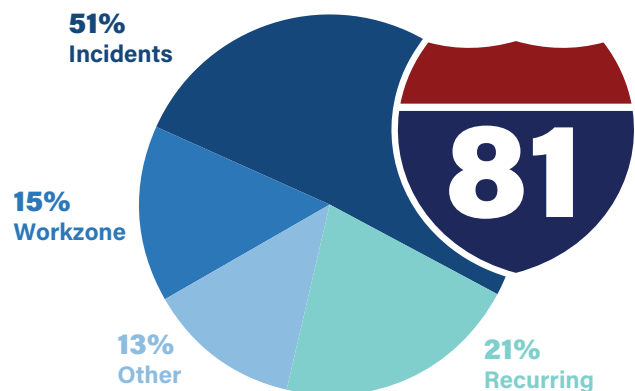
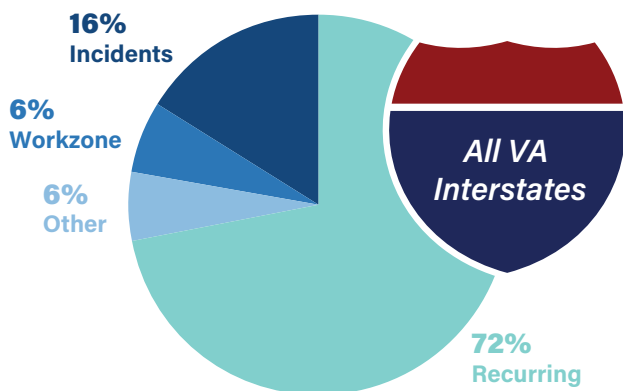
How Are We Improving Performance?

In the I-95 corridor, the Atlantic Gateway project is funding a program of projects that will address the severe congestion and poor reliability between Fredericksburg and I-495, including the extension of the Express Lanes, the Rappahannock River crossing expansion, and VRE improvements.

The I-81 Corridor is particularly affected by delay caused by incidents. More than half of the delay in the I-81 corridor is due to incidents compared with only 16 percent on all other Virginia Interstate roadways. The corridor has more than 45 crashes per year with clearance times greater than four hours.

The I-81 Corridor Improvement Plan identified a \$2 billion program of capital improvements that will address many of the segments with the most significant reliability, delay, and safety issues. To specifically address incidents, the Plan includes an Operational Improvements Plan that details strategies including:

- » Changeable message signs and cameras
- » Expanded safety service patrols
- » Detour routes and parallel facility improvements
- » Contract emergency clearance
- » Truck parking enhancements





Measure

Rail On-Time Performance



Measure Explanation and Importance

On-time Performance (OTP) is a measure of the percentage of time a passenger rail service arrives and departs within a designated window of time, and can be measured in a number of ways, including end-point on-time performance, percentage of passengers arrived on time, and all-station on-time performance. The exact time frame for what is considered “on-time” varies depending on the service provider and the length of the trip. OTP can directly reflect system efficiency and reliability and can be an indicator of underlying issues such as congestion.

OTP is shown for two rail systems in Virginia: Amtrak and Virginia Railway Express (VRE). Virginia financially supports four Amtrak routes (state-supported Amtrak Routes) connecting the Commonwealth to destinations along Amtrak’s Northeast Corridor.

- » Route 46: Washington – Lynchburg – Roanoke
- » Route 47: Washington – Newport News
- » Route 50: Washington – Norfolk
- » Route 51: Washington – Richmond

Amtrak operates the following additional trains in Virginia:

- » Auto Train: Lorton - Sanford, FL (one daily round trip)
- » Cardinal: New York-Washington, DC-Charlottesville-Cincinnati-Chicago (three round trips per week)
- » Crescent: New York-Charlottesville-Atlanta-New Orleans (one daily round trip)
- » Palmetto: New York-Richmond-Savannah (one daily round trip)
- » Silver Meteor: New York-Richmond-Miami (one daily round trip)
- » Silver Star: New York-Richmond-Tampa-Miami (one daily round trip)

Amtrak uses a mileage-based tolerance to develop on-time percentages. In other words, a train must arrive at the station within the allowed number of minutes of its scheduled arrival time. The number of minutes varies based on the number of total miles traveled. Amtrak’s Virginia state-supported routes are allowed a 15-minute tolerance, and the OTP target for state supported routes is 82 percent.

Virginia also provides financial support to VRE, which provides Monday-Friday commuter rail service from the Northern Virginia suburbs to Alexandria, Crystal City, and downtown Washington, DC, along the I-66 and I-95 corridors. VRE has two lines:

- » Manassas Line (Broad Run to Union Station)
- » Fredericksburg Line (Spotsylvania to Union Station)

VRE’s OTP standard is that trains arrive at their final destination within five minutes of scheduled arrival, and no revenue train departs an intermediate station before scheduled departure. VRE sets an annual OTP target as part of its budget process; for FY 2018, VRE’s target was greater than 90 percent OTP.



Measure Performance

Amtrak

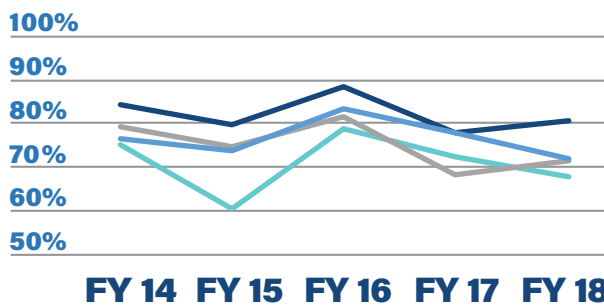
From 2014 to 2018, OTP for Virginia-supported Amtrak trains was typically between 70 and 90 percent, using Virginia endpoint performance measures provided by Amtrak. Northbound trains saw a similar variation of OTP between 2014 and 2018, with OTP peaking for all four trains in 2016. During the same period, southbound trains from Washington to Newport News and Richmond saw a significant improvement in OTP.

VRE

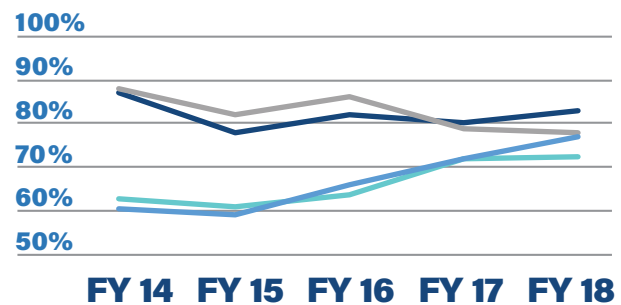
From 2014 to 2018, OTP for the Fredericksburg Line was typically between 80 and 90 percent; on the Manassas Line, it was typically between 85 and 95 percent. The most significant variations occurred on the Fredericksburg Line in Summer 2016 (65 percent OTP) and Summer 2017 (73 percent OTP), although OTP rebounded each year within a few months.

The following charts depict average annual on-time performance for Amtrak trains by line segmented by direction, and for VRE by line for each month to show variation associated with ongoing projects.

Amtrak Northbound Trains OTP, 2014-2018



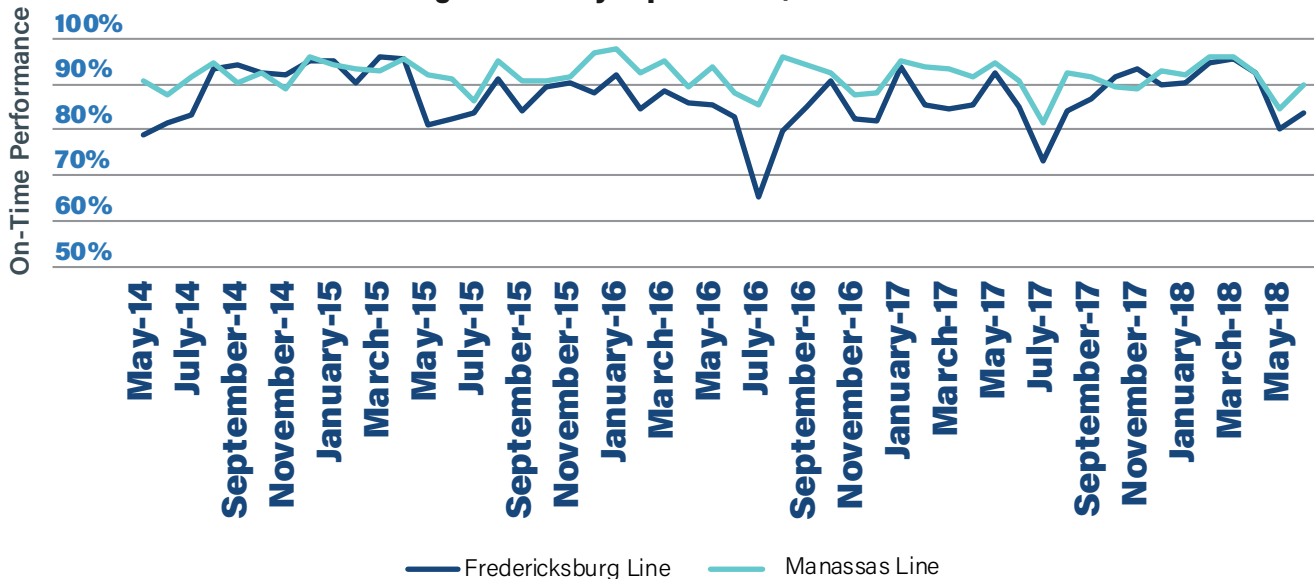
Amtrak Southbound Trains OTP, 2014-2018



- 46 - Washington - Lynchburg-Roanoke
- 47 - Washington - Newport News
- 50 - Washington - Norfolk
- 51 - Washington - Richmond

- 46 - Washington - Lynchburg-Roanoke
- 47 - Washington - Newport News
- 50 - Washington - Norfolk
- 51 - Washington - Richmond

Virginia Railway Express OTP, 2014-2018





Why Did Performance Change

Except for consistent OTP improvements on Amtrak's southbound trains from Washington to Newport News and Richmond, OTP for Amtrak and VRE trains have not dramatically changed over the last five years. Instead, small variations in OTP may be ascribed to singular events, or to occasional, but ongoing, issues. Extreme heat, power outages, and severe weather caused VRE's summer OTP declines. These drops in performance occur occasionally throughout the year, but are more common in the summer when the train's speed may be limited due to high temperatures. In addition to heat orders, summer season is when most track work is performed, which increases OTP issues on all services, including Amtrak.

Service delays – including the minutes of delay – are well documented by Amtrak. Reasons for delays caused by network capacity issues can range from track work to speed restrictions to interference from another train and weather events. Other causes of delays could result from Amtrak equipment issues such as engine or car failure. Where capacity is an issue in Northern Virginia, Amtrak and VRE trains can interfere with one another's OTP if a train falls out of the planned time slot and causes a cascade of events in the network.



How Are We Improving Performance?

Since 2010, DRPT has invested over \$300 million in network capacity:

- » **Acca Yard (2016-2019):** In 2019, construction was completed on a rail bypass around a freight and passenger rail chokepoint between two Amtrak stations in Richmond. This project, funded by DRPT and CSX, addressed a long-standing source of passenger rail delay between these two stations.

- » **Arkendale Third Track (2010-Present):** DRPT has provided funding for design and construction of a third track along a heavily congested nine-mile stretch of CSX's main line from the Arkendale station to Powells Creek; this is a critical section of third track needed between Washington, DC and Fredericksburg. The third track segment will be used to meet, pass, and overtake trains to enhance the performance schedule for intercity passenger service, high-speed passenger rail service, and VRE commuter service.
- » **Roanoke Improvements (2014-2017):** DRPT entered into capital funding agreements with the City of Roanoke and Norfolk Southern for the improvements needed to extend Amtrak service to downtown Roanoke, including track capacity improvements and a train servicing facility and platform. Service to Roanoke began in October 2017, bringing passenger rail to Roanoke for the first time in 40 years.

Additionally, when a second passenger rail train was extended from Richmond to Norfolk in March 2019, DRPT optimized schedules to improve OTP.

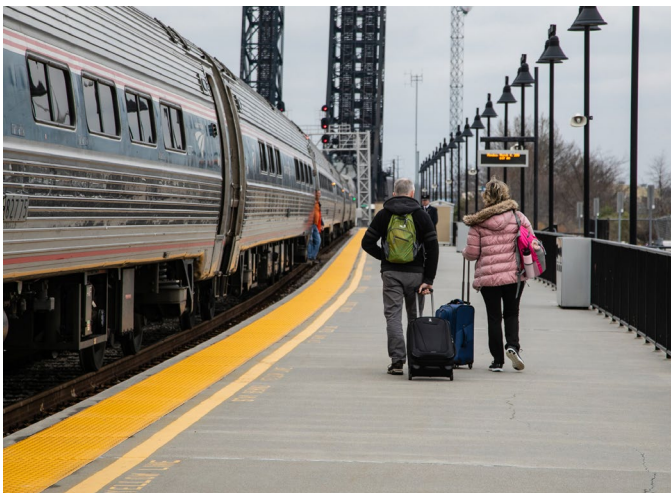
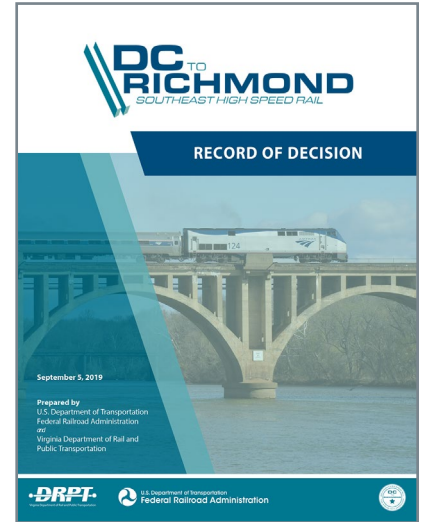
VRE is also in the design stages for improvements to many of their commuter rail stations, including operational improvements that will reduce dwell time and increase operational flexibility at one of its busiest stations, located in Crystal City in Arlington County. These plans will be coordinated with a future fourth track currently under design by the DRPT's DC to Richmond (DC2RVA) project, a high-speed rail project between Washington, DC and Richmond. DC2RVA would add a third track between the cities, as well as a fourth track across Long Bridge, which connects Virginia rail service (including Amtrak and VRE) to Washington, DC, over the Potomac River. In addition to offering the track capacity for more train service, the new tracks could increase reliability by providing a location to offload disabled trains, allow two tracks in operation with one under maintenance or construction.

In September 2019, the Federal Railroad Administration, in cooperation with DRPT, announced that the Record of Decision (ROD) for the Washington, D.C., to Richmond Southeast Higher Speed Rail Project, also known as DC2RVA, had been signed.

This step completes the Environmental Impact Statement study process and makes the project eligible to receive additional Federal funding to advance project planning.

The vision for DC2RVA is to increase rail capacity in order to deliver additional and more reliable passenger and commuter rail parallel to the heavily congested I-95 corridor. For more information on the DC2RVA Rail Project and to view the full ROD and related documents, visit www.dc2rvairail.com.

Amtrak is also working with stakeholders and transit providers across the Washington, DC region – including VRE, WMATA, the Maryland Transit Administration (MTA), and the Union Station Redevelopment Corporation (USRC) – on the “Washington Union Station Concourse Modernization Project,” which seeks to triple passenger capacity and double train capacity at Union Station over the next 20 years. The Environmental Impact Statement for the project is in progress, and is expected to be complete in 2020.





GOAL B:

ACCESSIBLE AND CONNECTED PLACES



Measure

Number of workers who can access jobs in VTrans Activity Centers within a 45-minute drive or a 45-minute transit trip

Measure Explanation and Importance

This measure estimates the number of workers who have auto or transit access to jobs in each VTrans Activity Center in 2018. Auto access is defined as the total number of workers who can reach jobs located in an Activity Center within a 45-minute trip; transit access is defined as the number of workers who can reach jobs located in an Activity Center within a 45-minute trip (including up to 30 minutes of walking).

This measure considers both job location and worker location when looking at auto and transit accessibility. In many situations, a worker may have auto and/or transit access to jobs in multiple Activity Centers. As a result, the Activity Center-specific numbers in this measure should not be summed to get a statewide "total" accessibility number.

Accessibility to employment areas is critical for the Commonwealth's economy; VTrans aims to increase opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs.

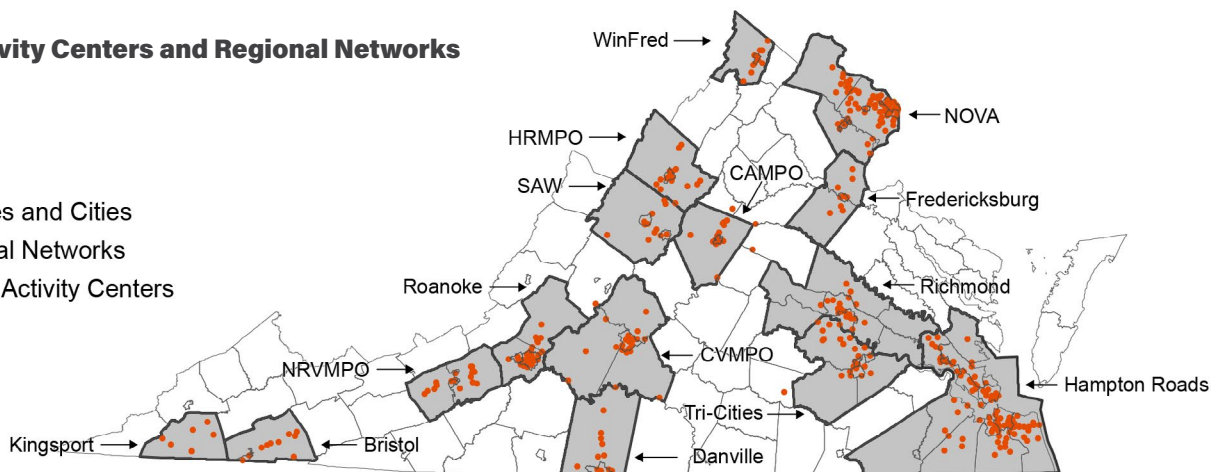
VTrans Activity Centers are areas of regional importance that have a high density of economic and social activity. There are 389 defined Activity Centers concentrated in the VTrans Regional Networks. Regional Networks are based on designated MPOs within the Commonwealth. If an MPO boundary includes only a portion of a county, the entire county will be included. VTrans identifies 15 Regional Networks in the Commonwealth; transportation infrastructure in these areas serves commuters, intra-regional, and local travel.

Data is only available for 2018. This data helps establish a baseline against which future Reports can review change in accessibility for each activity center. Changes in accessibility are associated with where workers live and where jobs are located, and transportation network changes that may increase or decrease travel time. Within VTrans, this measure is being used to assess the competitiveness between highway and transit access, and to determine where significant gaps in access exist.

VTrans Activity Centers and Regional Networks

Legend

- Counties and Cities
- Regional Networks
- VTrans Activity Centers



Note: Chesterfield County is located in both the Richmond and Tri Cities Regional Networks.

Measure Performance



Activity Centers where the highest number of workers can access jobs within a 45-minute auto trip are located in areas of the Commonwealth with high numbers of adjacent jobs and households: Northern Virginia (Arlington County, City of Alexandria, Fairfax County, Prince William County, Loudoun County, City of Falls Church, City of Fairfax), Hampton Roads (Cities of Portsmouth, Norfolk, and Virginia Beach), and the

Richmond region (City of Richmond, Henrico County, and Chesterfield County).

Activity Centers where the highest number of workers can access jobs within a 45-minute transit trip (101,000 or more) are concentrated in Northern Virginia, primarily around Metrorail stations (some of which also have VRE or Amtrak access). Generally transit access to jobs is most dependant on the first and last mile connections. Multiple transit stops and corridors within activity centers provide the highest level of direct and convenient access for workers – creating a more competitive option for transit relative to driving.

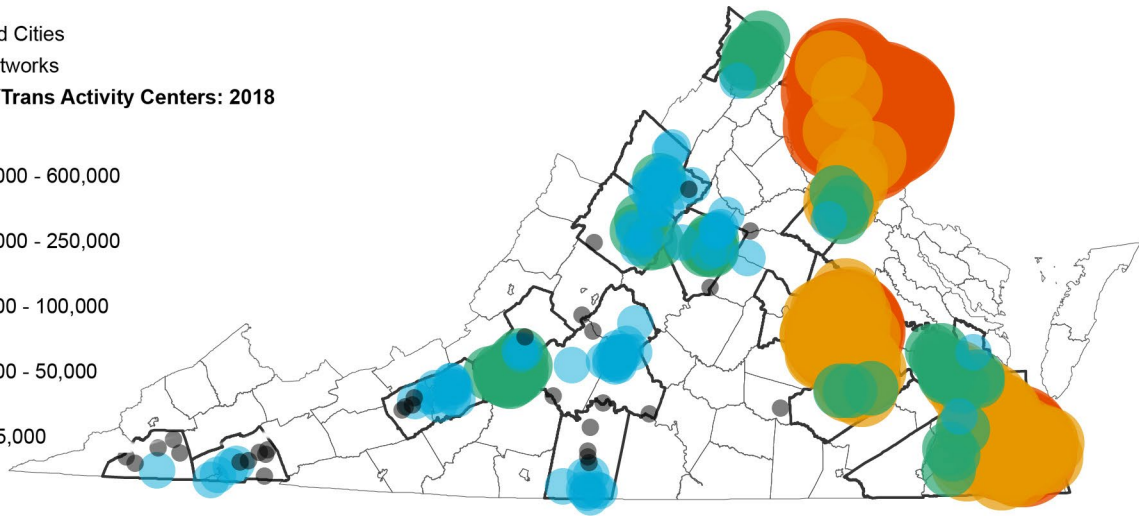
Workers Accessing Jobs by Auto, by VTrans Activity Center (2018)

Legend

-  Counties and Cities
-  Regional Networks



Auto Access to VTrans Activity Centers: 2018

-  251,000 - 600,000
-  101,000 - 250,000
-  50,100 - 100,000
-  25,100 - 50,000
-  1 - 25,000








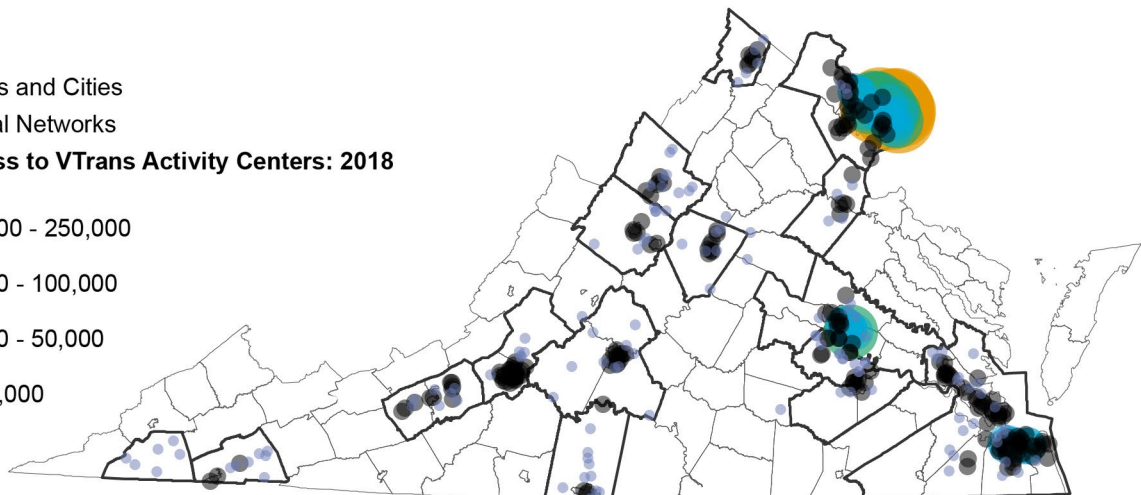
Workers Accessing Jobs by Transit, VTrans Activity Center (2018)

Legend

-  Counties and Cities
-  Regional Networks

Transit Access to VTrans Activity Centers: 2018

-  101,000 - 250,000
-  50,100 - 100,000
-  25,100 - 50,000
-  1 - 25,000
-  0



To account for wide ranges in the scale of available jobs, an alternative method of measuring worker accessibility to jobs presents a ratio comparing transit access to auto access. For Activity Centers with transit access, the highest ratio of workers able to access jobs by transit compared to by driving (15 or more workers able to access jobs by transit for every 100 able to access jobs by driving) are located in:

- » Downtown Charlottesville/University of Virginia
- » City of Lynchburg
- » James Madison University area
- » Blacksburg/Virginia Tech
- » Northern Virginia: Activity Centers primarily concentrated around Metrorail lines
- » City of Richmond
- » City of Roanoke

When this ratio is applied to each Regional Network (using the sum of all transit accessible workers to activity centers in the Regional Network, divided by the sum of all auto-accessible workers to activity centers in the Regional Network), Northern Virginia, Charlottesville, and Roanoke regions have the highest Regional Network ratios (10-14 transit accessible jobs per 100 auto accessible jobs), followed by the New River Valley and Richmond area (6-9 transit accessible jobs per 100 auto accessible jobs).



How Are We Improving Performance?

Multimodal projects incrementally have received more funding through SMART SCALE through each round – increasing from 2 percent in Round 1 to 17 percent of Round 3 funding allocated to either bus transit or rail transit. These projects include increasing pedestrian safety and streetscape improvements to Bus Rapid Transit (BRT) stations in Richmond, BRT on Richmond Highway (Route 1) from the Huntington Metro to Fort Belvoir, and funding for new Hampton Roads Transit commuter bus service to the Newport News Shipyard.






OIPI also supports communities through its Urban Development Area (UDA) Technical Assistance program. Locally designated UDAs help communities plan for growth using elements of traditional neighborhood design, reducing the impacts of growth on transportation networks. For more information, please visit: <http://oipi.virginia.gov/planning-assistance/grants/default.asp>.

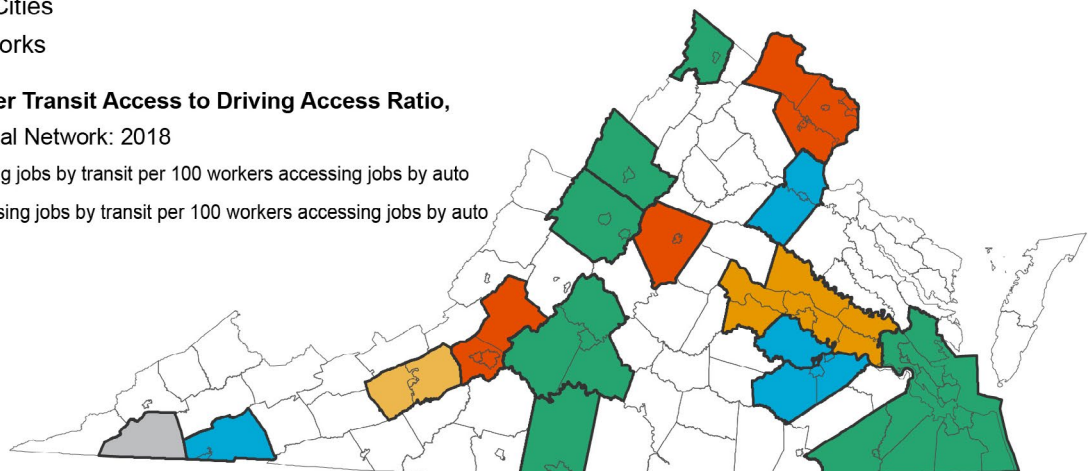
VTrans is currently developing a list of Mid-Term Needs to address some of the most pressing transportation issues over the next 7-10 years. As part of this process, a new measure will look at transit access for **Equity Emphasis Areas**, which will review communities where equity in transit access should be emphasized based on resident characteristics, population density, and existing transit service.

Legend

-  Counties and Cities
-  Regional Networks

VTrans Activity Center Transit Access to Driving Access Ratio, Aggregated by Regional Network: 2018

-  0 workers accessing jobs by transit per 100 workers accessing jobs by auto
-  1-2 workers accessing jobs by transit per 100 workers accessing jobs by auto
-  3-5
-  6-9
-  10-14





Measure

Annual transit ridership in Virginia,
Annual intercity passenger rail ridership in Virginia

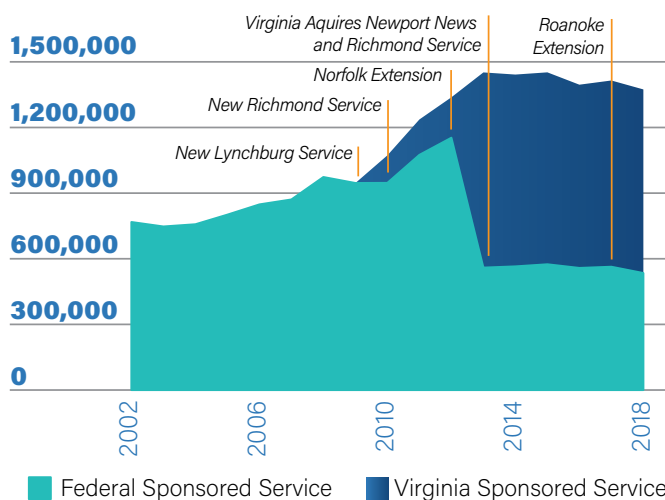


Measure Explanation and Importance

All public transit agencies in the Commonwealth are required to report monthly ridership to DRPT, which is then aggregated on an annual basis. Transit ridership is important because ridership is used to allocate state operating assistance to transit agencies/service providers, and it allows DRPT to evaluate statewide transit performance and demonstrate the benefits to Virginia.

Likewise, intercity passenger rail ridership demonstrates the benefit of the service to Virginia, and helps DRPT evaluate statewide intercity passenger rail performance. Intercity passenger rail ridership is defined as the number of Amtrak passenger trips with at least one beginning or end point at a station within Virginia. Intercity passenger rail ridership can be broken down into two groups: State-sponsored ridership (services operating less than 750 miles and receiving state financial support) and long-distance ridership (services greater than 750 miles which are part of the Amtrak national system).

Composition of annual Amtrak ridership from FY 02 - FY 18 for Virginia State-Sponsored Service and Long Distance Amtrak Service in Virginia



Measure Performance

Transit Ridership in Virginia

In FY 2019, Virginia's transit agencies reported 64,798,471 unlinked passenger trips across all modes, which represents a 0.2 percent increase compared to FY 2018.

This marks the first year-over-year increase in reported ridership from Virginia's transit agencies in more than five years. Bus transit, which makes up the bulk of transit ridership reported by Virginia transit agencies, increased by 0.7 percent, while other modes experienced modest declines compared to FY 2018.

In addition to the ridership reported by Virginia transit agencies, WMATA provided 107,128,658 unlinked passenger trips in the Commonwealth, bringing the statewide total to 171,927,129 in FY 2019.

Nineteen transit agencies reported ridership increases in FY 2019. Small urban and rural areas continue to experience the most consistent ridership growth. Suffolk Transit and Blacksburg Transit reported ridership increases of 14.8 percent and 16.5 percent, which can be attributed to growing local demand for transit service, coupled with operator-initiated service improvements and expansions.

Since FY 2017, Washington Metropolitan Area Transit Authority's (WMATA) ridership has remained steady. The table at the top of page 35 shows Virginia ridership on WMATA for heavy rail, bus, and paratransit over the last three fiscal years. To be counted as part of the total Virginia ridership, an individual's trip must either originate or terminate in the Commonwealth.

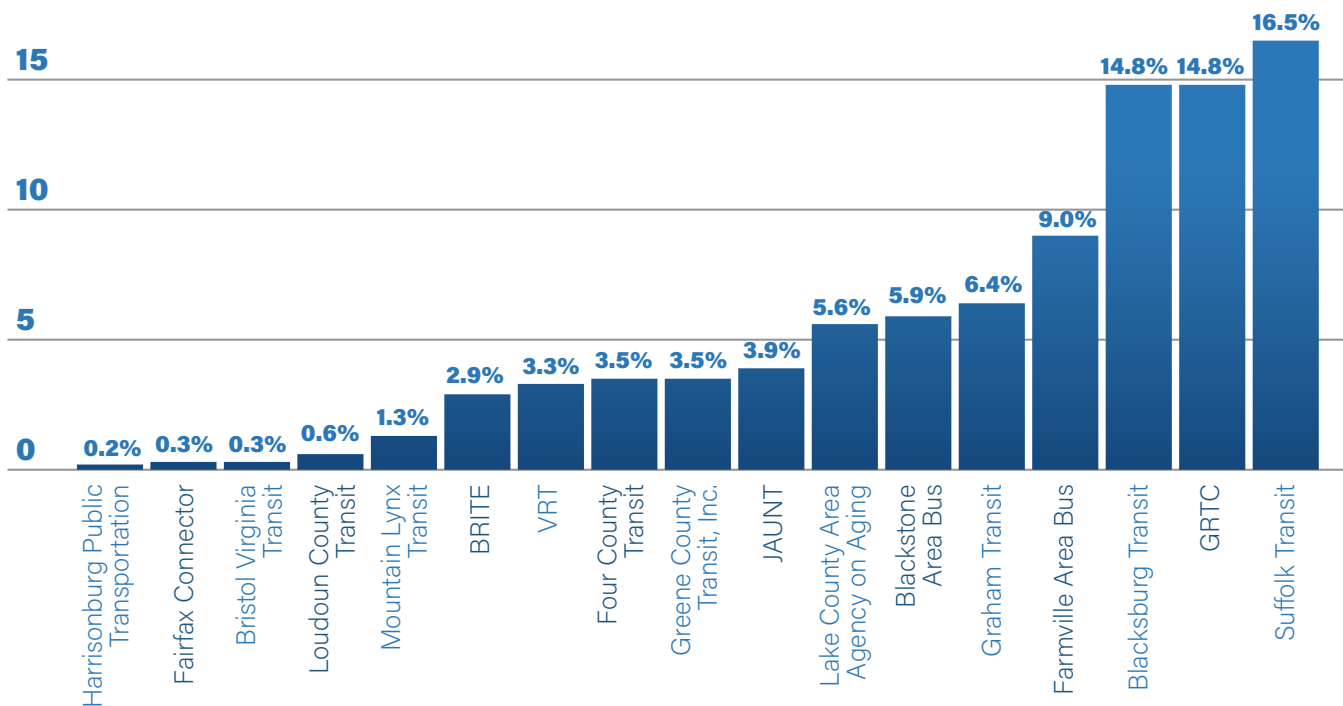
The charts below present statewide transit ridership change, excluding WMATA, across all transit modes, and a highlight of the systems with increasing ridership in FY 2019.

Ridership and Ridership Change by Transit Mode

	FY 17	% Change (FY 17-18)	FY 18	% Change (FY 18-19)	FY 19
Commuter Rail	4,676,123	-0.9%	4,631,909	-4.8%	4,408,114
Light Rail	1,319,791	+7.4%	1,417,350	0.0%	1,416,912
Bus	60,616,801	-5.9%	57,065,639	+0.7%	57,485,493
Ferry	295,983	+10.7%	327,661	-8.0%	301,321
Paratransit	1,224,696	-1.0%	1,212,456	-2.1%	1,186,631
TOTAL	68,133,394	-5.1%	64,655,015	+0.2%	64,798,471

Annual Ridership Change - Providers with Increases (FY18-19)

20



Greensville-Emporia Transit reported a 98.3 percent increase in ridership from FY18-FY19; however, their service first launched in October 2017, thus they did not have a full year of ridership to compare. Petersburg Area Transit reported a 19.5 percent increase in ridership from FY18-FY19; however, a ridership audit revealed under-reporting in FY18, thus their year-to-year comparison is skewed.

The table below shows Virginia ridership on WMATA for heavy rail, bus, and paratransit over the last three fiscal years.

WMATA Ridership and Ridership Change by Transit Mode

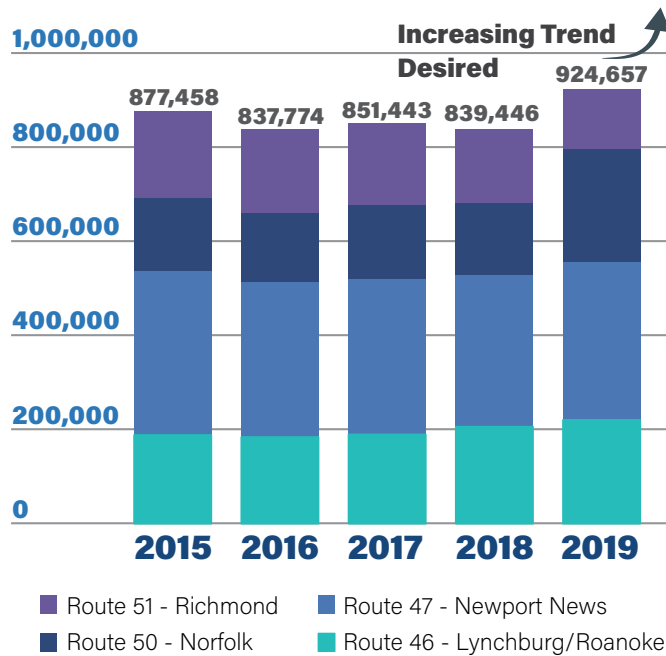
	FY 17	% Change (FY 17-18)	FY 18	% Change (FY 18-19)	FY 19
Heavy Rail	89,497,280	1.8%	91,116,098	-0.8%	90,305,329
Bus	19,154,426	-9.7%	17,293,559	-4.7%	16,474,263
Paratransit	333,226	1.8%	339,196	2.9%	349,066
TOTAL	108,984,932	-0.2%	108,748,853	-1.5%	107,128,658

Intercity Passenger Rail Ridership in Virginia

Virginia began sponsoring intercity passenger rail service in 2009, steadily growing services and taking responsibility for routes that would have otherwise been discontinued due to shifts in Federal support. Over the 10 years of state-sponsored service, Virginia ridership has maintained steady growth. Years with service expansions had the greatest ridership gains.

As depicted in the chart below, Virginia-sponsored Amtrak service is comprised of four routes that operate six daily round trips with connections to Washington, DC and the Northeast Corridor.

Intercity Passenger Rail Ridership



? Why Did Performance Change?

Increases in transit ridership across 19 agencies in FY 2019 is primarily attributed to growing local demand for transit service, coupled with operator-initiated service improvements and expansions. For example, in Richmond, the Greater Richmond Transit Company (GRTC) experienced a 14.8 percent increase in ridership. In Fiscal Year 2019, GRTC rolled out a number of significant changes to their transit network including a system-wide overhaul of the fixed route network and developing new partnerships with Virginia Commonwealth University and Richmond Public Schools. GRTC also opened its new seven-mile Bus Rapid Transit (BRT) line known as the "The Pulse," which includes three miles of dedicated lanes and many of the features that make BRT faster than conventional bus service.

WMATA heavy rail ridership increased by nearly two percent between FY 2017 and FY 2018; however, it suffered a slight decline in FY 2019. This decline can be attributed to the WMATA Platform Improvement Program (PIP). The PIP led to a temporary disruption of service on the Blue and Yellow lines between Franconia-Springfield and National Airport from May 25, 2019, through September 8, 2019. This service disruption led to a 16 percent decrease in ridership in June 2019.

The Platform Improvement Program will continue to have an impact on ridership in FY 2020 with the Blue and Yellow line work lasting through the first three months of the fiscal year. Work on the Orange line is expected to occur during Summer 2020.

WMATA Bus ridership decreased nearly 10 percent in FY 2018 and another approximate five 5 percent in FY 2019. WMATA attributes this decrease to “changing customer expectations” with a desire for more “frequent” and “reliable” transit that “the current bus system is not meeting.”

In FY 2019, passenger rail ridership increased by 10 percent, recording the highest ridership total since Virginia started sponsoring service. It is important to note that year to year fluctuations in ridership are a common trend influenced by many factors, including weather events, construction projects, economic conditions, fuel prices, customer experience, and ticket prices. While ridership is presented here on an annual basis, it is important to understand that ridership reflects travel patterns similar to roadways: ridership fluctuates throughout the year, with high and low seasons. Summer months and the winter holiday season experience the highest ridership, while February is typically one of the lowest months.

Planning for construction projects, marketing discounts, improving on-time performance, offering better on-board services, ensuring a state of good repair at stations, and partnering with other service providers on connectivity are ways Virginia can affect ridership and provide alternatives to highway travel.



How Are We Improving Performance?

Urban areas throughout the Commonwealth have been changing rapidly over the past 30 years, resulting in new settlement and commuting patterns. The transit systems and networks that serve these areas, however, have not always kept up with these changes.

New Transit Strategic Planning requirements are intended to ensure that the largest, urban transit agencies are proactively managing their systems through effective system design.

GRTC (Richmond) and Blacksburg Transit have both completed system redesign efforts, leading to significant increases in ridership. Strategic plans will be completed by Hampton Roads Transit, Greater Lynchburg Transit Company, Petersburg Transit, and PRTC in calendar year 2019.

Fiscal Year 2020 also marked the transition of state transit operating assistance to performance-based allocation formula. More accountability and transparency in the statewide operating program rewards lower operating costs and higher ridership, promoting more efficient system operations and efforts to enhance ridership.

In his 2017 report, former USDOT Secretary Ray LaHood noted the need for major reforms to WMATA's bus service. Subsequently, WMATA initiated a Bus Transformation Study that is a regionally-developed mobility strategy to define the roles of buses and their operators, advance innovations, and create a plan to advance these goals. This study is scheduled for completion in late 2019. In addition, in 2020 the Silver Line expansion to Dulles International Airport is projected to begin operation.

Virginia is working to improve Intercity Passenger Rail service on numerous fronts to increase ridership and grow revenues on our state-sponsored service routes. Initiatives include:

- » **Marketing Efforts** - DRPT works with Amtrak to offer a number of targeted discounts to increase ridership on Virginia supported services. In 2019 DRPT launched an Anytime Virginia discount, student discounts, and has improved group discounts and senior discounts.
- » **Customer Experience** - Over the past two years DRPT has worked with Amtrak to improve on-board announcements, replace WiFi equipment to improve reliability, add Virginia products to the café menu, and add additional cleaning services.
- » **Station Needs Assessment** - DRPT works with Amtrak to assess state of good repair at all stations in the Commonwealth, and to address the Americans with Disability Act standards for access at stations and boarding trains.

GOAL C: SAFETY FOR ALL USERS

Measure
 Total number of motorized fatalities and serious injuries.
 Rate of motorized fatalities and serious injuries.

Targets
 Fatalities: 950 (2020)
 Fatality Rate: 1.08 (2020)
 Serious Injuries: 7,473 (2020)
 Serious Injury Rate: 8.47 (2020)

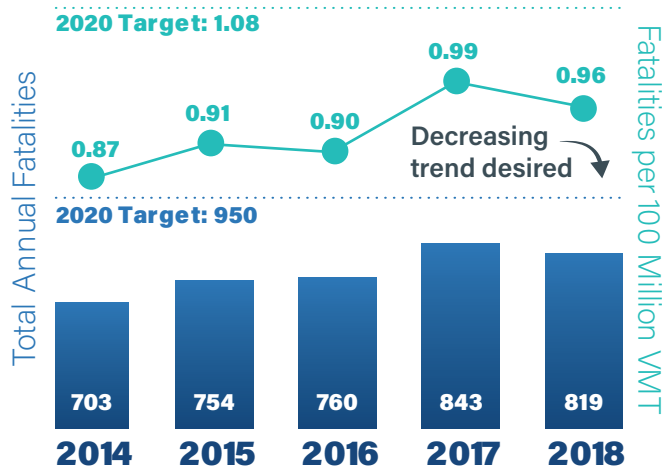
Measure Explanation and Importance

The count measures track the total number of persons killed or seriously injured as a result of a motor vehicle crash on any public road in Virginia. The rate measures normalize the number of fatalities or serious injuries per 100 million vehicle miles traveled (VMT), based on annually published VDOT data.

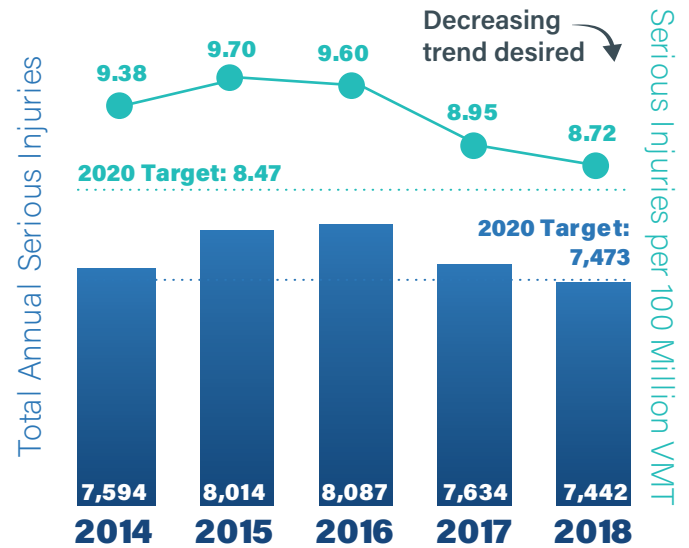
By tracking these measures, Virginia is able to evaluate positive and negative trends to understand the effects of existing policies and interventions and apply other proven strategies to reduce fatalities and serious injuries on Virginia's roads.

Measure Performance

Total Fatalities and Fatality Rate



Total Serious Injuries and Serious Injury Rate



Why Did Performance Change?

The number of fatalities and serious injuries per year on Virginia roads trended steadily downward after 2007 and both reached all-time lows in 2014. Since then, motor vehicle crashes have increased in Virginia, which is consistent with national trends. This trend is related to driver behavior, available funding relative to systemic safety needs, and increases in VMT and active transportation. In particular, increases in distracted driving, below average seat belt use compared to national averages, and increases in the younger population and older drivers have contributed to more fatal crashes in recent years.

External factors also influence roadway safety and the number of crashes on the transportation system. In particular, increases in VMT track with increases in fatalities and serious injuries. Additional VMT is most significant on rural local roads, which correlates with increases in roadway departure crashes, and on urban collectors, which correlates with increases in pedestrian and bike crashes. Population increases, amongst the 15-24 and 75-plus age groups has also contributed to increasing crash trends in recent years.

SHSP Emphasis Areas



* Includes drunk, drugged, drowsy, and distracted driving.



How Are We Improving Performance?

Virginia's safety efforts are focused on correcting poor driver behavior and improving roadway elements and traffic control to reduce crashes and their consequences. Numerous strategies and actions are defined and implemented across eight emphasis areas in the five-year Strategic Highway Safety Plan (SHSP).

ARRIVE ALIVE VIRGINIA is the tagline for Virginia's 2017-2021 SHSP. The SHSP mission is to save lives and reduce injuries through the 4E's.

Virginia
adopts the **VISION**
of **Toward Zero**
Deaths.

All
roadway
users

should
arrive
safely at their destinations.



ENGINEERING



EMERGENCY
RESPONSE



ENFORCEMENT



EDUCATION

The SHSP includes policies, programs, and projects that detail how Virginia will achieve its safety goals.

Implementation of the SHSP has been robust. Infrastructure is being designed or retrofitted to warn users of risks, provide forgiving elements, and reduce the consequences of poor driver behavior. Lower-cost/higher benefit infrastructure projects, known as systemic safety treatments, have become a priority. Examples include the installation of curve warning signs and rumble strips to reduce roadway departures. At intersections, VDOT is installing high-visibility backplates to make signals more visible, flashing yellow arrows to reduce head-on and angle crashes, improving signal timing, and improving signing and marking at unsignalized intersections.

For more expensive infrastructure expansions, innovative intersections and interchanges reduce conflicts and severe crashes. Such improvements, along with access management, TDM, transit, and non-motorized accommodations are being promoted and funded through programs such as SMART SCALE.

Changes to driver behaviors through education and enforcement are also being implemented. **The Northam Administration launched the Executive Leadership Team on Highway Safety which initiates and coordinates public campaigns to educate roadway users about unsafe behaviors.** The information is also taught through outreach and curriculum at schools and universities.

Starting in 2019, the CTB is working with VDOT and OIPI to inform decisions on the implementation of systemic safety improvements and establish new policy for HSIP funding distribution to reduce fatal and serious injury crashes.

On the enforcement side, state and local police coordinate on high-visibility efforts throughout the year to enforce traffic laws and prevent fatalities and serious injuries. The addition of drug recognition experts throughout the state has helped address another rising trend.

Incident and emergency response is also improving safety through a Statewide Traffic Incident Management platform, helping alert drivers to incidents and better protect emergency personnel.



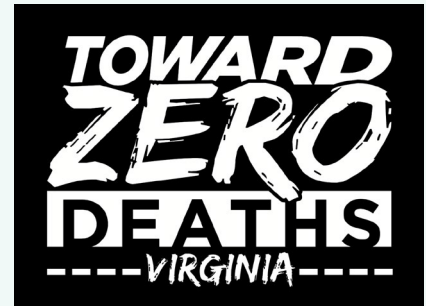
Safety Performance Measure Target Setting

OIPI, VDOT, and DMV worked together over the past year to develop a more rigorous data-driven methodology to establish targets for the safety performance measures. The new approach is intended to represent the best projections of safety outcomes based on socioeconomic and demographic trends, current policies and projects, investment strategies, infrastructure, and behavioral programs spending. The CTB adopted new 2020 safety targets reflecting this approach in June 2019. These targets are presented in this Report.

The new approach and projected safety outcomes, which indicate the potential for continued increases in fatal and serious injury crashes, indicate the need for a shift in investment strategies and policies, which in part have been deployed as part of the FY 2020 SYIP.

Toward Zero Deaths

A new [Towards Zero Deaths website](https://tzdva.org/)^a has been launched to tie infrastructure, education, enforcement, and emergency response together.



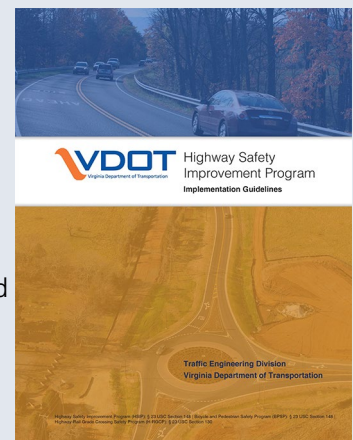
The website provides information to stakeholders, partners, and the public on the Commonwealth's efforts to drive down fatal and serious injury crashes.

^a <https://tzdva.org/>

The Highway Safety Improvement Program (HSIP) is a core FHWA program supporting implementation of safety projects.

Projects in the HSIP must address an emphasis area action item in the SHSP and provide a positive return on investment. VDOT annually receives approximately \$60 million in Federal funding to program safety projects. In the past, VDOT has programmed a mix of single-location, or spot, projects and systemic treatments spread across the network.

VDOT is now focusing intently on completing deployment of systemic safety improvements across the state-maintained network. An initial Implementation Plan will result in a centralized approach for setting priorities and schedules for deploying systemic improvements to achieve the greatest crash reductions possible at priority locations. Once the initial plan is fully implemented at a cost of \$137 million over six years, these systemic improvements are expected to save more than 60 lives and prevent over 1,200 injuries per year statewide.





Measure

Number of non-motorized fatalities and serious injuries



Targets

711 (2020)



Measure Explanation and Importance

This measure tracks the combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle on all public roads in Virginia during a calendar year. Non-motorized refers to pedestrians and bicyclists. For this measure, a lower value is better.

Increasingly active lifestyles in urban and suburban areas as well as other trends in non-motorized travel have led to increased pedestrian and bicycle activity. By tracking this measure, Virginia can gauge the effects of existing policies and interventions as presented in the SHSP and apply proven strategies to reduce fatalities and serious injuries for non-motorized modes of travel.

As shown in the figure, non-motorized fatalities and serious injuries have generally declined. While the measure includes both fatalities and serious injuries for cyclists and pedestrians, it is important to also understand the underlying data, for example, over 85 percent of non-motorized fatalities and serious injuries are pedestrians. Of the 137 non-motorized fatalities in 2018, 123 were pedestrian, representing the highest total over the last five years. The increase in fatalities has been offset by a steady decrease in serious injuries.



Why Did Performance Change?

Many of the underlying factors influencing the other safety measures also influence this measure:

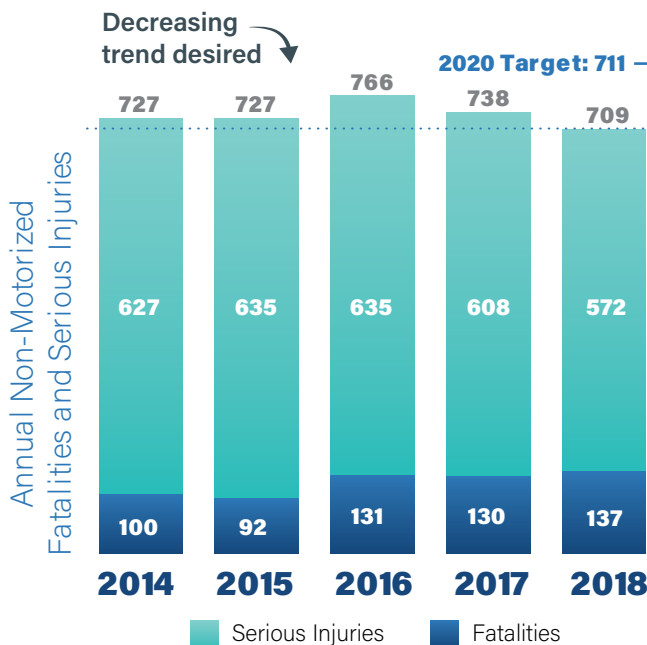
- » Increase in vehicle miles traveled,
- » Increases in the younger population driving and more prevalent distracted driving,
- » Increases in driving under the influence, and
- » Increases in pedestrian and bicycle activity.

VMT increases were significant on urban collectors. Vehicle congestion in urban areas, coupled with changes to land uses and the greater availability of bicycle and pedestrian facilities, correlates with bicycle and pedestrian crash trends. A review of crash data also pointed to more pedestrians being struck at mid-block crossings versus intersections. The increase in biking and walking is also occurring adjacent to roadways that often do not include accommodations for these users.

More travel on rural roads is also creating challenges. The mix of narrow roadways, higher speeds, low seat belt use, and distracted driving has increased severe crash outcomes particularly for cyclists and pedestrians.



Measure Performance





How Are We Improving Performance?

As with motorized fatalities and serious injuries, Virginia's safety efforts for non-motorized travel focus on correcting poor driver behavior and improving roadway elements and traffic control to reduce crashes and their consequences.

A focus on education and enforcement across all emphasis areas is having an impact on safety performance. Success also relies on effective partnerships between VDOT, other state agencies, and regional and local partners to develop countermeasures and implement strategies to address the causes of bicycle and pedestrian crashes throughout Virginia. Proven countermeasures include high-visibility crosswalks, pedestrian countdown signals, pedestrian refuge islands (or extended curb areas), and pedestrian crossing signs and flashing beacons, as well as road diets. In 2018, VDOT implemented two road diet projects that reduced the number of travel lanes and added bike lanes – helping to reduce crashes by nearly 70 percent.

The Governor's Executive Leadership Team on Highway Safety is using public campaigns to educate roadway users about unsafe behaviors. Transportation and safety stakeholders meet regularly to discuss data and known causation factors in an effort to implement responses and raise awareness to reduce injuries and fatalities.

Pedestrian Safety Action Plan (PSAP)

VDOT's PSAP helps understand key pedestrian safety concerns and identifies counter-measures to address the concerns through policy, improved maintenance, land development practices, and projects.

Throughout high-crash and high-demand pedestrian corridors across Virginia, VDOT works with localities to review current policy, conduct crash analysis, and identify the right and cost-effective countermeasures for potential funding.

Education and enforcement efforts are also being deployed to prevent pedestrian and bicycle crashes. The Street Smart campaign in the Washington, D.C. region has been successful raising awareness about safety and the laws that protect people who walk and bike. The Walk Smart, Virginia! Campaign, run by the Virginia Department of Education, was created to involve schools, families, and communities in making smarter and safer decisions when commuting by foot. VDOT's Safe Routes to School Program commits nearly \$1 million annually to support safety programs and improvements that make walking and biking to school a safe and convenient activity. On the enforcement side, campaigns such as Drive Sober or Get pulled Over focus on preventing impaired driving crashes, which can lead to unsafe interactions between drivers and pedestrians or bicyclists.



In October 2019, VDOT was honored with two National Roadway Safety Awards, recognizing the agency's Pedestrian Safety Action Plan and Strategic Guardrail Management Program. Both efforts are focused on using research and technology to implement measurable improvements at identified safety challenges.



GOAL D:

PROACTIVE SYSTEM MANAGEMENT



Measure

Percentage of bridges in good or fair condition – All Public Roads, Interstate system, Primary system, Secondary system



Targets

All public roads: 95.5 percent
Interstate: 99 percent
Primary: 96 percent
Secondary: 94 percent

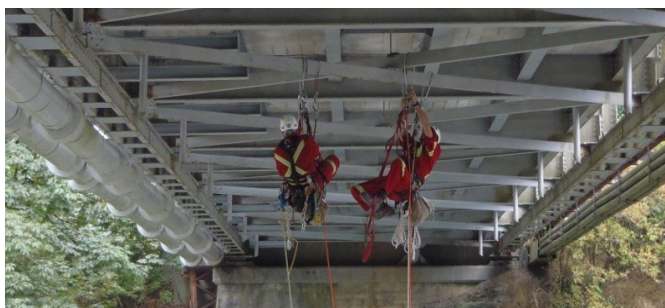
Measure Explanation and Importance

Virginia's bridge measures track the overall health of bridges and culverts (also known as structures, but referred to collectively as bridges in this Report) maintained by VDOT on all public roads, segmented by the Interstate, Primary, and Secondary roadway systems. Each measure is expressed as a percent, representing the number of bridges that are rated as good or fair condition divided by the total number of bridges. For each measure, a higher value is better.

Bridges are periodically inspected to determine the condition of various parts of the bridge, which are rated on a scale of 0 (failed) to 9 (excellent). Bridges are considered in poor condition if the deck, the superstructure, or the substructure receive a condition rating of 4 or below.

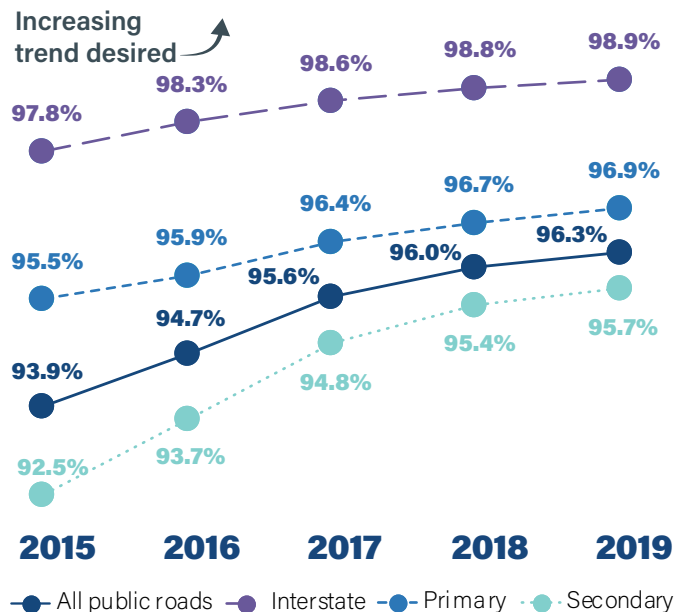
The fact that a bridge is in poor condition does not imply that it is unsafe. A bridge in poor condition typically requires maintenance and may need eventual rehabilitation or replacement to address deficiencies. Poor bridges may be posted with reduced vehicle weight limits. If unsafe conditions are identified, then the bridge will be closed.

Maintaining Virginia's bridges is important to ensure a safe and well-functioning roadway network for passenger and freight movement. By tracking these measures, Virginia is able to proactively identify and prioritize bridge maintenance needs and manage overall maintenance costs.



Measure Performance

Percent of Bridges in Good or Fair Condition



Bridge condition has trended upward for all four measures. The Interstate system has the highest percentage of bridges in good or fair condition, while the secondary system has the lowest percentage. The percentage of Interstate bridges that are in good or fair condition has increased by 11 percent since 2015, and by 2.4 percent for bridges on all public roads – all very positive performance trends.

Virginia has made progress in reducing the number of poor bridges in recent years. For example, since 2010, VDOT has replaced or improved approximately 2,130 poor bridges and structures (almost 10 percent of its entire inventory).

VDOT's current policy is to maintain performance at 95.5 percent of all bridges considered in good or fair condition. This policy applies differently by system, with a 99 percent target for Interstates, 96 percent target for Primary facilities, and a 94 percent target for Secondary facilities.

Why Did Performance Change?

A combination of aging infrastructure and reductions in available funding during the recession of 2008-2009 led to declines in performance and necessitated corrective action. Following the recession, the General Assembly approved and the CTB oversaw funding to bring the system back to a state of good repair while focusing on Virginia's pressing maintenance needs ("worst-first" approach). These actions resulted in improved performance on all systems.

VDOT has achieved more across the entire system in recent years by focusing on proactive rehabilitation with an emphasis on preservation, timely intervention, and efficiency through high-return new materials, techniques, and treatments.

This is a new strategy, which utilizes bridge maintenance funding to focus on overall inventory condition rather than a "worst-first" approach.

How Are We Improving Performance?

Virginia currently spends \$215 million annually for bridge maintenance and operations and allocates \$225 million from the State of Good Repair (SGR) Program. Projections of available funding for bridge preservation and replacement relative to goals and forecasted needs show an increasing funding gap if a worst-first strategy is employed.

While the share of poor bridges is decreasing, 2019 inspection data shows approximately 4,440 bridges that are likely one inspection away from having one or more components evaluated as "poor," meaning the bridge will be rated structurally deficient. These bridges represent almost 21 percent of the statewide inventory maintained by VDOT. Most can be rehabilitated and preserved at 15 percent or less of the replacement cost, providing decades of additional service life.

Understanding the challenges of maintaining our aging infrastructure, in 2019, the General Assembly established the Robert O. Norris Bridge and Statewide Special Structure Fund for the purpose of funding maintenance and replacement of large and unique structures. The bill requires the CTB to conduct a "comprehensive review" of the condition and performance of pavements and bridges, review investment strategies, and recommend new 20-year targets for sustainable performance and an investment strategy to achieve them. The comprehensive review conducted by VDOT has shown that a balanced approach based on proactive preservation can lead to long-term sustainability of the bridge program. The report on the results of the analysis is due in late 2019 to the General Assembly.





Measure

Percentage of sufficient lane miles of pavement – Interstate system, Primary system, and Secondary system



Targets

Interstate: ≥ 82 percent
Primary: ≥ 82 percent
Secondary: ≥ 65 percent



Measure Explanation and Importance

VDOT closely monitors the condition of pavement across 128,770 lane miles on the Interstate, Primary, and Secondary systems. Preserving this infrastructure provides safe and reliable movement of people and goods within the Commonwealth.

VDOT uses a numeric scale, the Critical Condition Index (CCI), to explain and categorize pavement sufficiency. CCI is calculated on a scale of 0 to 100. A CCI value of 100 represents pavement with no visible distress, while a value of 0 indicates a pavement in heavily distressed condition. Pavements with CCI values 60 or above are considered sufficient.

The pavement measure is expressed as a percent, representing the number of lane miles rated “sufficient” (CCI above 60) divided by the total number of lane miles. For each measure, a higher value is better.

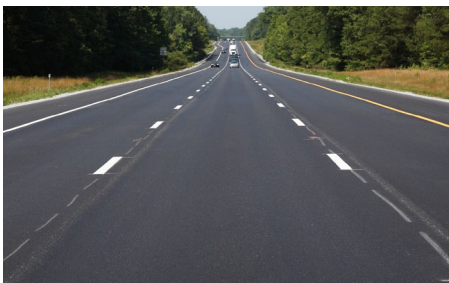
Deficient pavement can damage vehicles, negatively impact traffic speeds, diminish ride quality, increase vehicle operating costs, and pose a safety risk to users. Tracking these measures enables VDOT to proactively identify and prioritize maintenance and repair needs and manage overall costs.



Annual condition assessments of Virginia’s pavement network are essential to maintaining a sustainable pavement maintenance program and meeting performance targets. VDOT’s approach focuses on maintaining pavement assets over decades-long asset lifecycles in a cost-effective manner. This strategy has helped prioritize proactive maintenance to the Interstate and Primary system to support continually improving performance while simultaneously extending the pavement life.



Pavement condition is collected by a vehicle like this annually on 100 percent of the Interstate and Primary system, and 20 percent of the Secondary system.



Good and Excellent Pavement



Poor/Fair Pavement Being Restored

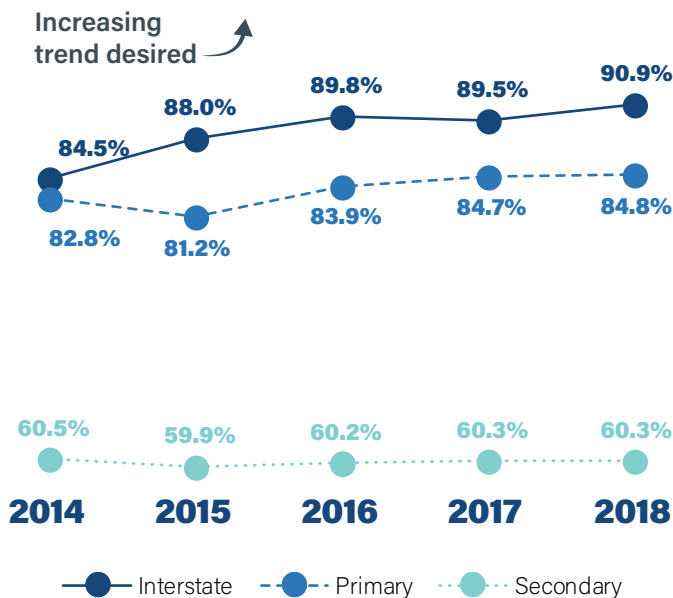


Poor to Very Poor Pavement

Measure Performance

Between 2014 and 2018, the percentage of sufficient lane miles increased 5.4 percentage points on the Interstate system and 2.0 percentage points on the Primary system. Secondary roads saw performance remain essentially flat.

Percent of Sufficient Lane Miles



Virginia's Interstate and Primary networks exceed the target of 82 percent, while the Secondary system falls short of the target of 65 percent.

Why Did Performance Change?

Reductions in available funding during the recession of 2008-2009 led to declines in performance and necessitated corrective action. Following the recession, the General Assembly approved and CTB oversaw funding to bring the system back to a state of good repair. These actions resulted in improved performance on the Interstate and Primary systems, beginning in 2014 and 2015, respectively, with sustained performance on the Secondary system, albeit below the targeted performance level.

How Are We Improving Performance?

In FY 2019, VDOT spent \$519 million on pavement activities across the Interstate, Primary, and Secondary systems.

VDOT's investment strategy includes a strategic and optimal balance of preventive, corrective, restorative, and reconstruction activities within its paving program.

The State of Good Repair Program (§ 33.2-369) provides funding for the reconstruction and rehabilitation of deteriorated pavements on the Interstate and Primary systems and Primary Extensions (both VDOT and locally maintained or owned). The Highway Maintenance and Operations Fund (HMOF) provides additional funding for maintaining the roadway network.

As with the bridge program, the pavement program faces challenges with aging infrastructure. In accordance with the Robert O. Norris Bridge and Special Structures Fund, the CTB is conducting a "comprehensive review" of the condition and performance of pavements and bridges. This includes reevaluating long-term investment strategies and performance targets to ensure that desired pavement performance levels are achieved and lifecycle costs optimized.

The strategies and policies under consideration include:

- » Cost to achieve the current performance targets and cost to maintain current performance levels,
- » Consideration of tiered targets for the Primary and Secondary systems that take into account traffic volume, and
- » Costs and benefits of employing different maintenance strategies.

Localities receive maintenance payments of over \$450 million annually for maintenance of their system, which includes pavements and other roadway assets. The comprehensive review of the VDOT owned network has shown that in order to achieve the desired level of performance, given optimal lifecycle planning, additional funding is necessary. Should additional funding not become available, lower performance is anticipated. A report on the results of the review is due late in 2019 to the General Assembly.



Measure

Equipment (age) -

Percentage of vehicles that have met or exceeded their useful life

Rolling Stock (age) -

Percentage of vehicles within a particular asset class that have met or exceeded their useful life

Infrastructure - Percentage of track segments (by mode) with performance restrictions by class

Facilities - Percentage of facilities (by group) with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale



Targets

Established by transit provider through coordination with DRPT

Measure Explanation and Importance

Aging infrastructure creates maintenance challenges. Integrating asset management principles into the everyday business of transit providers creates accountability and transparency for the condition of revenue vehicles, equipment, and facilities. Transit Asset Management (TAM) practices allow for advanced planning to manage aging infrastructure by balancing preventive maintenance with asset replacement.

The transit measures under this objective align with FTA TAM rules published in July 2016, which require FTA grantees to develop TAM plans for assets including vehicles, facilities, equipment, and infrastructure. As this is a relatively new requirement, the measures in this section have not been tracked over time. Instead, the measures provide a snapshot of Virginia transit operator asset inventories and conditions during the development of their first TAM plans (approximately 2016-2017), as well as future performance targets established in that plan (approximately 2018-2019).

For the purpose of TAM, FTA separates transit providers into two groups, Tier I and Tier II. Tier I providers operate 101 or more vehicles across all fixed route modes during peak regular service, or operate rail; Tier II providers operate 100 or fewer vehicles, or are a subrecipient under the 5311 Rural Area Formula Program. **There are six Tier I providers and 35 Tier II providers in Virginia.**

Measure Performance – Tier 1

Data collected from Tier I provider TAM plans was used to compare current asset inventory conditions against performance targets set by each transit operator.

Virginia Railway Express (VRE)

Asset inventory condition assessments and performance targets for VRE are published in the September 2018 VRE Transit Asset Management Plan. The percentages in the 2017/2018 column indicate current asset inventory condition at the time of plan development; the percentages in the FY 2018 target column represent VRE performance targets.

Although VRE has ambitious performance targets, they aim for zero percent of vehicles, equipment, and facilities exceeding their useful life – their current asset conditions meet those targets, with the small exception of some maintenance equipment.

VRE Asset Performance and Targets

Measure	Asset Class	2017/2018	2018 Target
Rolling Stock	Locomotive	0%	0%
	Cab Car	0%	0%
	Passenger Car	0%	0%
Equipment	Non-Revenue Service Vehicles	Maintenance Tooling: 13%	0%
	Non-Revenue Vehicles	0%	
Facilities	Administrative	0%	0%
	Maintenance	0%	0%
	Passenger	0%	0%
	Parking	0%	0%

WMATA

Asset inventory condition assessments and performance targets for the Washington Metropolitan Area Transit Authority (WMATA) are published in the October 2018 WMATA Transit Asset Management Plan. The percentages in the 2016/2017 column indicate current asset inventory and condition at the time of plan development; the percentages in the 2020 Target column represent WMATA performance targets for those measures.

WMATA's revenue rail cars meet its performance targets, while buses fall just under the targets. Current facility conditions also meet WMATA's performance targets, although several type of equipment currently exceed the targeted allowed percentage of vehicles that have met or exceeded their useful life. Data for MetroAccess vans and Infrastructure (track segments with performance restrictions) was not included in the plan, but each item has performance targets for 2020.

WMATA Asset Performance and Targets

Measure	Asset Class	2016-2017	2020 Targets
Rolling Stock	Rail cars	1%	4%
	Buses	2%	0%
	MetroAccess Vans	N/A	23%
Facility	Maintenance Equipment	18%	Admin & Maintenance 52%
	Administration	0%	
	Building Components	17%	Passenger & Parking: 23%
	Canopy	0%	
Infrastructure	Heavy Rail	N/A	2.2%
Equipment	Car	22%	16%
	Heavy Truck	22%	
	Passenger Van	25%	
	Special	12%	
	Truck	22%	

HRT

Asset inventory condition assessments for Hampton Roads Transit (HRT) are published in the December 2018 HRT Transit Asset Management Plan. The percentages in the 2017 column indicate current asset inventory condition at the time of plan development. Specific performance targets were not provided in the plan.

Measure	Asset Class	2017
Rolling Stock	Revenue Vehicles	33%
Equipment	Non-Revenue/ Service Vehicles	86%
Infrastructure	Light Rail	3%
	Park and Ride Lot	0%
	Light Rail Station	0%
	Transit Center	0%
	Operator Restroom	0%
	Administration	0%
	Ferry Dock	5%
	Maintenance	2%
	Bus Stops	0%
Light Rail Bridge	0%	



GRTC

Asset inventory condition assessments for GRTC are published in the September 2018 GRTC Transit Asset Management Plan. The percentages in the 2017 column indicate current asset inventory and condition at the time of plan development. Specific performance targets were not provided in the plan.

Asset Class	Asset Class	2017
Rolling Stock	Cutaway	0%
	Bus	32%
	Van	1%
Equipment	Other Support Vehicle	33%
	Pickup/Utility Truck	50%
	Sedan/Station Wagon	71%
	SUV	69%
	Tow Truck	100%
	Van	70%
	Bus Maintenance Equipment	0%
	Administration Building	4%
Facilities	Church Annex Building	100%
	CNG Station	0%
	Maintenance Building	0%
	Pulse BRT Stations	0%
	Other Facilities Equipment	0%
	Maintenance Equipment	0%

Fairfax Connector

Asset inventory condition assessments for Fairfax Connector are published in the National Capital Region Transportation Planning Board's (TPB) Regional Transit Asset Management Targets report (2017).

Asset Class	Asset Class	2017	Targets
Rolling Stock	Bus	2%	5-10%
Equipment	Pickup/Utility Truck	29%	14%
	Sedan	0%	0%
	SUV	0%	0%
Facilities	Maintenance and Administration Buildings (3)	0%	0%
	Passenger and Parking Facilities (7)	0%	0%

PRTC

Asset inventory condition assessments for PRTC are published in TPB's Regional Transit Asset Management Targets report (2017).

Asset Class	Asset Class	2017	Targets
Rolling Stock	Bus (45')	46%	46%
	Bus (40')	18%	18%
	Bus (30')	27%	27%
	Van	0%	0%
Equipment	Service Vehicles	50%	50%
Facilities	Maintenance and Administration Buildings	0%	0%
	Commuter Lot	0%	0%



Measure Performance – Tier II

Aggregated asset inventory condition assessments and performance targets for Tier II providers are published in the FY 2018 Group TAM plan, sponsored by DRPT. The Group TAM plan provides performance targets for both 2018 and 2019, although only one asset class has different targets for each year (articulated bus).

For rolling stock (revenue vehicles), most asset classes either hit the 2018 targets, or were slightly above. All equipment (non-revenue vehicles) hit the 2018 targets, as did most facilities, with the exception of administrative and maintenance facilities.

Measure	Asset Class	2017	2018 Target	2019 Target
Rolling Stock	AB - Articulated Bus	0%	20%	15%
	BU - Bus	7%	10%	10%
	CU - Cutaway	5%	10%	10%
	MB - Minibus	27%	25%	20%
	BR - Over-the-Road Bus	23%	20%	15%
	TB - Trolley Bus	6%	10%	10%
	VN - Van	26%	25%	25%
Equipment	Non Revenue/Service Automobile	22%	25%	25%
	Trucks and other Rubber Tire Vehicles	25%	25%	25%
Facilities	Administrative and Maintenance Facility	17%	10%	10%
	Administrative Office	0%	10%	10%
	Maintenance Facility	0%	10%	10%
	Passenger Facilities	0%	10%	10%

How Are We Improving Performance?

DRPT recently developed a project-based prioritization process for prioritizing the allocation of capital funding, as required by legislation passed by the General Assembly in 2018. This program, within DRPT's Transit Grant Program (also known as MERIT), provides financial assistance to support public transportation and TDM services throughout the state and is designed to support DRPT's core mission:

"To facilitate and improve the mobility of the inhabitants of Virginia, and to promote the efficient transport of goods and people in a safe, reliable, and cost effective manner."



Making Efficient + Responsible Investments In Transit

MERIT places the highest priority on maintaining the state's transit assets in a state of good repair. This approach codifies priorities to prevent the capital program from being diverted to fund expansion projects at the expense of maintaining system assets, as was possible previously.

The new process was first implemented in DRPT's FY 2020 grant application cycle. This process sets aside at least 80 percent of capital program funds available to address State of Good Repair, and Minor Enhancement.

- » State of Good Repair (SGR): Projects or programs to replace or rehabilitate an existing asset.
- » Minor Enhancement: Projects or programs to add capacity, new technology, or a customer facility with a cost of less than \$2 million or include a vehicle expansion of no more than five vehicles or 5 percent of the existing fleet size.

The CTB will have the discretion to allocate up to 100 percent of the available state capital funding to meet SGR needs. The CTB may shift capital funds from Major Expansion to State of Good Repair, based on need. DRPT will evaluate State of Good Repair projects based on asset condition and service impact; the asset condition score depends on asset age, as well as mileage-based scoring for vehicles.



GOAL E:

**HEALTHY COMMUNITIES AND SUSTAINABLE
TRANSPORTATION COMMUNITIES**



Measure

Annual vehicle miles traveled per capita

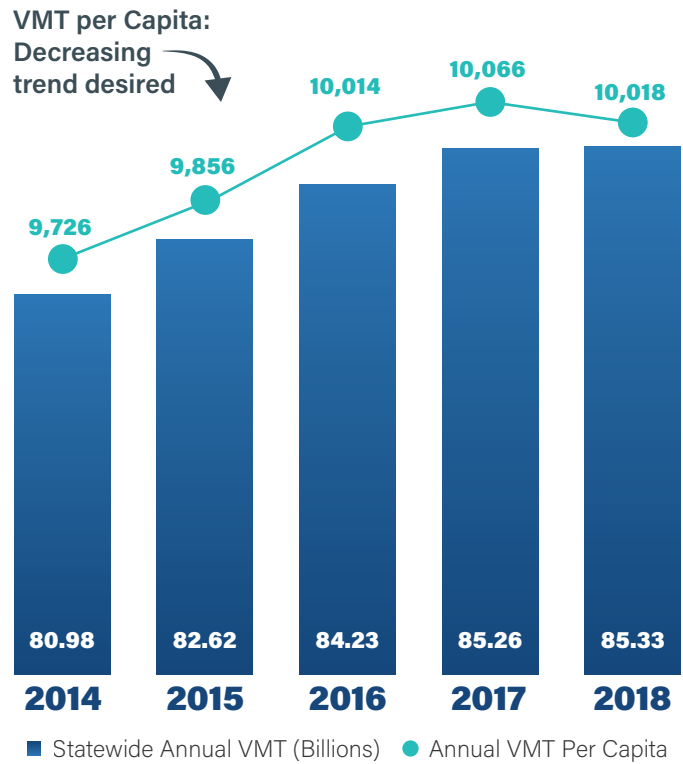
**Measure Explanation
and Importance**

Annual vehicle miles traveled (VMT) per capita is defined as:

- » The total annual miles of vehicle travel in Virginia on all public roads as reported annually by VDOT,
- » Divided by the total population in Virginia as estimated annually by the Weldon Cooper Center.

VMT in Virginia has steadily increased over the last five years as a result of continued population and economic growth. VMT per capita gives a different picture of travel demand by looking at average miles traveled per person statewide and by jurisdiction. Increases in VMT per capita can negatively impact traffic congestion, air pollution, and public health. Decreases are often associated with lower emissions and more travel on alternative modes. Decreases in VMT per capita result from a variety of factors, including: newly implemented land use policies that better link households to destinations; connected transit, bicycle, and pedestrian infrastructure; economic and social factors; and other strategies to reduce auto dependence, like travel demand management (TDM).

Measure Performance



The first Bus Rapid Transit corridor in the Richmond region, the GRTC Pulse, opened in summer 2018, providing reliable, high-quality transit service within the Broad Street corridor. The service connects to existing bus routes and links households, businesses, Virginia and City of Richmond government offices, Virginia Commonwealth University (VCU), and the VCU Medical Center.

Why Did Performance Change?

Since 2014, VMT traveled per Virginia resident has increased by nearly 300 miles per year (about a 3 percent increase). Many of the reasons for changes in VMT per capita are tied to factors beyond Virginia transportation agencies control, such as gas prices and commodity movement. Stable fuel prices and a strong economy usually result in more travel.

2017 and 2018 VMT per capita has shown a slower increase and then a decrease, compared to prior years with annual 1 to 2 percent increases. As shown in the below maps, decreases in VMT per capita since 2014 are occurring in:

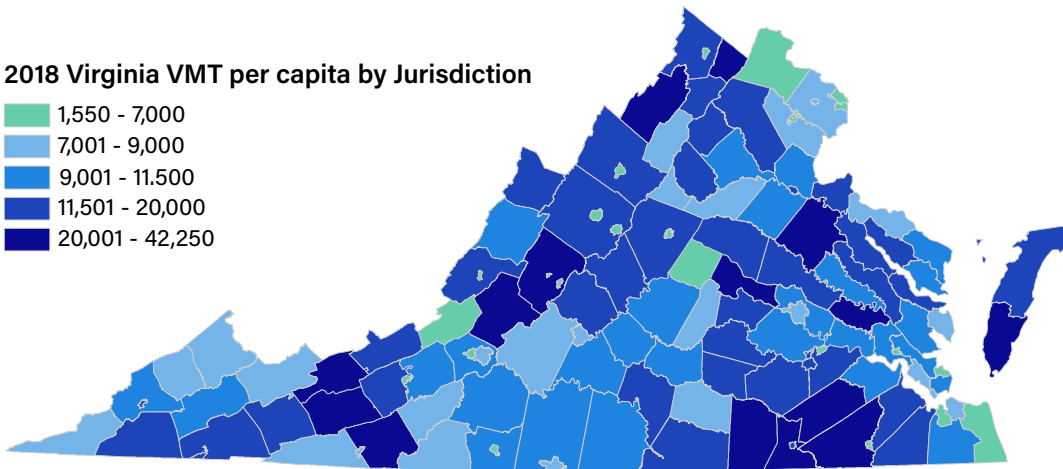
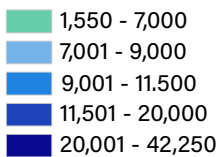
- » Urban regions where land use patterns or multimodal options create opportunities to reduce vehicle travel.
- » Regions that may be experiencing low population growth or population loss.

How Are We Improving Performance?

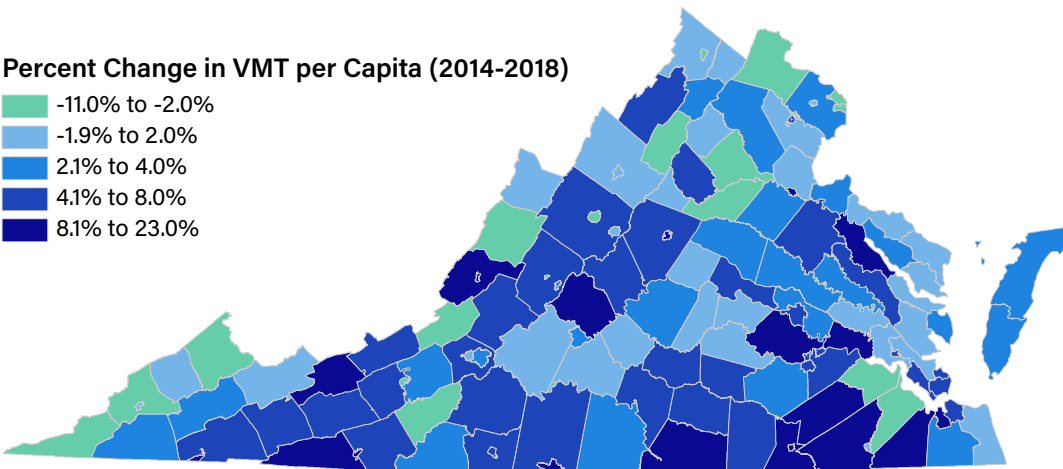
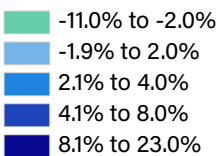
The Commonwealth's commitment to urban development areas through grant programs and SMART SCALE are encouraging compact and mixed used development in town centers matched with a safe, multimodal transportation system. There are over 220 designated locations across Virginia in more than half of Virginia's jurisdictions.

Investments that expand service and increase reliability of transit, support micro-mobility options in urban centers (scooters, shared bikes), and improve bicycle and pedestrian networks provide options to reduce vehicle travel. The \$8 million Parking Demand Management System funded through the Innovation and Technology Transportation Fund (ITTF) will provide real-time parking information for eight park & ride lots on I-95 corridor that support VRE, vanpooling, and carpooling – enabling better information for commuters.

2018 Virginia VMT per capita by Jurisdiction



Percent Change in VMT per Capita (2014-2018)



VMT per capita is based on total VMT on the highway network. Many of the high VMT per capita jurisdictions include interstate highways, where most VMT is associated with long-distance vehicle trips.



Measure

Percentage of passenger fleet composed of low-emission vehicles (hybrid or electric vehicles)



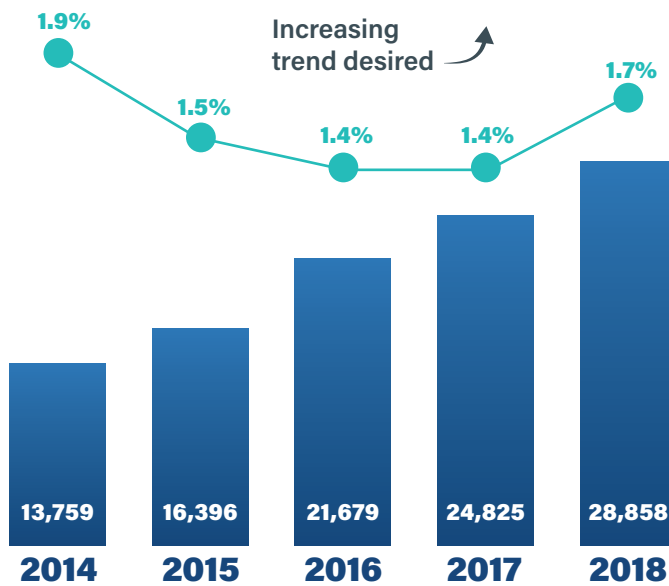
Measure Explanation and Importance

Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEV), and Battery Electric Vehicles (BEV) generally emit less or no emissions from their tailpipes and have a positive impact on air quality compared to conventional internal combustion vehicles operating with gasoline or diesel fuel. This measure tracks the annual registration by the Department of Motor Vehicles (DMV) of HEVs, PHEVs, and BEVs in Virginia as an indicator for reducing on-road vehicle emissions.



Measure Performance

According to the registration data, there has been a steady increase in HEV, PHEV, and BEV registrations from 2014 to 2018, even as the share of these vehicles among the total number of registered vehicles in the state has varied over time.



■ Registered HEVs, PHEVs, EVs ● Share of Virginia Registrations



Why Did Performance Change?

As Virginia's economy has grown steadily over the past five years, overall vehicle ownership has continued to grow. A greater selection, more competitive pricing, and improved reliability of HEVs, PHEVs, and BEVs has supported the increase in registrations over time. The availability and marketing of incentives also has an impact, including the following Virginia and Federal incentives:

- » PHEVs and BEVs purchased during or after the year 2010 may be eligible for a Federal income tax credit of up to \$7,500.
- » The same PHEVs and BEVs eligible for the Federal income tax credit that display the Virginia Clean Special Fuel license plate may use Virginia HOV lanes regardless of the number of occupants.
- » Vehicles exclusively powered by clean fuel, including compressed or liquefied natural gas, electricity, or solar energy are exempt from the Northern Virginia emissions inspection program.



How Are We Improving Performance?

There are a variety of programs helping to expand opportunity and decrease costs of electric vehicle ownership for private and public fleets.

Virginia Volkswagen (VW) Settlement Beneficiary Mitigation Plan - The Virginia Department of Environmental Quality (DEQ) administers an environmental mitigation trust that has been established as part of the VW settlement.

\$93.6 million is allocated from the trust through Virginia's mitigation plan, and the funding is spread through a suite of programs and projects, including:

- » \$14 million committed to expanding EV charging station locations across Virginia.
- » \$14 million toward the deployment of all-electric transit buses.
- » \$20 million aimed at accelerating the deployment of electric school buses.
- » Remaining trust funding will be allocated to the implementation of eligible mitigation actions informed by the public process undertaken during the development of Virginia's mitigation plan.



All-Electric Transit Buses - \$14 million of the trust is being allocated to replacing older diesel public transit buses with all-electric buses. The

funding is allocated through a new Clean Transportation Voucher Program implemented through DRPT's annual capital grant cycle, or MERIT. The goal of the program is to provide funding to transit agencies to cover the incremental cost of transitioning to all-electric buses.

During the FY 2020 grant cycle, DRPT awarded \$9 million of the funds leveraged by \$3.5 million from Virginia's statewide transit capital program, to fund the purchase of 17 battery-electric buses and fast chargers for Alexandria (DASH), Blacksburg Transit, and Hampton Roads Transit.



Electric Vehicle Charging Network - DEQ is developing a statewide public EV charging network to help accelerate EV adoption in Virginia.

Through the VW settlement funds, DEQ entered into a \$14 million contract with EVgo in August 2018 to develop the network over the next three years. New fast charging stations will be prioritized in high travel corridors which deliver a range of 60 to 80 miles for every 20 minutes of charging. DEQ and EVgo broke ground on the first stations in May 2019.

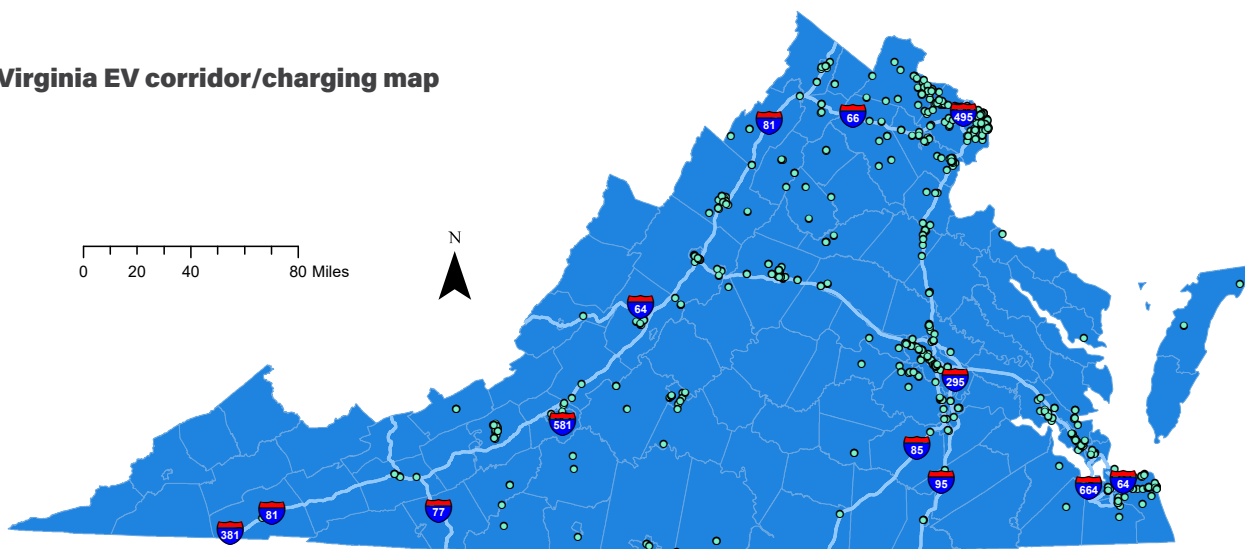
Through the FHWA's Alternative Fuel Corridor designation, Virginia identified I-64, I-66, I-81, I-85, and I-95 as part of a national network of alternative fueling and charging. According to the Environmental Protection Agency's (EPA's) Alternative Fuel Center data, as of August 2019, there are 619 public electric charging stations with a combined 1,530 charging outlets.



Clean School Bus Program - Virginia dedicated \$20 million in VW Trust funds to accelerate the deployment of cleaner school buses across Virginia's public school districts. Nearly 99 percent of

Virginia's public school bus fleet is diesel. More than 3,500 of the diesel buses are model year 2006 or older, with over 500 running on unregulated engines prior to the first EPA diesel standards (pre-1998).

Virginia EV corridor/charging map





Measure

Statewide on-road mobile source emissions



Measure Explanation and Importance

This measure tracks the statewide emissions of criteria pollutants and greenhouse gases from on-road mobile sources consistent with Federal and Commonwealth air quality and public health goals. Emission data is obtained from the EPA National Emissions Inventory, which is based on local traffic and fuel data provided by VDOT and DEQ. Criteria pollutants are those identified within the Clean Air Act, which are critical to attaining EPA's air quality standards in Virginia. These include fine particulate matter (PM 2.5), and ozone precursors – nitrogen oxides (NOx) and volatile organic compounds (VOCs).

There has been a considerable decline—42 percent, 36 percent, and 32 percent in PM 2.5, NOx, and VOC emissions, respectively, statewide since 2014. Note, this data is based on emission trends published triennially in EPA's National Emissions Inventory. Final 2017 mobile emissions data from EPA should be available in spring 2020.



Why Did Performance Change?

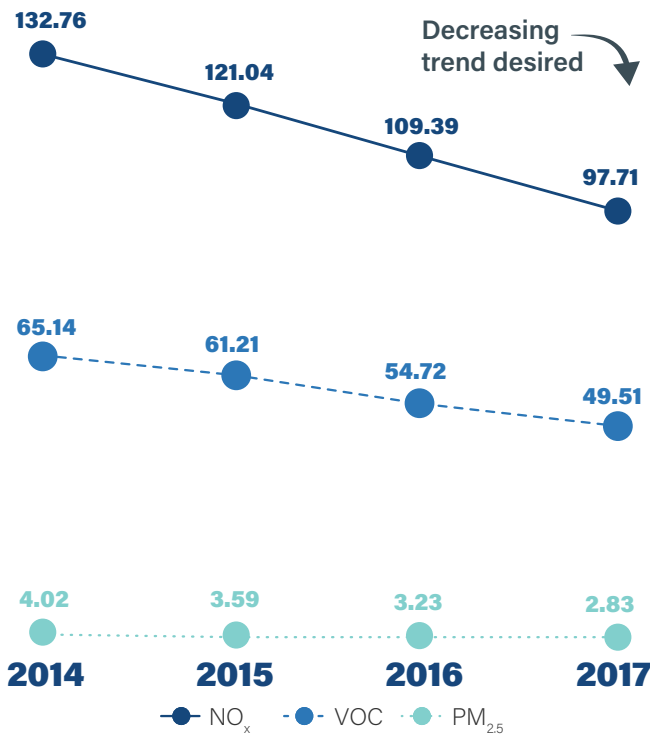
Statewide VMT increased over 5 percent from 2014 to 2017. Over the same period, statewide emissions have decreased between 32 and 42 percent. The majority of this decline is attributed to the following Federal standards:

- » **The EPA Tier 2 Vehicle Emission Standards -** Started in 2004, this program created for the first time consistent emission standards covering passenger cars, light trucks, and large SUVs and passenger vehicles. The standards supported deployment of lower sulfur gasoline and diesel, and more stringent particulate matter standards.
- » **Heavy-Duty Highway Engines and Vehicles -** In 2007, new EPA standards implemented ultra-low sulfur diesel and emissions standards for heavy duty vehicles.
- » **Tier 3 Vehicle and Fuel Standards -** This rule establishes more stringent vehicle emissions standards and will reduce the sulfur content of gasoline from current average level of 30 ppm to 10 ppm beginning in 2017.



Measure Performance

1,000 annual tons—on-road mobile sources



While not presented within the performance chart, national fuel economy standards have had a great impact on helping to decrease greenhouse gas (GHG) emissions from transportation in Virginia, even as vehicle miles traveled continues to increase. Nationwide, GHG emissions from transportation account for 29 percent of emissions from all economic sectors.

Federal fuel economy standards from 2008–2011 and 2012–2016 increased average car and light duty fleet fuel economy from 22.5 mpg in 2008 to 35.5 mpg in 2016. Over the next decade, the following standards will continue to increase fuel economy and decrease GHG emissions:

- » **National Program Phase 2 (MY 2017-2025)** - This program covers the light-duty vehicle fuel economy standards for model years 2017 to 2025. The standards are phased-in and projected to result in an average fuel economy of 54.5 mpg.
- » **Phase 1 and Phase 2 National Medium and Heavy Vehicle Standards (MY 2014-2018, and MY 2018-2027)** - Fuel efficiency standards for model years 2014 to 2018 medium- and heavy-duty vehicles, and extended standards through 2027 covering combination tractors, heavy-duty pickups and vans, vocational vehicles, and trailers.
- » **Federal Renewable Fuel Standard Program** - Mandates the use of 36 billion gallons of renewable fuel annually by 2022. This program supports the inclusion of 10 percent ethanol in gasoline in Virginia, which helps reduce lifecycle GHG emissions.

- » **Congestion mitigation** - Reducing inefficient travel, where vehicles emit more emissions per mile, helps reduce wasted fuel. For example, a vehicle operating at 25 mph emits 25 percent more greenhouse gases than a vehicle operating at 50 mph. VDOT's Safety Service Patrol is a critical aspect of a comprehensive approach to managing congestion. The service covers 846 Interstate miles and helps detect incidents and minimize incident duration.



- » **Reducing vehicle miles traveled** - Alternatives to driving alone helps reduce emissions per person mile traveled. This includes working from home, transit, shared rides, biking, and walking. For example, DRPT's Vanpool!VA program provides financial incentives to start and maintain vanpools throughout Virginia, particularly in Northern Virginia during construction of the I-66 and I-395 Express Lanes.

How Are We Improving Performance?

Emission reductions within the transportation sector primarily come from four groups of strategies.

- » **Vehicle and fuel technologies** - Federal standards and state incentives and infrastructure to support electric and alternative fuel vehicle deployment will reduce total fuel consumption, lead to cleaner fuels and engines, and reduce total emissions. **For example, new vehicle technologies could reduce average annual GHG emissions from each vehicle by 34 percent through 2030.**



- » **Infrastructure design and fleet management** - Through the operation and maintenance of the transportation system, VDOT is exploring various innovative concepts. These involve infrastructure technologies, including broadband installation and other communication technology along priority corridors to prepare for autonomous and connected vehicles, and a solar power assessment for VDOT facilities.

7.0 TRANSPORTATION INFRASTRUCTURE BANK AND TOLL FACILITIES REVOLVING ACCOUNT

Virginia Transportation Infrastructure Bank (VTIB)

Chapters 830 and 868 of the 2011 Acts of Assembly created the VTIB. As required, OIPI is reporting on the status of the VTIB, including the balance, funding commitment made of the prior fiscal year, and performance of the current loan portfolio.

VTIB is a special non-reverting, revolving loan fund and is a sub-fund of the Transportation Trust Fund. The Bank was created for the purpose of making loans and other financial assistance to localities, private entities and other eligible borrowers for multimodal transportation projects.

VTIB Status and Balance

- » As of June 30, 2019, the total capitalization of VTIB funds available total \$68.6 million.

Funding Commitments

- » There are five closed loans totaling \$332.9 million allocated, of which \$156.0 million has been disbursed. There is \$144.7 million available for further disbursements (including the full loan amount for Potomac Yard Metrorail and I-395 Express Lanes projects).
- » There are no current pending applications.

Performance of Loan Portfolio

- » Interest earnings to date (June 30, 2019) total \$21.3 million, which has mostly accrued on undisbursed funding.
- » Projected loan repayments over the next decade total \$91.9 million. Loan maturity dates range from the earliest in 2033 to the latest in 2054.

Toll Facilities Revolving Account (TFRA)

VTIB Outstanding Loans:

Complete - U.S. Route 17/Dominion Boulevard:

Expand Dominion Boulevard, replace the "Steel Bridge" over the Elizabeth River, and other improvements.

Amount Disbursed: \$119,700,130

Loan Balance: \$134,454,435, payback ongoing

Complete - Pacific Boulevard Extension and

Expansion: Expand Pacific Boulevard from two to four lanes and extend to Russel Branch Parkway.

Amount Disbursed: \$34,991,791

Loan Balance: \$20,032,948, payback ongoing

Ongoing - Parallel Thimble Shoals Tunnel: Build a new two-lane tunnel on U.S. 13.

Loan Amount: \$50,000,000

Amount Disbursed to Date: \$1,336,490

Status: Completion planned for Dec. 2023

Ongoing Project - Potomac Yard Metrorail Station:

Build the Potomac Yard Metrorail Station.

Loan Amount: \$50,000,000

Amount Disbursed to Date: \$0 (disbursements scheduled to start in Fall 2019)

Status: Completion planned for spring 2022

Ongoing Project - I-395 Express Lanes: I-95 Express Lanes extension 8 miles north on I-395.

Loan Amount: \$45,000,000

Amount Disbursed to Date: \$0 (disbursements scheduled to start in Fall 2019)

Status: Completion planned for summer 2020

Virginia Transportation Infrastructure Bank

The Virginia Resources Authority (VRA), as manager of the VTIB, is required to submit Biennial Reports to the General Assembly. The data included below summarizes information included in the July 29, 2019 Biennial Report.

The TFRA was created under §33.2-1529 of the Code of Virginia. As required, OIPI is reporting on the status of the TFRA, including the balance, project commitments from the account, repayment schedules, and the performance of the current loan portfolio.

TFRA provides a method to finance and/or refinance existing and potential toll facilities. The TFRA is a separate finance approach from the Federally codified loan programs such as the State Infrastructure Bank approach in 23 USC 610. Funds allocated from TFRA intended for planned or operating toll facilities are considered advance funding and are expected to be repaid.

TFRA Status and Balance

- » As of June 30, 2019, the fund balance in the TFRA is \$67.7 million.

Funding Commitments

- » There are nine projects currently funded through the TFRA totaling \$234.1 million in outstanding loan balance. Loans are actively being repaid, with at least three project loans fully repaid by 2022.

Performance of Loan Portfolio

- » The TFRA has one outstanding loan receivable associated with a 1999 agreement for the Chesapeake Expressway. The loan will be repaid pursuant to the terms of the 2012 indenture of the Chesapeake Transportation System bonds. The 1999 TFRA Payment accrues interest at a rate of 3 percent per year, with the outstanding principal and interest totaling \$30.4 million.

Toll Facilities Revolving Account

VDOT annually reports the status of the TFRA. The data included below summarizes information as of June 30, 2019.

TFRA Status and Balance:

Fund/ Facility	Amount (millions)	Anticipated Repayment Date
E-ZPass/Toll Collection Support (Working Capital)	\$41.0	On-going
Highway Construction Fund Legacy Projects	\$23.1	Actively addressing through project closeout
I-95 Fredericksburg Extension Procurement	\$12.0	2020
Powhite Parkway Extension Toll Facility	\$15.5	Annual payments: Current – 2023
Coleman Bridge Toll Facility	\$39.1	Annual payments: 2020 – 2032
I-66 Inside the Beltway Express Toll Facility	\$72.0	Annual payments: 2023 – 2047
I-64 Express Lanes, Segment I and advance for transit	\$21.0	Annual payments: 2023 – 2050
I-64 Express Lanes, Segment II	\$10.0	Annual payments: To be determined
Hampton Roads HOT Network	\$1.5	2022
Total	\$234.1	

TECHNICAL APPENDIX – PERFORMANCE MEASURE METHODOLOGY

This Appendix provides technical details regarding the methodology supporting the development of performance measure trends within the Report. Technical details include definitions, data sources, and methodologies for the measures identified as “Virginia” or “Both.” Federal measure documentation is available [here](#).¹⁴

Biennial Report Performance Measures

VTrans Goal	Page	Performance Measure	Measure Source
A	22	Percent PMT in Excessively Congested Conditions (PECC) – Limited Access Roadways	Virginia
A	22	Travel Time Index (TTI) – Non-Limited Access Roadways	Virginia
A	24	Person Miles Traveled in Reliable and Unreliable Conditions	Virginia
A	26	Passenger rail on-time performance (OTP)	Virginia
A	21	Truck Travel Time Reliability Index – Interstate	Federal
A	24	Percentage of person miles traveled that are reliable – Interstate	Federal
A	24	Percentage of person miles traveled that are reliable – Non-Interstate NHS	Federal
A	21	Annual hours of peak hour excessive delay per capita	Federal
B	30	Accessibility to VTrans activity centers (highway and transit)	Virginia
B	33	Transit and intercity passenger rail ridership (2 measures)	Virginia
C	37	Total motorized fatalities and total motorized serious injuries (2 measures)	Both
C	37	Fatality rate and serious injury rate (per 100 million vehicle miles traveled) (2 measures)	Both
C	40	Total non-motorized fatalities and serious injuries	Both
D	42	Percent of bridges in good or fair condition – All public roads, Interstate, Primary, Secondary (4 measures)	Virginia
D	42	Percentage of deck area of bridges in good condition	Federal
D	42	Percentage of deck area of bridges in poor condition	Federal
D	44	Percentage of sufficient lane miles – Interstate, Primary, Secondary (3 measures)	Virginia
D	44	Percentage of pavement in good condition – Interstate	Federal
D	44	Percentage of pavement in poor condition – Interstate	Federal
D	44	Percentage of pavement in good condition – Non-Interstate NHS	Federal
D	44	Percentage of pavement in poor condition – Non-Interstate NHS	Federal
D	46	Equipment (age) – Percentage of vehicles that have met or exceeded their ULB	Both
D	46	Rolling Stock (age) – Percentage of vehicles that have met or exceeded their ULB	Both
D	46	Infrastructure (performance) – Percentage of track segments with performance restrictions	Both
D	46	Facilities (condition) – Percentage of facilities (by group) with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale (1=Poor to 5=Excellent)	Both
E	50	Vehicle miles traveled (VMT) per capita	Virginia
E	52	Percentage of passenger fleet composed of low-emitting vehicles (hybrids or EVs)	Virginia
E	54	Statewide on-road mobile source emissions (criteria pollutants)	Virginia
E	21	Percentage of non-SOV travel	Federal
E	64	CMAQ Program emissions: total emission reductions for VOC and NOx (2 measures)	Both

¹⁴ <https://www.fhwa.dot.gov/tpm/rule.cfm>

Measures were identified based on three unique sources and organized into the five VTrans goals:

- » **Virginia** - These measures were developed for inclusion within the report consistent with CTB direction and OIPI, VDOT, and DRPT staff recommendations. A number of these measures are also being used as part of the ongoing VTrans Update process to support the identification of mid-term needs.
- » **Federal** - These measures are exclusively unique to the Federal transportation performance management requirements specified through MAP-21 and the FAST Act. Some measures apply only to the Federal system in Virginia (Interstates and National Highway System), which represents roughly 15 percent of all lane miles owned and maintained by VDOT. Also, there are several measures that only apply to the National Capital Transportation Planning Board region in Virginia.
- » **Both** - The five highway safety measures and the four transit asset measures address both Virginia and Federal performance reporting goals. As a result, the Report highlights these measures as if they were Virginia-specific measures.

In total, the above table identifies 39 multimodal performance measures - 17 Virginia-specific measures, 11 unique Federal measures, and 11 measures that cover both Virginia and Federal requirements.

Virginia Performance Measures

1. Percent Person Miles Traveled in Excessively Congested Conditions - Limited Access Roadways

Definition: Excessively Congested Conditions: Travel times that are 75 percent longer than free-flow travel time

System Description: Interstates and Limited Access Roadways

Data sources: INRIX observed speed data and Average Daily Traffic Volumes with Vehicle Classification data on Interstate, Arterial, and Primary Routes from VDOT's Traffic Monitoring System (TMS)

Methodology: Traffic count data is merged with the INRIX data by highway links (organized by traffic message channel (TMC) codes) to calculate the share of peak-hour person miles traveled (within the 14-hour period, 6AM to 8PM) on facilities experiencing excessively congested conditions (75 percent longer than free flow travel time).

2. Travel Time Index (TTI) - Non-Limited Access Roadways

Definition: Travel Time Index (TTI): The ratio of the peak-period travel time to the free-flow travel time.

System Description: Non-Limited Access Roadways

Data sources: INRIX observed speed data and Average Daily Traffic Volumes with Vehicle Classification data on Interstate, Arterial, and Primary Routes from VDOT's Traffic Monitoring System (TMS)

Methodology: After assigning traffic count data to the INRIX data, by individual highway links (organized by traffic message channel (TMC) codes), the peak hour TTI was weighted by peak hour (within the 14-hour period, 6AM to 8PM) VMT in order to estimate average TTI at the statewide level and for Northern Virginia and the Urban Crescent (Urban Crescent includes all jurisdictions with the Hampton Roads, Richmond, Fredericksburg, and Washington D.C. urbanized areas in Virginia).

3. Person Miles Traveled in Reliable and Unreliable Conditions

Definitions: Level of Travel Time Reliability (LOTTR): The ratio of the 80th percentile travel time compared to the 50th percentile travel time.

System Description: Interstates and Limited Access Roadways

Data sources: INRIX observed speed data and Average Daily Traffic Volumes from VDOT's Traffic Monitoring System (TMS)

Methodology: Speed data for the 80th and 50th percentile speeds, based on an annual average for weekdays and weekends, was used to calculate the LOTTR for each hour during the 14-hour period from 6AM to 8PM. Results are presented as the share of person miles traveled by reliability threshold, classified as follows:

- » Extremely Unreliable Travel (80th percentile travel time is 50 percent higher than median travel time), LOTTR greater than or equal to 1.5.
- » Moderately Unreliable Travel (80th percentile travel time is between 30 to 50 percent higher than median travel time), LOTTR greater than or equal to 1.3
- » Reasonably Reliable Travel (80th percentile travel time is less than 30 percent higher than median travel time)

4. Passenger rail on-time performance (OTP)

Definitions: The percentage of time a passenger rail service arrives and departs within a designated window of time of its scheduled arrival or departure.

System Description: Amtrak Virginia rail routes and VRE routes.

Data sources: VRE and Amtrak OTP Data

Methodology: OTP tolerance for Amtrak (Virginia routes) is 15 minutes within the scheduled time. For VRE, OTP tolerance is five minutes within the scheduled arrival. While the average annual OTP is shown for Amtrak routes (by line by direction – northbound/southbound), VRE data is shown by month to show the variation due to ongoing improvements.

5. Accessibility to VTrans activity centers (auto and transit)

Definitions: Activity Center: Defined as part of VTrans, they are areas of regional importance that have a high density of economic and social activity concentrated in VTrans Regional Networks.

Accessibility to Jobs: Number of workers who can access jobs in VTrans Activity Centers within a 45-minute drive or 45-minute transit trip (including up to 30 minutes of walking).

System Description: VTrans Activity Centers identified within the 15 Regional Networks

Data sources: Auto access and transit access by Census Block Groups (aligned with Activity Centers) was provided by VDOT's Accessibility model. The model was calibrated for the VTrans accessibility measure, which measures the cumulative number of workers that have access to Activity Center jobs within 45 minutes of driving or 45 minutes of transit (which includes up to 30 minutes of walking). The model employed [LEHD LODES](https://lehd.ces.census.gov/data/)¹⁵ data to determine workers by workplace and by residential location.

Methodology:

- » **Workers Accessing Jobs by Transit, by VTrans Activity Center:** The total number of workers who can reach jobs located in an Activity Center within a 45-minute transit trip.
- » **Workers Accessing Jobs by Auto, by VTrans Activity Center:** The total number of workers who can reach jobs located in an Activity Center within 45 minutes of driving.

¹⁵ <https://lehd.ces.census.gov/data/>

- » **VTrans Activity Center Transit Access to Driving Access Ratio:** To determine this ratio, the number of workers accessing jobs by transit in an Activity Center was divided by the number of workers accessing jobs by auto in an Activity Center. For each Regional Network, the number of workers accessing jobs by transit in each of the Regional Network's Activity Centers was summed, then divided by the number of workers accessing jobs by auto in each of the Regional Network's Activity Centers.

6 & 7. Transit and intercity passenger rail ridership

Definition: Transit and intercity passenger rail ridership: Unlinked Passenger Trips is the number of times passengers board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination and regardless of whether they pay a fare, use a pass or transfer, ride for free, or pay in some other way.

System Description: Virginia's 41 public transportation agencies

Data sources: DRPT, through annual reporting by each agency

Methodology: DRPT provided unlinked passenger trips for transit agencies in Virginia.

8 & 9. Total number of motorized fatalities and total number of motorized serious injuries

Definitions: Fatality/Injury: The total number of people killed (a fatality is an injury that results in death within 30 days after the motor vehicle crash in which the injury occurred) or seriously injured (a serious injury is any injury other than fatal, resulting in one or more of the following: severe laceration or significant loss of blood; broken or distorted extremity; crush injuries; suspected skull, chest, or abdominal injury; significant burns; unconsciousness when taken from the crash scene; or, paralysis in a motor-vehicle crash).

System Description: All public roads in Virginia

Data sources (Fatalities): National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) 2014-2016, Virginia DMV TREDIS System via VDOT's [Crash Analysis Tool \(Tableau workbook\)](#)¹⁶

Data sources (Serious Injuries): DMV TREDIS System via VDOT's [Crash Analysis Tool \(Tableau workbook\)](#)¹⁴

Methodology: Targets are based on CTB presentations and action items. 2020 targets are based on the [June 2019 CTB meeting](#).¹⁷

10 & 11. Fatality rate and serious injury rate (per 100 million vehicle miles traveled)

Definitions: This measure utilizes the same definitions for fatalities and serious injuries as detailed in measures 8 & 9 divided by annual statewide public road vehicle miles traveled.

System Description: All public roads

Data sources (Fatalities): National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) 2014-2016, DMV TREDIS System via VDOT's [Crash Analysis Tool \(Tableau workbook\)](#)¹⁴ 2017-2018

Data sources (Serious Injuries): DMV TREDIS System via VDOT's [Crash Analysis Tool \(Tableau workbook\)](#)¹⁴

Data sources (VMT): VDOT Traffic Data publications

Methodology: Targets are based on CTB presentations/action items (refer to measures 8 & 9)

¹⁶ https://public.tableau.com/profile/tien.simmons#!/vizhome/Crashtools8_2/Main

¹⁷ <http://www.ctb.virginia.gov/resources/2019/june/reso/2.pdf>

12. Total non-motorized fatalities and severe injuries

Definitions: Bicycle or Pedestrian Fatality/Injury Incidents: The total number of bicyclists and pedestrians killed or seriously injured utilizing the same definitions for fatalities and serious injuries as detailed in measure 9.

System Description: All public roads

Data sources (Fatalities): National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) 2014-2016, DMV TREDS System via VDOT's [Crash Analysis Tool \(Tableau workbook\)](#)¹⁶ 2017-2018

Data sources (Serious Injuries): DMV TREDS System via VDOT's [Crash Analysis Tool \(Tableau workbook\)](#)¹⁶

Methodology: Targets are based on CTB presentations/action items (refer to measures 8 & 9)

13 - 16. Percentage of bridges in good or fair condition – All public roads, Interstate, Primary, Secondary

Definition: The share of bridges in good or fair condition as determined through the General Condition Rating

System Description: This measure tracks the condition of 21,173 bridges and culverts in Virginia, 19,598 which are owned by VDOT, segmented by facility type

Data sources: VDOT National Bridge Inventory (NBI) data submitted annually to FHWA

Methodology: Bridge condition is determined through a recurring inspection process. The inspection process develops a General Condition Rating (GCR) for each structure (bridge or culvert) based on the condition of three different components of a bridge (deck, superstructure, substructure) or the condition of the culvert. The GCR scale is from 0 to 9, with 7 to 9 considered "Good," 5 to 6 considered "Fair," and 4 or less considered "Poor" or "Structurally Deficient." Any bridge with at least one component at 4 or less is recorded as a "Poor" bridge.

17 - 19. Percentage of sufficient lane miles – Interstate, Primary, Secondary

Definition: The share of pavement (lane miles) determined to be sufficient based on the Critical Condition Index

System Description: This measure tracks the condition of over 128,000 lane miles of pavement in Virginia segmented by facility type

Data sources: VDOT pavement condition data as collected annually and processed by VDOT's contractor, Fugro-Roadware Inc., using continuous digital imaging and automated crack detection technology.

Methodology: Pavement condition is determined through the Critical Condition Index (CCI). The CCI aggregates observed pavement distresses, as recorded through automated pavement inspection, into a 0 to 100 scale. Pavement rated at 60 or better on this scale is considered in fair, good, or excellent condition, and is assigned as "sufficient" pavement. All pavement rated below 60 is considered in poor condition, or "not-sufficient."

20 - 23. Transit Asset Management –

Equipment (age) – Percentage of vehicles that have met or exceeded their useful life benchmark (ULB)

Rolling Stock (age) – Percentage of vehicles that have met or exceeded their ULB

Infrastructure (performance) – Percentage of track segments with performance restrictions

Facilities (condition) – Percentage of facilities (by group) with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale (1=Poor to 5=Excellent)

Measure Definitions:

Equipment (age): Percentage of vehicles that have met or exceeded their Useful Life Benchmark (ULB)

Rolling Stock (age): Percentage of vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)

Infrastructure: Percentage of rail track segments (by mode) with performance restrictions by class

Facilities: Percentage of facilities (by group) with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale

System Description: Virginia public transportation agencies

Data sources:

- » **Tier 1 Agencies:** WMATA Transit Asset Management Plan (October 2018), HRT Transit Asset Management Plan (December 2018), GRTC Transit Asset Management Plan (September 2018), VRE Transit Asset Management Plan (September 2018), Fairfax Connector, and PRTC targets established in the [Regional Targets for Transit Asset Management](#)¹⁸ adopted by the National Capital Region Transportation Planning Board in May 2017.
- » **Tier 2 Agencies:** DRPT Group Transit Asset Management Plan, Federal Fiscal Year 2018

Methodology: Tier I provider TAM plans identified current asset inventory conditions, as well as performance targets set by the agency for each measure. Aggregated asset inventory condition assessments and performance targets for Tier II providers were published in DRPT’s Group Transit Asset Management Plan (2018).

24. Vehicle miles traveled (VMT) per capita

Definition:

Annual vehicle miles traveled (VMT) per capita: The total annual miles of vehicle travel in Virginia on all public roads, divided by the total population in Virginia estimated annually.

System Description: All Virginia Public Roadways

Data sources: VDOT annual [VMT data](#),¹⁹ [Weldon Cooper Center Population Estimates](#)²⁰

Methodology: Statewide VMT and per-capita VMT (divided by total population in the state) between 2014 to 2018 was plotted from the data. Per-capita VMT by jurisdiction (counties and cities) for 2018 was calculated and the change in per-capita VMT between 2014 and 2018 was mapped.

25. Percentage of passenger fleet composed of low-emitting vehicles (hybrids or EVs)

Definitions: Low Emission Vehicles: For the purposes of this measure, these vehicles include Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEV) and Battery Electric Vehicles (BEV).

System Description: Passenger Cars titled and registered in Virginia on an annual basis

Data sources: Virginia DMV titling and registration data.

¹⁸ https://www.mwcog.org/assets/1/6/TAM_2017_Providers_Individual_Targets_05032017.pdf

¹⁹ <https://www.virginiadot.org/info/ct-TrafficCounts.asp>

²⁰ <https://demographics.coopercenter.org/virginia-population-estimates>

Methodology: For compiling the registrations data, DMV used the “RP-PLATE-ORIGINATION-DATE,” as every registration record has this date which is in essence when the plate first came into existence. The Report also references and maps electric vehicle charging station locations based on information from the U.S. Department of Energy [Alternative Fuels Data Center](https://afdc.energy.gov/).²¹

26. Statewide on-road mobile source emissions (criteria pollutants)

Definitions: Criteria Pollutants: They are the six most common air pollutants— carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide—for which EPA has established national ambient air quality standards (NAAQS).

System Description: On-road mobile sources in Virginia.

Data sources: EPA’s state emissions trend data for criteria pollutants 1990-2017.

Methodology: From the EPA data source, data is extracted for Virginia from the data series for the “Highway Vehicles” source type and plotting the series to visualize the trend of statewide emissions. For the purposes of this report, fine particulate matter (PM 2.5), and ozone precursors—nitrogen oxides (NOx) and volatile organic compounds (VOCs)—are shown, as they are critical to attaining EPA’s air quality standards in Virginia.

Note, the data used for this Report is based on EPA estimated trend data. Every three years, EPA releases the National Emission Inventory (NEI), the official estimate of emissions. NEI data for 2011 and 2014 is available and currently being finalized for 2017 (with expected release in Spring 2020).

27 & 28. CMAQ Program emissions: total emission reductions for VOC and NOx

Definitions: CMAQ Program: The Congestion Mitigation and Air Quality (CMAQ) program is a Federal program to fund transportation projects and programs that reduce emissions and help meet the requirements of the Clean Air Act (CAA) and its amendments.

System Description: Tracks CMAQ funded projects within Virginia’s current and former air quality non-attainment and maintenance areas: Northern Virginia, Richmond, Hampton Roads, Fredericksburg, and the Tri-Cities area.

Data sources: FHWA CMAQ Public Access System (PAS)

Methodology: CMAQ project emission reductions from 2014 to 2018 within the Northern Virginia portion of the Metropolitan Washington non-attainment area are compared with the 2019 and 2021 targets. These emission reductions and associated targets are reported to FHWA as required through MAP-21 and FAST Act rulemakings. For the four maintenance areas, total funding and emission reductions are not required to be reported to FHWA.

Measure Performance: The emission reductions within Northern Virginia reflect the performance of 68 unique CMAQ funded projects totaling over \$50.4 million in CMAQ funding leveraged by over \$611.7 million in other Federal, State, and local funding sources. Average kilograms (kg) reduced per day from these projects total 3.57 kg NOx and 1.87 kg VOC in 2018. For both NOx and VOC, these estimated reductions are close to or exceed the 2019 targets of 3.744 kg/day for NOx and 1.721 kg/day for VOC.

Across the four other eligible regions, since 2014, the CMAQ program has funded 96 unique projects. These projects received Federal CMAQ funding of over \$47.2 million leveraged by over \$564.9 million in state and local sources. The average daily reduction of these projects in 2018 totaled 691 kg of NOx and 428 kg of VOC.

²¹ <https://afdc.energy.gov/>

Federal Performance Measures

More information on Federal measures are available through the FHWA Transportation Performance Management page at: <https://www.fhwa.dot.gov/tpm/>.

29. Truck Travel Time Reliability Index – Interstate

Definition: Truck Travel Time Reliability (TTTR) Index measures the reliability of truck travel on the Interstate system across five time periods – AM peak, midday, PM peak, overnight, weekends. The TTTR is generated by dividing the 95th percentile travel time by the normal time (50th percentile) for each segment. The TTTR Index multiplies each segment's highest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate.

30 & 31. Percentage of person-miles traveled that are reliable – Interstate and Non-Interstate National Highway System (NHS)

Definition: Level of travel time reliability (LOTTR) measures the reliability of all person miles traveled on the Interstate system and non-Interstate NHS across four time period – AM peak, midday, PM peak and weekends. LOTTR is defined as the ratio of the longer travel times (80th percentile) to a "normal" travel time (50th percentile). The measures are the percent of person-miles traveled on the relevant portion of the NHS that are reliable. Person-miles include bus, auto, and truck occupancy levels.

32. Annual hours of peak hour excessive delay per capita on the NHS

Definition: The peak hours of excessive delay per capita measure currently applies (through end of 2021) to urbanized areas of 1 million or more in population that also are nonattainment or maintenance areas for ozone, carbon monoxide, or particulate matter (PM) emissions. In Virginia, this only applies to the Virginia portion of the greater Washington, DC, region. The threshold for excessive delay is based on the travel time at 20 miles per hour or 60 percent of the posted speed limit travel time, whichever is greater, during the AM and PM peak periods.

33 & 34. Percentage of deck area of bridges in good condition and percentage of deck area of bridges in poor condition

Definition: These measures are based on reported National Bridge Inventory (NBI) condition ratings for bridges and culverts on the NHS in Virginia. As highlighted in measures 13-16, condition is determined by the lowest CGR rating of deck, superstructure, substructure, or culvert. Deck area is based on structure length and deck width.

35 - 38. Percentage of pavement in good condition and in poor condition – Interstate and Non-Interstate NHS

Definition: These measures are based on pavement condition data submitted by VDOT to FHWA through the Highway Performance Monitoring System (HPMS). FHWA requires pavement condition to include four distresses – International Roughness Index (IRI), cracking, and rutting or faulting. Each distress is reported individually. Good pavement meets the criteria for good for all distresses. Pavement is considered poor if two or more distresses meet the criteria for poor.

39. Percentage of non-SOV travel

Definition: This measure is only applicable to Northern Virginia (consistent with measure 32). Mode share is based on the American Community Survey (ACS) Commuting (Journey to Work) data from the U.S. Census Bureau which is updated annually, and typically available by October of the following year.



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