



VIRGINIA

HIGHWAY SAFETY IMPROVEMENT PROGRAM 2020 ANNUAL REPORT



U.S. Department of Transportation
Federal Highway Administration

Photo source: Federal Highway Administration

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Disclaimer

Protection of Data from Discovery Admission into Evidence

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

Executive Summary

The Fiscal Year (FY) 2020 annual report submitted to the Federal Highway Administration (FHWA) describes the Virginia Department of Transportation's (VDOT) strategic use of Fixing America's Surface Transportation (FAST) Act funding of the Commonwealth's Highway Safety Improvement Program (HSIP) for the period July 2019 to June 2020.

The FAST Act continued the HSIP as a core program under Sections 148 and 130 of US Code Title 23. Under Section 154, the Surface Transportation Program and the National Highway Performance Program funds are transferred to be used for HSIP eligible proposals because Virginia does not have all the required components in its Open Container legislation. As a result, VDOT's HSIP is composed of the following sub-programs which use the above mentioned federal funding sources (23 USC Sections):

- A) Highway Safety Projects (HSP): Section 148
- B) Bicycle and Pedestrian Safety Projects (BPSP): Section 148
- C) Penalty Transfer-Open Container (OC) Projects: Section 154
- D) High Risk Rural Roads (HRRR): Section 148

A link to the HSIP guidelines, safety proposal submission documentation, and resource information is provided on-line at: http://www.virginiadot.org/business/ted_app_pro.asp

Note: Under ACTION: 23 U.S.C. 148(g) (1) FY2020 HRRR Special Rules. Over the most recent two-year period, Virginia was identified as having experienced an increase in its fatality rate on rural roads. Therefore, the Commonwealth obligated \$4,459,774 a specific amount of funds toward HRRR safety projects.

The Commonwealth of Virginia is committed to developing and maintaining a safe, multimodal transportation system. The spending targets for each VDOT district office are based on the level of FHWA funding in future years.

In June 2019, the Commonwealth Transportation Board (CTB) adopted Safety Performance Targets for CY 2020 and found the anticipated safety outcomes associated with the Safety Performance Targets to be unacceptable, and further directed the Office of Intermodal Planning and Investment (OIPI), working collaboratively with VDOT and Department of Motor Vehicles (DMV), to analyze and develop a plan resulting in a net reduction in fatal and serious injury crashes. A key finding from this data-driven analysis demonstrated that systemic and hybrid corridor safety projects provide greater potential crash reduction benefits for lower cost than traditional spot improvement projects, and this finding was presented to the CTB during multiple workshop meetings. In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial Systemic Improvement Plan. This initial Systemic Improvement Plan identified \$136.7 million in potential funding through FY 2025 in order to implement eight systemic countermeasure initiatives at VDOT-maintained roadways. The systemic countermeasure initiatives are as follows:

- High-Visibility Signal Backplates (HVSBS)
- Flashing Yellow Arrow (FYA)
- Pedestrian Accommodations Improvements at Signalized Intersections
- Centerline Rumble Strip
- Edgeline Rumble Strip/Stripes
- Curve Delineation
- Improvements at Unsignalized Intersections
- Safety Edge

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The systemic countermeasure implementation projects in this initial Systemic Improvement Plan is estimated to save 61 lives and 1,174 injuries per year statewide once implemented. This initial Systemic Improvement Plan also:

- Establishes goals and schedules for deploying the eight systemic countermeasures across VDOT's network.
- Includes a risk-based assessment of eight systemic countermeasures to include the locations, appropriate improvements, cost estimates, and schedules on all public roads.
- Aligns with emphasis areas in Virginia's Strategic Highway Safety Plan (SHSP).
- Will be updated periodically to advance additional systemic improvements.

The initial Systemic Improvement Plan is currently ongoing with potential project locations identified and implementation of systemic initiatives underway in many locations. Additional information on the initial HSIP Systemic Implementation Plan is provided on-line at:

<http://www.ctb.virginia.gov/resources/2019/sep/pres/9.pdf>.

Furthermore, in December 2019, the CTB approved the Highway Safety Improvement Program Project Prioritization Policy where it states the following:

- VDOT shall develop the next phase of the Implementation Plan for the deployment of systemic and hybrid safety countermeasures across the roadway network, including VDOT and locally-maintained facilities. Note: VDOT is currently in development of this next phase of the Safety Improvement Project Plan.
- After HSIP funds are set aside for program administration (approximately 5 to 10 percent), the remaining funds shall be programmed to projects with a goal of approximately 80 percent of funds allocated to systemic and hybrid safety improvements over the Six-Year Improvement Program (SYIP).
- In order to accelerate deployment of systemic and hybrid safety improvements, the CTB will not approve new spot improvement projects until FY 2026-2031 SYIP unless certain conditions are met.

The full CTB approval of the HSIP Project Prioritization Policy is provided on-line at:

<http://www.ctb.virginia.gov/resources/2019/dec/reso/10.pdf>.

VDOT's HSIP program processes have been developed in consultation with FHWA and in accordance with the FAST Act guidelines, final ruling (policy), and funding provided. Important to note, adding a new HSIP project to Virginia's Six-Year Improvement Program (SYIP) and Statewide Transportation Improvement Plan (STIP) will only be considered if the subject HSIP project was developed in accordance with Virginia's HSIP Project Prioritization Policy.

Virginia's Strategic Highway Safety Plan

In 2016, VDOT completed a multi-agency and disciplinary update of the Commonwealth's Strategic Highway Safety Plan (SHSP). In 2017, FHWA's Virginia Division approved Virginia's 2017-2021 SHSP. VDOT continues to coordinate with its safety partners and implement the SHSP engineering strategies to drive investment decisions to improve safety and reduce deaths and injuries for this reporting period.

Many safety partners are working towards reducing the number and severity of vehicle crashes on the Commonwealth's highways. Virginia's HSIP is structured to focus on infrastructure safety emphasis areas that may be improved with low cost minimal environmental impact (no right of way) engineering countermeasures, namely:

- A) Intersection geometry and traffic control
- B) Roadway and roadside improvements
- C) Bicycle and pedestrian risk reductions

Data-driven Decision-making on Transportation Safety

VDOT emphasizes data-driven decision-making to improve transportation safety and safety data. One way that VDOT has employed the use of the Highway Safety Manual (HSM) is through statewide evaluation of systemic improvement projects. This evaluation involves a simple before-and-after evaluation of all eligible systemic projects funded through the HSIP program. Also, this effort involved preparations for future systemic evaluations, including collection of project-level data and modification of the HSIP project application forms.

Also, in order to make data-driven decisions regarding the use of public funding for safety improvements, VDOT developed state-specific Safety Performance Functions (SPFs) and prioritized a list of locations with the largest Potential for Safety Improvements (PSI). The use of SPFs and PSI for network screening and project prioritization are well documented throughout the HSM.

VDOT developed a comprehensive set of state-specific SPFs covering 98 percent of its state-maintained roadway locations. The impetus for VDOT developing their own SPFs and analytical tools arose from the decision that AASHTOWare Safety Analyst™ did not meet their needs. VDOT developed state-specific SPFs using historical crash, traffic, and roadway inventory data. SPF developers worked closely with engineers throughout the development process to evaluate whether each SPF was implementable for all types of improvements (spot, corridor, and systemic). To date, VDOT has developed 24 SPFs covering the majority of roadway facilities, including two-lane roads, intersections, and freeways/multi-lane highways.

VDOT incorporates the comparisons of actual- to predicted-crash frequencies in its network screening, and then identifies the top 100 intersections and top 100 miles of segments with the largest PSI annually. This list is sent to the district engineers, and each district engineer can determine which site(s) to prioritize based on their practical experience and knowledge of the area.

VDOT has noted several benefits of the data-driven Virginia's SPF and PSI implementation effort, including:

- Prioritization of systemic countermeasure implementation locations at a District-level
- Use public funding in a cost-effective manner
- Measure quantifiable benefits for both systemic and spot improvements
- Better manage public concern
- Compare locations to prioritize projects

The state-specific SPFs and PSIs are incorporated beyond the HSIP and are being used as tools to develop project prioritization in VTrans's Long-Range Transportation Plan (VTrans2040) and Statewide Project Prioritization (SMARTSCALE). VTrans2040, completed in January 2018, is a major milestone in a performance-based planning framework. It established a direct link between planning (VTrans) and funding (SMARTSCALE). SMARTSCALE is a statewide program that distributes funding based on transparent and objective evaluation of projects to effectively support the Commonwealth achieve its transportation goals. In the SMARTSCALE application process, data-driven safety analysis is one of the weighting factors in the selection process, and a project with high PSI is more likely to receive a higher score for Safety than that of lower PSI.

The SPF development team conducts training (including an annual "roadshow" to all nine districts) and hosts webinars to ensure district engineers understand the methodology and how to use the SPFs. VDOT has not mandated the use of SPFs and PSIs by the districts because the process of introducing a new methodology takes time. However, the district engineers are aware that it is the preferred method for network screening.

Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

Program Structure

Program Administration

Describe the general structure of the HSIP in the State.

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, states are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

The primary objective of the Highway Safety Improvement Program (HSIP) is to identify and improve locations where there is a high concentration, or risk, of vehicle crashes that result in deaths or injuries. HSIP staff conduct network screening for the engineering emphasis areas in Virginia's Strategic Highway Safety Plan (SHSP). After conducting network screening, HSIP staff fulfill transportation safety planning requirements by producing listings of the largest Potential for Safety Improvement (PSI) on VDOT maintained intersections and segments. The lists are distributed to District staff, and each District Engineer determines which site(s) to prioritize based on their practical experience and knowledge of the area. Safety proposals are not limited to the locations that are identified by VDOT staff. Detailed crash analysis and site evaluation is typically conducted through a documented engineering study or Road Safety Assessment (RSA).

VDOT also uses the systemic approach methodology which provides a consistent framework for addressing risk using the HSIP process by identifying system-wide roadway safety concerns and strategies to address these concerns. Applying a systemic approach to addressing safety is beneficial to proactively address widespread safety issues and cost-effectively minimize crash potential. Rather than focus on specific crash locations, a systemic approach targets consistent crash trends and common risk factors in crashes throughout the roadway network.

In June 2019, the Commonwealth Transportation Board (CTB) adopted Safety Performance Targets for CY 2020 and found the anticipated safety outcomes associated with the Safety Performance Targets to be unacceptable, and further directed the Office of Intermodal Planning and Investment (OIPI), working collaboratively with VDOT and Department of Motor Vehicles (DMV), to analyze and develop a plan resulting in a net reduction in fatal and serious injury crashes. A key finding from this data-driven analysis demonstrated that systemic and hybrid corridor safety projects provide greater potential crash reduction benefits for lower cost than traditional spot improvement projects, and this finding was presented to the CTB during multiple workshop meetings. In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial Systemic Improvement Plan. This initial Systemic Improvement Plan identified \$136.7 million in potential

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funding through FY 2025 in order to implement eight systemic countermeasure initiatives at VDOT-maintained roadways. The systemic countermeasure initiatives are as follows:

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Furthermore, in December 2019, the CTB approved the Highway Safety Improvement Program Project Prioritization Policy where it states the following:

- VDOT shall develop the next phase of the Implementation Plan for the deployment of systemic and hybrid safety countermeasures across the roadway network, including VDOT and locally-maintained facilities. Note: VDOT is currently in development of this next phase of the Safety Improvement Project Plan.
- After HSIP funds are set aside for program administration (approximately 5 to 10 percent), the remaining funds shall be programmed to projects with a goal of approximately 80 percent of funds allocated to systemic and hybrid safety improvements over the Six-Year Improvement Program (SYIP).
- In order to accelerate deployment of systemic and hybrid safety improvements, the CTB will not approve new spot improvement projects until FY 2026-2031 SYIP unless certain conditions are met.

The full CTB approval of the HSIP Project Prioritization Policy is provided on-line at: <http://www.ctb.virginia.gov/resources/2019/dec/reso/10.pdf>.

VDOT Central Office is responsible for establishing the process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluation of the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis. Once the final HSIP projects are prioritized and selected by Central Office, the selected HSIP projects are included in Virginia's Six-Year Improvement Program (SYIP), which is then presented to the Commonwealth Transportation Board (CTB) for approval. Once the HSIP projects are approved, programmed, and have received allocated funds, the HSIP staff monitor the projects from scoping through construction to the final voucher. The project monitoring process consists of tracking changes that occur to the following functions:

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advertisement dates, funding authorization dates, engineer's estimates, and expenditures. Cost, schedule, and scope are monitored and measured to ensure that the HSIP projects are being delivered on time and on budget. HSIP project schedules and cost both directly affect the Federal Strategy and VDOT's ability to meet their Obligation Authority for the HSIP Program.

Where is HSIP staff located within the State DOT?

Engineering

The Virginia Department of Transportation HSIP staff is located in the Central Office of the Highway Department Agency as part of the Traffic Engineering Division (TED). TED is one of the core responsibilities of the Operation and Maintenance discipline of the department.

How are HSIP funds allocated in a State?

- Central Office via Statewide Competitive Application Process
- Formula via Districts/Regions

HSIP funding target amounts based on the combination of each District's proportion of Equivalent Property Damage Only values and rates. The Equivalent Property Damage Only (EPDO) method allows crash severities to be weighted to give more weight to serious crashes. EPDO weights are determined by FHWA's estimated costs to society of the various crash severity levels. The highway safety funding target formula for each VDOT District based on the EPDO method is the following:

$\% \text{ Funds Per District} = .5 * (\% \text{ of Statewide EPDO Crashes} + \% \text{ of Statewide EPDO Crash Rate})$

Describe how local and tribal roads are addressed as part of HSIP.

Local roads account for approximately 40 percent of all crashes and 20 percent of all fatal and serious injury crashes on Virginia's highways. Therefore, local safety projects are targeted to receive up to 20 percent of Virginia's HSIP funds for implementation and completion of their safety projects. VDOT has been providing the state-match to these safety projects for the past several years.

The safety proposals for local and tribal roads are required to follow the same HSIP Implementation Guidelines as the safety proposals for VDOT roads. The HSIP Systemic Implementation Plan that was implemented in FY 2020 states that the HSIP funds are to be allocated based on risk-based locations of systemic safety improvements in VDOT's initial Systemic Implementation Plan. Also, the initial Systemic Implementation Plan lays out the funding process for local projects as described below:

- Approximately 80 percent of available HSIP funds shall be allocated to systemic safety improvements over the six-year improvement program.
- HSIP funds for systemic improvements shall be available for local roads only in FY 2024 – FY 2025.
 - \$20 million of \$136.7 million proposed to be set aside for local systemic projects in FY 2024 and FY 2025.
 - Beginning FY 2023, localities may submit applications for funding for systemic countermeasure projects and initiatives.
 - VDOT shall establish the process for screening, scoring, and selection of HSIP projects.
 - CTB shall review and approve HSIP projects for final approval.

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VDOT assists the localities and tribal agencies by publishing Virginia's crash data from VDOT's Power BI crash analysis tool. VDOT Power BI crash analysis tool pulls the crash data from those crashes reported to the Virginia Department of Motor Vehicles (DMV)'s crash data source as DMV owns and maintains the main source of the crash data. This crash analysis tool allows the localities and tribal agencies to perform their own safety analysis, project prioritization, and project selection for submission to VDOT for funding consideration.

The University of Virginia's Center for Transportation Studies (CTS), Virginia Transportation Research Council (VTRC), and VDOT administers the Safety Circuit Rider (SCR) program, an important component of the Virginia Local Technical Assistance Program (LTAP). LTAP provides technical workshops, seminars, and short courses in the various transportation related topics for local government staff. The SCR's goal is to improve safety on the 11,000 miles of streets and roadways maintained by cities, towns, and local agencies in the Commonwealth of Virginia. The SCR provides four key services:

- Virtual/In-classroom transportation safety training
- One-on-one technical assistance and site visits
- Grant and proposal development support for state and federal aid
- Annual low-cost safety initiative

Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.

- Design
- Districts/Regions
- Local Aid Programs Office/Division
- Operations
- Planning
- Traffic Engineering/Safety

Describe coordination with internal partners.

Central Office Traffic Engineering HSIP staff communicates with District staff regarding HSIP activities, such as sharing information on requirements, emphasis areas, prioritization, funding, and safety data. Particularly in FY 2020, VDOT Central Office Traffic Engineering HSIP staff have been in frequent coordination with District staff to develop an inventory of existing, planned, and potential for implementation locations of the initial eight systemic countermeasure initiatives for each District. The inventories of the systemic countermeasure initiatives were then mapped in ArcGIS, and the ArcGIS maps were distributed back to the Districts for their use in tracking and recording the overall project implementation progress.

VDOT emphasizes the importance of a data-driven decision-making approach to improve safety in the Commonwealth of Virginia. In order to make a data-driven decision on the use of public funding for safety improvements, VDOT developed state-specific Safety Performance Functions (SPFs) and prioritized list of intersections and segments with the largest Potential for Safety Improvements (PSI). The SPF and PSI analysis are shared across the Districts and localities. Along with other safety data and analysis, the SPF and PSI analysis are encouraged to be used for project consideration and selection.

VDOT also uses its Strategically Targeted Affordable Roadway Solutions (STARS) Program managed by the Transportation Mobility and Planning Division to address congestion and safety concerns throughout the Commonwealth. STARS projects typically result in multiple recommended improvements that may be eligible for funding and implementation under maintenance budgets, applications in the SMART SCALE process, applications for the HSIP, State of Good Repair budgets, and/or applications for revenue sharing.

The HSIP projects are programmed through Virginia's Six-Year Improvement Program (SYIP). HSIP projects in

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SYIP are programmed with the appropriate Fiscal Year (FY) allocations for a specific phase to be delivered, and HSIP projects in the SYIP are tracked internally across appropriate divisions during their relevant phase of the project.

Identify which external partners are involved with HSIP planning.

- FHWA
- Local Government Agency
- Other-District/Design/Pe and Planning Staff
- Other-Virginia Local Technical Assistance Program (LTAP)

University of Virginia Transportation Training Academy serves as the FHWA-designated LTAP Center for the Commonwealth of Virginia. LTAP is designed to support FHWA's Every Day Counts initiative, coordinate training partnerships among local, state, federal transportation agencies, and the private sector, and provide technical support to find solutions to local transportation problems.

Describe coordination with external partners.

VDOT Districts are responsible for communicating with localities for any HSIP related projects, and each district office has its own local liaison. All external local partners must coordinate with their Local Liaison for the development and submission of the safety proposal. In addition, VDOT's Local Technical Assistance Program (LTAP) provides technical workshops, seminars, and short courses in the various transportation related topics for local government staff.

VDOT participates in the Local Programs Workshop with local government representatives every year. The focus of this workshop is to communicate with external stakeholders on various HSIP information and tools, such as reviewing the information on funding eligibility, process of applying for appropriate safety funding, application and project selection process, and available safety data and resources.

VDOT emphasizes the importance of a data-driven decision-making approach to improve safety in the Commonwealth of Virginia. In order to make data-driven decisions on the use of public funding for safety improvements, VDOT developed a state-specific Safety Performance Functions (SPFs) and a prioritized list of intersections and segments with the largest Potential for Safety Improvements (PSI). The SPF and PSI analyses are shared across the Districts and localities. Along with other safety data and analysis, the SPF and PSI analyses can be used for project consideration and selection. The localities also have full access to crash data from VDOT's Power BI crash analysis tool. VDOT Power BI crash analysis tool pulls the crash data from Virginia Department of Motor Vehicles (DMV)'s crash data source as DMV owns and maintains the main source of the crash data.

VDOT coordinates with local government partners, such as Metropolitan Planning Organizations (MPOs) and Planning District Commissions (PDCs), through meetings and webinars to set an obtainable target that coincides with VDOT's Strategic Highway Safety Plan (SHSP) goals.

Virginia's Commonwealth Transportation Board (CTB) oversees transportation projects and initiatives for the Commonwealth of Virginia. VDOT has the responsibility for construction, maintenance, and operation of Virginia's roadways under the overall guidance of the CTB. VDOT Central Office HSIP staff coordinates with CTB staff for prioritization of HSIP projects and through final HSIP project selection.

Describe other aspects of HSIP Administration on which the State would like to elaborate.

According to the 2017 VDOT Pedestrian Crash Assessment: Analysis of Pedestrian Crashes Occurring Between 2012-2016, pedestrian fatalities in Virginia have increased by 19 percent since 2012. In response to the continuing increase in pedestrian fatality rates, the VDOT Traffic Engineering Division completed an inaugural statewide Pedestrian Safety Action Plan (PSAP) in early 2018. This report documents the process VDOT followed to complete the PSAP and considers ways to improve pedestrian safety and ultimately reduce pedestrian fatalities throughout the Commonwealth.

VDOT worked with a multidisciplinary group of stakeholders to identify and address pedestrian safety concerns through a data driven approach. This approach included identifying and addressing locations with a history of pedestrian safety crashes along with proactively addressing pedestrian crash risk through the identification of priority corridors. This report complements other pedestrian safety efforts in the Commonwealth, including the Virginia 2017–2021 Strategic Highway Safety Plan (SHSP), VDOT HSIP, SMART SCALE, Transportation Alternatives Program, and Safe Routes to School program. Local, regional, and state agencies should review this report to identify and implement potential countermeasures, update design policies, and supplement other State pedestrian safety initiatives.

Program Methodology

Does the State have an HSIP manual or similar that clearly describes HSIP planning, implementation and evaluation processes?

Yes

VDOT is currently in process of updating the VDOT HSIP Implementation Manual.

Select the programs that are administered under the HSIP.

- Bicycle Safety
- HRRR
- Intersection
- Pedestrian Safety
- Roadway Departure

Program: Bicycle Safety

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes
- Other-Risk Reduction

Exposure

- Traffic
- Volume

Roadway

- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Other-Available facilities
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100

Total Relative Weight:100

VDOT Central Office is responsible for establishing process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluating the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis.

Program: HRRR

Date of Program Methodology:8/22/2018

What is the justification for this program?

- FHWA focused approach to safety

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes

- Fatal and serious injury crashes only

Exposure

- Traffic
- Volume

Roadway

- Functional classification

What project identification methodology was used for this program?

- Equivalent property damage only (EPDO Crash frequency)
- Excess expected crash frequency using SPFs

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Competitive application process

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-B/C Ranking:40
Other-Project in PSI or District SHSP Listing:25
Other-High Number of Targeted Crashes:10
Other-Cost Estimate and Project Schedule:10
Other-Other:15
Total Relative Weight:100

Program: Intersection

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes	Exposure	Roadway
<ul style="list-style-type: none">• All crashes• Fatal and serious injury crashes only	<ul style="list-style-type: none">• Traffic• Volume	

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess expected crash frequency with the EB adjustment
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100

Total Relative Weight:100

VDOT Central Office is responsible for establishing process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluating the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis.

Program: Pedestrian Safety

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes
- Other-Risk Reduction

Exposure

- Traffic
- Volume
- Population

Roadway

- Median width
- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Other-Community Support and Missing sidewalk
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100

Total Relative Weight:100

VDOT Central Office is responsible for establishing process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluating the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis.

Program: Roadway Departure

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes
- Fatal and serious injury crashes only

Exposure

- Traffic
- Volume

Roadway

- Median width
- Horizontal curvature
- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100

Total Relative Weight:100

VDOT Central Office is responsible for establishing process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluating the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis.

What percentage of HSIP funds address systemic improvements?

80

HSIP funds are used to address which of the following systemic improvements?

- Horizontal curve signs
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Other-Install Flashing Yellow Arrow Traffic Signals
- Other-Install High-Visibility Signal Backplates
- Other-Install Pedestrian Crossing Improvements
- Rumble Strips
- Safety Edge
- Traffic Control Device Rehabilitation
- Wrong way driving treatments

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Rumble strips consist of centerline rumble strips and edgeline rumble strips

What process is used to identify potential countermeasures?

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- SHSP/Local road safety plan
- Other-PSI Listing Network Screening

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

Describe how the State HSIP considers connected vehicles and ITS technologies.

In the Virginia's Strategic Highway Safety Plan (SHSP), VDOT considers Connected Vehicle/Autonomous Vehicles as a special area of focus. The SHSP provides a strategy in providing future technology regarding this specific topic: Ensure that future connected and autonomous vehicle technology deployments maximize potential safety benefits for all users by supporting necessary planning and research activities.

Intelligent Transportation Systems (ITS) technologies are part of HSIP projects as there can be cost-effective ITS projects that improve safety.

Examples of ITS technologies applicable for HSIP:

- Real-time Adaptive Signal Controllers,
- Advance Transportation Controllers
- Signal Optimization
- Dynamic Message Sign (DMS), Overhead Message Boards, and Closed-Circuit Television (CCTV)
- Fiber Optic Lines and Connection.
- Incident Management: Signs and Camera
- Real-time Performance Measuring Software: iPeMS (Iteris Performance Measurement System)

Does the State use the Highway Safety Manual to support HSIP efforts?

Yes

Please describe how the State uses the HSM to support HSIP efforts.

VDOT emphasizes data-driven decision-making to improve transportation safety and safety data. One way that VDOT has employed the use of the Highway Safety Manual (HSM) is through a statewide evaluation of systemic improvement projects. This evaluation involved a simple before-and-after evaluation of all eligible systemic projects funded through the HSIP program. Also, this effort involved preparations for future systemic evaluations, including collection of project-level data and modification of the HSIP project application forms.

In order to make data-driven decisions on the use of public funding for safety improvements, VDOT developed state-specific Safety Performance Functions (SPFs) and prioritized list of locations with the largest Potential for Safety Improvements (PSI). The use of SPFs and PSI for network screening and project prioritization are well documented throughout the HSM.

VDOT developed a comprehensive set of state-specific SPFs, covering 98 percent of its state-maintained

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roadway locations. The impetus for VDOT developing their own SPF and analytical tools arose from the decision that AASHTOWare Safety Analyst™ did not meet their needs. VDOT developed state-specific SPFs using historical crash, traffic, and roadway inventory data. SPF developers worked closely with engineers throughout the development process to evaluate whether each SPF was implementable for all types of improvements (spot, corridor, and systemic). To date, VDOT has developed 24 SPFs covering the majority of roadway facilities, including two-lane roads, intersections, and freeways/multi-lane highways. For each facility/location type, VDOT developed two separate SPFs: one for total crashes and the other for fatal + injury crashes. Actual crash frequency for any specific location can be compared to the SPF for locations of that type to see if, for the level of traffic volume, the location has more than the predicted number of crashes.

VDOT incorporates the comparisons of actual- to predicted-crash frequencies in its network screening and provides district engineers with a list of the top 100 intersections and top 100 miles of roadway segments drawn from the locations that are above the SPF. VDOT uses the most recent three years of crash data to calculate the PSI. The PSI is the expected number of crashes for the site minus the predicted number of crashes based on the SPF for that facility type. As with SPFs, VDOT calculates the PSI for total crashes and fatal + injury crashes. A site with a positive PSI warrants examination and those with the highest PSI values should be considered high priority. With this PSI list, each district engineer can determine which site(s) to prioritize based on their practical experience and knowledge of the area.

VDOT has noted several benefits of the data-driven SPF and PSI implementation effort, including:

- Prioritization of systemic countermeasure implementation locations at a District-level
- Using public funding in a cost-effective manner
- Measuring quantifiable benefits for both systemic and spot improvements
- Managing public concern
- Comparing locations to prioritize projects

The SPF development team conducts training (including an annual “roadshow” to all nine districts) and hosts webinars to ensure district engineers understand the methodology and how to use the SPFs. VDOT has not mandated the use of SPFs and PSIs by the districts because the process of introducing a new methodology takes time. However, the district engineers are aware that it is the preferred methodology for network screening.

Describe program methodology practices that have changed since the last reporting period.

In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial Systemic Improvement Plan. This initial Systemic Improvement Plan identified \$136.7 million in potential funding through FY 2025 in order to implement eight systemic countermeasure initiatives at VDOT-maintained roadways. The systemic countermeasure initiatives are as follows:

- High-Visibility Signal Backplates (HVSB)
- Flashing Yellow Arrow (FYA)
- Pedestrian Accommodations Improvements at Signalized Intersections
- Centerline Rumble Strip
- Edgeline Rumble Strip/Stripes
- Curve Delineation
- Improvements at Unsignalized Intersections
- Safety Edge

This initial Systemic Improvement Plan also:

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- Establishes goals and schedules for deploying the eight systemic countermeasures across VDOT's network.
- Includes a risk-based assessment of eight systemic countermeasures to include the locations, appropriate improvements, cost estimates, and schedules on all public roads.
- Aligns with emphasis areas in Virginia's Strategic Highway Safety Plan (SHSP).
- Will be updated periodically to advance additional systemic improvements.

VDOT Central Office is responsible for establishing the process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. Data-driven analysis was conducted to identify potential locations where the systemic countermeasures could be installed. For example, selecting and prioritizing signalized intersection locations for pedestrian accommodations improvements based on high-priority pedestrian corridor information from the Pedestrian Safety Action Plan (PSAP). VDOT Districts are responsible for further evaluation of the selected HSIP project locations for feasibility based on local knowledge and additional project evaluation.

Describe other aspects of the HSIP methodology on which the State would like to elaborate.

VDOT Traffic Engineering Central Office administers the HSIP and provides the VDOT District Offices with Targeted Safety Needs (TSN) intersections and segments based in the Highway Safety Manual (HSM) network screening methodology. TSN locations indicate intersections or segments that have a positive Potential for Safety Improvements (PSI) value in three or more years of the five-year period, indicating recurring safety issues. VDOT districts use this information with local knowledge to initiate further engineering studies of the locations and scope projects to be submitted for inclusion in its Six-Year Improvement Program (SYIP).

Depending on the scale and complexity of the projects, VDOT district offices conduct Roadway Safety Assessments (RSA) as determined by the VDOT District Traffic Engineer. To assist the District Traffic Engineer with conducting these RSAs, VDOT's Highway Safety Program developed Virginia specific guidelines for performing these assessments.

The Equivalent Property Damage Only (EPDO) method allows crash severities to be weighted to give more weight to serious crashes. EPDO weights are determined by FHWA's estimated costs to society of the various crash severity levels. For the purpose of the funding formula, only injury crashes are included in the EPDO formula calculation. The highway safety funding target formula for each VDOT District based on the EPDO method is the following:

$$\% \text{ Funds Per District} = .5 * (\% \text{ of Statewide EPDO Crashes} + \% \text{ of Statewide EPDO Crash Rate})$$

Rural areas tend to have higher severe crash rates while urban areas tend to have more total crashes and, therefore, a greater proportion of overall crashes. By including equal credit for the proportion of total EPDO crashes and crash rate in the formula, this method balances the distinct challenges of urban and rural districts.

VDOT Central Office is responsible for establishing the process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluation of the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis. Once the final HSIP projects are prioritized and selected by Central Office, the selected HSIP projects are included in Virginia's Six-Year Improvement Program (SYIP), which is then presented to the Commonwealth Transportation Board (CTB) for approval. Once the HSIP projects are approved, programmed, and have received allocated funds, the HSIP staff monitor the projects from scoping through construction to the final voucher. The project monitoring process consists of tracking changes that occur to the following functions: advertisement dates, funding authorization dates, engineer's estimates, and expenditures. Cost, schedule, and scope are monitored and measured to ensure that the HSIP projects are being delivered on time and on

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budget. HSIP project schedules and cost both directly affect the Federal Strategy and VDOT's ability to meet their Obligation Authority for the HSIP Program.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

Virginia's State Fiscal Year is from July 1 through June 30 of the following year.

Enter the programmed and obligated funding for each applicable funding category.

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	\$53,122,000	\$34,829,324	65.56%
HRRR Special Rule (23 U.S.C. 148(g)(1))	\$4,459,774	\$4,459,774	100%
Penalty Funds (23 U.S.C. 154)	\$11,741,000	\$11,741,000	100%
Penalty Funds (23 U.S.C. 164)	\$0	\$0	0%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	\$0	\$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	\$0	\$0	0%
State and Local Funds	\$0	\$0	0%
Totals	\$69,322,774	\$51,030,098	73.61%

How much funding is programmed to local (non-state owned and operated) or tribal safety projects?

\$6,000,000

How much funding is obligated to local or tribal safety projects?

\$6,548,516

How much funding is programmed to non-infrastructure safety projects?

\$5,500,000

How much funding is obligated to non-infrastructure safety projects?

\$5,537,557

VDOT considers the following type of projects as non-infrastructure safety project:

- Road Safety Audit (RSA): VDOT uses RSA to reduce the number of fatal and severe injury crashes by proactively identifying potential safety issues and providing recommended improvements

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- Support for HSIP Program and Planning: Projects that support HSIP program implementation and planning activities. Activities includes development of RSA guidance, consultant task for HSIP planning and support for identification of safety countermeasures, and prioritization of safety improvements.
- Support for HSIP Crash and Data Analysis: Projects to support HSIP crash analysis and crash data improvement
- Strategic Highway Safety Plan (SHSP) Development and Implementation: Projects to update SHSP and implementation action plan

The following specific projects were completed under the non-infrastructure safety project:

- Virginia Specific Crash Modification Factor (CMF) Development for Safety Evaluation
- Virginia Statewide Pedestrian Safety Action Plan (PSAP)
- Effectiveness of Highway Safety Improvement Program Systemic Treatments
- Preparation of MIRE Fundamental Data Element
- SMARTSCALE Safety Scoring Analysis
- Safety Measure Target Setting
- Policy for Pedestrian Safety Action Plan

How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?

\$83,400,000

How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?

\$0

At the end of the federal fiscal year, \$83.4 million of other federal apportionments (STBG, CMAQ, TAP) subject to the FAST Act rescission were transferred into the HSIP program to reduce the amount of these funds subject to the FAST Act rescission upon its calculation date of September 30, 2019. Such transfers are administrative actions explicitly provided for in federal regulations. The intent is to transfer these funds back out of HSIP in increments over the next three federal fiscal years; therefore, there is no impact or change to the HSIP program or funding as currently projected in the Six-Year Financial Plan (SYFP). Put another way, the HSIP program is anticipated to remain funded at the levels currently shown in the SYFP and SYIP (absent, of course, any changes to future revenue projections or policy direction). As a result, there is no anticipation or expectation that any HSIP funds will lapse.

Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.

Having realistic and attainable project schedules may be considered as an impediment to obligating HSIP funds. Few Districts have struggled in the project development of HSIP funded safety projects, which resulted in some safety projects missing their submission deadlines. Ultimately, HSIP funds were not used for those projects in the planned years. To overcome these project delivery issues, the HSIP staff are working with the District Traffic Engineers to track the milestones of HSIP projects. This will ensure District project managers stay on schedule and deliver the safety improvement projects on time.

VDOT will continue to work through its District offices to provide guidance and support in the project development phase of these safety projects.

General Listing of Projects

List the projects obligated using HSIP funds for the reporting period.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
UPC 96938 #HB2.FY17 Route 53/618 Roundabout	Intersection traffic control	Modify control - modifications to roundabout	1	Intersections	\$430764	\$3901367	HSIP (23 U.S.C. 148)	N/A	Major Collector	7,000	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce number and severity of crashes at intersections through design, traffic control & operations while considering the context of area
UPC 107021 RTE 254 - SAFETY IMPROVEMENTS	Roadway	Rumble strips - edge or shoulder	5.84	Miles	\$1600000	\$1345761	HSIP (23 U.S.C. 148)	N/A	Major Collector	4,500	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system
UPC 107073 US 23 Shoulder Initiative	Roadway	Rumble strips - edge or shoulder	19.85	Miles	\$2873794	\$2873799	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Other	17,000	60	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system
UPC 107074 Route 23 Median Shoulders	Roadway	Rumble strips - edge or shoulder	14.75	Miles	\$2163561	\$2163561	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Other	14,000	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
UPC 107797 #HB2.FY17 RTE 95 - EXTEND NB ACCEL LANE AT BELVIDERE ST	Interchange design	Acceleration / deceleration / merge lane	0.317	Miles	\$850000	\$3416757	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Interstate	155,000	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce number and severity of crashes at intersections through design, traffic control & operations while considering the context of area
UPC 108514 Pave Existing Shoulders and Install Rumble Strips & Signs.	Roadway	Rumble strips - edge or shoulder	5.05	Miles	\$1106829	\$1808991	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Other Freeways & Expressways	21,000	60	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system
UPC 108888 ROAD DIETS - IMPROVE BICYCLE ACCOMMODATIONS	Roadway	Roadway narrowing (road diet, roadway reconfiguration)		Various	\$1654500	\$1746816	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	1,800	35	City Municipal Highway Agency or	Spot	Bicyclists	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 109513 US Route 21 Rumble Stripe Initiative	Roadway	Rumble strips - edge or shoulder	28.45	Miles	\$4565000	\$4565000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	1,800	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system
UPC 109579 Route 220/688 Access Management Improvements	Access management	Raised island - install new	0.1	Miles	\$367033	\$367033	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	11,000	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce number and severity of crashes at intersections

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															through design, traffic control & operations while considering the context of area
UPC 109580 Rt. 220 Safety Improvements	Roadway	Rumble strips - edge or shoulder	5.26	Miles	\$2439723	\$2427779	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	18,000	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system
UPC 109588 ROUTE 20/231 ROUNDABOUT AT OLD SOMERSET HSIP	Intersection traffic control	Modify control - modifications to roundabout	1	Intersections	\$3219743	\$3219743	HSIP (23 U.S.C. 148)	N/A	Major Collector	4,200	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce number and severity of crashes at intersections through design, traffic control & operations while considering the context of area
UPC 109594 TOWN OF LEESBURG - BATTLEFIELD PKWY SHARED USE PATH @ RTE 15	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	0.261	Miles	\$712838	\$875548	HSIP (23 U.S.C. 148)	N/A	Major Collector	28,000	55	City Municipal Highway Agency or	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 109920 I-81 Median Guardrail - Smyth Co.	Roadside	Barrier - other	9	Miles	\$959233	\$959233	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Interstate	33,000	70	State Highway Agency	Spot	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
UPC 109922 Route 80 Shoulder Initiative	Roadway	Rumble strips - edge or shoulder	11.3	Miles	\$1517008	\$1745394	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	8,300	25	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential for roadway departure crashes by improving roadway system
UPC 111360 Franklin Road Sidewalk Improvements- Rt. 220 B- Roanoke City	Pedestrians and bicyclists	Install sidewalk	0.76	Miles	\$451044	\$763544	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Other	51,000	55	County Highway Agency	Hybrid	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 111426 RIVERWALK SHARED USE PATH PROJECT (PHASE I)	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	0.19	Miles	\$237111	\$338601	HSIP (23 U.S.C. 148)	N/A	Local Road or Street	8,000	30	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 111430 Pedestrian Improvements - City of Galax	Pedestrians and bicyclists	Install new crosswalk	4	Intersections	\$395052	\$420103	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	2,700	55	County Highway Agency	Systemic	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 113847 I-81 Exit 32 - Improve Superelevation NB & SB	Roadway	Superelevation / cross slope	0.4	Miles	\$1315499	\$1315499	Penalty Funds (23 U.S.C. 154)	N/A	Principal Arterial-Interstate	32,000	70	State Highway Agency	Spot	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															with high potential roadway departure crashes by improving roadway system
UPC 114064 GRAVES MILL ROAD - INSTALL ADAPTIVE SIGNAL CONTROLS	Advanced technology and ITS	Advanced technology and ITS - other	1.49	Miles	\$462500	\$462500	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	26,000	35	City Municipal Highway Agency	Spot	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential roadway departure crashes by improving roadway system
UPC 114093 RTE 29 - SHOULDER WIDENING AND RUMBLE STRIPS (AMHERST)	Roadway	Rumble strips - edge or shoulder	8.77	Miles	\$4352330	\$1976874	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	23,000	65	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential roadway departure crashes by improving roadway system
UPC 114094 RTE 29 - SHOULDER WIDENING AND RUMBLE STRIPS (CAMPBELL)	Roadway	Rumble strips - edge or shoulder	4.58	Miles	\$1529620	\$1024763	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	32,000	60	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce chance of vehicles leaving travel lane at locations with high potential roadway departure crashes by improving roadway system
UPC 114402 Opal Phase II - Median Restrictions	Access management	Median crossover - close crossover	0.03	Miles	\$291180	\$247925	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	46,000	45	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															crashes to apply proven ped safety countermeasures
UPC 114651 PARK AVE.-CROSSWALK & PEDESTRIAN SIGNAL IMPROVEMENTS	Pedestrians and bicyclists	Install new crosswalk	0.1	Miles	\$469000	\$449000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0	0	City or Municipal Highway Agency	Systemic	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114652 RUSSELL ROAD-INSTALL SIGNALIZED CROSSWALK	Pedestrians and bicyclists	Install new "smart" crosswalk	0.1	Miles	\$113452	\$113452	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	8,100	55	City or Municipal Highway Agency	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114670 RECTANGULAR RAPID FLASHING BEACONS ON WASHINGTON BLVD	Pedestrians and bicyclists	Pedestrian signal - Pedestrian Hybrid Beacon	1	Intersections	\$80000	\$107861	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	33,000	45	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114671 RECTANGULAR RAPID FLASHING BEACON GEORGE MASON DR & 4TH ST N	Pedestrians and bicyclists	Pedestrian signal - Pedestrian Hybrid Beacon	1	Intersections	\$40000	\$53930	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	25,000	45	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
UPC 114672 RECTANGULAR RAPID FLASHING BEACON AT LEE HWY & N NELSON ST	Pedestrians and bicyclists	Pedestrian signal - Pedestrian Hybrid Beacon	1	Intersections	\$40000	\$54138	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	23,000	35	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114701 PSAP - Pedestrian Facility Improvements in Richmond	Pedestrians and bicyclists	Install new crosswalk		Various	\$1540000	\$1539985	HSIP (23 U.S.C. 148)	N/A	Major Collector	0	0	County Highway Agency	Systemic	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114721 Little Creek Corridor (PSAP)	Pedestrians and bicyclists	Install new crosswalk	11	Intersections	\$180702	\$180702	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	22,000	45	City or Municipal Highway Agency	Systemic	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114733 PEDESTRIAN UPGRADES AT PROPOSED INTERSECTIONS IN PW COUNTY	Pedestrians and bicyclists	Crosswalk		Various	\$56775	\$21550	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0	0	State Highway Agency	Systemic	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or potential for crashes to apply proven ped safety countermeasures
UPC 114765 PEDESTRIAN SIGNAL UPGRADES - CITY OF ROANOKE	Pedestrians and bicyclists	Pedestrian beacons		Various	\$230000	\$230000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0	0	State Highway Agency	Systemic	Pedestrians	Strategy 1. Identify corridors & locations having concentrations of ped activity or

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															potential for crashes to apply proven pedestrian safety countermeasures

Please note that for the projects listed under this question, the dollar amount represents construction cost only. Preliminary engineering and non-infrastructure costs are not included in this table, and the amount figures will be different from the amount entered in for Question #23.

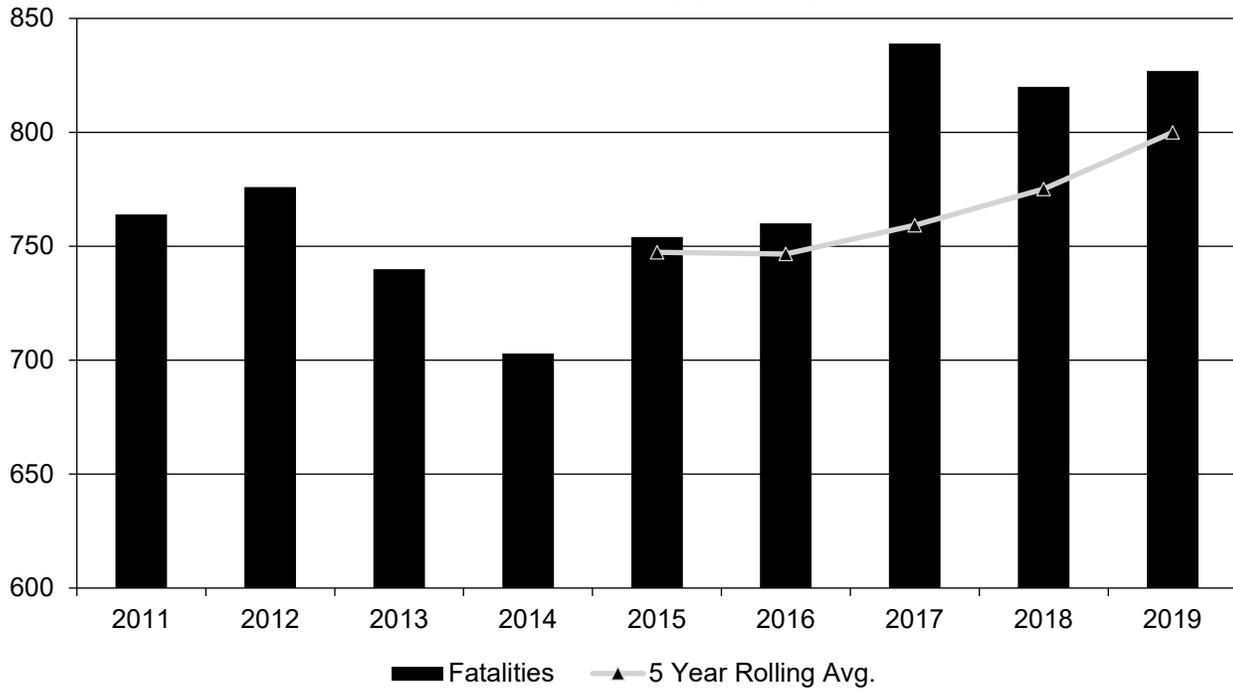
Safety Performance

General Highway Safety Trends

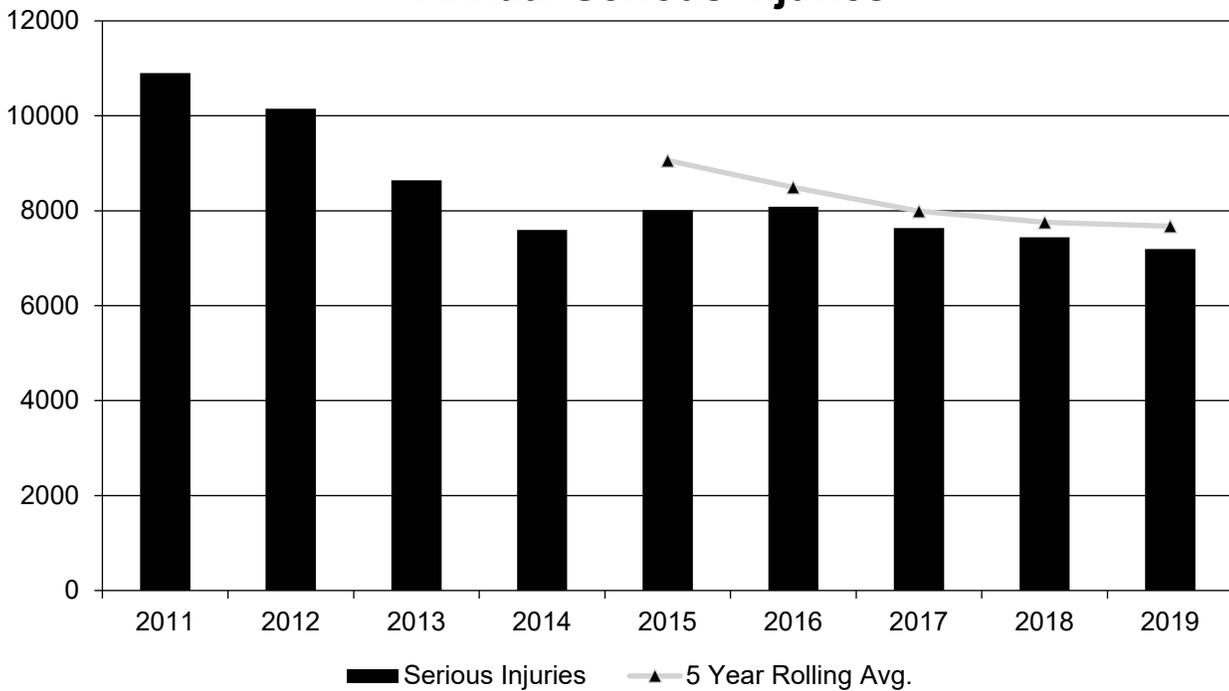
Present data showing the general highway safety trends in the State for the past five years.

PERFORMANCE MEASURES	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fatalities	764	776	740	703	754	760	839	820	827
Serious Injuries	10,901	10,149	8,643	7,594	8,014	8,087	7,634	7,442	7,197
Fatality rate (per HMVMT)	0.944	0.959	0.916	0.868	0.913	0.900	0.984	0.961	0.968
Serious injury rate (per HMVMT)	13.462	12.536	10.701	9.377	9.699	9.575	8.953	8.721	8.426
Number non-motorized fatalities	79	108	83	100	92	132	123	130	137
Number of non-motorized serious injuries	700	778	629	627	635	630	598	568	584

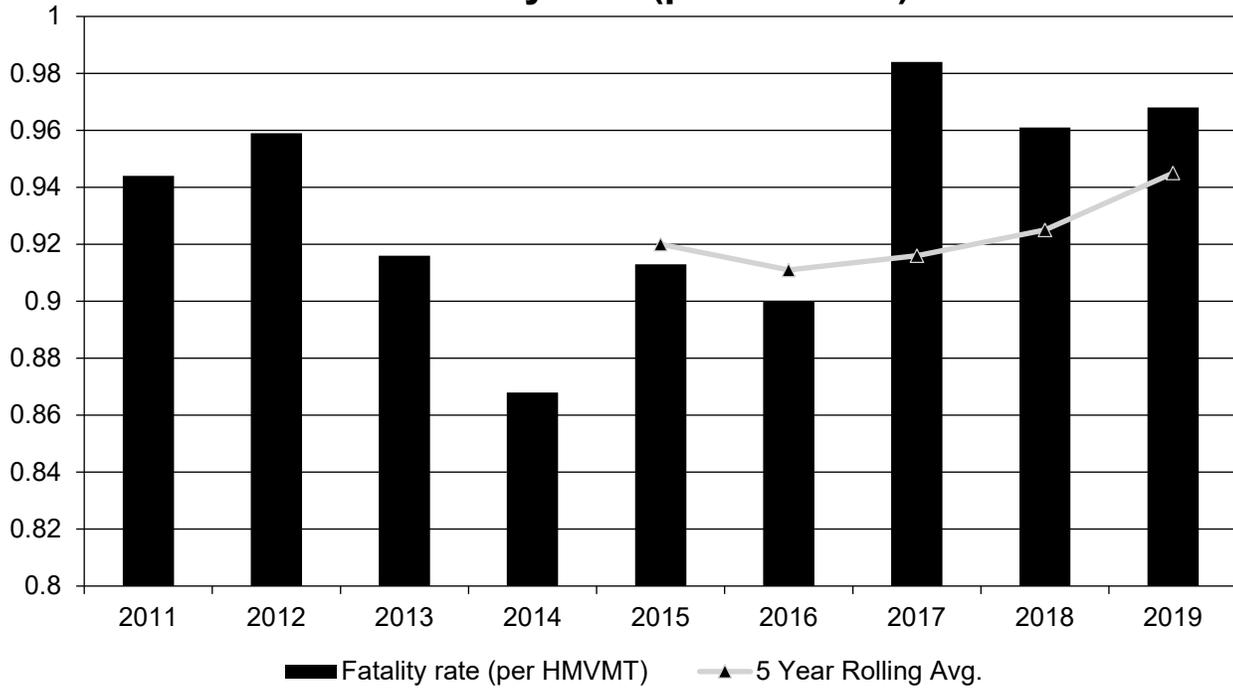
Annual Fatalities



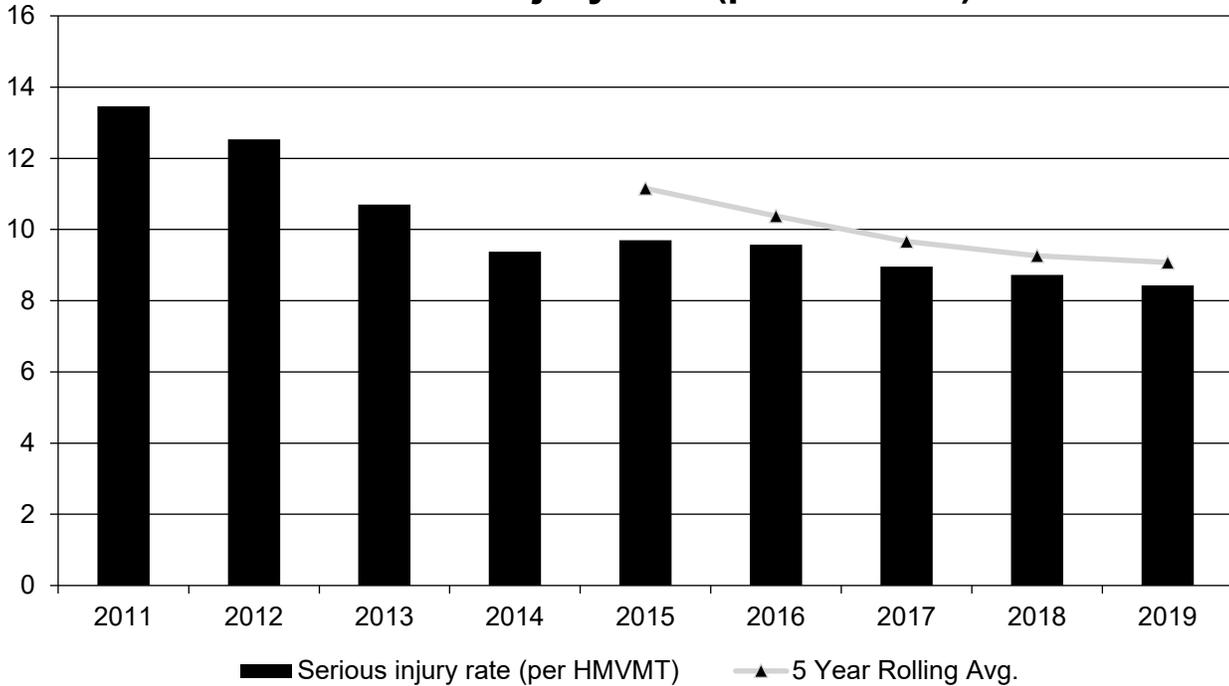
Annual Serious Injuries



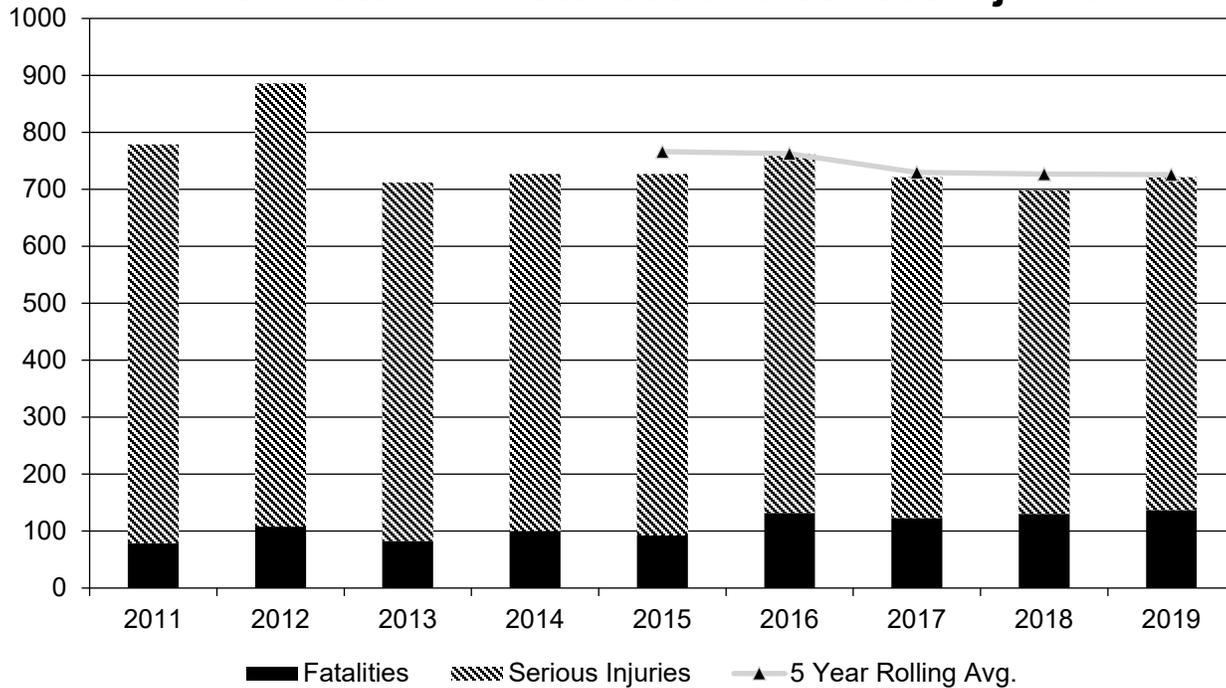
Fatality rate (per HMVMT)



Serious injury rate (per HMVMT)



Non Motorized Fatalities and Serious Injuries



Describe fatality data source.

FARS

FARS data is used as fatality data source for 2011 to 2018. Since fatalities information is not available on FARS for 2019, VDOT database is being used to obtain fatalities information for 2019.

To the maximum extent possible, present this data by functional classification and ownership.

Year 2019

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	49.8	352	0.64	4.54
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other	78.4	556.8	1.24	8.85
Rural Minor Arterial	100.8	658.8	1.95	12.94

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Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Minor Collector	18.6	146.8	1.84	14.55
Rural Major Collector	122.4	869.8	3.34	23.74
Rural Local Road or Street	57.8	509	2.35	20.81
Urban Principal Arterial (UPA) - Interstate	60.4	692	0.33	3.74
Urban Principal Arterial (UPA) - Other Freeways and Expressways	15	126.8	0.32	2.7
Urban Principal Arterial (UPA) - Other	82.4	932	0.76	8.26
Urban Minor Arterial	70.6	876.2	0.8	9.66
Urban Minor Collector	34.6	434.2	0.81	9.63
Urban Major Collector				
Urban Local Road or Street	13.4	175.8	0.41	5.36

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Year 2019

Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	642.2	5,390.2	1.1	9.34
County Highway Agency	7.6	88	0.42	4.99
Town or Township Highway Agency	2	26.4	0.29	4.05
City or Municipal Highway Agency	109.6	1,461.2	0.58	8.11
State Park, Forest, or Reservation Agency				
Local Park, Forest or Reservation Agency				
Other State Agency				
Other Local Agency				
Private (Other than Railroad)				
Railroad				
State Toll Authority				
Local Toll Authority		6		3.93
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				
Other				

Safety Performance Targets

Safety Performance Targets

Calendar Year 2021 Targets *

Number of Fatalities:852.0

Describe the basis for established target, including how it supports SHSP goals.

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Five Year Rolling Average above is based on predicted annual value of 872 fatalities in 2020 and 898 fatalities in 2021. These annual and 5-year average targets represent an increase that began in 2015 and is anticipated into 2021. Additional information on the prediction method used and collaboration with the Virginia Highway Safety Office (VAHSO) are described in Question 35. When Virginia's 2017-2021 SHSP safety performance objectives were set there had been a long period of fatalities declining. Optimistic linear reductions in fatalities were envisioned and a goal of 50 percent reductions by 2030 appeared plausible. Now that data-driven targets are being set and approved by our Commonwealth Transportation Board (CTB), the goals have even more support, given recent fatality increases, with policy focus on safety, the reprioritization of HSIP on more cost-effective systemic countermeasures, and legislation for additional state funding of safety improvements.

Number of Serious Injuries:7451.0

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 7597 serious injuries in 2020 and 7385 serious injuries in 2021. These annual and 5-year average targets represent leveling of the expected outcomes. Additional information on the prediction method used and collaboration with the VAHSO are described in Question 35. When Virginia's 2017-2021 SHSP safety performance objectives were set, there had been a long period of large annual reductions in serious injuries. Optimistic linear reductions in serious injuries were envisioned, although a flattening was beginning in 2015. Recently, serious injuries have remained somewhat level since that time. Now that data-driven targets are being set and approved by our Commonwealth Transportation Board (CTB), the goals have even more support, given recent leveling, with the reprioritization of HSIP on more cost-effective systemic countermeasures and legislation for additional state funding of safety improvements.

Fatality Rate:0.984

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 0.994 fatalities per HMVMT in 2019 and 1.012 fatalities per HMVMT in 2020. These annual and 5-year average targets represent an increase that began in 2017 and is anticipated into 2021. Additional information on the prediction method used and collaboration with the VAHSO are described in Question 35. When Virginia's 2017-2021 SHSP safety performance objectives were set there had been a long period of fatalities declining and post-recession VMT increases. Optimistic linear reductions in fatality rates were envisioned towards a 50 percent reduction goal. Recently, however, fatalities have increased and VMT growth is minimal. Now that data-driven targets are being set and approved by our Commonwealth Transportation Board (CTB), the goals have even more support, given recent fatality increases and near level VMT, with the reprioritization of HSIP on more cost effective systemic countermeasures and legislation for additional state funding of safety improvements.

Serious Injury Rate:8.615

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 8.657 serious injuries per HMVMT in 2020 and 8.325 serious injuries per HMVMT in 2021. These annual and 5-year average targets represent a leveling of the expected outcomes. Additional information on the prediction method used and collaboration with the VAHSO are described in Question 35. Similar to fatality rates, optimistic SI rate linear reduction objectives were set for the 2017-2021 SHSP period. Now that data-driven targets are being set and approved by our Commonwealth Transportation Board (CTB), the goals have even more support, given recent leveling of SI and near level VMT, with the reprioritization of HSIP on more cost effective systemic countermeasures and legislation for additional state funding of safety improvements.

Total Number of Non-Motorized Fatalities and Serious Injuries:725.0

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 733 and then 750 non-motorized fatalities and serious injuries in 2020 and 2021, respectively. These annual and 5-year average targets represent a slight increase of the expected outcomes. Additional information on the prediction method used and collaboration with the VAHSO are described in Question 35. Although pedestrian fatalities had a 50 percent increase in 2016 and have remained at that level, serious injuries for all non-motorized has declined. This combination resulted in an inverted U shape trend for annual total values and level five-year averages. To support our SHSP fatality goals, reducing our non-motorized deaths will provide an important part of the mission. Indicating a leveling of non-motorized severe outcomes has led to support of SHSP identified infrastructure improvements and education initiatives within VDOT and across our safety partner organizations.

Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.

During the 2019 safety target setting coordination and Commonwealth Transportation Board (CTB) approval process, the CTB requested that VDOT investigate a more robust and data-driven methodology than using previous measure data trend lines or optimistic targets based on the SHSP.

VDOT HSIP staff investigated best practices (e.g., NCHRP 17-67) and prepared a work plan to develop a log-linear regression model to obtain baseline count predictions of future year measures and then adjust the baseline by assessing the expected benefits (crash modifications) of transportation projects to be completed the year prior. The rate measures would then be determined based on VMT forecasts. Multiple social, economic, population, infrastructure and behavioral program spending and Vehicle-Miles Traveled (VMT) factors were tested for significance in predicting the count measures. VDOT began coordination with the Virginia Department of Motor Vehicles (DMV) State Highway Safety Offices (SHSO) early in the process to get their data and input since the first 2020 target setting using this method following 23 CFR 490. Several years of SHSO grant program spending was obtained to determine if crash modifications could be determined at the jurisdictional level for each program or in aggregate. Strong correlation between program spending and measure rates could not be produced, but a downward trend in rates was observed with increased spending for several programs. The program and total spending were tested and included in the fatality, serious injury and non-motorized regression models as significant factors for 2021 predictions. Several other VDOT spending categories for construction, maintenance, and operations were also tested and included in the models. As the baseline predictions were prepared, each SMART SCALE (capital improvement) and HSIP project to be completed in 2020 and early 2021 was assessed to determine the crash reduction benefits based on published Crash Modification Factors (CMFs). These project benefits were then subtracted from the baseline predictions to determine the final 2021 targets. Additionally, Virginia passed a handheld electronic device law that will become effective January 2021. Therefore, additional reductions in fatalities and serious injuries were obtained from the SHSO based on NHTSA data for expected reductions. The 2021 annual targets were then used, with the 2020 interim year targets, to determine the 5-year average targets as entered in Question #34.

The baseline target models were developed using VDOT district and monthly data where available. This construct with the consideration of programmed projects completed includes the local and regional agency priorities for capital and behavioral program spending. The models could be used to test different spending scenarios. As such, the jurisdictional and regional mobility and safety initiatives are directly incorporated into the target setting methodology.

Since 2017, VDOT has held quarterly Metropolitan Planning Organization (MPO) coordination meetings for all FHWA (and optional FTA) performance measures and target setting. These meetings continued with MPO safety target setting. An Excel workbook with regional safety measure and VMT data and linear predictions is provided after the statewide values are reported to FHWA. This updated data and prediction tool has been provided since their 2018 targets. A SharePoint site was developed and introduced for obtaining the workbook and submitting the targets. The workbook update required refining the Fatality Analysis Reporting System

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(FARS) geospatial data with Virginia fatality data to provide fatalities that occurred in Virginia for the multi-state MPOs. VDOT also provided a submittal letter template for MPOs to indicate if they will support the State or choose their own targets. All MPOs submittals have been received since the 2018 target setting.. Three (of 15) of the larger MPOs decided to set independent targets from the State percent reductions. Updates and outreach for MPO 2021 target setting will occur in September 2020.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State's 2019 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	840.0	800.0
Number of Serious Injuries	7689.0	7674.8
Fatality Rate	0.940	0.945
Serious Injury Rate	8.750	9.075
Non-Motorized Fatalities and Serious Injuries	714.0	725.8

The frequency measure targets for 2019 were set based on annual count trend lines to account for the increases in 2017 and expected increases in 2018. VMT estimates of 1.5 percent increase per year were used to determine the annual rate measure targets. The ACTUALS values in the above table are based on Virginia measure counts and VMT estimates as of May 2020.

The predicted increases in VMT and count measures did not occur as expected, except for non-motorized users. Thus early estimates indicate that two of the five measures meet the targets with fatality rate measure only 0.005 higher than the target. The final published VMT may change the rate measures. Besides flattening VMT reducing exposure and thus severe crash outcomes, others factors included in our new baseline safety measure prediction models may have impacted the 2019 outcomes. A review of the factors with each predicting positive or negative influence on severe crash outcomes provides good indicators for the reasons trends continued or are changing. For example, having fewer snow fall months will increase non-motorized travel and increase those related crash outcomes. Also, increased funding of behavioral and/or infrastructure funding in the districts with increasing trends could flatten or reverse the trend. Further, changes in the alcohol sales and proportion of young and older driver populations could have decreased severe crashes. Additionally, Virginia's HSIP projects are increasingly implementing systemic treatments that are more cost effective at reducing severe crashes.

Applicability of Special Rules

Does the HRRR special rule apply to the State for this reporting period?

Yes

Yes, the fatality rate on rural roads (Rural Major Collectors, Rural Minor Collectors and Rural Local Roads) increased over the most recent two-year period, and therefore, the HRRR special rule applies to Virginia.

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Please note that preliminary engineering and non-infrastructure related projects are not included on the project list on Question #29, and most of the HRRR funds were allocated/obligated on nine pre-scoping projects to perform preliminary engineering work.

Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.

PERFORMANCE MEASURES	2013	2014	2015	2016	2017	2018	2019
Number of Older Driver and Pedestrian Fatalities	127	102	122	126	159	144	170
Number of Older Driver and Pedestrian Serious Injuries	690	617	643	665	665	688	697

Rate of traffic fatalities and serious injuries for drivers and pedestrians 65 years of age and older has not increased over the most recent 2-year period, and therefore, the Older Drivers and Pedestrians Special Rule does not apply in VA.

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Lives saved

Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.

VDOT is programming more systemic safety projects and as a result is interested in understanding the effectiveness of these projects. In 2018, VDOT began an effort to evaluate all HSIP-funded systemic improvement projects. Because systemic projects are usually deployed in several locations over one or multiple jurisdictions, it has proven to be difficult to gather accurate data or perform analysis on the overall effectiveness of these systemic improvement projects. As a result of the challenges encountered in the evaluation effort, VDOT has engaged in an effort to develop a project tracking tool specifically designed to track these HSIP-funded systemic projects.

What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?

- # miles improved by HSIP
- HSIP Obligations
- More systemic programs

Describe significant program changes that have occurred since the last reporting period.

In June 2019, the Commonwealth Transportation Board (CTB) adopted Safety Performance Targets for CY 2020 and found the anticipated safety outcomes associated with the Safety Performance Targets to be unacceptable, and further directed the Office of Intermodal Planning and Investment (OIPI), working collaboratively with VDOT and Department of Motor Vehicles (DMV), to analyze and develop a plan resulting in a net reduction in fatal and serious injury crashes. A key finding from this data-driven analysis demonstrated that systemic and hybrid corridor safety projects provide greater potential crash reduction benefits for lower cost than traditional spot improvement projects, and this finding was presented to the CTB during multiple workshop meetings. In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial Systemic Improvement Plan. This initial Systemic Improvement Plan identified \$136.7 million in potential funding through FY 2025 in order to implement eight systemic countermeasure initiatives at VDOT-maintained roadways. The systemic countermeasure initiatives are as follows:

- High-Visibility Signal Backplates (HVSB)
- Flashing Yellow Arrow (FYA)
- Pedestrian Accommodations Improvements at Signalized Intersections
- Centerline Rumble Strip
- Edgeline Rumble Strip/Stripes
- Curve Delineation
- Improvements at Unsignalized Intersections

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- Safety Edge

The systemic countermeasure implementation projects in this initial Systemic Improvement Plan is estimated to save 61 lives and 1,174 injuries per year statewide once implemented. This initial Systemic Improvement Plan also:

- Establishes goals and schedules for deploying the eight systemic countermeasures across VDOT's network.
- Includes a risk-based assessment of eight systemic countermeasures to include the locations, appropriate improvements, cost estimates, and schedules on all public roads.
- Aligns with emphasis areas in Virginia's Strategic Highway Safety Plan (SHSP).
- Will be updated periodically to advance additional systemic improvements.

The initial Systemic Improvement Plan is currently ongoing with potential project locations identified and implementation of systemic initiatives underway in many locations. Additional information on the initial HSIP Systemic Implementation Plan is provided on-line at: <http://www.ctb.virginia.gov/resources/2019/sep/pres/9.pdf>

Furthermore, in December 2019, the CTB approved the Highway Safety Improvement Program Project Prioritization Policy where it states the following:

- VDOT shall develop the next phase of the Implementation Plan for the deployment of systemic and hybrid safety countermeasures across the roadway network, including VDOT and locally-maintained facilities. Note: VDOT is currently in development of this next phase of the Safety Improvement Project Plan.
- After HSIP funds are set aside for program administration (approximately 5 to 10 percent), the remaining funds shall be programmed to projects with a goal of approximately 80 percent of funds allocated to systemic and hybrid safety improvements over the Six-Year Improvement Program (SYIP).
- In order to accelerate deployment of systemic and hybrid safety improvements, the CTB will not approve new spot improvement projects until FY 2026-2031 SYIP unless certain conditions are met.

The full CTB approval of the HSIP Project Prioritization Policy is provided on-line at: <http://www.ctb.virginia.gov/resources/2019/dec/reso/10.pdf>

VDOT Central Office is responsible for establishing the process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluation of the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis. Once the final HSIP projects are prioritized and selected by Central Office, the selected HSIP projects are included in Virginia's Six-Year Improvement Program (SYIP), which is then presented to the Commonwealth Transportation Board (CTB) for approval. Once the HSIP projects are approved, programmed, and have received allocated funds, the HSIP staff monitor the projects from scoping through construction to the final voucher. The project monitoring process consists of tracking changes that occur to the following functions: advertisement dates, funding authorization dates, engineer's estimates, and expenditures. Cost, schedule, and scope are monitored and measured to ensure that the HSIP projects are being delivered on time and on budget. HSIP project schedules and cost both directly affect the Federal Strategy and VDOT's ability to meet their Obligation Authority for the HSIP Program.

Effectiveness of Groupings or Similar Types of Improvements

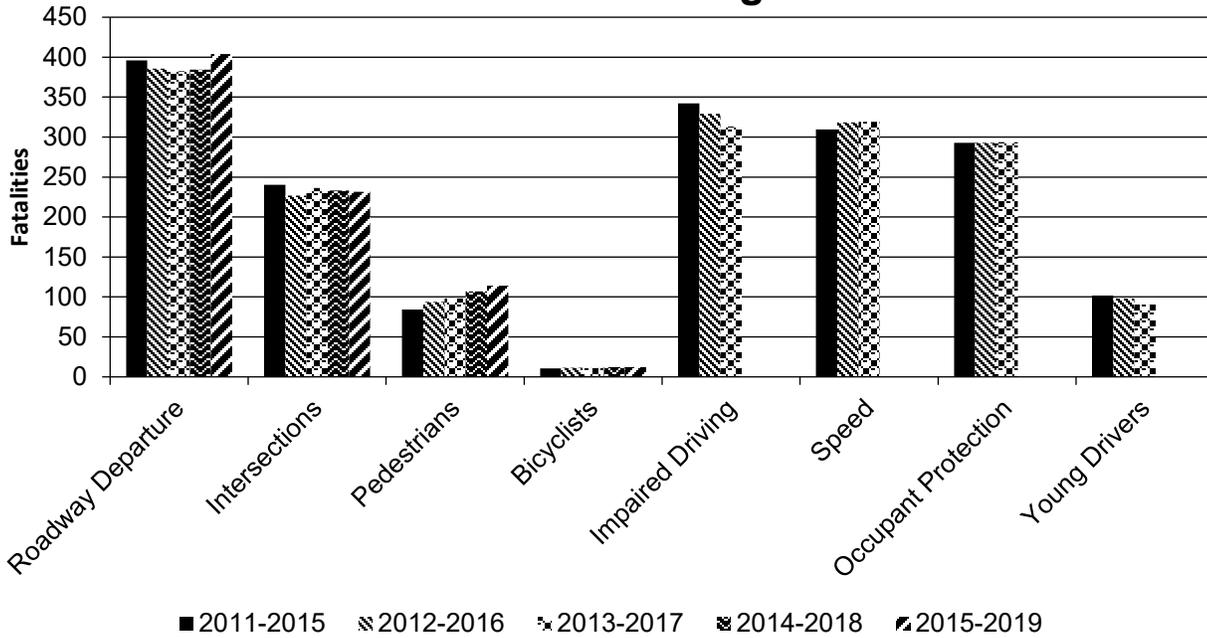
Present and describe trends in SHSP emphasis area performance measures.

Year 2019

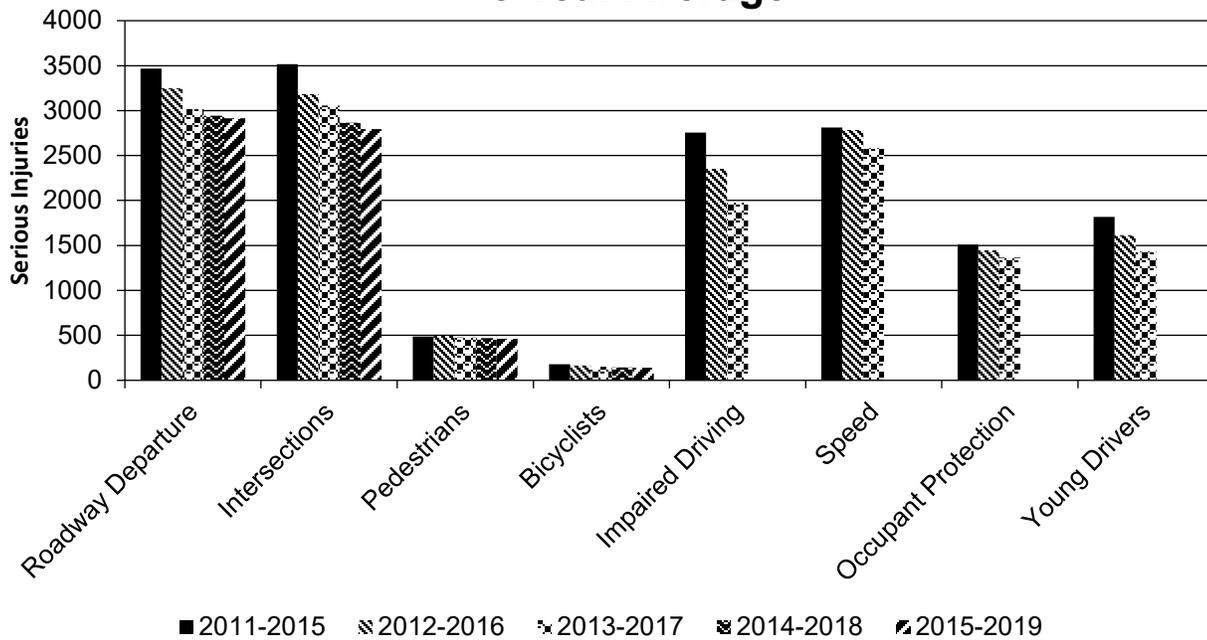
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SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Roadway Departure	Run-off-road	403.8	2,916	0.49	3.42
Intersections	Intersections	231.6	2,794	0.27	3.17
Pedestrians	Vehicle/pedestrian	114.2	463.2	0.13	0.54
Bicyclists	Vehicle/bicycle	12.2	139	0.02	0.16
Impaired Driving	Alcohol-related				
Speed	Speed-related				
Occupant Protection	All				
Young Drivers	All				

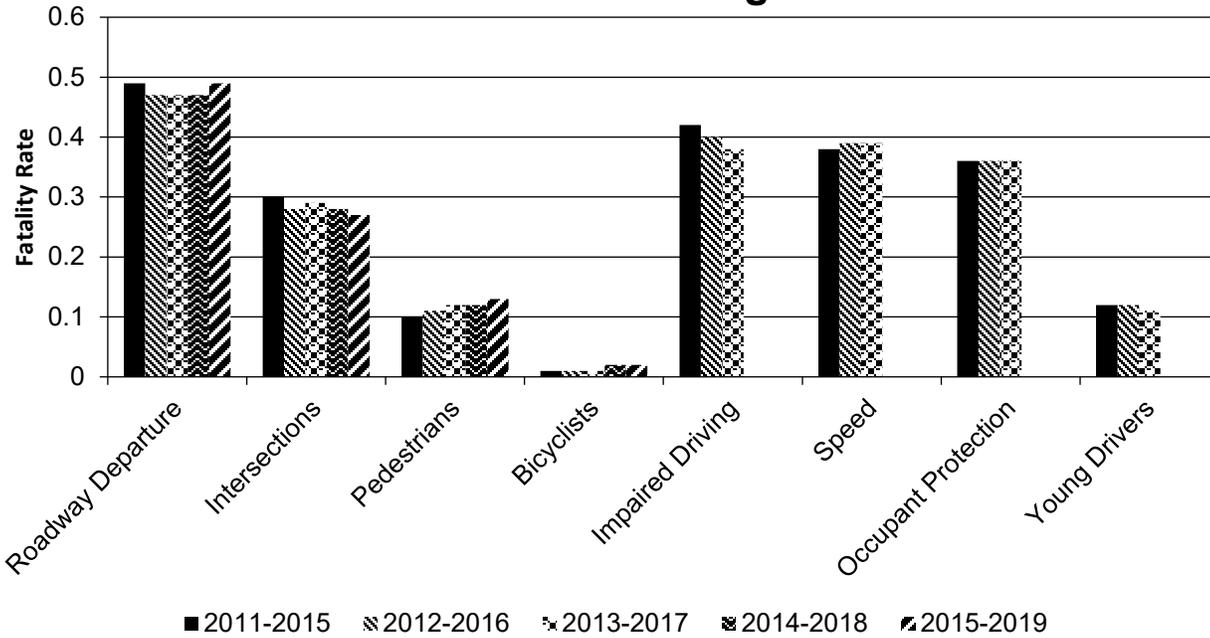
Number of Fatalities 5 Year Average



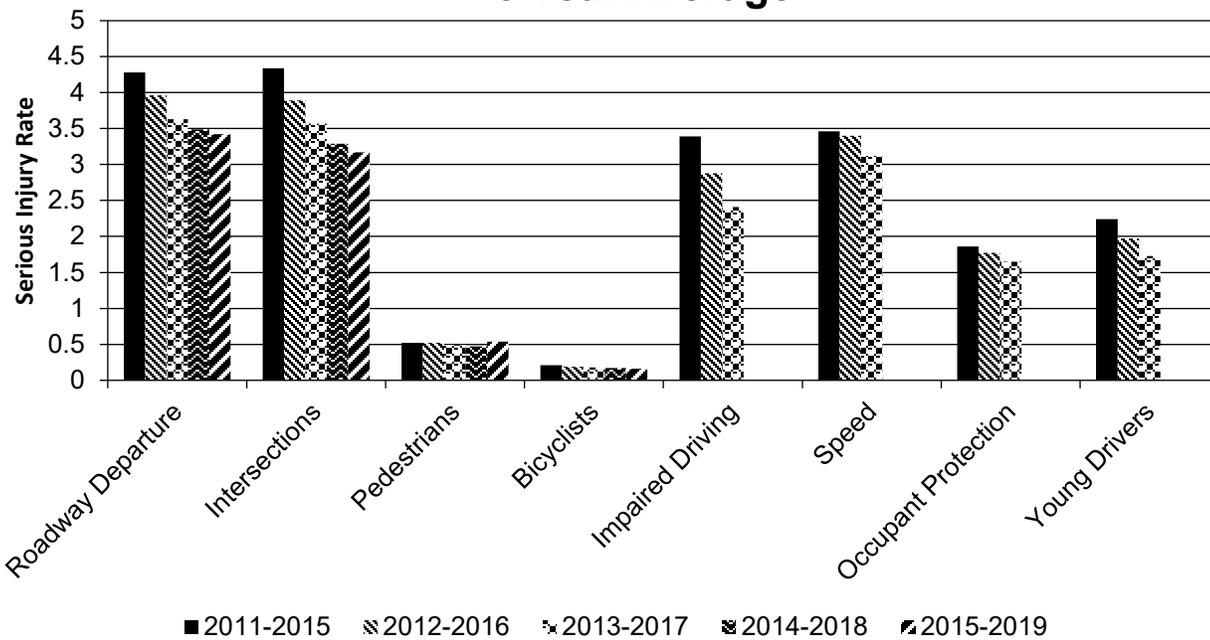
Number of Serious Injuries 5 Year Average



Fatality Rate (per HMVMT) 5 Year Average



Serious Injury Rate (per HMVMT) 5 Year Average



Project Effectiveness

Provide the following information for previously implemented projects that the State evaluated this reporting period.

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
106572	Freeway and Expressway	Roadway	Rumble strips - edge or shoulder	42.00	66.00	3.00		18.00	8.00	3.00	36.00	66.00	110.00	
107119	Freeway and Expressway	Shoulder treatments	Widen shoulder - paved or other	4.00	3.00		1.00				7.00	4.00	11.00	
104805	Freeway and Expressway	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	1.00	1.00			1.00	1.00			2.00	2.00	
93136	Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	10.00	8.00	1.00				1.00	11.00	12.00	19.00	
106574	Other Principal Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	9.00	9.00				1.00		6.00	9.00	16.00	
86480	URBAN MINOR ARTERIAL	Intersection geometry	Auxiliary lanes - add left-turn lane	13.00	4.00				1.00		6.00	13.00	11.00	
86488	URBAN COLLECTOR	Intersection geometry	Auxiliary lanes - add left-turn lane	8.00	1.00						1.00	8.00	2.00	
86678	URBAN PRINCIPAL ARTERIAL	Intersection geometry	Auxiliary lanes - add slip lane	15.00	8.00			3.00	2.00		19.00	18.00	29.00	
89901	URBAN MINOR ARTERIAL	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	6.00	5.00			2.00			6.00	8.00	11.00	
94529	URBAN PRINCIPAL ARTERIAL	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00					1.00		6.00	3.00	7.00	
98096	Freeway and Expressway	Intersection geometry	Auxiliary lanes - extend existing left-turn lane	9.00	8.00			1.00	3.00		6.00	10.00	17.00	
104678	Freeway and Expressway	Intersection geometry	Auxiliary lanes - modify right-turn lane offset	4.00	2.00			2.00			1.00	6.00	3.00	
90499	URBAN COLLECTOR	Roadway	Superelevation / cross slope	9.00	1.00			1.00			1.00	10.00	2.00	
93568	Minor Arterial	Roadway	Superelevation / cross slope	3.00				1.00				4.00		
98372	URBAN MINOR ARTERIAL	Intersection geometry	Auxiliary lanes - add left-turn lane	8.00	6.00							8.00	6.00	

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LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
93938	URBAN COLLECTOR	Intersection traffic control	Modify control - modifications to roundabout	3.00	4.00						2.00	3.00	6.00	
97027	URBAN MINOR ARTERIAL	Intersection traffic control	Modify control - modifications to roundabout	3.00	1.00			2.00			5.00	5.00	6.00	
98561	URBAN PRINCIPAL ARTERIAL	Intersection geometry	Auxiliary lanes - add right-turn lane	8.00								8.00		
98564	URBAN PRINCIPAL ARTERIAL	Intersection traffic control	Modify traffic signal - modernization/replacement	3.00	14.00			1.00	2.00		6.00	4.00	22.00	
98565	URBAN PRINCIPAL ARTERIAL	Intersection traffic control	Modify traffic signal - modernization/replacement	13.00	18.00						3.00	13.00	21.00	
106238	URBAN MINOR ARTERIAL	Roadside	Removal of roadside objects (trees, poles, etc.)	2.00								2.00		
106293	URBAN PRINCIPAL ARTERIAL	Intersection traffic control	Modify traffic signal - modernization/replacement	23.00	46.00			4.00	1.00		21.00	27.00	68.00	
107868	Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	19.00	16.00			1.00	1.00		7.00	20.00	24.00	
98562	URBAN PRINCIPAL ARTERIAL	Intersection geometry	Auxiliary lanes - extend existing left-turn lane	13.00	6.00						2.00	13.00	8.00	
98563	URBAN PRINCIPAL ARTERIAL	Intersection geometry	Auxiliary lanes - modify turn lane storage	23.00	15.00			1.00			3.00	24.00	18.00	
104635	Interstate	Advanced technology and ITS	Advanced technology and ITS - other	55.00	66.00	5.00	1.00	3.00	3.00	5.00	15.00	68.00	85.00	
104814	Interstate	Advanced technology and ITS	Advanced technology and ITS - other	126.00	134.00	6.00		5.00	6.00	6.00	13.00	143.00	153.00	
93349	Other Principal Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	5.00	3.00			2.00			1.00	7.00	4.00	

Compliance Assessment

What date was the State’s current SHSP approved by the Governor or designated State representative?

05/12/2017

What are the years being covered by the current SHSP?

From: 2017 To: 2021

When does the State anticipate completing it’s next SHSP update?

2021

Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT	Segment Identifier (12) [12]	100						100		100	
	Route Number (8) [8]	100									
	Route/Street Name (9) [9]	100									
	Federal Aid/Route Type (21) [21]	100									
	Rural/Urban Designation (20) [20]	100						100			
	Surface Type (23) [24]	100						100			
	Begin Point Segment Descriptor (10) [10]	100						100		100	
	End Point Segment Descriptor (11) [11]	100						100		100	
	Segment Length (13) [13]	100									
	Direction of Inventory (18) [18]	100									
Functional Class (19) [19]	100						100		100		

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ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Median Type (54) [55]	100									
	Access Control (22) [23]	100									
	One/Two Way Operations (91) [93]	100									
	Number of Through Lanes (31) [32]	100						100			
	Average Annual Daily Traffic (79) [81]	100						100			
	AADT Year (80) [82]	100									
	Type of Governmental Ownership (4) [4]	100						100		100	
	INTERSECTION	Unique Junction Identifier (120) [110]			100						
	Location Identifier for Road 1 Crossing Point (122) [112]			100							
	Location Identifier for Road 2 Crossing Point (123) [113]			100							
	Intersection/Junction Geometry (126) [116]			100							
	Intersection/Junction Traffic Control (131) [131]			50							
	AADT for Each Intersecting Road (79) [81]			96	99						
	AADT Year (80) [82]			96	99						
	Unique Approach Identifier (139) [129]			100							
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100					
	Location Identifier for Roadway at					100					

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Beginning of Ramp Terminal (197) [187]										
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					100					
	Ramp Length (187) [177]					100					
	Roadway Type at Beginning of Ramp Terminal (195) [185]					100					
	Roadway Type at End Ramp Terminal (199) [189]					100					
	Interchange Type (182) [172]					100					
	Ramp AADT (191) [181]					60					
	Year of Ramp AADT (192) [182]					60					
	Functional Class (19) [19]					100					
	Type of Governmental Ownership (4) [4]					100					
Totals (Average Percent Complete):		100.00	0.00	92.75	24.75	92.73	0.00	100.00	0.00	100.00	0.00

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

The Non-State column items for the MIRE categories remain as blanks or 0 as VDOT is still in its outreach/planning process. This fiscal year, VDOT continued conducting a needs assessment of VDOT's Road Inventory Management System (RIMS) to assess the compliance level of RIMS with MIRE FDE requirements. This assessment will determine the roadway elements that are identified as not available in RIMS but should be added into RIMS in order to meet MIRE FDE requirements for further evaluation and collection. Response to Question #50 explains VDOT's progress on MIRE data collection in greater detail.

Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.

VDOT follows the 10-step VDOT MIRE FDE Implementation Plan to meet the requirement to have complete access to the MIRE Fundamental Data Elements (FDE) on all public roads by September 30, 2026. VDOT is currently on steps 3 and 4 which determine the data collection needs. This fiscal year, VDOT continued conducting a needs assessment of VDOT's Road Inventory Management System (RIMS) to assess the compliance level of RIMS with MIRE FDE requirements. This assessment will determine the roadway elements that are identified as not available in RIMS but should be added into RIMS in order to meet MIRE FDE requirements for further evaluation and collection.

VDOT has been communicating with the localities to identify the availability, completeness, and schema of the data maintained by the localities on the public roads they maintain. Communication with the localities to date includes face-to-face meetings, email correspondence, phone calls, live webinar presentations, and multiple web/email-based surveys to obtain this information. VDOT will continue communication with localities and obtain any available data to determine the completeness and schema. After assessing the completeness and schema of the locality's databases, VDOT will develop a preliminary plan to translate the jurisdictional data received into proper state schema for inclusion into

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VDOT's database as well as identify any MIRE FDE elements that are not satisfied by the locality datasets. Additionally, VDOT will create a detailed data collection plan and a cost estimate for the data collection. When funding sources have been identified, VDOT will begin collecting all remaining data needed to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.

Optional Attachments

Program Structure:

FINAL_VDOT_HSIP_Implementation_Manual.pdf

Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

Glossary

5 year rolling average: means the average of five individuals, consecutive annual points of data (e.g. annual fatality rate).

Emphasis area: means a highway safety priority in a State's SHSP, identified through a data-driven, collaborative process.

Highway safety improvement project: means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

HMVMT: means hundred million vehicle miles traveled.

Non-infrastructure projects: are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.

Older driver special rule: applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.

Performance measure: means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.

Programmed funds: mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.

Roadway Functional Classification: means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.

Strategic Highway Safety Plan (SHSP): means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

Systematic: refers to an approach where an agency deploys countermeasures at all locations across a system.

Systemic safety improvement: means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.

Transfer: means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.