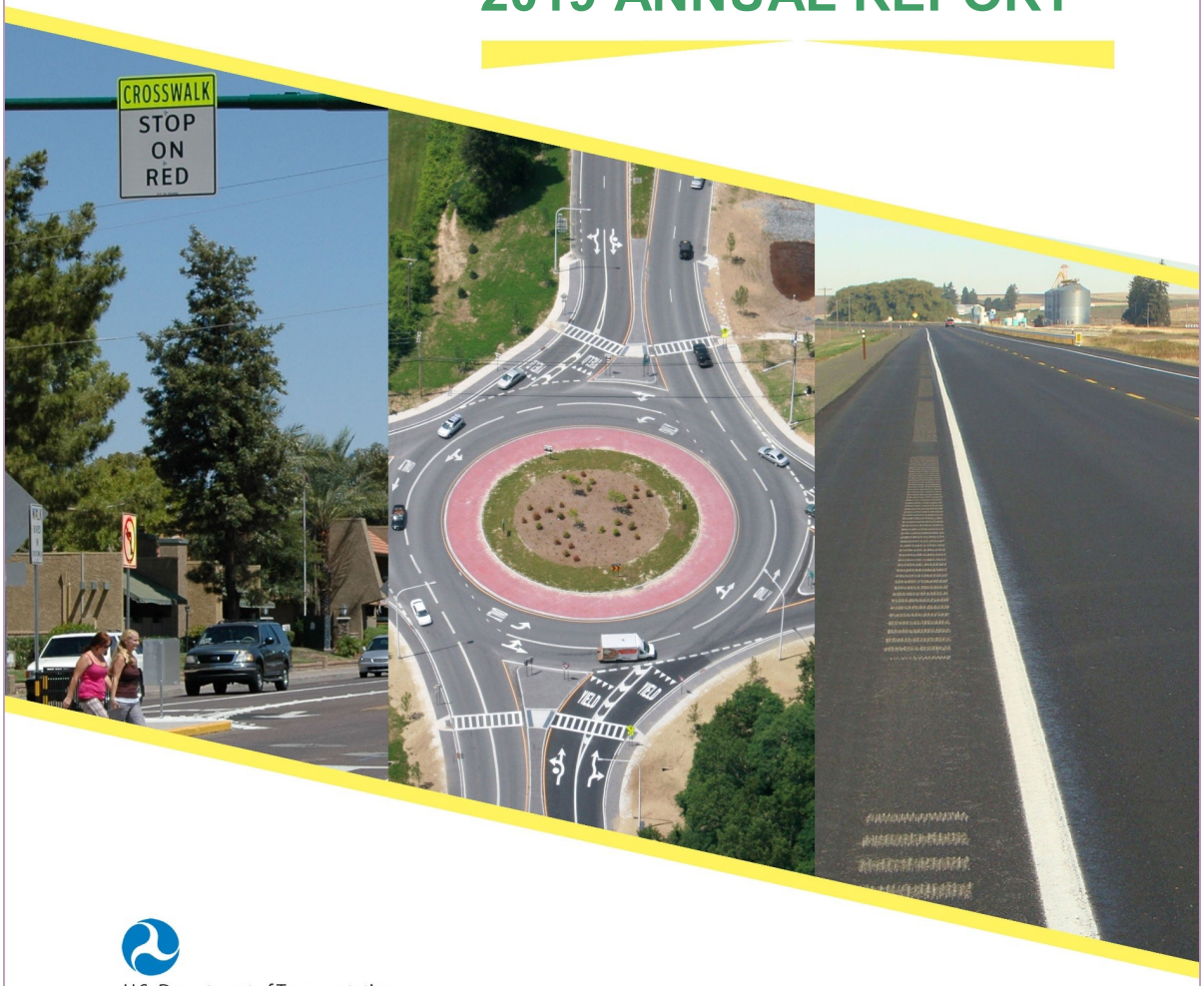
VIRGINIA

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2019 ANNUAL REPORT



U.S. Department of Transportation
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. 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

This Fiscal Year (FY) 2019 annual report submitted to the Federal Highway Administration (FHWA) describes the Virginia Department of Transportation (VDOT)'s strategic use of FAST Act funding of the Commonwealth's Highway Safety Improvement Program (HSIP) for the period July 2018 to June 2019.

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 mentioned above (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) FY2019 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 State must obligate a specific amount of funds toward HRRR safety projects in the next fiscal year.

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 level of FHWA funding in future years. Districts considered systemic, corridor, and intersection improvements for all users on priority routes and intersections identified in the crash data when submitting safety proposals. These proposals included high crash locations, roadway segments, and systemic highway and pedestrian risk locations.

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. All information about VDOT’s HSIP program are described in the VDOT’s HSIP Implementation Guideline manual. 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 Implementation Guideline manual.

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 Highway Safety Manual (HSM) is through statewide evaluation of systemic improvement projects. This new evaluation began in FY2019 and 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 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 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 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. 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:

- 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 VTran'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 State 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 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 do know it is the preferred method for network screening.

New Projects and Policy Updates

Safety Circuit Rider Program

2019 Virginia Highway Safety Improvement Program

In FY2019, the University of Virginia's Center for Transportation Studies (CTS), Virginia Transportation Research Council (VTRC), and VDOT fully deployed 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 was launched 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:

- 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

Policy Change on Systemic Projects and Spot-specific Projects

In FY2019, VDOT implemented an update to the State's HSIP investment strategy and policy to cost-effectively implement safety countermeasures. This update consisted of increasing the level of funding for systemic improvement projects programmed in the State's HSIP. In FY2019, 72 percent of HSIP funds were allocated for systemic improvement projects, up from 30 percent in the previous years. The revised HSIP investment strategy calls for a substantial increase in the proportion of HSIP funding for systemic and systemic-hybrid safety improvement projects because applying a systemic approach to address safety proactively addresses widespread safety issues and cost-effectively minimize crash potential. Often, it is more cost-effective to correct the problem on a system-wide basis rather than individually by high crash location when examining the system. It is important to note that VDOT understands the importance of spot-specific projects, and the systemic approach will not replace the spot-specific approach in its entirety. The increased emphasis of systemic approach is to increase the cost-effectiveness of the HSIP program at the program-level. Next FY, VDOT will not accept additional HSIP applications to focus on systemic improvement projects, but moving forward, VDOT expects to allocate 80 percent of HSIP funds for systemic improvement projects.

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 focusing on 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.

VDOT Central Office is responsible for reviewing and scoring the HSIP project proposals submitted by the Districts. 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 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.

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:

% Funds Per District = .5*(% of Statewide EPDO Crashes + % of Statewide EPDO Crash Rate)

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

The safety proposals for local and tribal roads are required to follow the same HSIP Implementation Guidelines as safety proposals for VDOT roads. The proposed project must fit into the locality's safety prioritization, and the locality is encouraged to develop its own systemic safety projects. The project proposal must be developed in a data-driven manner, and the project should have the support of the local governing body. VDOT assists the localities and tribal agencies by publishing Virginia's crash data from VDOT's Tableau crash analysis tool. VDOT Tableau 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. As of August 2019, this tool contains historical crash data from 2006 to May of 2019. This crash analysis tool allows the localities and tribal agencies perform their own safety analysis, project prioritization, and project selection for submission to VDOT for funding consideration.

Localities and tribal agencies submit their proposals through the VDOT Smart Portal Application Tool, which is also the tool being used for VDOT proposal submittals. The local VDOT District Office will include the localities' proposals as part of the district's submittal for review. As part of the submittal process workflow, the VDOT Local Liaison and VDOT district traffic engineers must validate all safety proposals submitted by the localities before submitting for evaluation. The locality is responsible for providing all supporting documentation pertaining to the proposed safety improvement application, including but not limited to crash history and local support for the proposal.

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.

New for FY2019, the University of Virginia's Center for Transportation Studies (CTS), Virginia Transportation Research Council (VTRC), and VDOT fully deployed 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

was launched 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:

- 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 requirement, emphasis areas, prioritization, funding, and safety data.

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 can 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 State. 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 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 the 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 through Smart Portal, and available safety data and resources.

VDOT emphasizes the importance of 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 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 Tableau crash analysis tool. VDOT Tableau 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. As of August 2019, this tool contains historical crash data from 2006 to May of 2019.

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 State, 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 counter-measures, 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
FileName:
FINAL VDOT HSIP Implementation Manual.pdf

Select the programs that are administered under the HSIP.

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

Program: Bicycle Safety

Date of Program Methodology:7/1/2003

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
All crashes	Traffic Volume	Functional classification
Other-Risk Reduction		Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Other-Available facilities

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-Project Identification:30
Other-Proposed Improvement Projects:45
Other-Cost Estimate and Project Schedule:10
Other-Other:15
Total Relative Weight:100

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	Exposure	Roadway
Fatal and serious injury crashes only	Traffic Volume	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:7/1/2003

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
All crashes	Traffic Volume	
Fatal and serious injury crashes only		

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess expected crash frequency with the EB adjustment

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 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: Pedestrian Safety

Date of Program Methodology:7/1/2003

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	
All Other-Risk Reduction	crashes	Traffic Volume Population	Median Functional Roadside features	width classification

What project identification methodology was used for this program?

- Crash frequency
- Other-Community Support and Missing sidewalk

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-Problem Identification:30
Other-Proposed Improvement Project:45
Other-Cost Estimate and Project Schedule:10
Other-Other:15
Total Relative Weight:100

If the Location included in the VDOT Pedestrian Safety Action Plan as a Hot Spot or a Priority Corridor, then the project will be automatically selected. Otherwise follow the relative weight in scoring:

Program: Roadway Departure

Date of Program Methodology:7/1/2010

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
All crashes Fatal and serious injury crashes only	Traffic Volume	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

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

What percentage of HSIP funds address systemic improvements?

72

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

- Add/Upgrade/Modify/Remove Traffic Signal
- Horizontal curve signs
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Other-Pedestrian Crossings
- Rumble Strips
- Safety Edge

What process is used to identify potential countermeasures?

- Add/Upgrade/Modify/Remove Traffic Signal
- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- High friction surface treatment
- 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 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 Highway Safety Manual (HSM) is through statewide evaluation of systemic improvement projects. This new evaluation began in FY2019 and 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 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 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 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 is 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:

- 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 understand that it is the preferred methodology for network screening.

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:

% Funds Per District = .5*(% of Statewide EPDO Crashes + % 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 reviewing and scoring the HSIP project proposals submitted by the

Districts. Once the final HSIP projects are prioritized and selected by Central Office, the selected HSIP projects are included in Virginia's SYIP, which is then presented to the Commonwealth Transportation Board (CTB) for approval. Once the HSIP projects are approved, programmed, and funds are allocated, the HSIP staff monitors 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 costs 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- June 30 of each year.

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$50,296,130	$41,160,664	81.84%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$4,459,774	$4,459,774	100%
Penalty Funds (23 U.S.C. 154)	$11,741,724	$11,741,724	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	$66,497,628	$57,362,162	86.26%

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

$1,940,400

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

$7,125,656

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

$4,289,194

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

$0

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
- 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 Implemenation: 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?

0%

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%

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
97735	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	0.13	Miles	$135346	$686854	HSIP (23 U.S.C. 148)	N/A	Major Collector	11,000	25	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify locations having potential for crashes to apply proven pedestrian safety countermeasures.
104661	Intersection traffic control	Modify traffic signal - modernization/replacement	0.45	Miles	$7382649	$8341938	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	17,400	45	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
106513	Roadway	Rumble strips - edge or shoulder	31.46	Miles	$1185000	$1185000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	3,700	60	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
107043	Interchange design	Installation of new lane on ramp	0.09	Miles	$2639532	$2639532	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	5,500	35	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
107795	Interchange design	Installation of new lane on ramp	0.115	Miles	$650000	$2803368	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	0	25	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
107796	Interchange design	Acceleration / deceleration / merge lane	0.35	Miles	$550000	$2720000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	4,600	25	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges

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
108004	Interchange design	Acceleration / deceleration / merge lane	0.641	Miles	$628121	$4438354	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	132,000	70	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
108005	Interchange design	Installation of new lane on ramp	0.268	Miles	$507866	$2346580	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	132,000	70	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
108165	Pedestrians and bicyclists	Install sidewalk	0.155	Miles	$607096	$607096	HSIP (23 U.S.C. 148)	N/A	Minor Collector	4,900	35	State Highway Agency	Spot	Pedestrians	Strategy 1. Identify locations having potential for crashes to apply proven pedestrian safety countermeasures.
108790	Roadside	Barrier - other	5	Miles	$767680	$767680	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other Freeways & Expressways	48,000	55	State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
108946	Interchange design	Extend existing lane on ramp	1.173	Miles	$2249948	$2249948	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	50,000	70	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
109261	Advanced technology and ITS	Congestion detection / traffic monitoring system	10.3	Miles	$4563340	$4563340	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	0	65	State Highway Agency	Systemic	Incident Response and Emergency Medical Services	Strategy 1. Develop an effective incident response program to ensure timely response to access emergency services and reduce secondary crashes.

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
109512	Roadside	Barrier - cable	5	Miles	$1158735	$1158735	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	29,000	70	State Highway Agency	Spot	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
109570	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	1	Intersections	$562297	$562297	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	41,000	45	Other Local Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
109583	Shoulder treatments	Pave existing shoulders	3.43	Miles	$1400000	$1400000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	3,700	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
109584	Roadside	Barrier - other	3.5	Miles	$1600000	$1600000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	1,000	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
111093	Shoulder treatments	Widen shoulder - paved or other	5.1	Miles	$4884983	$4884983	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	11,000	55	State Highway Agency	Hybrid	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
111684	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists		Various	$116921	$116921	HSIP (23 U.S.C. 148)	N/A	Local Road or Street	0		State Highway Agency	Spot	Bicyclists	Strategy 1. Identify locations having potential for crashes to apply proven bicycle safety countermeasures.

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
111727	Interchange design	Interchange design - other	0.15	Miles	$1630099	$2080207	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	17,000	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
111730	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	0.24	Miles	$2538310	$5878829	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	9,600	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
112500	Roadside	Barrier - cable	1.5	Miles	$399231	$426143	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	58,000	55	State Highway Agency	Spot	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
112897	Interchange design	Acceleration / deceleration / merge lane	0.794	Miles	$4446167	$4449180	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	87,000	60	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
114188	Shoulder treatments	Widen shoulder - paved or other	4.1	Miles	$328000	$328000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	17,000	55	State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
114190	Shoulder treatments	Widen shoulder - paved or other	6.42	Miles	$513600	$513600	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes

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
107121	Roadway signs and traffic control	Curve-related warning signs and flashers		Various	$1335359	$2667502	HSIP (23 U.S.C. 148)	N/A	Major Collector	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
107196	Roadway signs and traffic control	Curve-related warning signs and flashers		Various	$1500000	$1500000	HSIP (23 U.S.C. 148)	N/A	Minor Collector	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
108789	Intersection traffic control	Modify traffic signal - add flashing yellow arrow	8	Signals	$137834	$137834	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		Other Local Agency	Systemic	Intersections	Strategy 2. Improve user comprehension of and compliance with intersection and interchange traffic control devices.
108791	Intersection traffic control	Modify traffic signal - add flashing yellow arrow	13	Signals	$182643	$182643	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		Other Local Agency	Systemic	Intersections	Strategy 2. Improve user comprehension of and compliance with intersection and interchange traffic control devices.
108796	Pedestrians and bicyclists	Pedestrian signal	0	Miles	$1870100	$1870100	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		Other Local Agency	Systemic	Pedestrians	Strategy 1. Identify locations having potential for crashes to apply proven pedestrian safety countermeasures.
108889	Pedestrians and bicyclists	Pedestrian signal		Various	$3419338	$3419338	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		Other Local Agency	Systemic	Pedestrians	Strategy 1. Identify locations having potential for crashes to apply proven pedestrian safety countermeasures.
109687	Intersection traffic control	Modify traffic signal - add flashing yellow arrow	18	Signals	$392000	$392000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		Other Local Agency	Systemic	Intersections	Strategy 1. Reduce the

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
															frequency and severity of crashes at intersections and interchanges
109702	Intersection traffic control	Modify traffic signal - modernization/replacement	1.02	Miles	$405000	$469024	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		Other Local Agency	Systemic	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
109889	Roadway	Pavement surface - high friction surface		Various	$959827	$959827	HSIP (23 U.S.C. 148)	N/A	Major Collector	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
112887	Roadway	Rumble strips - center		Various	$1132500	$1132500	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
112893	Roadway signs and traffic control	Roadway signs (including post) - new or updated		Various	$554690	$554690	HSIP (23 U.S.C. 148)	N/A	Major Collector	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
113366	Shoulder treatments	Widen shoulder - paved or other		Various	$1300000	$1300000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes

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
113367	Shoulder treatments	Widen shoulder - paved or other		Various	$648892	$649892	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
113572	Roadway	Rumble strips - edge or shoulder		Various	$500000	$500000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
113596	Intersection geometry	Auxiliary lanes - modify left-turn lane offset	0.1	Miles	$236749	$236749	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	26,000	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
113908	Intersection traffic control	Modify traffic signal timing - signal coordination		Various	$231200	$231200	Penalty Funds (23 U.S.C. 154)	N/A	Minor Arterial	0		State Highway Agency	Systemic	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
113933	Roadway	Rumble strips - edge or shoulder		Various	$1000000	$1000000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		State Highway Agency	Systemic	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential for roadway departure crashes
114333	Advanced technology and ITS	Advanced technology and ITS - other		Various	$641030	$641030	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		State Highway Agency	Systemic	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges

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
114335	Intersection traffic control	Modify traffic signal - add backplates with retroreflective borders		Various	$208189	$208189	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		State Highway Agency	Systemic	Intersections	Strategy 2. Improve user comprehension of and compliance with intersection and interchange traffic control devices.
114337	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	11.6	Miles	$476523	$476523	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		State Highway Agency	Systemic	Bicyclists	Strategy 1. Identify locations having potential for crashes to apply proven bicycle safety countermeasures.
114713	Intersection geometry	Intersection geometry - other	0.96	Miles	$4619789	$4619789	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	49,000	55	State Highway Agency	Systemic	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
114859	Intersection geometry	Auxiliary lanes - modify left-turn lane offset	0.2	Miles	$460478	$460478	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	16,000	55	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
114733	Pedestrians and bicyclists	Crosswalk		Various	$57000	$57000	HSIP (23 U.S.C. 148)	N/A	Minor Arterial	0		State Highway Agency	Spot	Pedestrians	Strategy 1. Identify locations having potential for crashes to apply proven pedestrian safety countermeasures.
114402	Access management	Access management - other	0.03	Miles	$350000	$350000	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	46,000	45	State Highway Agency	Spot	Intersections	Strategy 1. Reduce the frequency and severity of crashes at intersections and interchanges
113847	Roadway	Superelevation / cross slope	0.4	Miles	$1179970	$1179970	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Interstate	32,000	70	State Highway Agency	Spot	Roadway Departure	Strategy 1. Reduce the likelihood of vehicles leaving the travel lanes at locations with higher potential

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
															for roadway departure crashes
108888	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists		Various	$1654500	$1654500	HSIP (23 U.S.C. 148)	N/A	Principal Arterial-Other	0		Other Local Agency	Spot	Bicyclists	Strategy 1. Identify locations having potential for crashes to apply proven bicycle safety countermeasures.

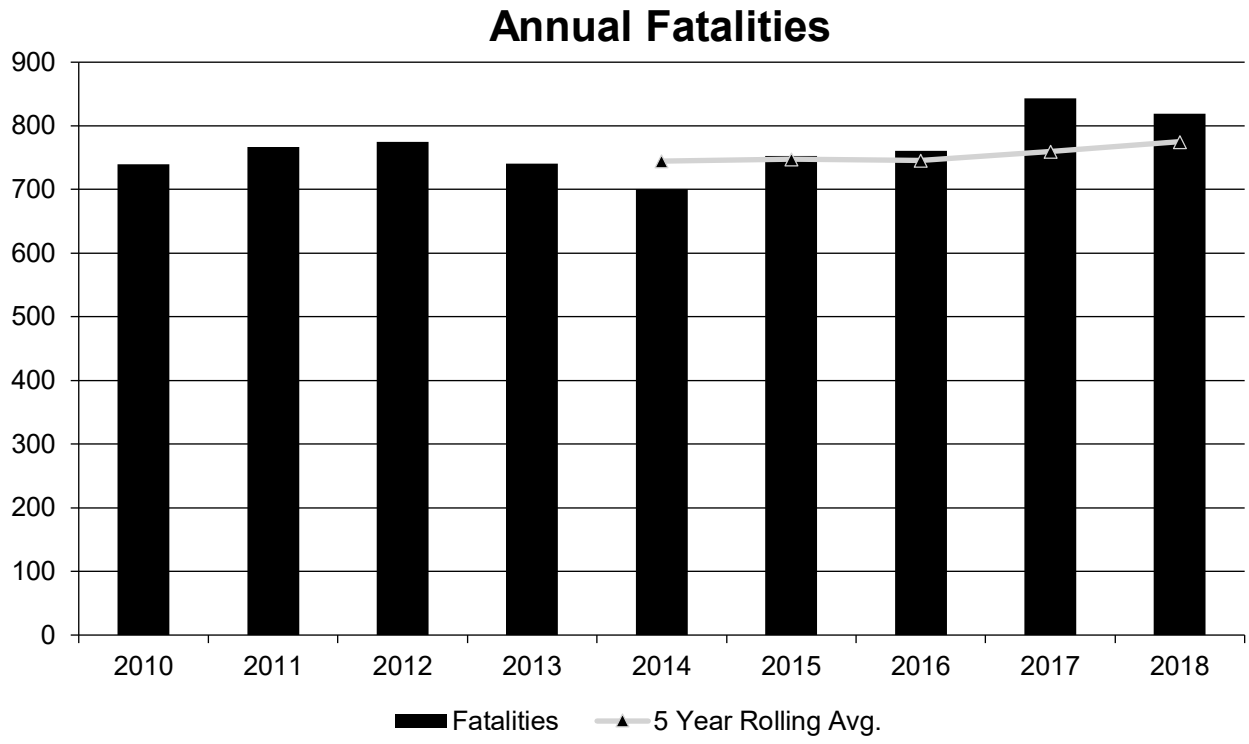
For the projects listed under this question, the dollar amount represents construction cost only. Preliminary engineering and non-infrastructure costs are not included in this table, and the amount figures will be different from that of the amount entered in for Question #23.

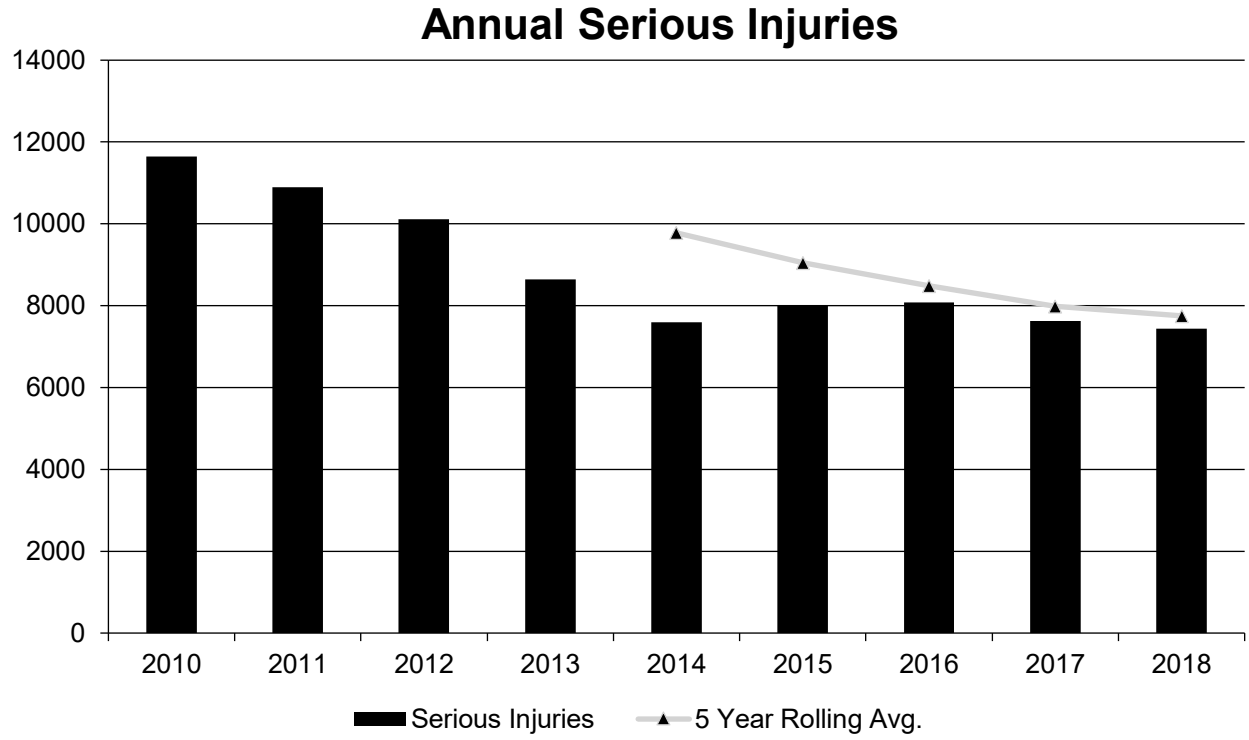
Safety Performance

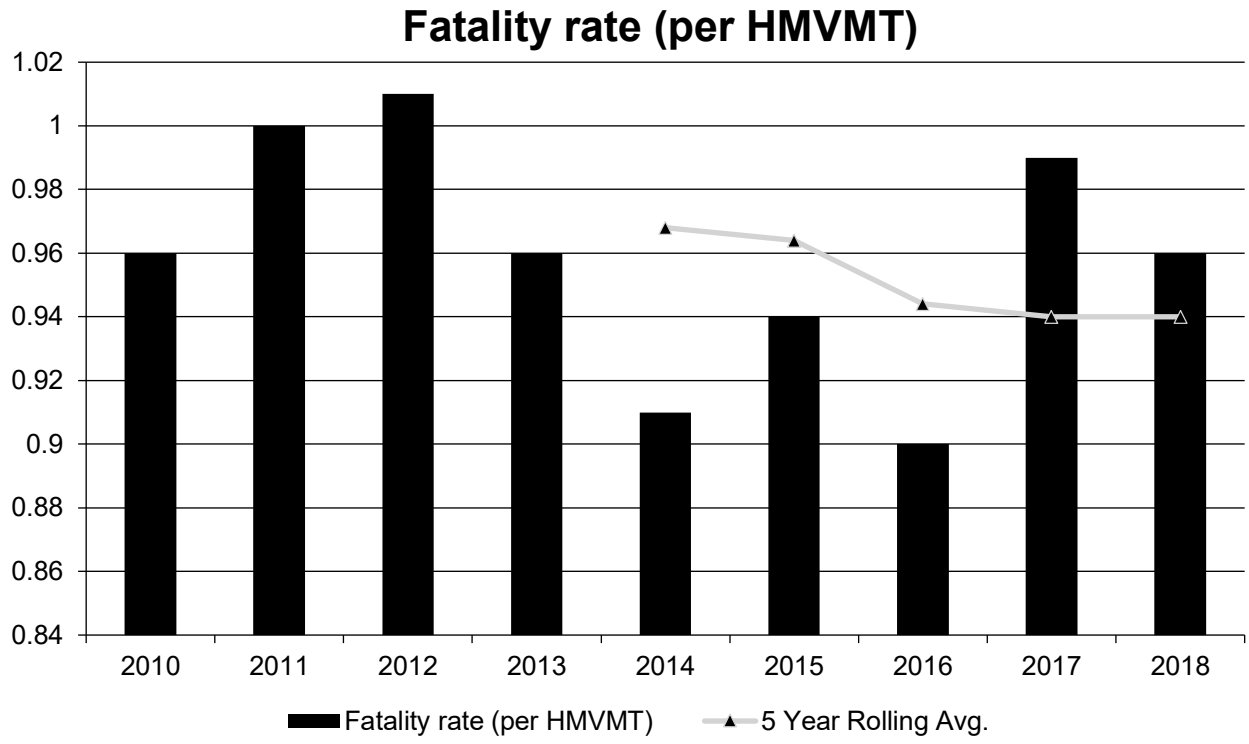
General Highway Safety Trends

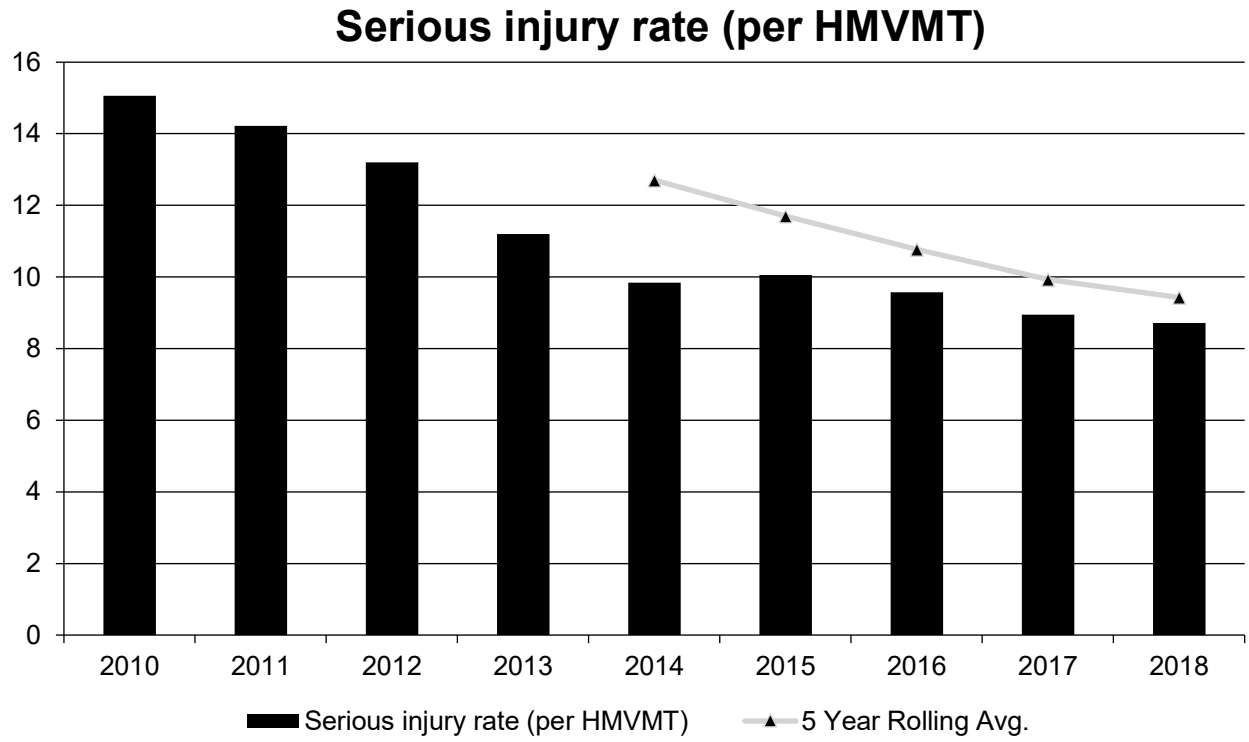
Present data showing the general highway safety trends in the State for the past five years.

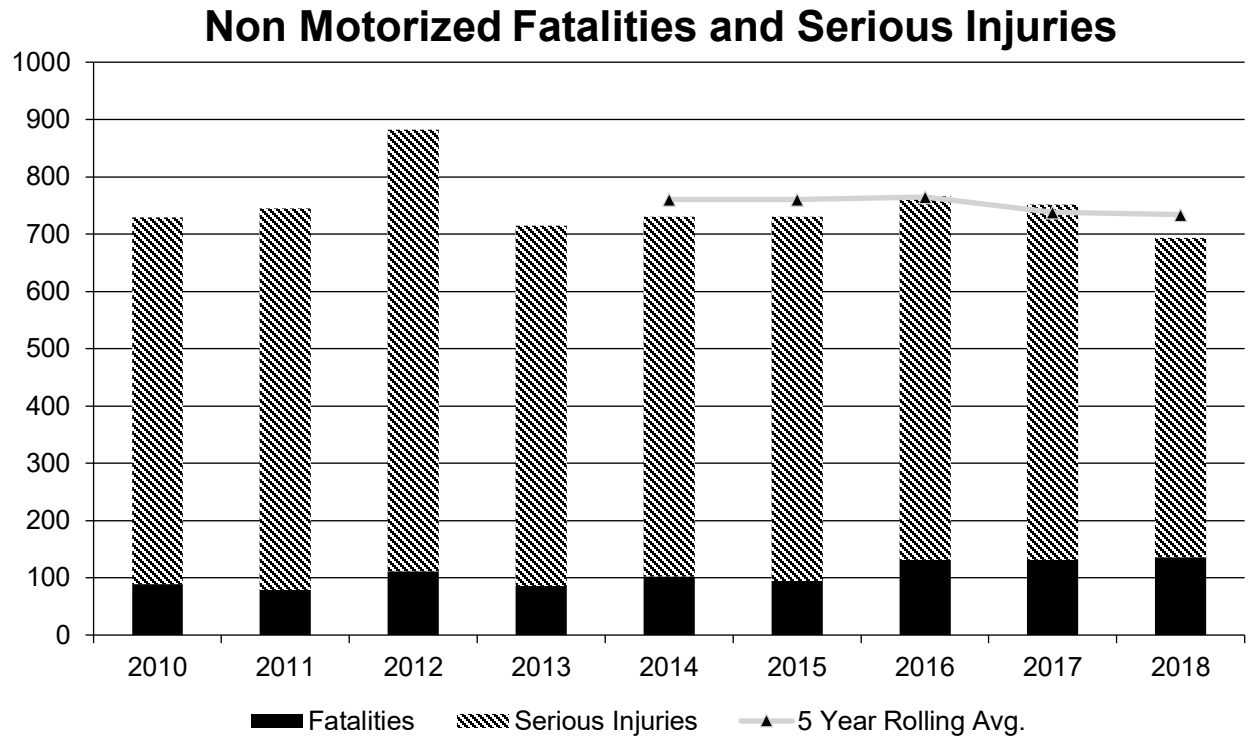
PERFORMANCE MEASURES	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities	740	767	775	741	700	753	761	843	819
Serious Injuries	11,649	10,897	10,114	8,643	7,597	8,011	8,075	7,634	7,442
Fatality rate (per HMVMT)	0.960	1.000	1.010	0.960	0.910	0.940	0.900	0.990	0.960
Serious injury rate (per HMVMT)	15.060	14.230	13.200	11.200	9.840	10.050	9.580	8.950	8.720
Number non-motorized fatalities	89	79	111	86	102	95	131	131	136
Number of non-motorized serious injuries	640	666	771	629	628	635	635	620	557


Annual Fatalities
900
800
700
600
500
400
300
200
100
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
14000
12000
10000
8000
6000
4000
2000
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
2010
2011
2012
2013
2014
2015
2016
2017
2018
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
16
14
12
10
8
6
4
2
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Describe fatality data source.

FARS

FARS data is used as fatality data source for 2009 to 2017. Since fatalities information is not available on FARS for 2018, VDOT database is being used to obtain fatalities information for 2018.

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

Year 2018

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	45	346.8	0.59	4.49
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other	76.2	553.4	1.24	9.02
Rural Minor Arterial	100.4	657.6	1.96	13.01
Rural Minor Collector	17.6	151.8	1.97	17.54
Rural Major Collector	121.2	883.6	3.16	23

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 Local Road or Street	58.6	546.6	2.32	21.57
Urban Principal Arterial (UPA) - Interstate	60.2	722.8	0.33	4.01
Urban Principal Arterial (UPA) - Other Freeways and Expressways	13	121	0.29	2.85
Urban Principal Arterial (UPA) - Other	74.6	949.4	0.7	8.44
Urban Minor Arterial	66.4	898.6	0.77	9.93
Urban Minor Collector	37.4	453.6	0.91	10.59
Urban Major Collector				
Urban Local Road or Street	13.2	192.4	0.49	7.16

Year 2018

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	623.8	5,487.4	1.06	9.25
County Highway Agency	7	88	0.5	6.11
Town or Township Highway Agency	1.2	24.2	0.23	4.21
City or Municipal Highway Agency	103.6	1,457.8	0.64	9.58
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		6.2		3.82
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				
Other				

Safety Performance Targets

Safety Performance Targets

Calendar Year 2020 Targets *

Number of Fatalities:857.0

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

Five Year Rolling Average above is based on predicted annual value of 915 fatalities in 2019 and 950 fatalities in 2020. These annual and 5-year average targets represent an increase that began in 2017 and is anticipated in 2019 and 2020. Additional information on the prediction method used is described in Question 35.

Number of Serious Injuries:7641.0

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

Five Year Rolling Average above is based on predicted annual value of 7575 serious injuries in 2019 and 7473 serious injuries in 2020. These annual and 5-year average targets represent a slight increase from 2018 and is anticipated in 2019 and the next year. Additional information on the prediction method used is described in Question 35.

Fatality Rate:0.995

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

Five Year Rolling Average above is based on predicted annual value of 1.05 fatalities per HMVMT in 2019 and 1.08 fatalities per HMVMT in 2020. These annual and 5-year average targets represent an increase that began in 2017 and is anticipated in 2019 and the next year. Additional information on the prediction method used is described in Question 35

Serious Injury Rate:8.871

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

Five Year Rolling Average using 2019 predicted values above is based on predicted annual value of 8.69 serious injuries per HMVMT in 2019 and 8.47 serious injuries per HMVMT in 2020. These annual and 5-year average targets represent slight decreases that began in 2017 and are anticipated in 2019 and the next year. Additional information on the prediction method used is described in Question 35.

Total Number of Non-Motorized Fatalities and Serious Injuries:724.0

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

Five Year Rolling Average above is based on predicted annual value of 711 non-motorized fatalities and serious injuries in 2020. These annual and 5-year average targets represent slight decreases that began in 2016 and are anticipated in 2019 and the next year. Additional information on the prediction method used is described in Question 35.

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 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 for the 2020 target setting 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 for increased spending for several programs. The program and total spending were tested and included in the fatality and non-motorized regression models as significant factors. 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 2019 and early 2020 was assessed to determine the crash reduction benefits based on Crash Modification Factors (CMFs). These benefits were then subtracted from the baseline predictions to determine the final 2020 targets. The 2020 annual targets were then used, with the 2019 targets, to determine the 5-year average targets as entered in for 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 have meetings continued with MPO safety target setting. An Excel workbook was provided and updated with their 2018 and 2019 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 (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 were received for the 2018 and 2019 targets. An Excel summary workbook that includes all of the MPO submittals was prepared and is available to FHWA upon request. Three (of 15) of the larger MPOs decided to set independent targets from the State percent reductions. Updates and outreach for MPO 2020 target setting will occur in September 2019.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State's 2018 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.

Optimistic 5-year average safety performance measures were submitted for 2018 targets based on the Strategic Highway Safety Plan (SHSP) objectives and trend lines through 2016. Targets for 2019 were set based on annual count trend lines to account for the increases in 2017 and expected increases in 2018.

The 2018 Fatality (F) target of 709 would require annual fatalities to decrease from 761 in 2016 to 640. In 2018, fatalities decreased to 819. This decrease followed an increase in fatalities from 2016-2017, which was the largest percent increase (11-percent increase) in recent history. Presuming 1.5 percent Vehicle-Miles Traveled (VMT) growth, the target fatality rate of 0.83 would have required rates to decline from 0.90 in 2016 to 0.70 in 2018. The 2017 11-percent increase in fatalities was not expected where about 50 percent of the

increase came from vulnerable users. Much of the increase occurred on lower functional class highways; this increase was roadway departures in rural areas and non-motorized on urban roads.

The 2018 Serious Injury (SI) target of 7570 would require the annual SI to decline from 8075 in 2016 to 6,750 in 2018. The SI rate target of 8.73 would require SI rates to decline from 9.60 in 2016 to 6.90 in 2018. SI increased from an all-time low in 2014 and then dropped to a new low in 2018. However, VMT did not grow as expected in 2018.

The F and SI trends point to the injury declines from in-vehicle improvements reaching a limit of effectiveness. During this period more HSIP projects were programmed on systemic improvements which should provide benefits in 2019 and future years. Other construction program funds were allocated to the last years of the Six-Year Improvement Program (SYIP), so the benefits will not be quantified for several years. VDOT assessment of the expected benefits, accounting for driver behavior reducing the expected crash reductions, indicated that systemic projects have a Benefit-Cost Ratio (BCR) five times greater than those of spot and corridor improvements.

The 2018 non-motorized F and SI target of 681 would require F and SI to decline from 766 in 2016 to 565 in 2018. While F increased slightly during this period, SI decreased to a total of 709 in 2018. Non-motorized travel has increased in Virginia in recent years. Although accommodations and improvements are being funded within construction and HSIP projects, infrastructure spending and deployment is probably not keeping pace with the new demand. Based on VDOT's PSAP identified priority locations additional open container funds were programmed for systemic treatments in 2019.

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.

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	2012	2013	2014	2015	2016	2017	2018
Number of Older Driver and Pedestrian Fatalities	113	127	102	122	126	159	144
Number of Older Driver and Pedestrian Serious Injuries	741	690	617	643	665	665	688

The rate of fatalities and serious injuries for drivers and pedestrians of 65 years of age and older had not increased during the most recent 2-year period, and therefore, Older Drivers and Pedestrians Special Rule is not applicable for Virginia.

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 in interested in understanding the effectiveness of these projects. In FY2019, 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. Ultimately, an analysis was conducted for all eligible HSIP-funded 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?

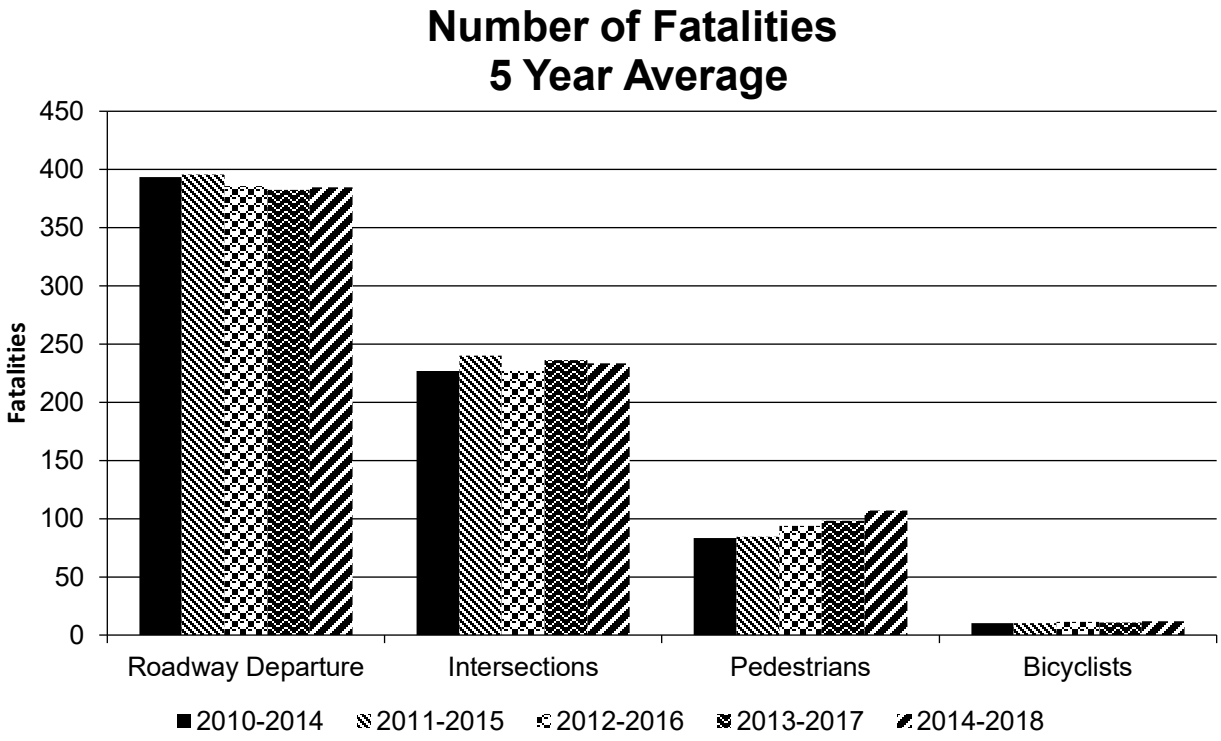
- # miles improved by HSIP
- HSIP Obligations
- More systemic programs

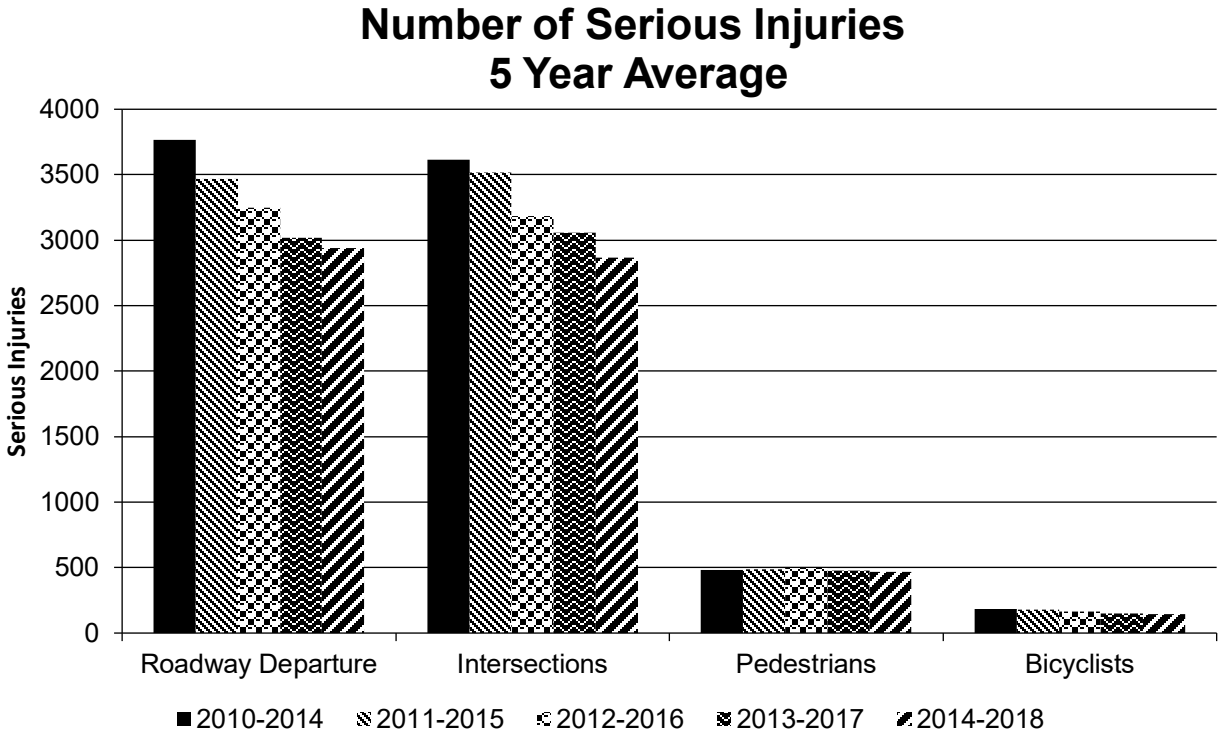
Effectiveness of Groupings or Similar Types of Improvements

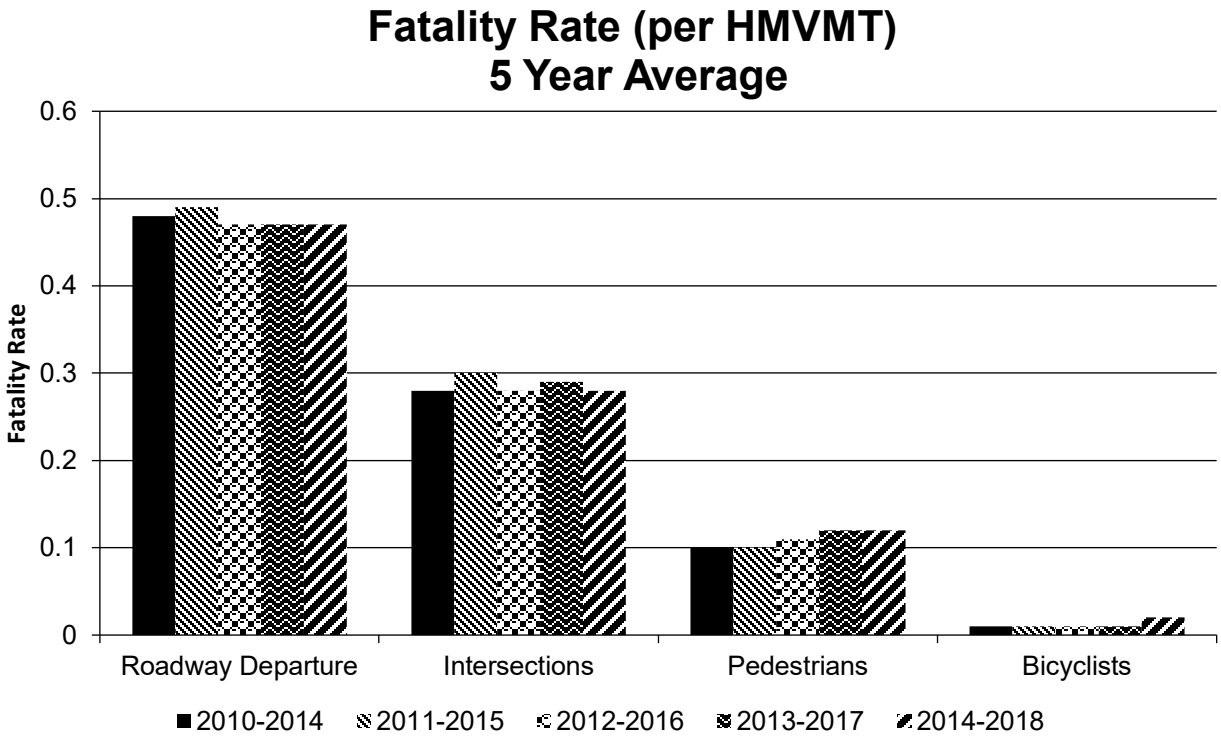
Present and describe trends in SHSP emphasis area performance measures.

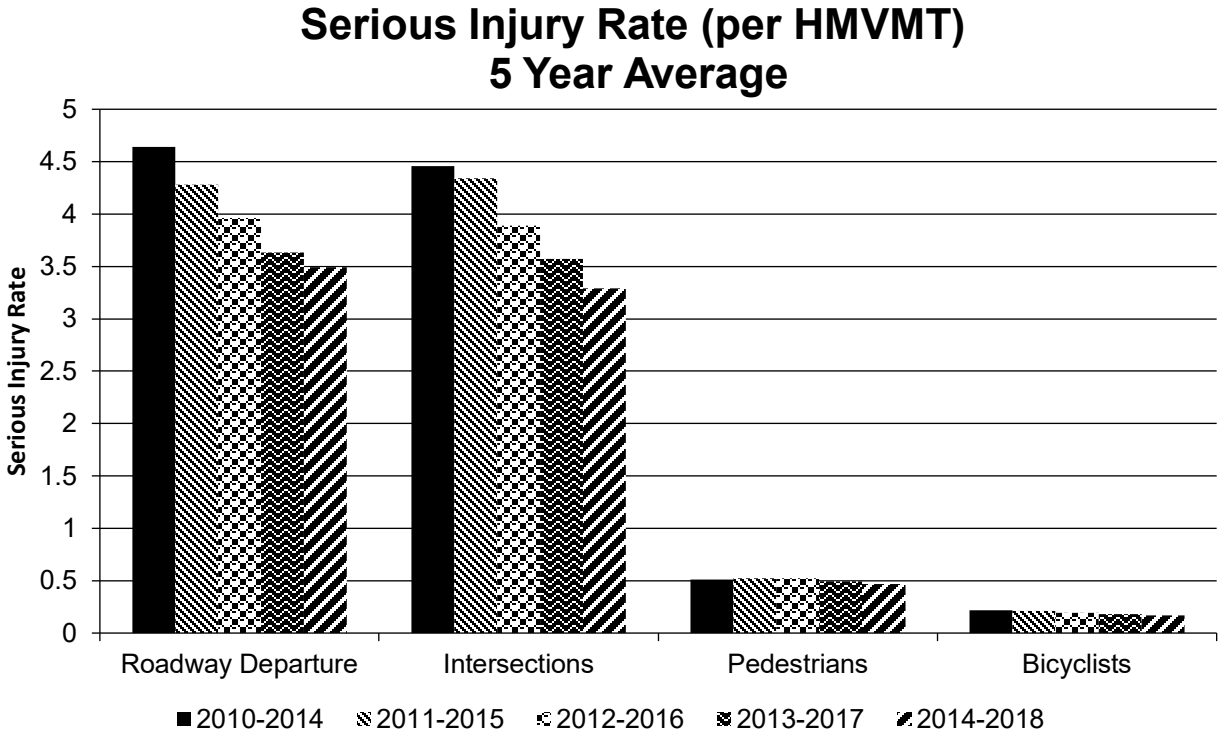
Year 2018

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		384.6	2,941.4	0.47	3.49
Intersections		233.2	2,865.8	0.28	3.29
Pedestrians		107	468.8	0.12	0.47
Bicyclists		12	143.6	0.02	0.17


Number of Fatalities
5 Year Average
Fatalities
450
400
350
300
250
200
150
100
50
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018


Number of Serious Injuries
5 Year Average
Serious Injuries
4000
3500
3000
2500
2000
1500
1000
500
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018





Has the State completed any countermeasure effectiveness evaluations during the reporting period?

Yes

Please provide the following summary information for each countermeasure effectiveness evaluation.

CounterMeasures:	Various - see attached report
Description:	VDOT's analysis on HSIP-funded systemic countermeasure analysis. Also see response to Question #46.
Target Crash Type:	
Number of Installations:	
Number of Installations:	
Miles Treated:	
Years Before:	
Years After:	
Methodology:	
Results:	Various - see attached report. Also see response to Question #46.

File Name: HSIP Systemic DRAFT Report.docx

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)
84358	Rural Minor Arterial	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	3.00	8.00						2.00	3.00	10.00	
94105	Urban Principal Arterial - Interstate	Shoulder treatments		526.00	483.00	2.00	1.00	31.00	12.00	198.00	126.00	757.00	622.00	
98371	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	321.00	153.00	2.00	2.00	24.00	6.00	233.00	78.00	580.00	239.00	
98376	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	286.00	189.00	1.00	1.00	21.00	9.00	209.00	138.00	517.00	337.00	
93350	Urban Minor Arterial	Intersection traffic control	Modify control - modifications to roundabout	5.00						9.00		14.00		
100564	Rural Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	13.00	1.00			3.00		19.00	1.00	35.00	2.00	
100565	Urban Principal Arterial - Other Freeways and Expressways	Intersection traffic control	Modify traffic signal - modernization/replacement	56.00	23.00				1.00	26.00	23.00	82.00	47.00	
106536	Urban Principal Arterial - Interstate	Roadway	Rumble strips - edge or shoulder	2.00			1.00	1.00	1.00	6.00	1.00	9.00	3.00	
97044	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - add additional signal heads	12.00	12.00			1.00	1.00	6.00	8.00	19.00	21.00	
100657	Urban Minor Arterial	Alignment	Alignment - other							9.00	8.00	9.00	8.00	
104668	Rural Principal Arterial - Other	Alignment	Alignment - other	2.00						2.00		4.00		
104671	Rural Principal Arterial - Other Freeways and Expressways	Shoulder treatments		14.00	23.00	1.00		3.00	4.00	19.00	26.00	37.00	53.00	
105470	Rural Principal Arterial - Other Freeways and Expressways	Shoulder treatments		264.00	48.00	5.00	1.00	43.00	6.00	137.00	29.00	449.00	84.00	

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)
105808	Rural Principal Arterial - Other Freeways and Expressways	Shoulder treatments		33.00	5.00	1.00		1.00	1.00	8.00	4.00	43.00	10.00	
96939	Rural Minor Arterial	Intersection geometry	Auxiliary lanes - add right-turn lane	4.00	7.00				1.00	1.00	4.00	5.00	12.00	
103461	Rural Principal Arterial - Other	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	6.00	1.00			2.00		12.00	1.00	20.00	2.00	
104687	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	35.00	14.00			3.00	1.00	35.00	7.00	73.00	22.00	
81441	Urban Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	13.00	8.00			2.00	2.00	21.00	9.00	36.00	19.00	
86489	Urban Minor Collector	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00	2.00			1.00		3.00	1.00	7.00	3.00	
86490	Urban Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00						1.00	2.00	4.00	2.00	
89899	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	5.00	1.00		1.00	1.00	1.00	2.00	5.00	8.00	8.00	
89902	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	10.00	7.00			2.00	1.00	9.00	8.00	21.00	16.00	
89903	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	7.00	2.00			1.00	1.00	4.00	2.00	12.00	5.00	
89904	Rural Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	9.00	8.00				1.00	7.00	5.00	16.00	14.00	
95423	Rural Minor Arterial	Intersection traffic control	Intersection signing - add enhanced advance warning (double-up and/or oversize)	7.00	3.00			3.00	2.00	6.00	8.00	16.00	13.00	
98095	Rural Principal Arterial - Other Freeways and Expressways	Intersection geometry	Auxiliary lanes - add left-turn lane	4.00						4.00	1.00	8.00	1.00	
104363	Urban Principal Arterial - Interstate	Interchange design	Improve intersection radius at ramp terminus	1.00	3.00					2.00		3.00	3.00	
104684	Rural Principal Arterial - Other Freeways and Expressways	Shoulder treatments		4.00	2.00	3.00		1.00		9.00	1.00	17.00	3.00	

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)
100659	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	9.00	10.00					3.00		12.00	10.00	
100661	Freeway and Expressway	Intersection traffic control	Intersection flashers - add advance intersection warning sign-mounted	2.00							1.00	2.00	1.00	
100663	Urban Principal Arterial - Other Freeways and Expressways	Intersection traffic control	Intersection flashers - add advance intersection warning sign-mounted	5.00	3.00					2.00	2.00	7.00	5.00	
100664	Rural Minor Arterial	Roadside	Barrier- metal	59.00	34.00	3.00	1.00	11.00	9.00	39.00	37.00	112.00	81.00	
104673	Rural Principal Arterial - Other	Shoulder treatments		10.00	9.00	1.00		1.00	1.00	4.00	4.00	16.00	14.00	
104674	Rural Minor Arterial	Shoulder treatments		13.00	18.00	2.00		6.00	5.00	13.00	12.00	34.00	35.00	
93347	Rural Minor Collector	Shoulder treatments								2.00		2.00		
97029	Urban Minor Collector	Intersection geometry	Auxiliary lanes - add left-turn lane	4.00	1.00							4.00	1.00	
104702	Rural Principal Arterial - Other	Shoulder treatments		8.00	11.00	1.00		2.00	4.00	3.00	11.00	14.00	26.00	
104703	Other Principal Arterial	Shoulder treatments		6.00	8.00			2.00	5.00	6.00	6.00	14.00	19.00	

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.

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	
		NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	
ROADWAY SEGMENT	Segment Identifier (12)	100						100		100	
	Route Number (8)	100									
	Route/Street Name (9)	100									
	Federal Aid/Route Type (21)	100									
	Rural/Urban Designation (20)	100						100			
	Surface Type (23)	100						100			
	Begin Point Segment Descriptor (10)	100						100		100	
	End Point Segment Descriptor (11)	100						100		100	
	Segment Length (13)	100									
	Direction of Inventory (18)	100									
	Functional Class (19)	100						100		100	
	Median Type (54)	100									
	Access Control (22)	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	
		NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	
	One/Two Way Operations (91)	100									
	Number of Through Lanes (31)	100						100			
	Average Annual Daily Traffic (79)	100						100			
	AADT Year (80)	100									
	Type of Governmental Ownership (4)	100						100		100	
INTERSECTION	Unique Junction Identifier (120)			100							
	Location Identifier for Road 1 Crossing Point (122)			100							
	Location Identifier for Road 2 Crossing Point (123)			100							
	Intersection/Junction Geometry (126)			100							
	Intersection/Junction Traffic Control (131)			50							
	AADT for Each Intersecting Road (79)			96	99						
	AADT Year (80)			96	99						
	Unique Approach Identifier (139)			100							
INTERCHANGE/RAMP	Unique Interchange Identifier (178)					100					
	Location Identifier for Roadway at Beginning of Ramp Terminal (197)					100					
	Location Identifier for Roadway at Ending Ramp Terminal (201)					100					
	Ramp Length (187)					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	
		NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	
	Roadway Type at Beginning of Ramp Terminal (195)					100					
	Roadway Type at End Ramp Terminal (199)					100					
	Interchange Type (182)					100					
	Ramp AADT (191)					60					
	Year of Ramp AADT (192)					60					
	Functional Class (19)					100					
	Type of Governmental Ownership (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

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 began 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 began 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 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 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.

Did the State conduct an HSIP program assessment during the reporting period?

No

No, VDOT did not complete a formal HSIP program assessment this reporting period. However, VDOT holds monthly meetings with its FHWA Division Office Safety Engineer. The purpose of these meetings is to ensure that both VDOT and FHWA are in consensus on the type of projects selected for the HSIP program as well as to ensure that the Department complies with the most current directives from FHWA Headquarters. VDOT shares with its FHWA Division office

a list of candidate projects and locations each year to apply for safety funds. FHWA participates with VDOT on project selection and coordination with its districts in developing appropriate scope and schedules for these candidate projects.

The latest HSIP program assessment was conducted when FHWA conducted a program assessment workshop along with VDOT and other safety stakeholders in March 27th, 2017. Through this assessment, FHWA determined that VDOT's HSIP and Railway-Highway Grade Crossing Program (RHGCP) meet, and in several aspects, exceed the regulatory program requirements. The HSIP requirements include a comprehensive data-driven Strategic Highway Safety Plan (SHSP) that identifies highway safety problems and produces a program of projects or strategies to significantly reduce serious injuries and fatalities on all public roads. For RHGCP, it requires consideration of relative risk of public crossings and results in a program of projects for improvement.

It is also worth mentioning that the VDOT Safety Program is regularly sought out by others for the program’s achievements in application of the Highway Safety Manual (HSM). VDOT continually makes the effort to enhance and develop data analysis tools and other resources for VDOT Districts and Localities in order to aid in their problematic location identification and project development.

When does the State plan to complete its next HSIP program assessment.

2022

Optional Attachments

Program Structure:

VDOT_PSAP_Report_052118_with_Appendix_A_B_C.pdf
FINAL VDOT RSA Manual.pdf
VDOT_Crash_Data_Manual_Nov2017.pdf
FINAL VDOT HSIP Implementation Manual.pdf
Project Implementation:

Safety Performance:

Evaluation:

HSIP Systemic DRAFT Report.docx
Compliance Assessment:

HSIP Program Review Report_Final.pdf

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.