VERMONT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2023 ANNUAL REPORT

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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. 407 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

During the state fiscal year (July 1, 2022 to June 30, 2023), VTrans worked on the development of seven projects and on the construction of eleven projects to remediate hot spot and corridor locations.

For the state fiscal year, the total amount of funding that was obligated during the reporting period was $20,873,740. Of this amount, $12,313,161 was obligated from HSIP Section 148, $7,274,979 was obligated from Section 164 and $1,285,600 was obligated from VRU Safety Special Rule (23 U.S.C. 148(g)(3)).

During the reporting period, VTrans was required to comply with the provisions set forth in 23 U.S.C. 148(i) and submitted an HSIP Implementation Plan for FFY23 for not meeting or making significant progress toward FHWA Safety Performance Measures for calendar year 2020 and has also been working on an HSIP Implementation Plan for FFY24 (due to not meeting the Safety Performance Measures for 2021).

Vermont safety performance for 2020 also triggered all three special rules, namely, the HRRR Special Rule (23 U.S.C. 148(g)(1)), the Older Drivers and Pedestrians Special Rule (23 U.S.C. 148(g)(2)), and the VRU Safety Special Rule (23 U.S.C. 148(g)(3)).

Safety performance has deteriorated slightly coming out of the pandemic as the five-year averages of the number of fatalities and serious injuries in 2022 have been higher than the current Strategic Highway Safety Plan 2017-2021 baseline period with the five-year average of the number of fatalities going from 64 fatalities to 65.2 and the five-year average of the number of suspected serious injuries going from 294.4 to 257.8 serious injuries.

During the reporting period, VTrans has continued to work with a consultant to review its HSIP structure and processes and adopted a new manual for its HSIP process. A noteworthy change for this reporting period is HSIP funding allocations driven by crash data on type, place, and frequency of crashes.

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 overall program structure is centralized.

For spot projects, HSIP staff review high crash locations on the federal aid network and identify potential projects. Solutions are proposed to mitigate crash patterns and crash types. Crash modification factors and benefit-to-cost ratios (B/C ratio) are used to determine the best solutions. A project must have a B/C ratio of greater than 1 to be further considered. A group of senior management review the recommendations for further advancement of the projects to scoping or design. Major HSIP projects are designed by consultants or Agency staff following the normal project development process. Small projects such as signage, markings, beacons and brush cutting are implemented via work orders done by the Agency or may be incorporated into existing projects where practical to do.

During this reporting period, VTrans created a municipal grant program for safety projects on local roadways for specific low-cost countermeasures. This program is currently based on local perceived safety needs.

Systemic countermeasure related to projects to address horizontal curve safety are currently being incorporated into existing projects. In the future, these could also be implemented via stand-alone statewide projects and municipal grants.

VTrans incorporates the SafetyEdge and centerline rumble stripes on all paving projects according to Agency guidelines.

Selected projects are evaluated using simple before and after crash data for a period of three-years before and three years after construction.

Where is HSIP staff located within the State DOT?

Operations

HSIP staff is located within the Operations and Safety Bureau and is part of the Traffic Operations and Mobility team.

High Crash Locations, which are currently used as a basis for the identification of HSIP sites, are generated by staff located within the Data Unit of the Operations and Safety Bureau.

The programming of HSIP projects is performed by staff located within the Asset Management Bureau and the design and construction of projects is performed by the Project Delivery Bureau.

How are HSIP funds allocated in a State?

- Central Office via Statewide Competitive Application Process
- Formula via Districts/Regions
- Other-Central Office via High Crash Location Reviews

A change to past practices in Vermont is the implementation of a grant application process for municipalities to apply for funding for local safety projects. VTrans has also targeted a greater amount of funds to local projects.

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

Vermont does not have any tribal roads. Local roads are addressed in several ways. VTrans offers a grant for small-scale systemic improvements on local roads. VTrans also delivers a limited number of site-specific treatments on local roads, with towns committing to future maintenance of the countermeasure. Lastly, VTrans has historically installed some larger site-specific treatments on Vermont Class 1 Town Highways.

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

- Design
- Districts/Regions
- Governors Highway Safety Office
- Local Aid Programs Office/Division
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety
- Other-Programming

In Vermont, the Governor’s Highway Safety Office is called the State Highway Safety Office and is part of VTrans.

Describe coordination with internal partners.

The HSIP coordinates directly with internal partners on project development, grant administration, crash data products, and project delivery. Examples of this coordination include:

· Coordination with the Project Delivery Bureau on site and countermeasure selection for HSIP-initiated projects prior to hand-off for delivery

· Coordination with the Asset Management Bureau's short and mid-range work plans, and in some cases incorporating the HSIP-driven elements into larger projects

· Shared administration of the Small Scale Local Safety Grant program with the Municipal Assistance Section, including shared roles in grant selection

· Frequent coordination with the Data Management Unit on crash data needs

· Regular check ins with Finance & Administration on obligation status and fund balances

· Coordination with VTrans District staff for Road Safety Audits

In addition to this day-to-day coordination, Operations and Safety hosts a bimonthly Safety Working Group that includes others such as bureau directors and the State Highway Safety Office.

Identify which external partners are involved with HSIP planning.

- Law Enforcement Agency
- Local Government Agency
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Describe coordination with external partners.

MPOs assist with the local grant program, promoting it to local governments and offering technical assistance with site selection and the applications. MPOs, local governments, and law enforcement are all involved in the Road Safety Audit process.

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

During the reporting period, the HSIP began administering a grant program, allowing municipalities to carry out site selection but restricting the program to a prescribed list of low-cost countermeasures. VTrans is in the process of implementing other administrative changes, including new target allocations for spending between programs and a formalization of HSIP roles, as listed in the HSIP Manual adopted in November 2022.

Program Methodology

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

Yes

Vermont has a HSIP manual that was finalized in November 2022 and that describes the current HSIP planning, implementation and evaluation processes.

Some of the older documents that were used in the past are attached as projects identified and selected from these processes are still being constructed or mentioned in this HSIP report.

Select the programs that are administered under the HSIP.

- HRRR
- Local Safety
- Low-Cost Spot Improvements
- Roadway Departure
- Sign Replacement And Improvement
- Vulnerable Road Users
- Other-Major Project Spot Improvements

The HRRR program refers to the applicability of the High Risk Rural Roads Special Rule under 23 USC 148(g)(1) and is in effect only if Vermont triggers the Special Rule.

The Local Safety program refers to the general reviews of rural local roads and the construction of low-cost measures.

The Roadway Departure program refers to the systemic review of curves and straight segments.

The Sign Replacement and Improvement refers to sign projects.

Vulnerable Road Users refer to pedestrian and bicyclist projects.

Low-Cost Spot Improvements and Major Project Spot Improvements refer to countermeasures implemented at high crash locations.

Program: HRRR

Date of Program Methodology:2/19/2016

What is the justification for this program?

- Other-Bipartisan Infrastructure Law Special HRRR Rule

What is the funding approach for this program?

Other-Funding set-aside only if special rules apply

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• Other-Fatal and all injury crashes		• Horizontal curvature • Functional classification

What project identification methodology was used for this program?

- Crash frequency

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

Yes

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

Yes

How are projects under this program advanced for implementation?

- Other-statewide project for low cost improvements

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

Available funding:100
Total Relative Weight:100

Program: Local Safety

Date of Program Methodology:11/1/2022

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes		• Roadside features

What project identification methodology was used for this program?

- Other-Local Identification Hazards

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

Available funding:50
Cost Effectiveness:50
Total Relative Weight:100

Program: Low-Cost Spot Improvements

Date of Program Methodology:10/3/2016

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Lane miles

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash rate
- Equivalent property damage only (EPDO Crash frequency)
- Relative severity index

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

Yes

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

Yes

How are projects under this program advanced for implementation?

- Other-Other-Operation & Safety Bureau Staff based on recommendations from Road Safety Audit Team

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

Available funding:100
Total Relative Weight:100

Program: Roadway Departure

Date of Program Methodology:11/1/2022

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

- Fatal and serious injury crashes only

Exposure

- Volume

Roadway

- Horizontal curvature
- Functional classification

What project identification methodology was used for this program?

- Other-Systemic Network Screening

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

Yes

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

Yes

How are projects under this program advanced for implementation?

- Other-Harmonization with other projects

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).

Rank of Priority Consideration

Available funding:25
Other-Feasibility:75

Program: Sign Replacement And Improvement

Date of Program Methodology:2/9/2015

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
		• Other-Sign replacement needs

What project identification methodology was used for this program?

- Other-Average Sign Age

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

No

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

How are projects under this program advanced for implementation?

- Other-Programed by Asset Management & Performance Bureau

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

Available funding:100
Total Relative Weight:100

Program: Vulnerable Road Users

Date of Program Methodology:7/1/2022

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- Other-Other-Bipartisan Infrastructure Law Special VRU Rule

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	• Other-Social Vulnerability Index	• Other-No Existing Ped/Bike Facility

What project identification methodology was used for this program?

- Probability of specific crash types

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?

- selection committee

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).

Rank of Priority Consideration

Available funding:1

Program: Other-Major Project Spot Improvements

Date of Program Methodology:11/1/2022

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 • Lane miles	• Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Equivalent property damage only (EPDO Crash frequency)
- Relative severity index

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?

- selection committee

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).

Rank of Priority Consideration

Available funding:1
Incremental B/C:2

What percentage of HSIP funds address systemic improvements?

0.3

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

- Rumble Strips

The percentage above represents the percentage of HSIP funds that was obligated during state fiscal year 2023 (7/1/22 to 6/30/23) that addresses systemic improvements. During the reporting period, HSIP funds were used to construct a project that focused on rumble strips.

Other improvements are implemented by policy or systematically. The safety edge and rumble strips are installed on all paving projects as per policy. Shoulder widening is also considered on paving projects based on physical and cost constraints.

VTrans has sign projects that are constructed yearly using HSIP funds but systematically , on a statewide basis (and not based on the systemic approach).

A project for the installations of signs at systemically identified town rural curves will be constructed during the next reporting period.

VTrans has completed the systemic screening of lane departure crashes and of intersection crashes and intend to deploy more systemic projects in order to approach the HSIP funding allocation goals mentioned in its HSIP Manual for systemic initiatives in the order of 38% on state-owned roads and 15% on local roads.

What process is used to identify potential countermeasures?

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- Stakeholder input

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

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

The HSIP considers other ITS technologies. For example, when VTrans constructs a new traffic signal with HSIP funds, the signal is connected to a central management system and VTrans has the ability to monitor the signal performance using ATSPM's (Automated Traffic Signal Performance Measures) and taking corrective actions. ATSPM help with having traffic signals operating correctly and having signal-controlled intersections being safer for all road users.

Regarding Connected Vehicle Technology, VTrans did install 16 intersections with V2I roadside units which broadcast Signal Phasing and Timing, SPaT messages to vehicles capable of receiving them. Ten intersections were completed in 2020 and six in 2021.

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.

VTrans has been using the overall safety management process discussed in Part B of the HSM to conduct the HSIP.

VTrans has been using the critical rate method to screen the roadway network when identifying high crash locations.

VTrans has been using the methodology shown in Appendix 4a to updates its crash cost estimates.

VTrans has been using crash modification factors for estimating the crash reduction benefits when calculating benefits/costs ratios (B/C ratio) for evaluating alternatives.

VTrans occasionally uses the predictive equations presented in Part C of the HSM when conducting site impacts analyses.

A research project to calibrate the predictive equations for two-lane rural roads found in Chapter 10 of the HSM was completed in September 2019 by the UVM Transportation Center. VTrans has been using IHSDM to recalibrate some of the HSM models using more recent crash data.

VTrans has been exploring how to incorporate the Intersection Control Evaluation process within its programs, with the aim of better quantifying safety performance through an increased usage of the HSM predictive methods.

VTrans issued an RFP for the development of a safety management system that will include network screening capabilities based on safety performance functions. A vendor was selected and implementation will be initiated during the next reporting period.

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

VTrans has increased its use of systemic methods for site selection, completing two risk-based screenings and developing an implementation plan for these projects. VTrans has also began changing its approach to countermeasure selection, developing matrices of potential countermeasures for specific crash types to narrow down possible treatments and streamline the process. In the upcoming year, project and program evaluation methods will change as directed in the manual and as a new software tool is procured.

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

VTrans currently performs network screening and generates high crash locations using the critical rate method. However, our existing tool does not allow for specifying crash types or manner of crashes. As a result, our HSIP hot spot network screening is based on all crashes and cannot single out fatal and serious injury crashes or certain manner of collision, such as single vehicle crashes. VTrans has been working for several years towards resolving this and is finally at a point where a new safety management tool will be implemented during the next reporting period.

Another critical current limitation is that roads that are not on the federal aid system are not included in the screening process since crashes on these roads are not currently assigned mile points. VTrans is in the process of remediating this. A recent incorporation of an ESRI location tool within the crash collection system, which allows law enforcement to select a location on a map and by doing so, automatically entering the mile point for the location in the crash collection system, has been done successfully for federal aid roads and future work is planned to carry it forward to local roads. For past crashes on local roads not on the federal aid system, VTrans is looking into taking the crash locations and analyzing their XY locations against the ARNOLD data and providing the route code and mile post for each crash through a series of geo-processes using Python scripting.

Given that Vermont is a rural state with crashes that tend to be dispersed for specific crash types such as lane departure crashes and certain intersection crashes, high risk sites for these crash types are not captured by the usual hot spot network screening. VTrans recently completed the systemic network screenings of lane departure crashes and of intersection crashes which will be used in the future to select locations and

countermeasures to implement systemic projects as well as to incorporate systemic improvements into paving, roadway and intersection projects.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$12,313,161	$12,313,161	100%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$0	$0	0%
VRU Safety Special Rule (23 U.S.C. 148(g)(3))	$1,285,600	$1,285,600	100%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$7,274,979	$7,274,979	100%
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	$20,873,740	$20,873,740	100%

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

32%

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

32%

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

11%

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

11%

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%

No funds were transferred into or out of the HSIP apportionments.

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

Vermont's main challenge is timely delivery of HSIP projects. Some projects accumulate long delays at every stage, preventing Vermont from making obligations on schedule. Because the HSIP program does not deliver projects directly, these delays are usually outside the program's control. To overcome this challenge, Vermont plans to begin programming flexible systemic projects that can be scaled up or down according to program needs. Vermont will also continue to "over-program" essential categories (e.g., special rules) in anticipation of potential delays, using alternate funding or advance construction if a shortfall occurs.

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
ARLINGTON STP 319-1(29) - Development	Intersection traffic control	Modify control – Modern Roundabout	1	Locations	$100000	$160000	HSIP (23 U.S.C. 148)	Rural	Major Collector	2,900	50	State Highway Agency	Spot	Intersections	Improve Geometry
BARRE CITY HES 037-1(8) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.229	Miles	$2514713	$3881395	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	7,500	25	City or Municipal Highway Agency	Spot	Intersections	Improve Geometry
BENNINGTON STP 1000(21) - Development	Alignment	Vertical alignment or elevation change	1	Locations	$10000	$70000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	0	50	State Highway Agency	Spot	Intersections	Improve Geometry
BRATTLEBORO STP 2000(29) - Closing	Pedestrians and bicyclists	Pedestrians and bicyclists – other	1.25	Miles	$0	$613226	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0	40	State Highway Agency	Spot	Pedestrians	Bicycle or Pedestrian Improvement
BRATTLEBORO STP 2000(29) - Closing	Pedestrians and bicyclists	Pedestrians and bicyclists – other	1.25	Miles	$93023	$613226	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	0	40	State Highway Agency	Spot	Pedestrians	Bicycle or Pedestrian Improvement
BRIDPORT-MIDDLEBURY HES RMBL(5) - Complete	Roadway	Rumble strips – center	7.354	Miles	$59021	$172926	Penalty Funds (23 U.S.C. 164)	Rural	Major Collector	0	50	State Highway Agency	Systemic	Lane Departure	Improve Driver Compliance
BURLINGTON HES 5000(18) - Construction	Intersection traffic control	Modify control – Modern Roundabout	0.317	Miles	$1228913	$13576522	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	6,300	25	City or Municipal Highway Agency	Spot	Intersections	Improve Operations
BURLINGTON HES 5000(18) - Construction	Intersection traffic control	Modify control – Modern Roundabout	0.317	Miles	$1985493	$13576522	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	6,300	25	City or Municipal Highway Agency	Spot	Intersections	Improve Operations
CLARENDON-RUTLAND TOWN NHG SGNL(56) - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	4	Locations	$2203779	$2803116	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	19,551	55	State Highway Agency	Spot	Intersections	Improve Operations
COLCHESTER HES NH 5600(14) - Development	Interchange design	Interchange design - other	1.025	Miles	$400000	$12544544	VRU Safety Special Rule (23 U.S.C. 148(g)(3))	Urban	Principal Arterial-Other	23,900	35	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
COLCHESTER HES NH 5600(14) - Development	Interchange design	Interchange design - other	1.025	Miles	$1000000	$12544544	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	23,900	35	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users

2023 Vermont Highway Safety Improvement Program

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
COLCHESTER HES NH 5600(14) C/1 - Construction	Interchange design	Interchange design - other	0.256	Miles	$4075000	$12544544	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	19,400	30	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
COLCHESTER STPG 5600(17) - Development	Intersection geometry	Intersection geometry - other	0.19	Miles	$200000	$600000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	15,600	50	State Highway Agency	Spot	Intersections	Improve Operations
CRASH PROGRAM HWCR(332) - Planned	Miscellaneous	Data collection	1	Locations	$540000	$600000	HSIP (23 U.S.C. 148)	N/A	N/A	0		State Highway Agency	HSIP Program Support	Data	Improve Data Quality
CRASH REPORTING HWCR(331) - Planned	Miscellaneous	Data collection	1	Locations	$247500	$550000	HSIP (23 U.S.C. 148)	N/A	N/A	0		State Highway Agency	HSIP Program Support	Data	Improve Data Quality
FAIR HAVEN-RUTLAND TOWN NHG SIGN(70) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	37.658	Miles	$553113	$2480324	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	0		State Highway Agency	Age of Signs	Older Drivers	Improve Signs and Markings
FERRISBURGH NH 019-4(32) - Construction	Intersection traffic control	Intersection traffic control - other	0.001	Miles	$5000	$1005398	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0	40	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
FERRISBURGH NH 019-4(32) - Construction	Intersection traffic control	Intersection traffic control - other	0.001	Miles	$87623	$1005398	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	0	40	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
HINESBURG HES 021-1(19) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.403	Miles	$466951	$5046899	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	8,600	40	State Highway Agency	Spot	Intersections	Improve Geometry
MILTON STP 5800(3) - Development	Intersection geometry	Intersection geometry - other	0.61	Miles	$225000	$1175000	HSIP (23 U.S.C. 148)	Urban	Minor Collector	10,520	35	State Highway Agency	Spot	Intersections	Improve Geometry
NEW HAVEN HES 032-1(8) - Construction	Intersection geometry	Intersection geometry - other	0.3	Miles	$10387	$3954882	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	4,000	45	State Highway Agency	Spot	Intersections	Improve Geometry
NEW HAVEN HES 032-1(8) - Construction	Intersection geometry	Intersection geometry - other	0.3	Miles	$800000	$3954882	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	4,000	45	State Highway Agency	Spot	Intersections	Improve Geometry
NORWICH STPG SGNL(57) - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	0.494	Miles	$1233	$1675288	Penalty Funds (23 U.S.C. 164)	Urban	Major Collector	0		State Highway Agency	Spot	Intersections	Improve Operations

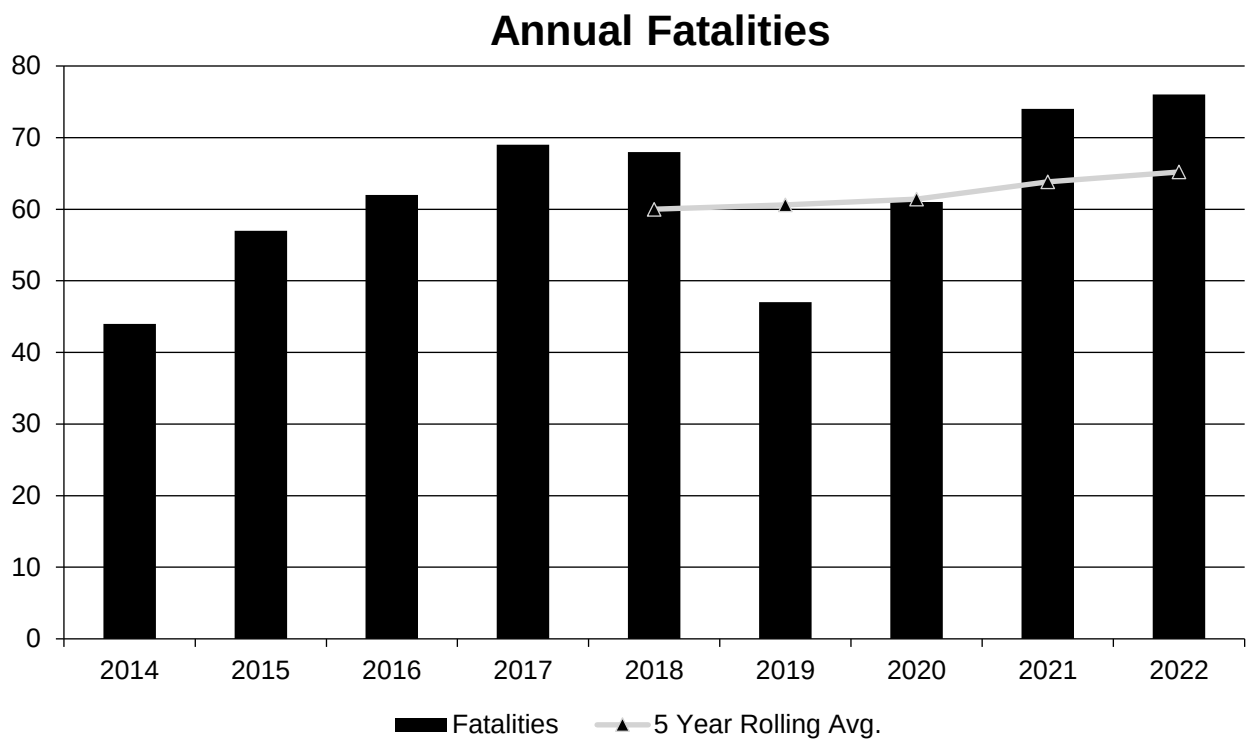
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
RUTLAND CITY STP BP14(24) - Development	Pedestrians and bicyclists	Pedestrians and bicyclists – other	0.25	Miles	$885600	$1323000	VRU Safety Special Rule (23 U.S.C. 148(g)(3))	Urban	N/A	0		Town or Township Highway Agency	Spot	Pedestrians	Bicycle or Pedestrian Improvement
RUTLAND TOWN NHG SGNL(59) - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Locations	$65000	$722875	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	25,291	40	State Highway Agency	Spot	Intersections	Improve Operations
SHELBURNE-SOUTH BURLINGTON NHG SGNL(51)C/2 - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	1.212	Miles	$265026	$6435396	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	0		State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
SOUTH HERO STP HES 028-1(22) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.265	Miles	$525898	$2699708	HSIP (23 U.S.C. 148)	Rural	Major Collector	7,922	35	State Highway Agency	Spot	Intersections	Improve Geometry
STATEWIDE HES HSIP(12) - Planned	Miscellaneous	Data collection	1	Locations	$540000	$2400000	HSIP (23 U.S.C. 148)	N/A	N/A	0		State Highway Agency	HSIP Program Support	Data	Improve Data Quality
STATEWIDE HES SHSP(19) - Planned	Miscellaneous	Miscellaneous - other	1	Locations	$3316	$180000	HSIP (23 U.S.C. 148)	N/A	N/A	0		State Highway Agency	HSIP Program Support	Data	Improve Data Quality
STATEWIDE HES SHSP(19) - Planned	Miscellaneous	Miscellaneous - other	1	Locations	$64910	$180000	Penalty Funds (23 U.S.C. 164)	N/A	N/A	0		State Highway Agency	HSIP Program Support	Data	Improve Data Quality
STATEWIDE HSIP(11) - Planned	Miscellaneous	Data analysis	1	Locations	$200000	$400000	Penalty Funds (23 U.S.C. 164)	N/A	N/A	0		State Highway Agency	HSIP Program Support	Data	Improve Data Quality
STATEWIDE HSIP(13) - Planned	Miscellaneous	Transportation safety planning	1	Locations	$600000	$1100000	Penalty Funds (23 U.S.C. 164)	N/A	N/A	0		State Highway Agency	HSIP Program Support	All Emphais Areas	Improve Infrastructues for all Users
STOWE STPG SGNL(52) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.13	Miles	$6000	$1368279	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	0	30	State Highway Agency	Spot	Intersections	Improve Geometry
STOWE STPG SGNL(52) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.13	Miles	$476242	$1368279	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	0	30	State Highway Agency	Spot	Intersections	Improve Geometry
WILLISTON STP 5500(17) - Development	Roadway	Roadway widening - add lane(s) along segment	0.706	Miles	$435000	$1950000	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	31,284	40	State Highway Agency	Spot	Lane Departure	Improve Geometry

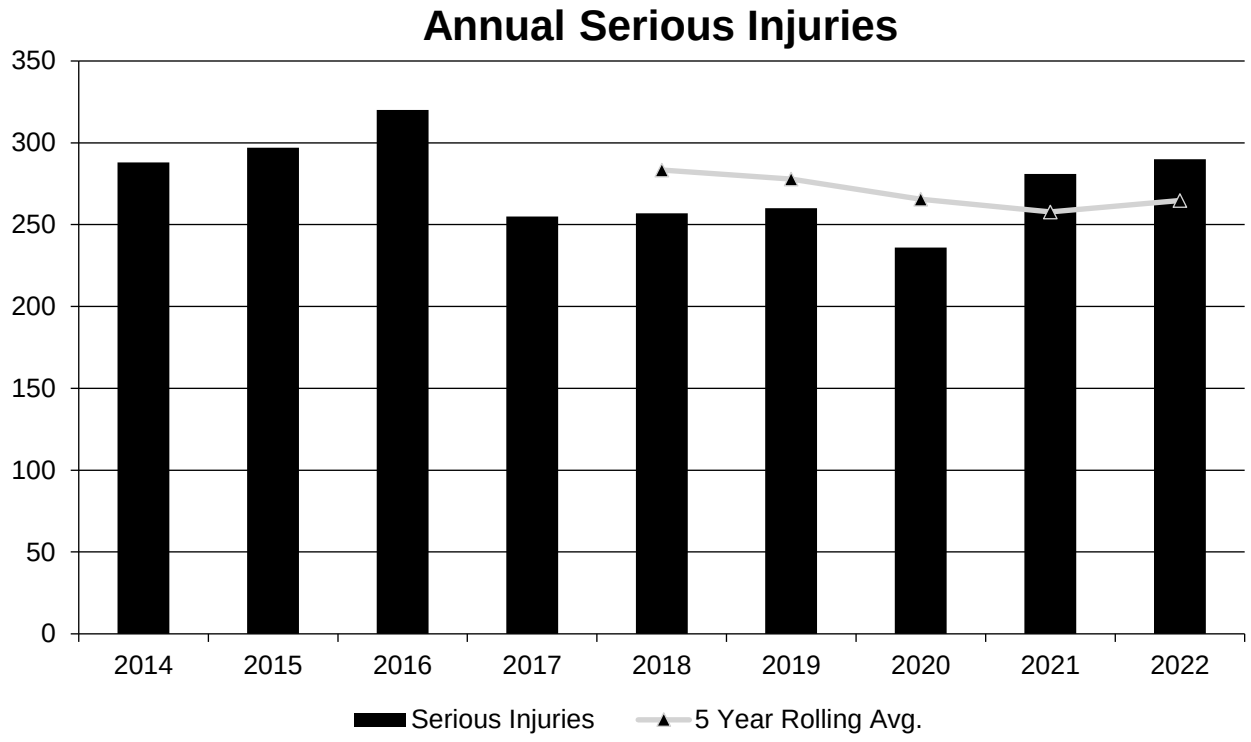
Safety Performance

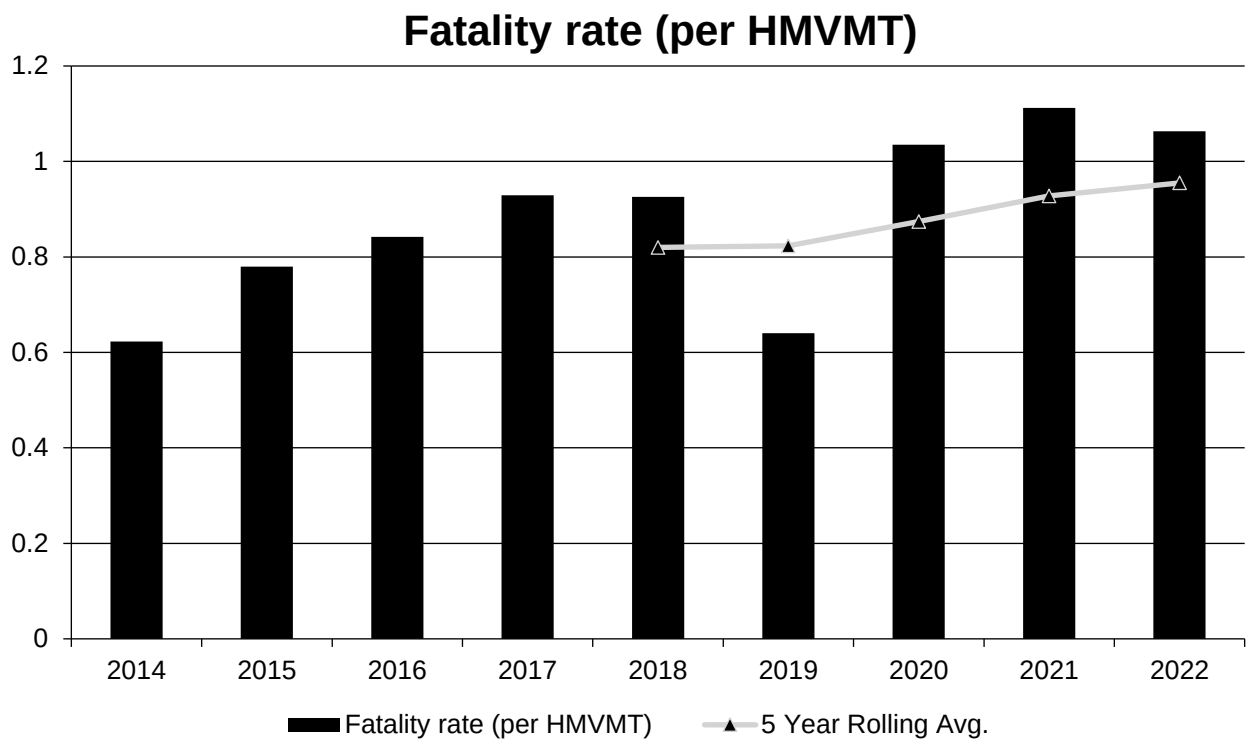
General Highway Safety Trends

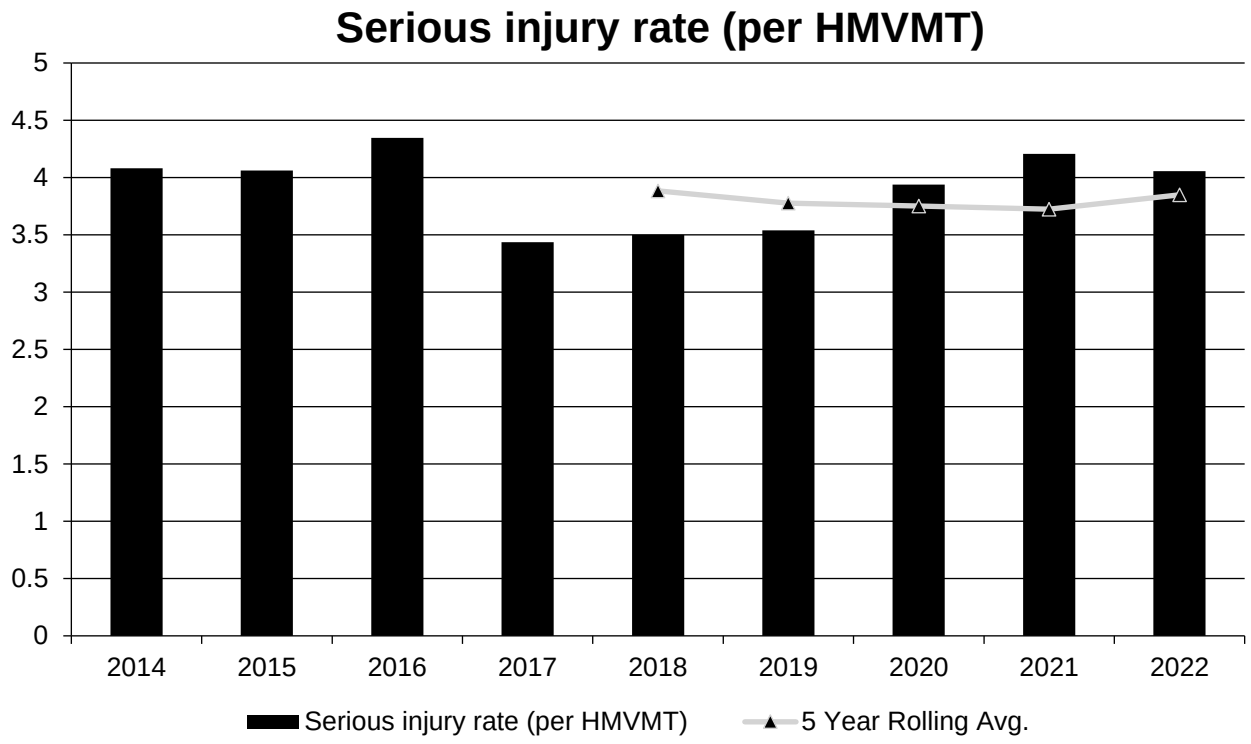
Present data showing the general highway safety trends in the State for the past five years.

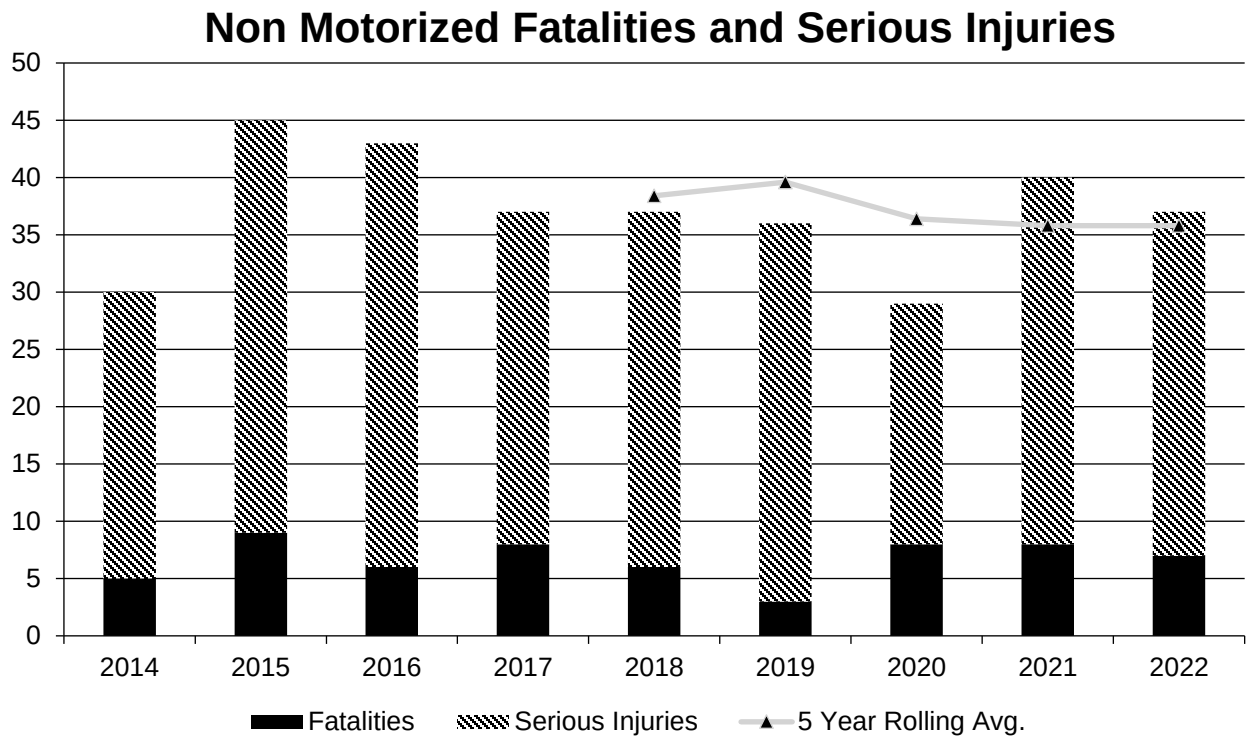
PERFORMANCE MEASURES	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fatalities	44	57	62	69	68	47	61	74	76
Serious Injuries	288	297	320	255	257	260	236	281	290
Fatality rate (per HMVMT)	0.623	0.780	0.842	0.929	0.926	0.640	1.035	1.112	1.063
Serious injury rate (per HMVMT)	4.080	4.062	4.345	3.435	3.499	3.540	3.940	4.206	4.055
Number non-motorized fatalities	5	9	6	8	6	3	8	8	7
Number of non-motorized serious injuries	25	36	37	29	31	33	21	32	30


Annual Fatalities
80
70
60
50
40
30
20
10
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
350
300
250
200
150
100
50
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.2
1
0.8
0.6
0.4
0.2
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Describe fatality data source.

FARS

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

Year 2022

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	6.4	17.2		
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other	7	26.4		
Rural Minor Arterial	18.6	51.8		
Rural Minor Collector	1.6	9		
Rural Major Collector	11.6	45		

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	9.4	36.2		
Urban Principal Arterial (UPA) - Interstate	1.4	6.2		
Urban Principal Arterial (UPA) - Other Freeways and Expressways				
Urban Principal Arterial (UPA) - Other	4.2	30.8		
Urban Minor Arterial	2	14.2		
Urban Minor Collector				
Urban Major Collector	1.8	16.8		
Urban Local Road or Street	0.8	6		

Year 2022

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	47.8	168.2		
County Highway Agency				
Town or Township Highway Agency	10	40.6		
City or Municipal Highway Agency	7.2	43.8		
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				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				

Provide additional discussion related to general highway safety trends.

In Vermont, a group public and private entities under the organization of the Vermont Highway Safety Alliance (VHSA) continues to collaborate towards safety efforts by promoting safety through education. VTrans also not only manages the Highway Safety Improvement Program but it also operates the State Highway Safety Office. This has facilitated the coordination and implementation of behavioral countermeasures targeted at the Critical Emphasis Areas listed in the SHSP.

Over the years, leaving the road is the principal crash type that has accounted for a large proportion of major crashes (fatal plus serious injury crashes). The 2022-2026 SHSP reports this percentage to be over 70%. Roadway departure crashes and crashes taking place at intersections are the crash types that are more readily addressed by the HSIP or other systematic efforts.

For several years, VTrans has been implementing statewide policies related to the inclusion of centerline rumble stripes and the SafetyEdge on all paving projects. As VTrans safety culture continues to grow, more emphasis on harmonization with planned projects will be sought in the future.

Regardless of these efforts, like in many parts of the country, fatalities have been occurring at a higher rate than usual over the last few years in Vermont. Speeding and aggressive driving, distracted driving, lack of seat belt use and impairment by alcohol or other drugs continue to be the principal factors.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2024 Targets *

Number of Fatalities:65.0

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

The Excel regression trend line value for 2024 is estimated at 68.2. The ARIMA forecast for 2024 is 65.6 with a 95% confidence interval of between 61.3 and 69.9.

The current baseline for 2024 is 65.6. A reason why the 2024 5-year average appears to be increasing compared to previous years, is that the 2019 number of fatalities, 47, is no longer part of the calculation. On the other hand, fatal crashes are still trending up. As of May 2023, when the target was evaluated, the number of fatal crashes and the number of fatalities in Vermont were lower than in 2022 but similar to 2021. In 2021, the total number of fatalities was 74.

The 2022-2026 SHSP calls for a 10% reduction in the 5-year average of the number of fatalities. Assuming a constant linear reduction, this represents a 2% reduction per year from 2022 numbers. To support the SHSP goal, this means that the 2024 target should be 63. However, Assuming that the number of fatalities in 2023 could be again above 65, to achieve a target that supports the SHSP goal means that an unrealistic reduction in the number of fatalities in 2024 will be needed, in the order of around 30 to 40 fatalities.

Based on the above, VTrans decided to keep the 2023 target value for 2024. The 2024 target was set at 65.

Vermont has been changing in 2022 the ways that it is using HSIP funding and has started to allocate funding where the data indicate the problems are, by focusing more on rural roadways and systemic projects. The results of these changes will, however, not be seen in the immediate future.

Number of Serious Injuries:258.0

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

The 2022-2026 SHSP calls for a 10% reduction in the 5-year average of the number of suspected serious injuries, a 2% reduction per year. To support the SHSP goal, this means that the 2024 target should be 253.4.

The number of suspected serious injuries has been trending up over the last five years, with a slight increase from 280 to 286 injuries in the most recent two years (2021 and 2022). The number of suspected serious injuries for the 1st quarter of 2023 was in pace with 2022.

A sensitivity analysis indicates that two high years in 2023 and 2024 (e.g., 280 each year) would bring the 2024 5-yr average to 272.4 and that on the other hand, with two years resembling numbers of prior to 2020 (e.g., 260), the 2024 5-yr average would be 264.4.

The Excel regression trend line value for 2024 is estimated at 254.7.The ARIMA forecast for 2024 is 269.8 with a 95% confidence interval of between 249.1 and 290.5.

Based on the above, VTrans decided to keep the 2023 target value for 2024. The 2024 target was set at 258.

This target maintains the current baseline for the SHSP with the aim of achieving greater reductions in the number of serious injuries in the later years of the plan as the outcome of the new HSIP funding allocations being currently deployed by Vermont are expected to improve safety.

Fatality Rate:0.965

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

The new approach established in 2022 for Vermont to reallocate its HSIP funds in greater proportions towards rural roads and systemic projects will not have an effect in the short term in reducing fatalities.

Vehicle miles traveled (VMT) are approaching the level that they were before the pandemic but are still lower.

The Excel regression trend line value for 2024 is estimated at 1.039. The ARIMA forecast for 2024 is 0.963 with a 95% confidence interval of between 0.852 and 1.073.

From the previous discussion concerning the five-year average for fatalities, a fatality rate scenario that would produce a target to support the yearly SHSP 2% crash reduction is likely unrealistic.

VTrans decided to keep the 2023 target value for 2024. The 2024 target was set at 0.965, and this formed the basis for setting this target.

Serious Injury Rate:3.746

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

The Excel regression trend line value for 2024 is estimated at 3.763. The ARIMA forecast for 2024 is 3.816 with a 95% confidence interval of between 3.690 and 3.942.

A value of 3.672 would be the target needed to support the straight application of the of 10% per year SHSP reduction goal. However, injury crashes have been increasing.

Based on the above, VTrans decided to keep the 2023 target value for 2024. The 2024 target was set at 3.746.

This target is above what would support the SHSP goal in terms of rate. Short and mid-term HSIP investments are expected to achieve greater reductions in the number of serious injuries in the later year of the SHSP as Vermont changed in 2022 the ways it is using HSIP funds by being more data driven and directing funds toward rural roads and more systemic projects.

Total Number of Non-Motorized Fatalities and Serious Injuries:34.0

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

The 2022-2026 SHSP calls for a 10% reduction in the 5-year average of the number of fatalities and in the number of suspected serious injuries. The 2022 non-motorized fatalities & suspected serious injuries 5-year average was 36. To support the 10% SHSP goal reduction, or the equivalent reduction of 2% per year, the 2024 target should be 34.6.

The Excel regression trend line value for 2024 is estimated at 34.1. The ARIMA forecast for 2024 is 37.2 with a 95% confidence interval of between 34.2 and 40.2.

Based on this information, the target has been set at 34 and supports the SHSP goal. The target is the same as it was for 2023.

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

In Vermont, the “State Highway Safety Office” is part of the Vermont Agency of Transportation. The “State Highway Safety Office” and the section that is responsible for the HSIP reporting are both under the Operations & Safety Bureau.

The three safety performance measures that have been common to both the NHTSA’s Highway Safety Plan, HSP, and FHWA’s Highway Safety Improvement Program, HSIP, (Number of fatalities, Fatality rate, Number of serious injuries) were developed initially by the Data & Analysis Section of the Operations & Safety Bureau using trend lines and ARIMA forecasting.

The other two measures (Serious injury rate and Pedestrian & Bicycle Fatalities and Serious Injuries) are required only for FHWA’s Highway Safety Improvement Program. These two measures were also originally determined by the Data & Analysis Section.

A coordination meeting was held with the Chittenden County MPO, the “State Highway Safety Office”, the Data and HSIP Sections of the Operations and Safety Bureau as well with its HSIP consultant and the Planning and Policy Bureau to discuss the draft targets.

In spring 2023, FHWA and NHTSA waived, for federal fiscal year 2024, the requirement that performance targets submitted for common performance measures be identical in the HSIP reporting and the HSP. Given this, VTrans decided to submit slightly different targets for the common performance measures for fiscal year 2024 for the two programs (HSIP and HSP).

Does the State want to report additional optional targets?

No

Vermont does not wish to establish separate targets for the urbanized areas.

Describe progress toward meeting the State’s 2022 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	58.0	65.2
Number of Serious Injuries	260.0	264.8

Fatality Rate	0.820	0.955
Serious Injury Rate	3.700	3.848
Non-Motorized Fatalities and Serious Injuries	35.0	35.8

Vermont determined to have not made significant progress towards meeting its 2022 targets as only two out of the five safety performance targets were met or were better than the 2020 baseline performances.

Vermont did not meet the 2022 target for the number of fatalities. The actual 5-year average performance for 2018-2022 (65.2) was higher than the established target for 2022 (58) and it was also not better than the 2016-2020 baseline (61.4) .

The number of fatalities in 2016 was 47. Prior to the pandemic, fatalities in Vermont had been typically in the 60s.

The number of fatalities in 2016 was much lower than usual and contributed to a lower trend line and lower goal setting. In addition, fatalities in Vermont in 2021 and in 2022 increased into the 70s, above what Vermont had experienced in the recent past.

The 2021 and 2022 increases in fatalities followed the national trend that has happened post-covid lockdowns. Speeding and more reckless driving are suspected to have contributed to the increase in fatalities.

- Vermont did not meet the 2022 fatality rate target. The actual performance for 2018-2022 (0.955) was higher than the established target for 2022 (0.820). Similarly, it was also not better than the 2016-2020 baseline (0.874).

The primary reason for not meeting this target is that the number of vehicle miles traveled during 2020 was approximately 18% lower due to the pandemic. Vehicle miles traveled in 2021 were 9% lower than the level of the pre-pandemic and in 2022, vehicle miles traveled were about 3% lower. In addition, the number of fatalities has been increasing in recent years in the lower 70s from being in the 60s.

- Vermont did not meet the number of suspected serious injuries target. The actual performance for 2018-2020 (264.8) was higher than the established target for 2022 (260). However, the actual performance (264.8) was better than the 2016-2020 baseline (265.6) and Vermont thus made significant progress.

- Vermont did not meet the 2022 suspected serious injury rate target. The actual performance for 2018-2022 (3.848) was higher than the established target for 2022 (3.700). Similarly, it was also not better than the 2016-2020 baseline (3.752).

The primary reason for not meeting this target is that the number of vehicle miles traveled during 2020 was approximately 18% lower due to the pandemic. Vehicle miles traveled in 2021 were 9% lower than the level of the pre-pandemic and in 2022, vehicle miles traveled were about 3% lower. In addition, the number of suspected serious injuries has increased since the pandemic due to speeding.

·- Vermont did not meet the number of non-motorized fatalities and non-motorized serious injuries target. The actual performance for 2018-2020 (35.8) was higher than the established target for 2022 (35.0). However, the actual performance (35.8) was better than the 2016-2020 baseline (36.4) and Vermont thus made significant progress.

Applicability of Special Rules

Does the VRU Safety Special Rule apply to the State for this reporting period?

Yes

For calendar year 2020, the number of traffic fatalities for vulnerable road users was fifteen percent of the total fatalities in Vermont.

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

Yes

Vermont's 5-year average fatality rates based on 100 MVMT on the three functional classifications of rural roads for the periods ending 2018 and 2020 increased from 1.077 to 1.133.

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	2016	2017	2018	2019	2020	2021	
Number of Older Driver and Pedestrian Fatalities	11	13	13	11	11	12	19
Number of Older Driver and Pedestrian Serious Injuries	31	31	26	30	25	52	40

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Change in fatalities and serious injuries
- Other-Change in fatal and serious injury crashes

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

The overall effectiveness of the HSIP is measured by changes in the number of fatalities and suspected serious injuries as well as by changes in the number of fatal and suspected serious injury crashes (referred to as major crashes).

Fatal and Injury Crashes (Major Crashes):

While the trend in the five-year average of the number of fatal crashes has increased from the 2014-2018 period to the 2018-2022 period, from 55.8 fatal crashes to 61.0, the five-year average of the number of suspected serious injury crashes has been going down, passing from 232.8 serious injury crashes to 220.4.

Overall, the trend in the five-year average of the number of major crashes has been downward from 287.8 major crashes to 283.6 major crashes.

Fatalities and Serious Injuries:

The five-year average of the number of fatalities went up when comparing the same two periods, passing from 60.0 to 65.2 fatalities. On the other hand, comparing the same two periods, shows that the five-year average of the number of serious injuries went down from 283.4 to 264.8 serious injuries.

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

- HSIP Obligations
- Increased awareness of safety and data-driven process
- Increased focus on local road safety
- More systemic programs

A continued increased awareness of data-driven processes indicates success as there has been a new desire in Vermont to use data-driven processes to identify projects and to allocate funding. Examples of new data initiatives include the systemic analysis of lane departure and intersection crashes and the evaluation of the intersection control evaluation (ICE) process to include predictive safety analysis in the scoping of non-scoping projects.

There has been an increased desire at VTrans to allocate more funds to systemic programs and to municipalities for local safety projects and to include safety countermeasures in all projects through harmonization.

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

In the past year, VTrans included pedestrian and bicycle improvements as HSIP projects to satisfy the special rule requirements in FFY 23 and initiated also the conduct of a Vulnerable Road User Safety Assessment under the HSIP. Funding prioritized new, separated facilities in areas with high rates of zero-car households and crash exposure. These funds were routed through Vermont's existing bicycle and pedestrian grant program.

Vermont has also made significant changes to selection of systemic projects. Vermont initiated two systemic network screenings for roadway departure and intersection crashes, classifying sites by risk and matching to potential countermeasures. These results will seed future rounds of systemic projects. Vermont also created a municipal grant program for small-scale systemic improvements, allowing towns to select and apply for sites.

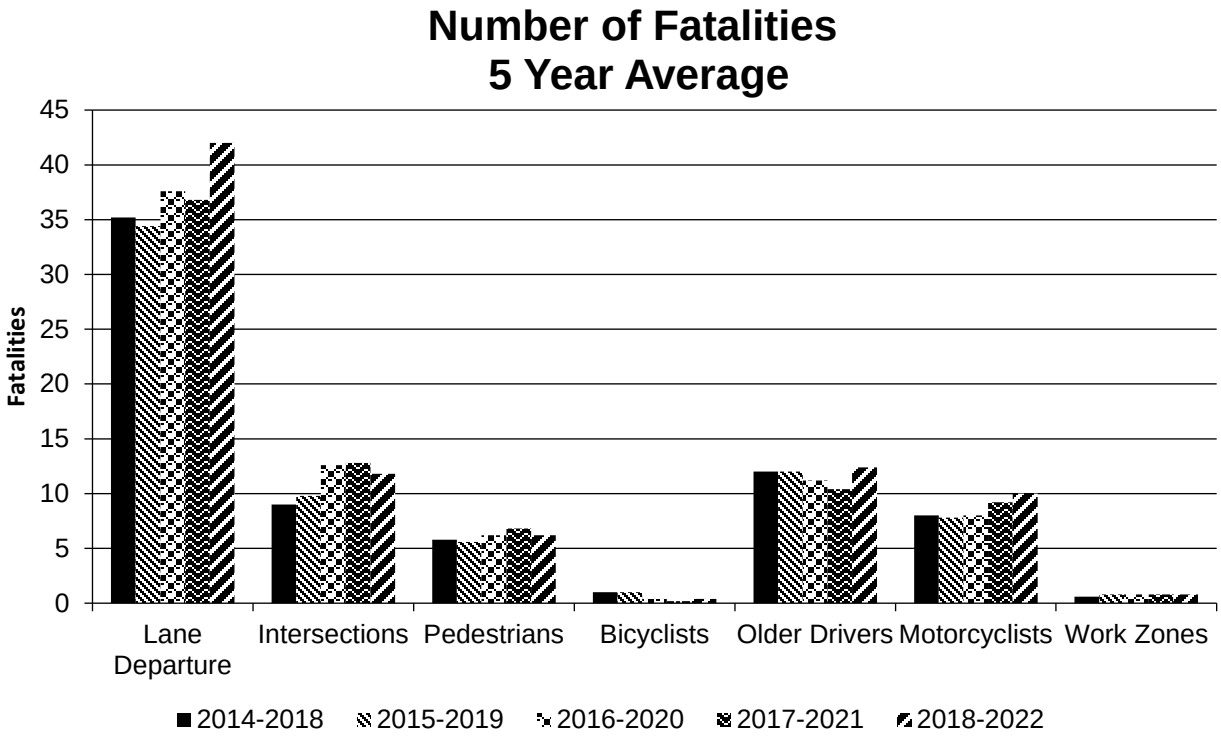
Finally, Vermont has created a larger program role for Data & Administration projects. As adopted in the new HSIP Manual, Vermont now targets 10% of HSIP spending for data and administrative improvements. This has been used for additional consultant support, acquisition of probe data, and will be used to procure a network screening software next year.

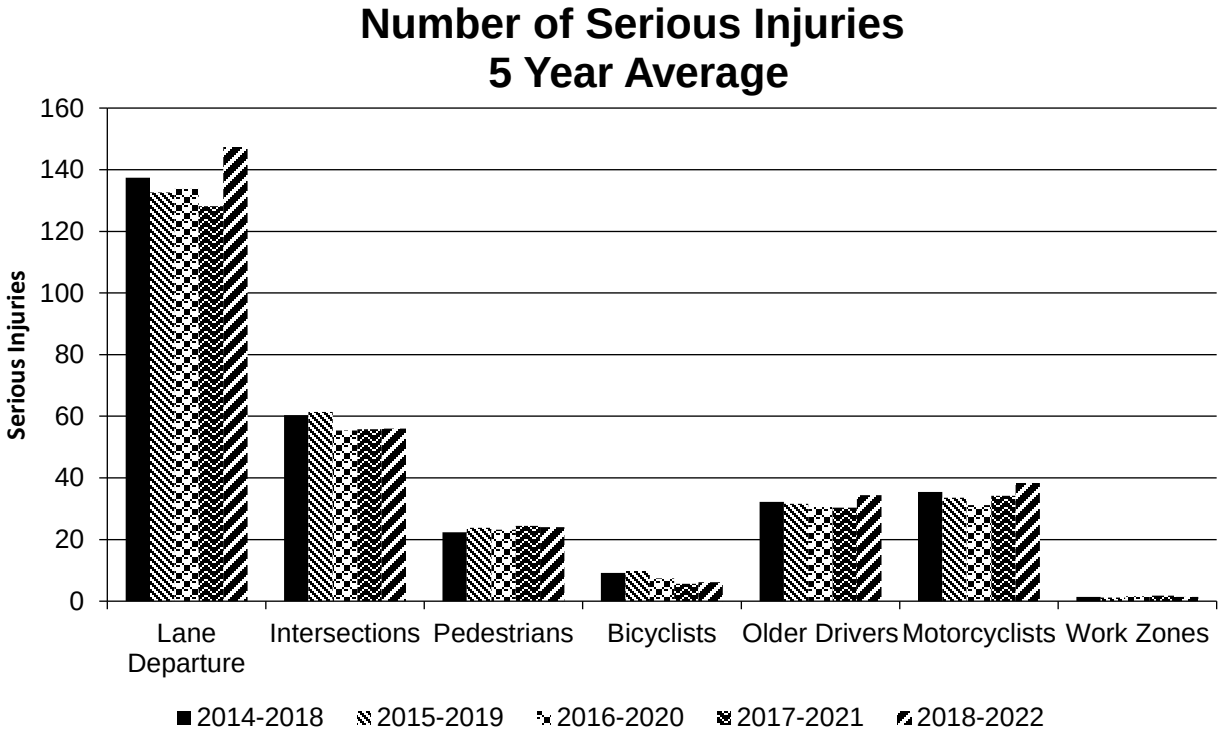
Effectiveness of Groupings or Similar Types of Improvements

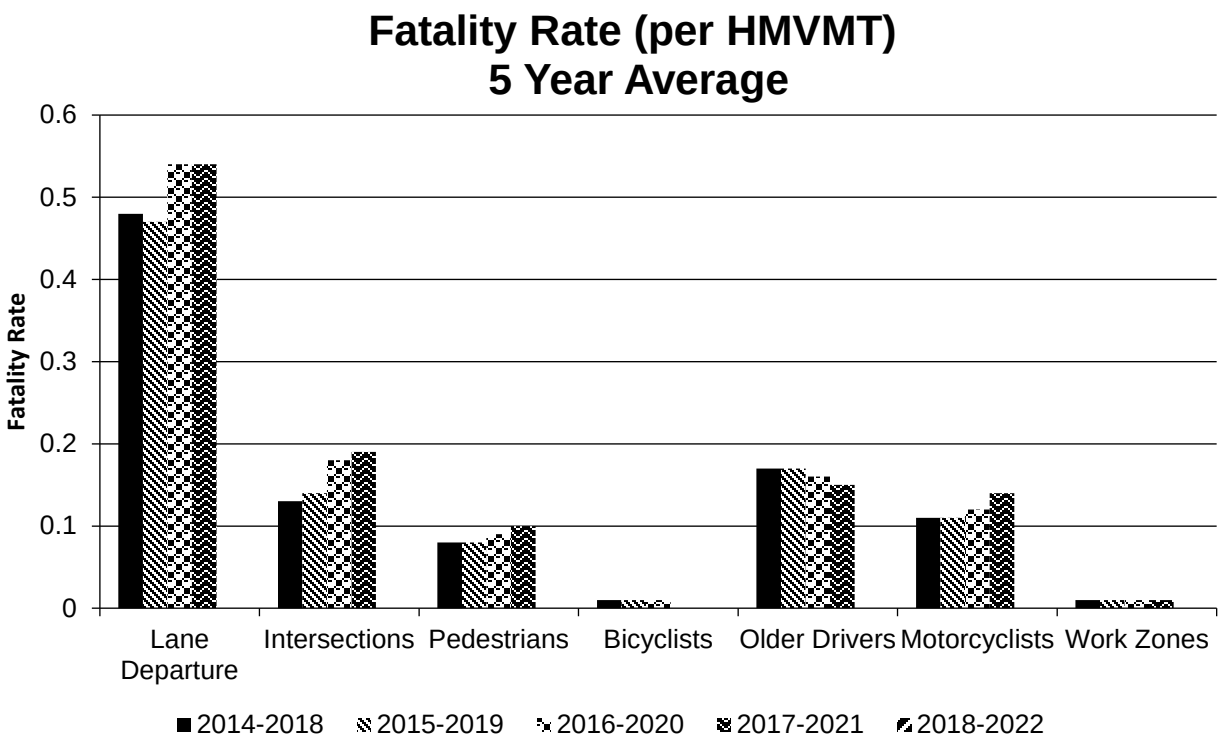
Present and describe trends in SHSP emphasis area performance measures.

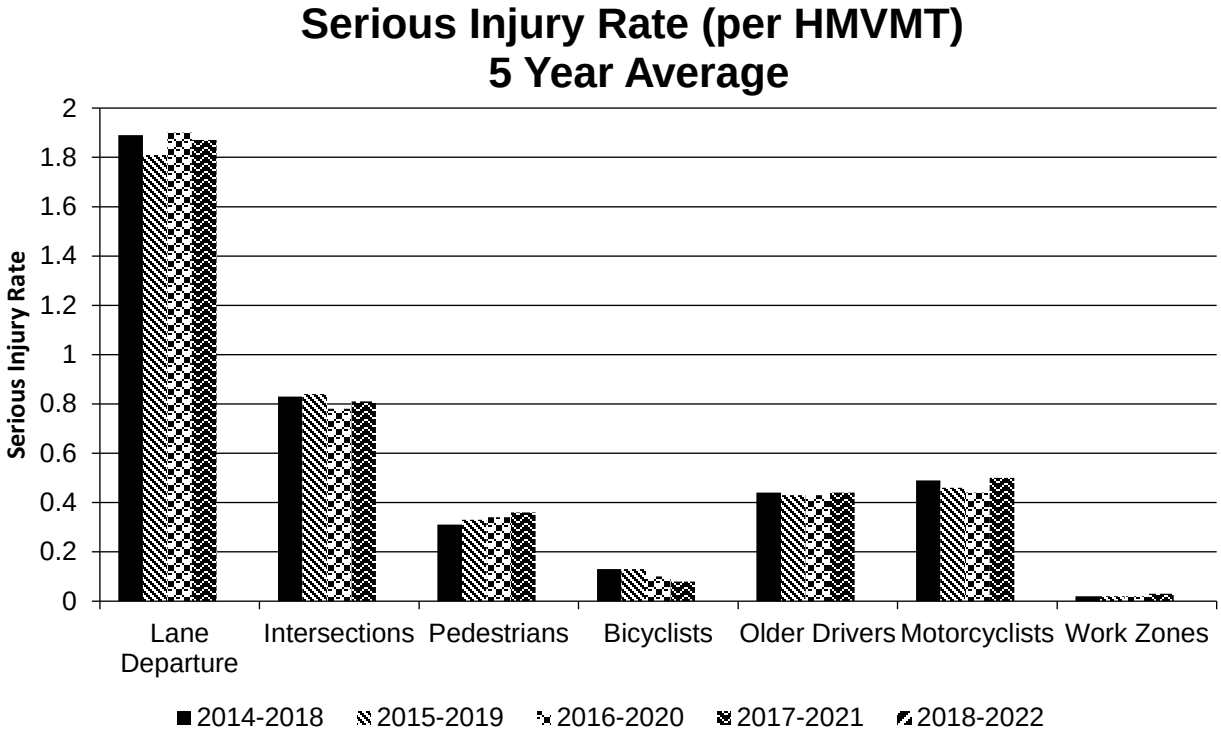
Year 2022

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)
Lane Departure		42	147.4		
Intersections		11.8	56		
Pedestrians		6.2	24		
Bicyclists		0.4	6.2		
Older Drivers		12.4	34.4		
Motorcyclists		10	38.4		
Work Zones		0.8	1.4		


Number of Fatalities
5 Year Average
Fatalities
45
40
35
30
25
20
15
10
5
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2014-2018
2015-2019
2016-2020
2017-2021
2018-2022


Number of Serious Injuries
5 Year Average
Serious Injuries
160
140
120
100
80
60
40
20
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2014-2018
2015-2019
2016-2020
2017-2021
2018-2022


Fatality Rate (per HMVMT)
5 Year Average
Fatality Rate
0.6
0.5
0.4
0.3
0.2
0.1
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2014-2018
2015-2019
2016-2020
2017-2021
2018-2022


Serious Injury Rate (per HMVMT)
5 Year Average
Serious Injury Rate
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2014-2018
2015-2019
2016-2020
2017-2021
2018-2022

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)
Charlotte NHG SGNL(49)	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	4.00	10.00					2.00	1.00	6.00	11.00	-1.70
Springfield STP 016-2(23)	Rural Minor Arterial	Intersection traffic control	Modify control – new traffic signal	13.00	9.00						1.00	13.00	10.00	-0.39

The table reports the evaluation of projects that were constructed in 2019 with HSIP funds. The evaluation was performed using the Simple Before-After Method with three full years of before and after crash data. The evaluation results represent the benefits to costs ratio (B/C) for each project.

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

Of the emphasis areas identified in the SHSP, lane departure crashes and intersection crashes are the two areas that specifically relate to engineering and the HSIP.

The 2022-2026 SHSP has target reductions for the intersection and lane departure emphasis areas that have been set at 15% and 10% of 2021 average thresholds. This represents a five-year target of 50 major crashes for intersection crashes and a five-year average target of 137 major crashes for lane departure crashes.

The latest five-year average (2018-2022) for lane departure and intersection crashes indicates that these crashes are trending upward. The latest five-year average (2018-2022) for lane departure crashes is 158.2 major crashes and is above the five-year average for 2017-2021 of 152.8 major crashes. Similarly, the latest five-year average (2018-2022) for intersection crashes is 59.8 major crashes and is above the five-year average for 2017-2021 of 58.8 major crashes.

Compliance Assessment

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

06/03/2022

What are the years being covered by the current SHSP?

From: 2022 To: 2026

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

2027

Vermont's current SHSP 2022 -2026 was approved by the Secretary of the Vermont Agency of Transportation on June 3, 2022. FHWA confirmed the approval of the process used to update Vermont's SHSP 2022 -2026 on June 16, 2022, The next update of the SHSP is due July 1, 2027.

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

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

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

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Functional Class (19) [19]	100	100					100	100	100	100
	Median Type (54) [55]	95	95								
	Access Control (22) [23]	100	100								
	One/Two Way Operations (91) [93]	100	100								
	Number of Through Lanes (31) [32]	100	100					100	62		
	Average Annual Daily Traffic (79) [81]	88	88					100	96		
	AADT Year (80) [82]	88	88								
	Type of Governmental Ownership (4) [4]	100	100					100	100	100	100
INTERSECTION	Unique Junction Identifier (120) [110]			100	100						
	Location Identifier for Road 1 Crossing Point (122) [112]			100	100						
	Location Identifier for Road 2 Crossing Point (123) [113]			100	100						
	Intersection/Junction Geometry (126) [116]			91	98						
	Intersection/Junction Traffic Control (131) [131]			83	95						
	AADT for Each Intersecting Road (79) [81]			83	96						
	AADT Year (80) [82]			83	96						
	Unique Approach Identifier (139) [129]			100	100						
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100	100				

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Location Identifier for Roadway at Beginning of Ramp Terminal (197) [187]					100	100				
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					100	100				
	Ramp Length (187) [177]					100	100				
	Roadway Type at Beginning of Ramp Terminal (195) [185]					20	20				
	Roadway Type at End Ramp Terminal (199) [189]					20	20				
	Interchange Type (182) [172]					100	100				
	Ramp AADT (191) [181]					100	100				
	Year of Ramp AADT (192) [182]					100	100				
	Functional Class (19) [19]					100	100				
	Type of Governmental Ownership (4) [4]					100	100				
Totals (Average Percent Complete):		**98.39**	**98.39**	**92.50**	**98.13**	**85.45**	**85.45**	**100.00**	**95.33**	**100.00**	**100.00**

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

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.

VTrans continues to work to meet the MIRE fundamental data element (FDE) requirements by September 30, 2026. Over the last year, there has been an effort to migrate existing roadway data to meet the data schema for MIRE and the development of missing elements. VTrans is also building an extract, transform and load (ETL) process for those elements that can not be migrated in the near term, with output from the ETL process being roadway segments, intersections, and interchange ramps. To date, the process for the roadway segments has been partially developed.

Much of the data needed to support the FDE requirements exist at VTrans to support the Highway Performance Monitoring System (HPMS) or other systems, but there were some elements that were identified at the beginning of the process that didn’t exist. There has been significant progress toward meeting the MIRE FDE requirements, but there is still work remaining to fill data gaps and complete the build out the ETL processes.

In 2021, the FHWA Office of Safety performed an assessment for the VTrans MIRE data and provided a scorecard. Based on this, VTrans is between 84% and 100% complete on having the coverage and format necessary to meet the MIRE FDE requirements. This assessment identified several areas where attributes at VTrans do not meet the required criteria and there will need to be revisions to the VTrans process for maintaining and reporting these fields. There were also gaps identified in data that need to be filled and some alterations to how data is currently being classified.

VTrans had a Traffic Records Assessment performed in the spring of 2022, which provided a review of the roadway data elements and assessment of any gaps in the data. This has prompted development of the addition of MIRE specific roadway element fields, such as Route Type and Federal Aid.

One area of success for MIRE is the development of the intersection data, coordination with a vendor early in the process to build out data for the federal aid highways, working with the Regional Planning Commissions (RPCs) to build out local road data, and the integration of processes to pull data from other sources to map to the data elements in the intersection point (nodes) and approach (node legs) data layers. There are still some gaps in this dataset, but there has been a significant amount of work done to date and processes that are in place to allow for the remainder of FDEs to be defined.

The MIRE data that is generated from the ETL process will be posted to the enterprise GIS repository and then served to the open geodata portal through feature services. This will provide access to internal GIS at VTrans and also to external users.

Tasks needed to comply with the 2026 deadline include:

- Review of the areas for improvement identified in the 2021 FHWA MIRE Assessment and 2022 Traffic Records Assessment
- Build out some data elements to match MIRE requirements, such as non-NHS highways to have full coverage of the ARNOLD data.
- Incorporate more detailed pavement classification to match MIRE schema
- Perform a rigorous assessment of what exists, identify gaps, and develop a data acquisition plan.
- Continue to develop validation tools and processes to ensure the highest quality of data.
- Expand the technology and methodologies for collecting the MIRE FDEs.
- Develop extract, transform and load (ETL) processes to reformat existing enterprise data to the MIRE data element schema.
- Determine a process for data exchange with other agencies that will collect data.
- Estimating the costs, levels of staffing, or resource requirements to collect the MIRE FDEs.
- Identifying funding for the collection, storage, and maintenance of the MIRE FDE data.
- Making the data accessible through the on-line geodata portal through web services.

Optional Attachments

Program Structure:

Vermont HSIP Low Cost Program October 2016.pdf
Systemic Local Road Safety Program for Sites Reviewed Before 2020.pdf
VTrans HSIP Manual Nov 2022-Final.pdf
Vermont HSIP Low Cost Program October 2016.pdf
Systemic Local Road Safety Program.pdf
Project Implementation:

Safety Performance:

Vermont Status Progress Towards Meeting its Safety Targets.pdf
Evaluation:

Compliance Assessment:

Glossary

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

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

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

HMVMT: means hundred million vehicle miles traveled.

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

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

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

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

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

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

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

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

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