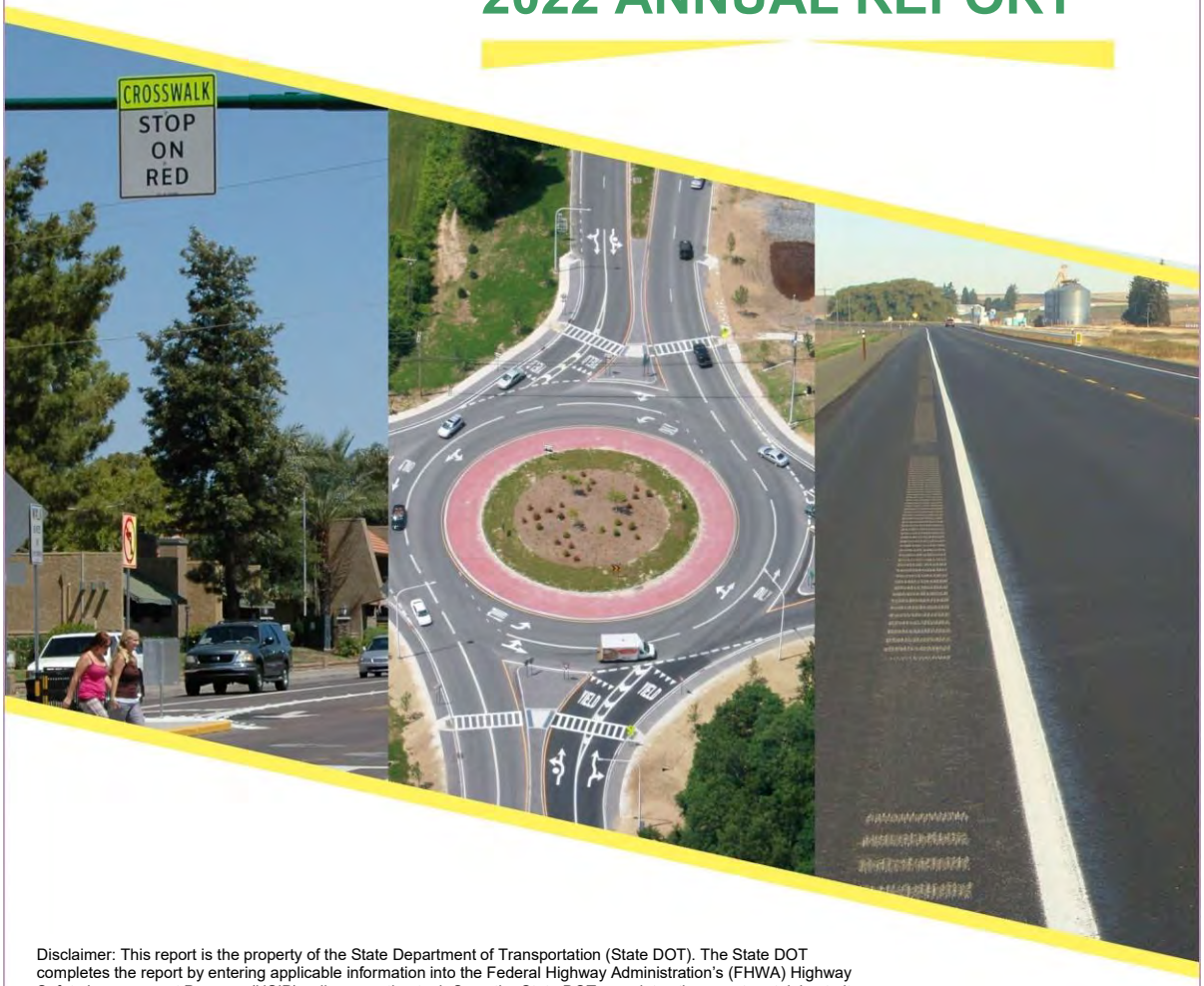
MASSACHUSETTS

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2022 ANNUAL REPORT



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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. 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

A Massachusetts HSIP Task Force was established in 2009 to develop guidelines for HSIP-eligible projects and programs. The Task Force consisted of FHWA, MassDOT Highway, MassDOT Planning and MARPA (Massachusetts Association of Regional Planning Agencies)/MPOs. Criteria for HSIP projects were defined. But the role of the Task Force was not to select individual projects and programs. The Task Force had met annually or as needed. In 2019, the Task Force was updated to include additional member in an effort to help move HSIP projects to advertise in a timely manner. MassDOT District Project Development Engineers were added and additional MPO members. At the time, the guidelines for HSIP projects were updated (in draft) to emphasize systemic projects and projects combined with other project types to broaden the impacts of the HSIP program.

This coming year it will be updated again now that MassDOT has developed network screening crash-based and risk-based based models (and further updating them this year). An HSIP Implementation Plan was completed last year which highlights the need for systemic projects. A guide was just finalized this year to evaluate project alternatives to improve the efficiency of the HSIP program. Furthermore, after years of trying to resolve the ROW issue for systemic projects and having FHWA arrange for a peer exchange with 5 other states, we have not been able to resolve the ROW issue but FHWA has encouraged MassDOT to utilize materials only contracts and provide materials to locals to assist with safety countermeasures. Additionally, Massachusetts is in the process of updating the SHSP and will have that completed in FFY 2023. Finally, for the past few years, the Traffic & Safety Engineering Section of MassDOT Highway Division and the MPOs have selected projects based on the capital improvement funding categories but not the funding source. That was done in MassDOT Planning. This has resulted in HSIP projects that may not be the most effective at reducing fatal and serious injuries.

Therefore, all of the above necessitates the redrafting of the HSIP guidelines. This should help to reinvigorate the HSIP Task Force so that the project selection for HSIP can be effective and responsive to the needs of SHSP strategies and ensure project readiness and ability of projects to be advertised in a timely manner. This should become more noticeable with the project selection for the coming years.

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.

A Massachusetts HSIP Task Force was initially established in 2009 to develop guidelines for HSIP-eligible projects and programs. The Task Forces role was to develop HSIP guidelines not to select individual projects. At the time, the Task Force consisted of FHWA, MassDOT Highway, MassDOT Planning and MARPA (Massachusetts Association of Regional Planning Agencies)/MPOs. It was determined that an HSIP eligible project was defined as one that contains a hot spot crash location (a cluster in which the total number of "equivalent property damage only" crashes in the cluster is within the top 5% of all clusters in a specific region), systemic fixes or any strategy, activity or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

The equivalent property damage only (EPDO) calculations were changed in 2018 to reflect the FHWA methodology for crash costs. Rather than the previous system of 10 points for a fatal crash, 5 points for an injury crash and 1 point for a property damage only crash, the new EPDO calculations are based on weighted average costs of crashes. So as not to be chasing fatal crashes only, the combined weighting of fatal and injury crashes is 21 times that of a property damage only crash. This new weighting was used in hot spot selection. This is described in a previous Top Crash Locations Report. https://www.mass.gov/doc/2017-top-crash-locations-report/download . To view the HSIP eligible clusters, go to: https://gis.massdot.state.ma.us/topcrashlocations/ . Recently developed in 2021, MassDOT has been using crash predictive methods and developed Safety Performance Functions for various types of collector and arterial roadways. This was then input into a new IMPACT network screening tool so that users can query, visualize, and export data for the Top 5% of segments (segments with the greatest difference between expected and predicted crashes). This is available in the Massachusetts crash data portal, IMPACT. https://apps.impact.dot.state.ma.us/sat/HotSpotNetworkScreening While the guidelines have not yet been updated to reflect this but the Top 5% locations are also HSIP eligible. Furthermore, MassDOT is moving to a more proactive systemic approach and has developed risk model for many of the emphasis areas within our SHSP. These models, and their detailed reports explaining the derivation of the models, were recently added to IMPACT in late summer 2021 and can be found at https://apps.impact.dot.state.ma.us/sat/NetworkEmphasisArea . Although HSIP guidelines have not yet been updated, Top risk locations will be eligible for systemic HSIP projects. In 2022, both the crash-based and risk-based network screening are being updated. The SHSP is also being updated and will be completed at the end of calendar yar 2022. The HSIP guidelines will be updated this coming year to reflect all of the work that has been done and is being done.

MassDOT Federal Aid Programming and Reimbursement Office and MassDOT Planning allocate the Federal funds into various categories for the Statewide Transportation Improvement Program (STIP), including

Statewide HSIP funds and HSIP funds for each of the regions under "Intersection Improvements" and "Safety Improvements". HSIP projects are selected based on the HSIP guidelines, the MPO processes, priority and readiness (regardless of roadway jurisdiction). Once an HSIP project (hot spot) has been identified, an early requirement is a Road Safety Audit which helps to guide the recommended improvements.

Based on a number of factors (outlined in response to Question 2, the HSIP Task Force will reconvene next year and update the guidelines so that HSIP project selection will result in the most effective projects to reduce fatalities and serious injuries.

Where is HSIP staff located within the State DOT?

Engineering

How are HSIP funds allocated in a State?

- Formula via MPOs
- Other-combination

The Capital Improvement Program (CIP) has pots of funds (like "Intersections", "Safety Improvements", "Interstate Maintenance", etc.), The MPOs and Sections assign projects to the CIP categories with recommendations which funding source to use (CMAQ, HSIP, STP, etc.) and then Planning assigns the projects to the specific funding category.

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

Working with the 13 Regional Planning Agencies (RPAs) and the 13 Metropolitan Planning Organizations (MPOs) that encompass the entire geographic area of the Commonwealth of Massachusetts, HSIP funds are allocated not only to projects that are eligible within the statewide Highway Safety Improvements Program but also to eligible projects programmed by the MPOs, which may include local roads and tribal roads. Because most of the project proponents in the Commonwealth are municipalities, these projects are locally initiated, driven, and coordinated with MassDOT through the project initiation and development process. There is close coordination between our Traffic Safety division staff and MPO/RPA staff on the sharing of data and identifying crash cluster locations and prioritizing safety improvements to assist local entities and the MPOs in making sound safety investment decisions. Providing the IMPACT crash data portal to the locals, with a safety analysis module and other tools, assists them to advance projects based on data driven processes.(https://apps.impact.dot.state.ma.us/cdp/home). Furthermore, this coming year, with IIJA funds available to locals for Safe Street for All program, MassDOT is updating the IMPACT tool to provide a data package to assist the locals to apply for grants without having to perform major data analytics on their own.

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

- Design
- Districts/Regions
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety

Describe coordination with internal partners.

Previously, the HSIP Task Force consists of seven members: 2 FHWA representatives (one from Massachusetts Division Office in Planning and one from the Massachusetts Division Office in Safety), 2 representatives from MassDOT Highway Division (Chief Engineer and Safety Engineer), one from MassDOT Office of Transportation Planning and two representatives from the Regional Planning Agencies (RPAs), the technical arm of the Metropolitan Planning Organizations (MPOs). The initial role of the Task Force was to establish HSIP guidelines based on input and feedback from others. The continuing role of the Task Force is to meet annually or as needed, ("meetings" could be via email or in person) to review and update the HSIP guidelines. The HSIP Task Force does not select the individual projects / programs. However, in 2019, the Task Force was expanded to include additional members from MassDOT's Project Development Engineers and additional MPOs as a means to move projects along more quickly and to be more nimble and responsive to safety needs. Based on a number of changes since 2019, the Task Force will reconvene next year (upon completion of the SHSP) and draft up updated guidelines.

Program and project selection occurs both in MassDOT HQ, MassDOT District and at the regional MPO level. Once projects are selected, the MassDOT Planning Office allocates the funding type to the STIP categories so that the full pot of HSIP funds are programmed.

For hot spot locations, Road Safety Audits are required and there is participation from a variety of disciplines both internal and external to MassDOT. MassDOT personnel include: MassDOT Safety and MassDOT District personnel as well as needed from MassDOT Highway Design, MassDOT Project Management, Complete Streets Engineer and others.

Identify which external partners are involved with HSIP planning.

- Academia/University
- FHWA
- Governors Highway Safety Office
- Law Enforcement Agency
- Local Government Agency
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)
- Other-SHSP Emphasis area team members
- Other-Advocacy groups
- Other-Public Health

Describe coordination with external partners.

All HSIP projects must be based on strategies identified in the SHSP which, in the past, has been developed with the assistance from our internal and external partners. The SHSP is in the process of being updated and will be completed by the end of calendar year 2022. So far to date, this has involved participation from over 200 participants from more than 25 agencies (including all of those external partners mentioned in the response to Question 9) and entities and the strategies identified in the SHSP are those that can be used for the HSIP eligible projects. Furthermore, all HSIP-eligible spot improvement projects require Road Safety Audits which ensures coordination with external partners. Project selection has a significant amount of external input through the MPO public process. Some specific programs are based on an Ad Hoc basis, as needed, and typically involve participation from external sources. As an example, we are working on a fatal and serious injury rural lane departure reduction program. Many of the locations identified are municipally owned. We have worked with locals to gauge interest and participation. As a first step in this program, MassDOT purchased and provided speed feedback trailers (through non-HSIP funds) to 10 rural local communities after using a data driven process to identify the communities with the greatest need. We will then work with the local communities on training and supplying materials to further reduce lane departure crashes.

Program Methodology

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

No

We used to have a guidance document but things have changed so much, as we move towards a more rigorous Safety Management Process, that a manual or guidance document has not yet been completed. The next HSIP annual report should have this answer as yes.

Select the programs that are administered under the HSIP.

- HSIP (no subprograms)

We do not yet have specific HSIP allocations. We had developed an HSIP Implementation Plan which we were planning on using that as a base for developing HSIP allocations but that has not yet happened.. We will have it next year, specifically with VRU.

Program: HSIP (no subprograms)

Date of Program Methodology:9/30/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- Other-Based on EPDO and data for intrsecitons nad other hot spot clusters

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-intersections EPDO (FI = 21 and O = 1)	• Traffic	• Median width • Horizontal curvature • Functional classification

What project identification methodology was used for this program?

- Equivalent property damage only (EPDO Crash frequency)
- 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?

- Other-eligibility and readiness

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-readiness:100
Total Relative Weight:100

What percentage of HSIP funds address systemic improvements?

10.6

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

- High friction surface treatment

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.

MassDOT definitely considers connected vehicles and ITS technologies as part of the safety solution. We are in the process of implementing a pilot project for Wrong Way Vehicle Detection systems at 17 key interchange ramps around Massachusetts. It is a statewide pilot program for detection and notification of vehicles entering the freeway ramps the wrong direction. This system will hopefully drastically reduce wrong way incidents at our highest occurring ramp locations. The project will use advanced technology to identify wrong way vehicles in real time and send alerts to our HOC and Mass State Police. The pilot project is scheduled to become operational within the year. This project used HSIP funding. The Route 9 Connected Corridor project is under construction and will add connected vehicle technology and adaptive control at 37 intersections along Route 9 from Worcester, MA to Wellesley, MA. This project was part of the SPaT challenge and used CMAQ funding. In Phase II, this will allow advance notice for motorists driving along the corridor of signal timing and phasing and pedestrian detection in crosswalks. The Connected Corridor will also allow snow and ice vehicles to extend signal phasing to help with operational progression along the corridor (i.e. not having the stop at each intersection if activated). MassDOT has been implementing smart work zone technologies since 2009 and has been awarded a USDOT Grant for the purpose of working cooperatively with other states, vendors and FHWA to have defined field device and traffic data added to the standardized WZ data feed specification, extending

the static work zone information to include dynamic real time information. MassDOT utilizes SWZ applications to provide real time feedback to drivers regarding travel times and congestion information, incidents, temporary closures and other information that will enhance the safety of road users and workers. MassDOT is in final design of the Districts 1 and 2 Signal Safety project that will provide connected vehicle technology capabilities on all signals in D1 and D2. In 2017, MassDOT worked with WAZE to install beacons in our tunnel system to aid driver navigation where GPS is lost. (Although no Federal funds were used for this). The batteries are at life expectancy and a replacement project is planned for summer 2022. MassDOT was actively involved in the EDC Use of Crowdsourcing in Operations and last year we piloted an interactive dashboard with FHWA and its contractor's assistance. There are aspects of this that will help with Safety as well but, HSIP funds were not used for this. MassDOT contracted with RITIS/INRIX and Streetlight to make use of travel time, speed and volume data to supplement our permanent count station program and can be used on our projects and in Planning features (but not using HSIP funds). We continue to look forward to other technologies that will enhance safety and reduce fatalities and injuries on the public roadways.

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.

In general, IMPACT (https://apps.impact.dot.state.ma.us/cdp/home) is our public-facing crash data portal which is designed to encourage public safety initiatives and awareness specific to crash information. Within IMPACT one can engage with crash related data through easy to understand pre-built reports, dashboards, tools and visualizations or one can conduct self-driven analysis this is all part of the safety management process identified in Part B of the HSM and is used for inputs into Part C of the HSM.

MassDOT uses both the predictive methodology and the empirical-Bayes method described in the Highway Safety Manual to support administrating the HSIP. In 2020, MassDOT completed the network screening process to consider the difference between expected and predicted crashes using HSM methodologies and Massachusetts-specific safety performance functions. Furthermore, a systemic risk-based network screening was also developed for nearly all of the emphasis areas in the SHSP. (Interestingly enough, many of the risk based models incorporated equity into the risk factors based on statistically significant information.) These models (both crash based and risk based) are visualized in a public-facing tool so any user (internal or external) can easily query, visualize, and export the Top 5% crash segments (https://apps.impact.dot.state.ma.us/sat/landing). We have recently begun updating all the models and will have that completed in 2022.

During RSAs (especially for HSIP projects), MassDOT uses HSM methodologies so expected crash frequency can be used for discussion, diagnosis, and countermeasure selection.

MassDOT also uses HSM methodologies to evaluate HSIP projects at the site-, project-, and countermeasure level. The empirical-Bayes method is used to estimate the number of crashes expected in the after period had no change occurred to compare with what was observed in the after period.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

Federal Fiscal Year
The projects / programs are from FFY 2021 but crash data are based on calendar years

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$24,799,685	$24,415,748	98.45%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$0	$0	0%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
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)	$104,646,761	$119,888,885	114.57%
State and Local Funds	$28,917,211	$44,339,669	153.33%
Totals	$158,363,657	$188,644,302	119.12%

This information was received from our FAPRO (Federal Aid) office.

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

52%

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

53%
These are the projects that are on locally owned roadways.

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

0%

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

0%
No non-infrastructure projects this year under HSIP funds

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.

There are two main impediments to obligating HSIP funds. One is project readiness. If a programmed project is not able to advertise (for any number of reasons), it is very difficult to just swap in another HSIP project because there are limited projects that already designed and ready to advertise. This could be because projects are rarely advanced in design unless they are already programmed on the STIP and even then, they are designed and reviewed to meet the advertising date. So if a programmed project is not able to advertise, we are often left with a hole to try and fill in a replacement project.

The second major impediment to obligating HSIP funds is that we are struggling to develop low cost-short term systemic projects here in Massachusetts. We are not able to have local communities self-certify that project work all occurs within the public way. This must only be done with layout plans or survey. Therefore, any simple pavement marking and/or signage project (typically the low cost/short term type systemic projects) must include a survey which adds time and expense and precludes the short term / low cost projects.

Based on the above two factors, it sometimes makes it challenging for MassDOT to obligate funds. This is especially true in cases in which we have short notice such as for High Risk Rural Roads Projects when we are informed 18 months before they must be obligated that we fall within the rule and must obligate a certain amount of money. It is too short of a time frame to develop a project (including ROW, environmental processes, etc.) so we struggle with what can be done.

There are steps we have taken to resolve these issues. A Project Manager from the MassDOT Design Section will be providing assistance to push projects along. With regards to the difficulties we face for systemic project, MassDOT Traffic and Safety Engineering has been meeting with FHWA ROW Section and MassDOT ROW Section to try to resolve ROW issues with regards to low cost systemic projects. In the short term, we anticipate testing out systemic projects on MassDOT roadways only where layouts are available. This was done for a rural High Friction Surface Treatment project. Last year, MassDOT developed an HSIP Implementation Plan, this highlighted the project types that would be most effective to reducing our fatalities and injuries. By highlighting these types of projects (systemic), there should have been a greater urgency to resolve some issues. In addition to this, FHWA helped set up a peer exchange with several other states and their FHWA Division offices so they could showcase how they conduct systemic projects. (Teaser, this meeting happened in 2022 and the end result is we could not solve the ROW issue but FHWA encouraged MassDOT to develop materials contracts and provide the materials to locals for them to install).

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
BOSTON - ROADWAY, CEILING, ARCH & WALL RECONSTRUCTION AND OTHER CONTROL SYSTEMS IN SUMNER TUNNEL	Miscellaneous				$5000000	$76718062	Other Federal-aid Funds (i.e. STBG, NHPP)	Urban	Principal Arterial-Other Freeways & Expressways	35,150	40	State Highway Agency			
READING - INTERSECTION SIGNALIZATION @ ROUTE 28 & HOPKINS STREET	Intersection traffic control	Modify control – new traffic signal	1	Intersections	$675377	$2161390	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	16,543	35	State Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
MASHPEE - CORRIDOR IMPROVEMENTS & RELATED WORK ON ROUTE 151, FROM OLD BARNSTABLE ROAD TO THE MASHPEE ROTARY	Roadway signs and traffic control	Roadway signs and traffic control - other	1.384	Miles	$412663	$11157034	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	16,030	40	Town or Township Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
EVERETT - RECONSTRUCTION OF FERRY STREET, SOUTH FERRY STREET AND A PORTION OF ELM STREET	Intersection traffic control	Modify control – Modern Roundabout	6	Intersections	$945266	$29134698	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	7,281	30	City or Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
SWAMPSCOTT - INTERSECTION & SIGNAL IMPROVEMENTS AT SR 1A (PARADISE ROAD) AT SWAMPSCOTT MALL	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$1203367	$1337074	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	25,779	35	State Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
WESTFIELD-IMPROVEMENTS & RELATED WORK ON ROUTE 20, COURT STREET &	Pedestrians and bicyclists	Install sidewalk	1.854	Miles	$1004192	$2868784	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	3,453	40	City or Municipal Highway Agency	Spot	Pedestrians	Incorporate pedestrian safety elements into

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
WESTERN AVENUE, LLOYDS HILL ROAD TO HIGH STREET/MILL STREET INTERSECTION (PHASE II)															infrastructure design and engineering
FRAMINGHAM-RECONSTRUCTION OF UNION AVENUE, FROM PROCTOR STREET TO MAIN STREET	Intersection traffic control	Modify control – new traffic signal	1.4	Miles	$900000	$10960186	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	12,557	35	City or Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
RAYNHAM-RESURFACING AND RELATED WORK ON ROUTE 138	Pedestrians and bicyclists	Install sidewalk	2.867	Miles	$2833529	$22373775	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	18,619	45	State Highway Agency	Spot	Pedestrians	Incorporate pedestrian safety elements into infrastructure design and engineering
NEW BEDFORD-INTERSECTION IMPROVEMENTS AND RELATED WORK AT ROCKDALE AVENUE AND ALLEN STREET	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$2319674	$2577416	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	9,600	30	City or Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
LEOMINSTER-IMPROVEMENTS AT ROUTE 12 (NORTH MAIN STREET) AT HAMILTON STREET, ROUTE 12 (NORTH MAIN STREET) AT NELSON STREET	Intersection traffic control	Modify traffic signal – modernization/replacement	2	Intersections	$7448129	$8275699	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	3,995	30	City or Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance
DISTRICT 1-DISTRICT 2-RESURFACING AND HIGH FRICTION SURFACE TREATMENT AND RELATED WORK AT	Roadway	Pavement surface – high friction surface	1.465	Miles	$2557488	$2841653	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	Incorporate safety elements into roadway design and maintenance

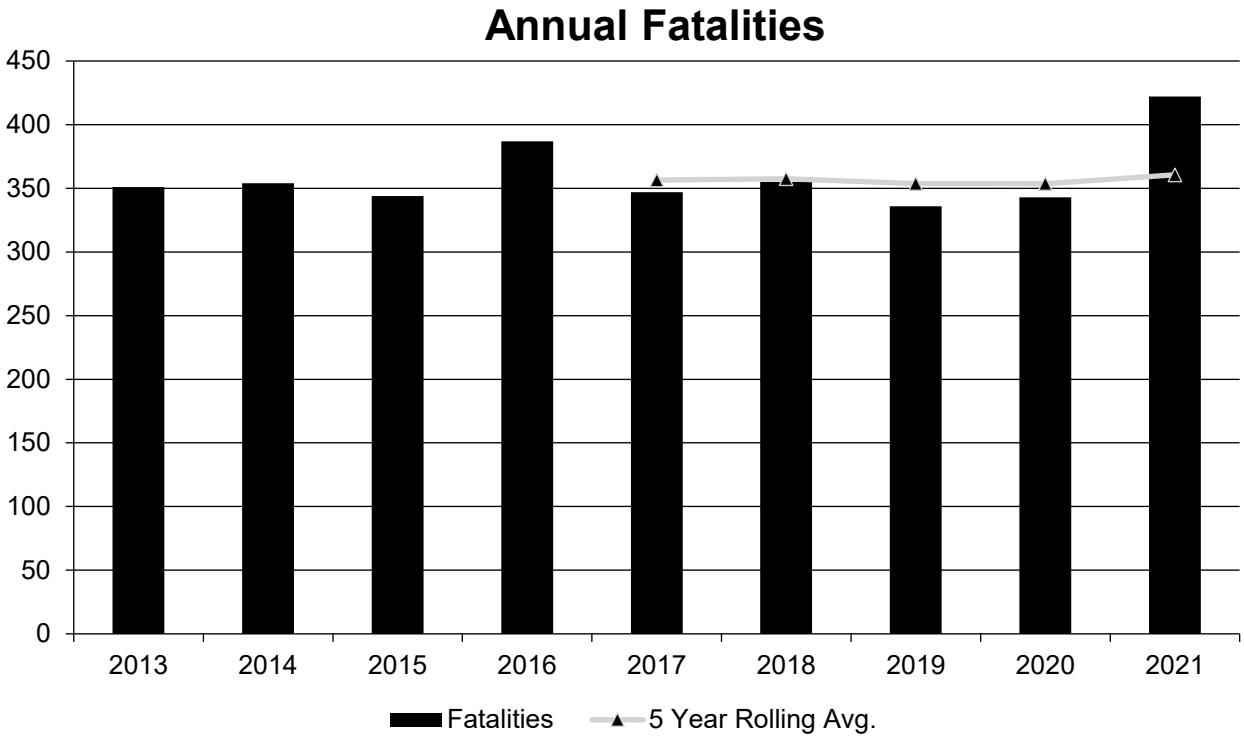
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
MULTIPLE LOCATIONS															

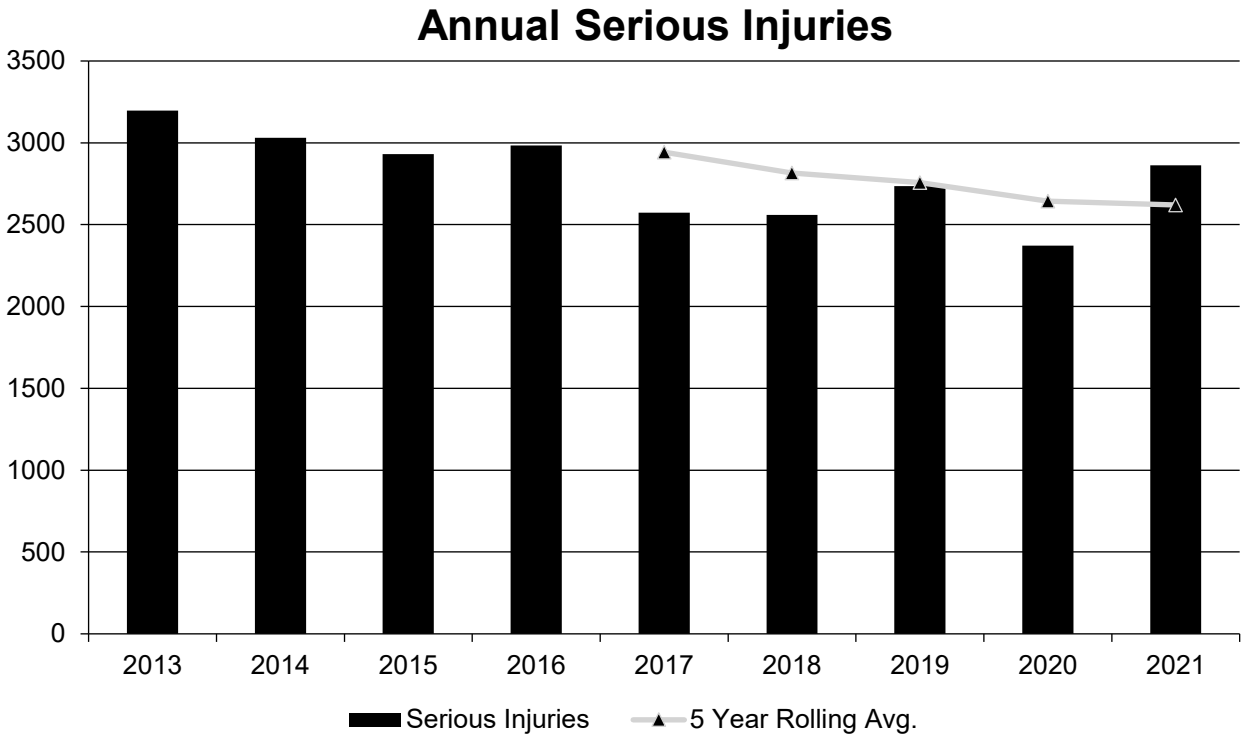
Safety Performance

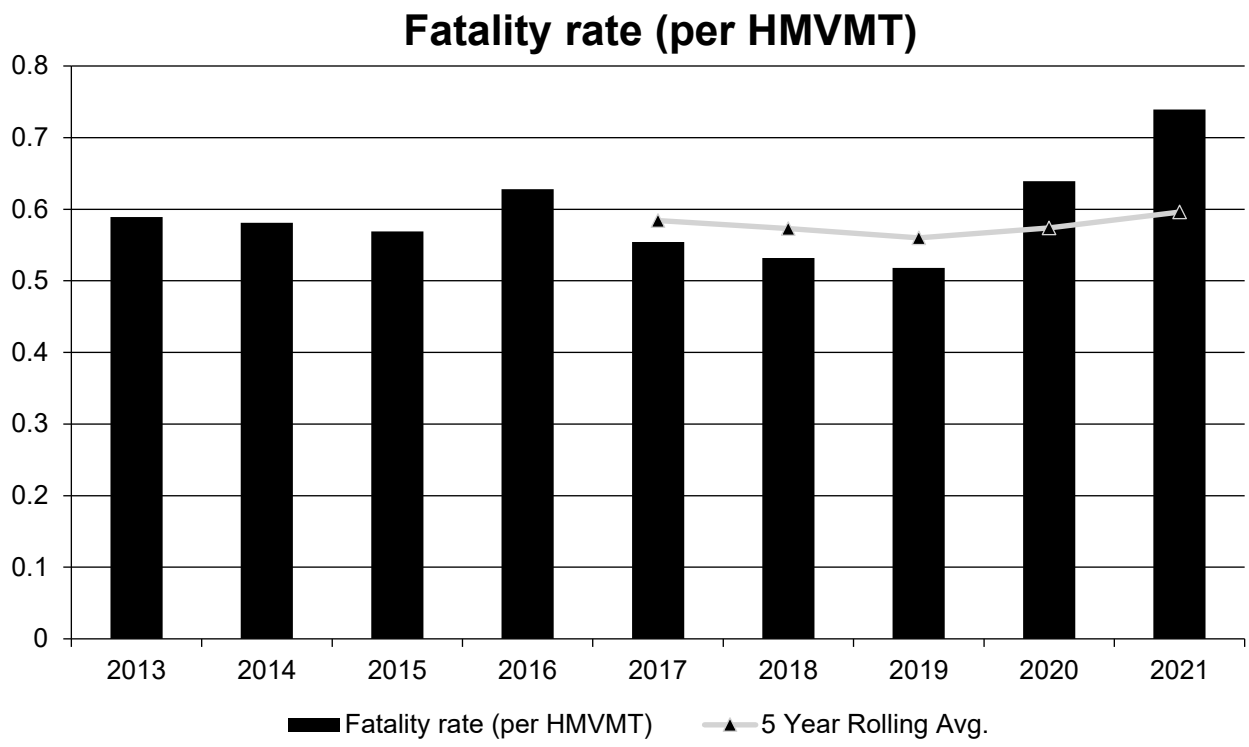
General Highway Safety Trends

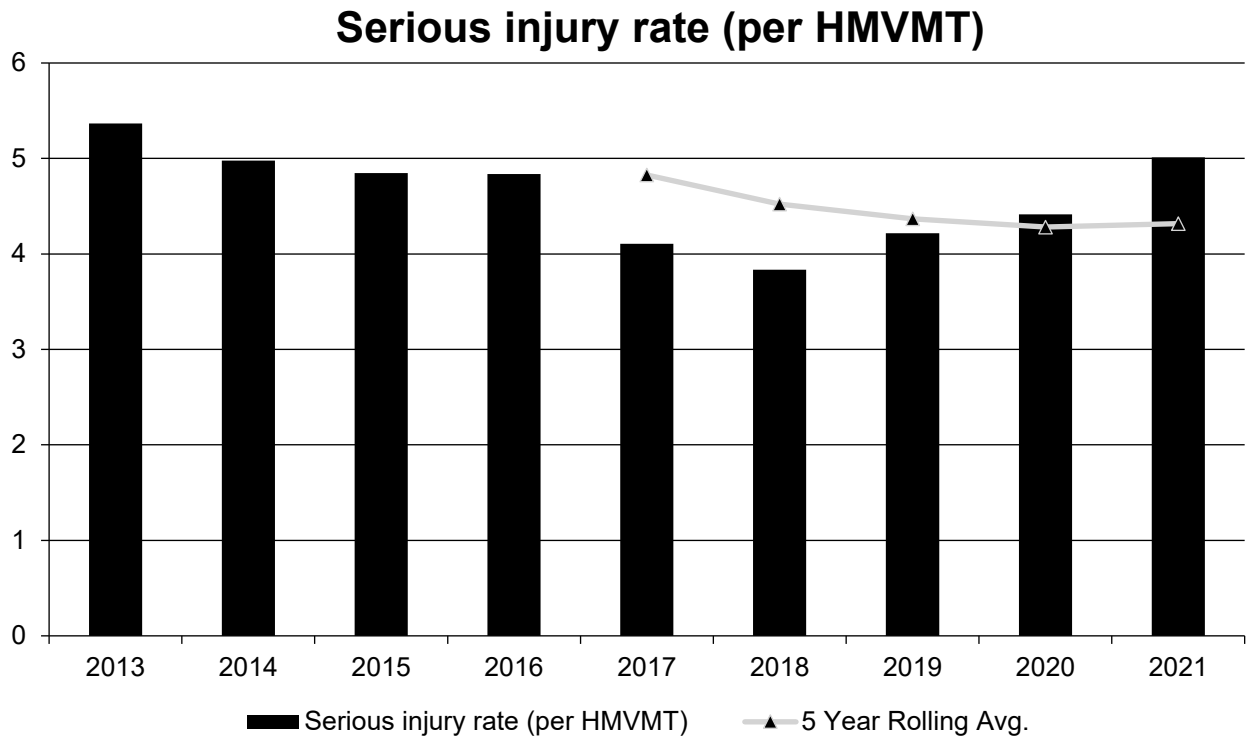
Present data showing the general highway safety trends in the State for the past five years.

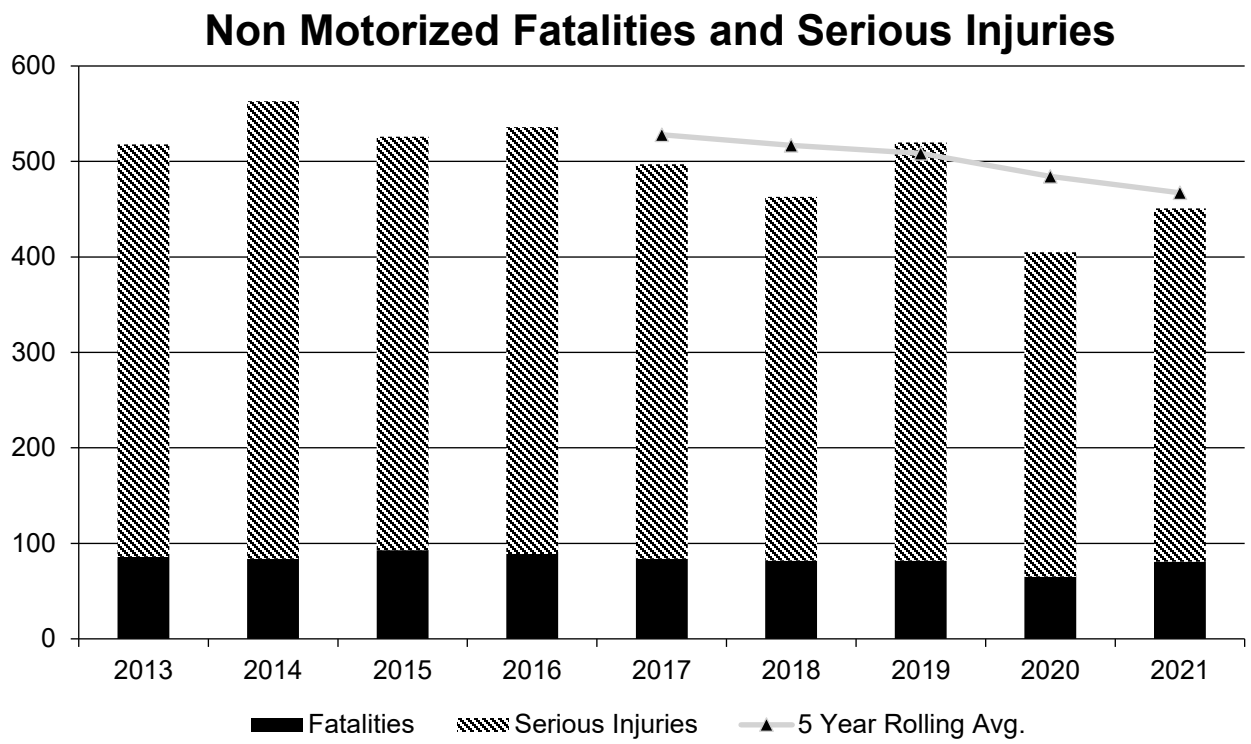
PERFORMANCE MEASURES	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fatalities	351	354	344	387	347	355	336	343	422
Serious Injuries	3,197	3,031	2,931	2,983	2,573	2,560	2,736	2,371	2,862
Fatality rate (per HMVMT)	0.589	0.581	0.569	0.628	0.554	0.532	0.518	0.639	0.739
Serious injury rate (per HMVMT)	5.365	4.977	4.848	4.838	4.106	3.834	4.216	4.416	5.012
Number non-motorized fatalities	86	84	93	89	84	82	82	65	81
Number of non-motorized serious injuries	432	479	433	447	413	381	438	340	370


Annual Fatalities
450
400
350
300
250
200
150
100
50
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
3500
3000
2500
2000
1500
1000
500
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
6
5
4
3
2
1
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Describe fatality data source.

Other

If Other Please describe

combination FARS website and FARS analysts in our State

For data through 2019, the data are based on the FARS public facing website. For 2020 and 2021, the data are based on our state's FARS' team data since the public facing website is not finalized for 2020 nor for 2021.

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

Year 2021

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	2.2	8	0.28	0.98
Rural Principal Arterial (RPA) - Other Freeways and Expressways	0.8	1.2	0.78	1.09
Rural Principal Arterial (RPA) - Other	3.4	5.6	1.23	2

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Minor Arterial	6.2	14.8	1.33	3.26
Rural Minor Collector	2.8	12	2.33	10.07
Rural Major Collector	5.4	26	0.81	3.92
Rural Local Road or Street	5.6	24.4	1.04	4.53
Urban Principal Arterial (UPA) - Interstate	59.2	229	0.37	1.42
Urban Principal Arterial (UPA) - Other Freeways and Expressways	13.2	116.6	0.21	1.87
Urban Principal Arterial (UPA) - Other	98.2	744.6	0.81	6.14
Urban Minor Arterial	93.2	788.6	0.79	6.68
Urban Minor Collector	0	0	0	0
Urban Major Collector	32.6	267.2	0.79	6.42
Urban Local Road or Street	35.6	313.8	0.44	3.87

Year 2021

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	156.8	832.2	0.49	2.56
County Highway Agency	0	0	0	0
Town or Township Highway Agency	0	0	0	0
City or Municipal Highway Agency	0	0	0	0
State Park, Forest, or Reservation Agency	0.2	1	0.24	1.19
Local Park, Forest or Reservation Agency	0	0	0	0
Other State Agency	7.4	42.6		
Other Local Agency	0	0	0	0
Private (Other than Railroad)	0.2	0.4	0.84	1.64
Railroad	0	0	0	0
State Toll Authority	0	0	0	0
Local Toll Authority	0	0	0	0
Other Public Instrumentality (e.g. Airport, School, University)	0	0.2	0	0.51
Indian Tribe Nation	0	0	0	0
Local Highway Agency (combined City/Town)	180	1,620.4	0.67	6.07
Federal/Army/Navy/Air Force	0	0.4	0	0.97
Unaccepted	4	37.8	0.34	3.19

- Vehicle mile traveled data are taken the Federal Highway Administration Office of Policy Information website https://www.fhwa.dot.gov/policyinformation/statistics/2007/vm2.cfm (link shown for 2007 but used for other years) and then checked against VMT information provided by the MassDOT Planning Office via the GIS VMT Viewer (https://gis.massdot.state.ma.us/dataviewers/vmt/). 2021 VMTs for Federal Functional Classification and Jurisdiction are preliminary and were obtained from the 2021 HPMS submittal.

- The fatality data for functional classification and jurisdiction came from FARS where available but updated based on updated data in the statewide system. The serious injury data for functional classification and for jurisdiction was obtained from IMPACT crash portal (https://apps.impact.dot.state.ma.us/cdp/home) from the Cross Tabulation tool. Fatal data for jurisdiction for years 2018-2021 were obtained from the IMPACT crash portal.
- Although the crash data is separated by urban major and minor collector, the VMTs are not and therefore, the two categories were combined. Major and minor collector crash numbers were pulled from the IMPACT crash portal.
- Non-geocoded crashes that contain no jurisdiction or functional classification were not included so totals may not add up.
- The category of “City OR Town Highway Agency” was added because Massachusetts did not make a distinction between these roads and the FARS data may not have been allocated to the official governance of the municipality type.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2023 Targets *

Number of Fatalities:355.0

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

Per FHWA guidance, the MassDOT target setting process began with a trend line projection based on the most recent available data. The 2020 fatalities were not finalized on the NHTSA FARS website when MassDOT began this process so the Massachusetts fatality data analyst provided the team with the 2020, 2021 and 2022 fatalities to date.

Due to COVID and the shutdowns in 2020 and the lingering impacts in 2021, the MA 2020 and 2021 fatality rates were not following the trend. Furthermore, the Infrastructure Investment and Jobs Act (IIJA) now requires "performance targets that demonstrate constant or improved performance" so MassDOT would be unable to use the increasing "targets".

Therefore, MassDOT took this opportunity to restate the ultimate goal of 0 fatalities and serious injuries on our roadways, but to also reflect a short-term target that would move the state in that direction.

Although the early part of 2022 was trending higher with fatalities than 2021, and the calendar year 2021 total was higher than calendar year 2020, MassDOT took this opportunity as a restart and developed targets by projecting 2022 annual fatalities to be equal to 3% higher than the state's lowest year in recent history and then the 2023 annual fatalities will continue downward and will be 3% lower than the lowest year in recent history. **That resulted in a 5-year average number of fatalities going from 361 (2017-2021) down to 355 (2019-2023) which reflects a 1.69% reduction**.

While MassDOT had to reset targets because of COVID and the increases the state had (based on preliminary information only) from behavioral components like speeding, unbelted, impaired, the team is projecting that the fatalities will decrease based on public education and other work efforts and the stated goal of 0 fatalities and serious injuries.

MassDOT continues efforts with HSIP, closely aligned work with the MassDOT Highway Safety Office (NHTSA funded), joint efforts with partners involved with sustainable transportation (bicyclist and pedestrian safety),

commitment on several EDC programs and more. All of this is being done through the lens of the Safe System approach.

The MassDOT updated SHSP, using a Safe System framework, is underway and expected to be completed before the end of 2023.

As a result, MassDOT recently started a speed management focus to move travel speeds closer to target speeds. This target was developed in coordination with the Executive Office of Public Safety and Security – Highway Safety Division (EOPSS/HSD), required to submit targets to NHTSA, the MassDOT Office of Transportation Planning (OTP) working closely with the MPOs, and the Office of Performance Management and Innovation (OPMI, which produces an annual performance report called *Tracker* that serves the public and MA Legislature, and senior leadership. Moreover, it should be restated that while MassDOT developed numeric targets, the goal is 0 and MassDOT will continue to work toward that goal by implementing SHSP strategies.

Number of Serious Injuries:2569.0

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

Per FHWA guidance, the MassDOT target setting process began with a trend line projection based on the most recent available data. The 2020 – 2022 serious injury data were not finalized in the statewide crash system so MassDOT used the information that was available as of April 19, 2022.

Due to COVID and the shutdowns in 2020 and the lingering impacts in 2021, the state's 2020 and 2021 serious injuries were not following the downward trend. Furthermore, the Infrastructure Investment and Jobs Act (IIJA) now requires "performance targets that demonstrate constant or improved performance" so MassDOT would be unable to use increasing "targets". Therefore, the team took this opportunity to restate the ultimate goal of 0 fatalities and serious injuries on MA roadways but reflect a short-term target that would move the state in that direction.

MassDOT developed targets by projecting the 2022 annual serious injuries to be equal to the lowest year in recent history and then the 2023 annual fatalities will continue downward using a more than 10% annual decrease which reflect average decreases in years in which the state experienced drops. **That resulted in a 5-year average number of serious injuries going from 2,620 (2017-2021) down to 2,569 (2019-2023) which reflects a 1.99% reduction**.

While MassDOT had to reset targets, MassDOT is projecting that the serious injuries will decrease based on public education and other our work efforts and the goal of 0 fatalities and serious injuries.

MassDOT continues efforts with HSIP, closely aligned work with the MassDOT Highway Safety Office (NHTSA funded), joint efforts with partners in sustainable transportation (bicyclist and pedestrian safety), commitment on several EDC programs and more. All of this is being done through the lens of the Safe System approach.

The MassDOT updated SHSP, using a Safe System framework, is underway and expected to be completed before the end of 2023. As a result, MassDOT recently started a speed management focus to move travel speeds closer to target speeds. This target was developed in coordination with the Executive Office of Public Safety and Security – Highway Safety Division (EOPSS/HSD), required to submit targets to NHTSA, the MassDOT Office of Transportation Planning (OTP) working closely with the MPOs, and the Office of Performance Management and Innovation (OPMI, which produces an annual performance report called *Tracker* that serves the public and State Legislature, and senior leadership. Moreover, it should be restated that while MassDOT developed numeric targets, the goal is 0 and MassDOT will continue to work toward that goal by implementing SHSP strategies.

Fatality Rate:0.590

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

The fatality rate is simply math. So once the team has projections for fatalities and has projected VMTs, the fatality rate is simply the 5-year average of the annual fatality rates.

Like nearly every other state, COVID greatly impacted the state's VMTs so the state rates spiked in 2020 with significantly lower VMTs and slightly higher fatalities. However, Massachusetts VMTs have come back and annual projections in 2023 are that VMTs will be higher than pre-pandemic levels. The projection is now **0.59 fatalities per 100 million vehicle miles traveled for 2019-2023 compared to .60 fatalities per 100 million vehicle miles traveled for 2017-2021 for which reflects a 1.69% drop in the fatality rate.** The long-term goal is toward zero deaths, so the long-term fatality rate target is 0.0 fatalities per 100 million VMTs.

Serious Injury Rate:4.250

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

The serious injury rate is simply math. So once MassDOT has projections for serious injuries and has projected VMTs, the serious injury rate is simply the 5-year average of the serious injury rate. Like nearly every other state, COVID greatly impacted the state's VMTs so Massachusetts rates spiked in 2020 with significantly lower VMTs which impacted the serious injury rates. The projection is now **4.25 serious injuries per 100 million vehicle miles traveled for 2019-2023 compared to 4.32 serious injuries per 100 million vehicle miles traveled for 2017-2021 for which reflects a 1.57% drop in the serious injury rate.** The long-term goal is toward zero deaths and serious injuries, so the long-term serious injury rate target is 0.0 serious injuries per 100 million VMTs.

Total Number of Non-Motorized Fatalities and Serious Injuries:437.0

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

As with all the other target setting measures, FHWA's guidance is to start with a trend line forecast and then consider external factors and planned implementation in order to set targets.

However, the number of non-motorist fatalities and serious injuries dramatically dropped in 2020 (a more than 25% annual reduction from 2019 to 2020) at the beginning of COVID and then increased in the year 2021 and early numbers in 2022 are not moving in the right direction. The heavy fluctuation made tracking the trend difficult.

Therefore, like was done with setting targets for fatalities by projecting our 2022 annual fatalities to be equal to 3% higher than our lowest year in recent history and then the 2023 annual fatalities will continue downward and will be 3% lower than the lowest year in recent history. **That resulted in a 5-year average number of non-motorist fatalities and serious injuries going from 467 (2017-2021) down to 437 (2019-2023) which reflects a 6.86% reduction**.

Massachusetts is actively working on strategies to ameliorate non-motorist fatality and injuries, while promoting and encouraging walking and cycling. The 2018 Strategic Highway Safety Plan, the 2019 Statewide Pedestrian Plan and the 2019 Statewide Bicycle Plan identify new multi-disciplined and multi-agency strategies to implement to eliminate fatalities and serious injuries of people walking and bicycling. The Commonwealth of MA awarded grants directed to local communities to help increase walking and biking trips while improving safety and that will help to move the needle.

The new focus on Speed Management and a Safe System approach should also help to drive down the fatalities and serious injuries. To show that state efforts are paying off, Massachusetts was ranked # 1 in the 2022 Bicycle Friendly State Report Card by the *League of American Bicyclists* who gave Massachusetts a grade of "A" for Infrastructure & Funding, Education & Encouragement, and Policies & Programs. Furthermore, Massachusetts will be subject to the Vulnerable Road User Rule and is already making plans for further investment of funds.

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

The targets were developed in coordination with the Executive Office of Public Safety and Security – Highway Safety Division (EOPSS/HSD) (required to submit targets to NHTSA), the MassDOT Office of Transportation Planning (OTP) working closely with the MPOs, and the Office of Performance Management and Innovation (OPMI), which produces an annual performance report called*Tracker* that serves the public and MA Legislature, as well as senior leadership. Although it was strongly stated that the state's goal is zero deaths and fatalities and the state targets presented are not MassDOT goals. The Secretary of Transportation and Administrator of Highways for MassDOT approved the targets recognizing that MassDOT must show short term incremental steps to get to the Massachusetts' goal.

Does the State want to report additional optional targets?

No

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	339.0	360.6
Number of Serious Injuries	2580.0	2620.4
Fatality Rate	0.550	0.596
Serious Injury Rate	4.230	4.317
Non-Motorized Fatalities and Serious Injuries	506.0	467.2

The unexpected happened in 2020 with COVID. Our VMTs dropped approximately 18% between 2019 to 2020. Even with the decreased volumes on our roadways, our fatalities increased. While it is too early to know, it is hypothesized that the increase in fatalities in 2020 (and that increased trend in 2021) has a number of factors like decreased seat belt use, increased excessive speeding and increased impairment. This all occurred at a time when enforcement was greatly diminished. This caused our target for fatalities, fatality rates, serious injuries and serious injury rates to be missed. Furthermore, because the VMTs dropped so dramatically, that impacted our rates so we did not even meet baseline. Unfortunately, many of the trends in behavior we have seen during the height of COVID have remained. We are actively working with our safety partners to try and ameliorate the unsafe behaviors practiced during COVID before they become ingrained in the culture. We did meet our target for the non-motorists, because we had a precipitous drop in fatalities in 2020 even though there was an increase in non-motorist activities. Unfortunately, this annual trend did not continue in 2021.

Applicability of Special Rules

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

No

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	2015	2016	2017	2018	2019	2020	2021
Number of Older Driver and Pedestrian Fatalities	65	75	49	77	78	69	82
Number of Older Driver and Pedestrian Serious Injuries	281	297	265	273	296	225	277

All fatality data 2015 - 2020 are from FARS. 2021 Fatality data are from FARS research personnel at MassDOT. All serious injury data are from IMPACT queried as of 6-7-22 (2020 and 2021 are still open and may be modified).

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Economic Effectiveness (cost per crash reduced)

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

- Note that projects have a variety of funding sources, not just HSIP, yet the calculation of costs includes total costs NOT just HSIP funds invested (so if a project has a Safety component within a larger project, the total cost was used but there would be other benefits realized besides safety and this just calculates the safety benefits). If only HSIP funds were utilized, the B/C would be significantly higher.
- Q46 summarizes the before/after evaluations of each project completed in 2017. MassDOT evaluated projects by comparing the expected crashes in the after period to the observed crashes in the after period. For all projects, both the before and after period were 3 years. Where possible, expected after crashes were calculated using Empirical Bayes (EB). If EB could not be used, MassDOT used crash rates to calculate the expected after period crashes. To calculate benefits, MassDOT used 2019 crash costs identified in the MassDOT Safety Alternatives Analysis Guide and assumed 20-year service life for each project and a 7-percent annual discount rate.
- The total benefits for all projects evaluated are calculated as $12.4 million, compared to $19.8 million in costs, for a benefit/cost ratio of 0.63. Unfortunately, these results are skewed by two projects which produced a combined negative benefit of $26.6 million at a combined cost of $3.8 million. Without these projects, MassDOT realized $39.0 million in benefits at a cost of $16.0 million for a benefit/cost ratio of 2.44.
- On aggregate, MassDOT observed two fatal crashes in the before period and 3 fatal crashes in the after period, an increase of 0.33 fatal crashes per year. In contrast, MassDOT observed 17 serious injury crashes in the before period and 16 in the after, a decrease in 0.33 serious injury crashes per year.
- The aggregated results of the HSIP projects show a reduction of 0.13 fatal and injury crashes per year for a total of 2.6 during the service life. This results in a cost of $7.6 million per prevented fatal and injury crash. Again, this is poorly skewed by one poorly performing project which resulted in an increase of 6.34 fatal and injury crashes per year. Without this project, MassDOT expects an annual reduction of 6.47 fatal and injury crashes per year for a total of 129.4 fatal and injury crashes during the service life. At a total cost of $16.5 million, this results in a $127,738 per reduced fatal and injury crash.
- Overall, these results suggest the need for MassDOT to improve their HSIP. Part of these improvements will be focusing more on systemic safety projects – which impact more sites at lower costs. Additionally, this is the first set of evaluations which included crash data from 2020, which proved to contain an anomalous relationship between traffic volume and crashes.

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

- # RSAs completed
- HSIP Obligations
- Increased awareness of safety and data-driven process

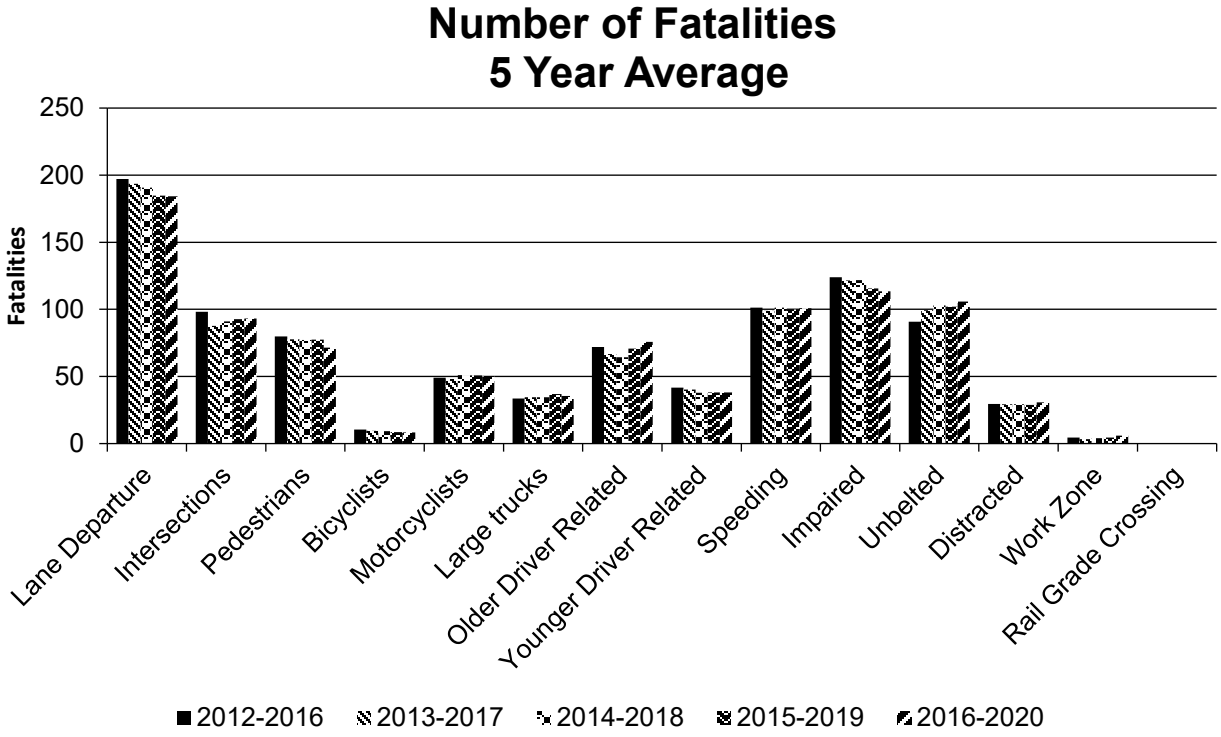
- More systemic programs

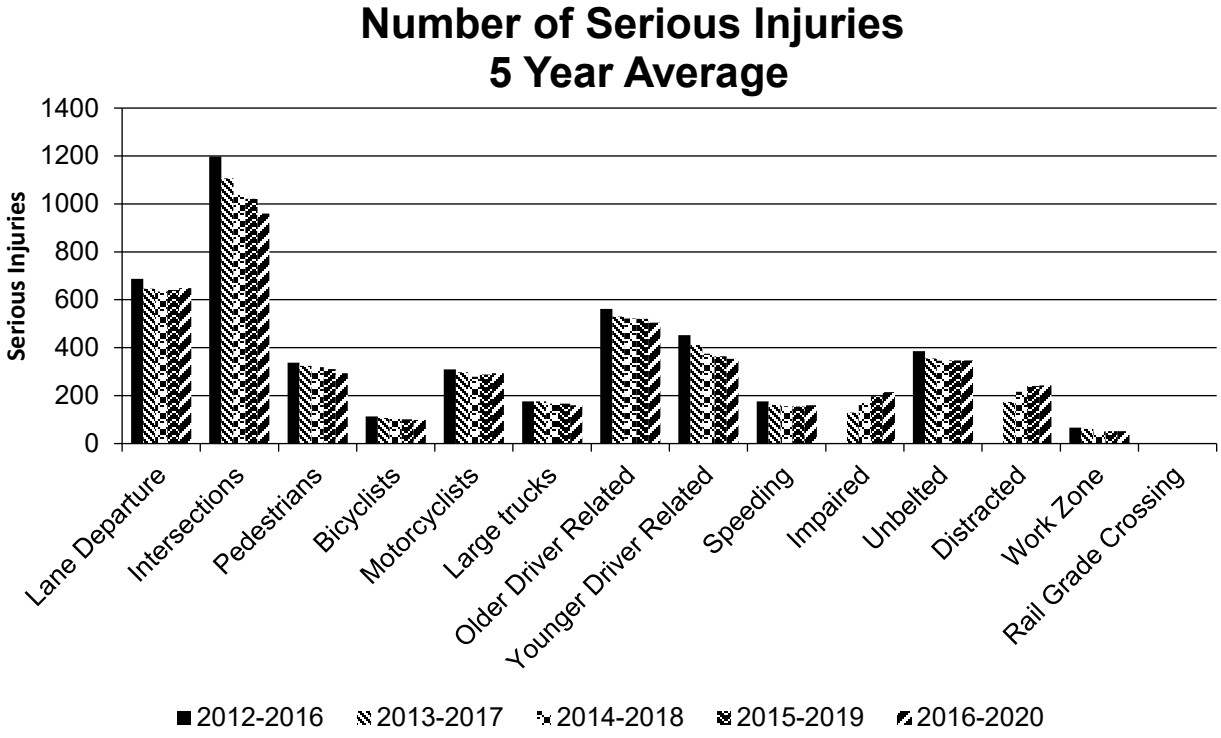
Effectiveness of Groupings or Similar Types of Improvements

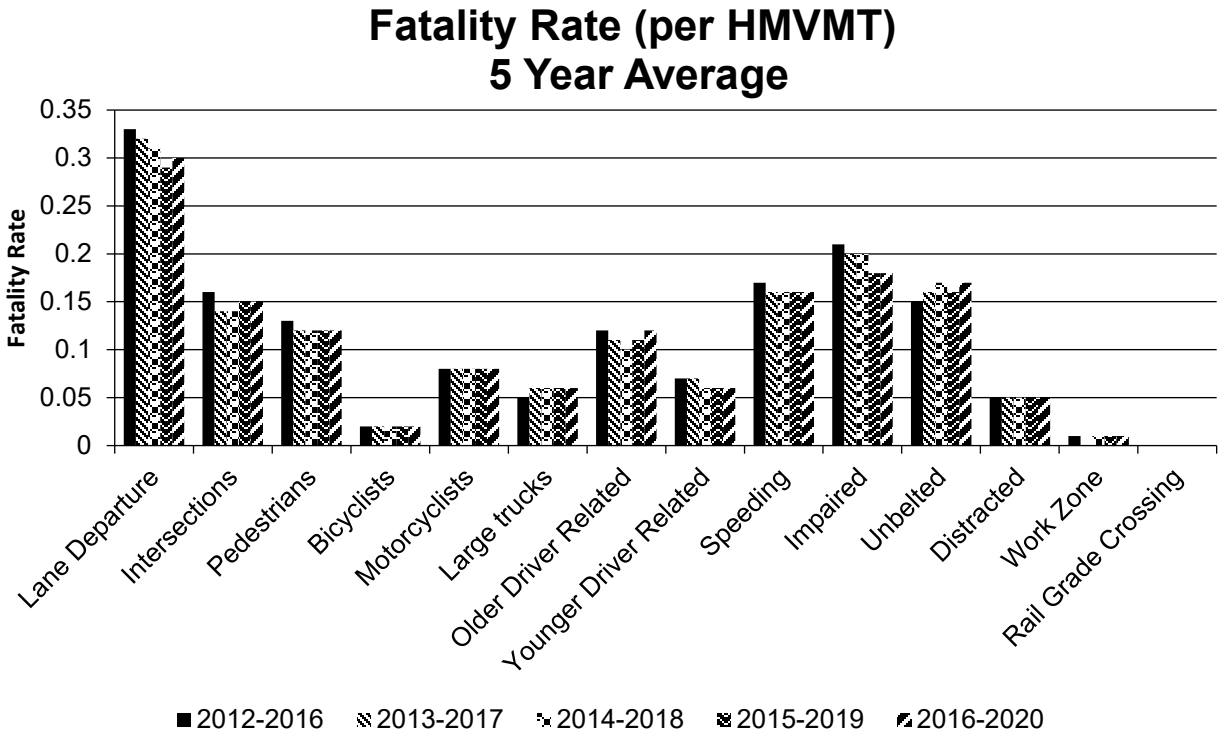
Present and describe trends in SHSP emphasis area performance measures.

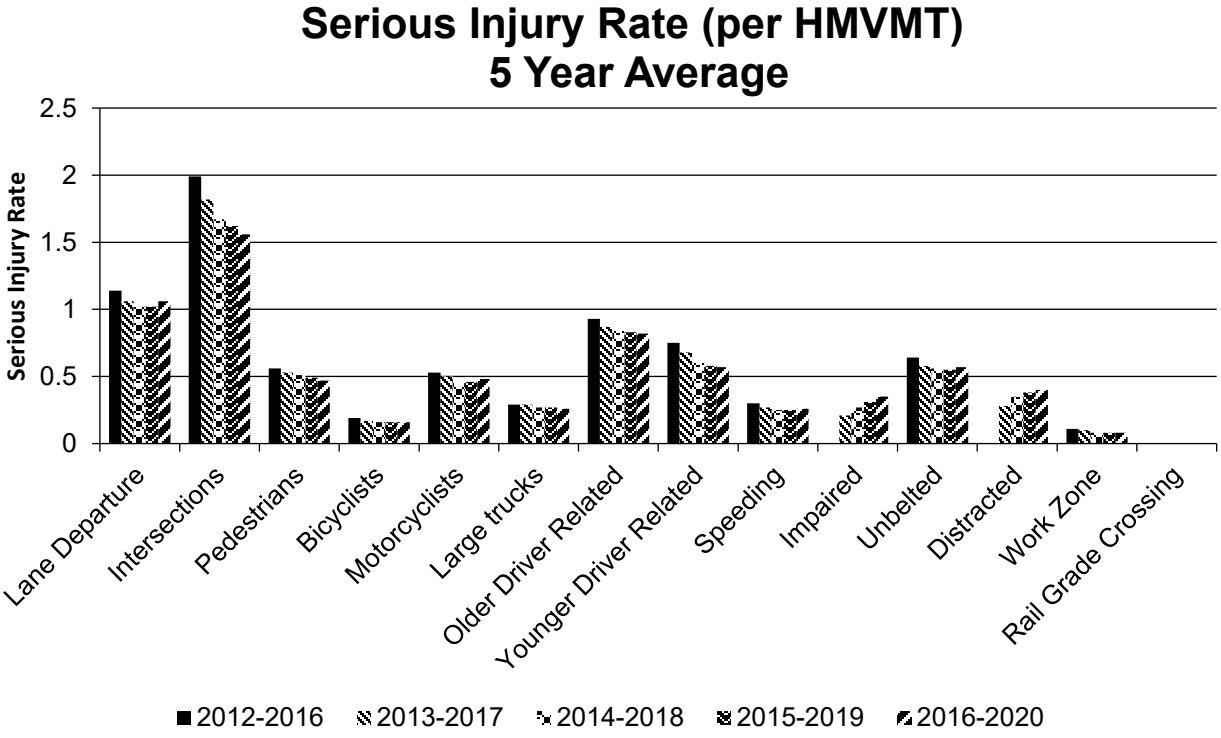
Year 2020

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		184.2	648.6	0.3	1.06
Intersections		93.2	960	0.15	1.56
Pedestrians		71.6	293.8	0.12	0.47
Bicyclists		8.2	98.6	0.02	0.16
Motorcyclists		50	293.4	0.08	0.48
Large trucks		35.6	159.6	0.06	0.26
Older Driver Related		75.8	504	0.12	0.82
Younger Driver Related		38.2	353.6	0.06	0.57
Speeding		100.8	160.2	0.16	0.26
Impaired		113.4	214.6	0.18	0.35
Unbelted		105.8	347.2	0.17	0.57
Distracted		30.8	242.6	0.05	0.4
Work Zone		5.8	51.6	0.01	0.08
Rail Grade Crossing		0.4	1.4	0	0


Number of Fatalities
5 Year Average
Fatalities
250
200
150
100
50
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Motorcyclists
Large trucks
Older Driver Related
Younger Driver Related
Speeding
Impaired
Unbelted
Distracted
Work Zone
Rail Grade Crossing
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020


Number of Serious Injuries
5 Year Average
Serious Injuries
1400
1200
1000
800
600
400
200
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Motorcyclists
Large trucks
Older Driver Related
Younger Driver Related
Speeding
Impaired
Unbelted
Distracted
Work Zone
Rail Grade Crossing
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020





Serious Injury data comes from the Statewide Crash Data System.
Not all of the emphasis area data have been collected in the Statewide Crash Data System since 2012. Note that impaired driving (via the field "suspected alcohol use") and "Distracted driving" were added in 2013 so they were not widely used until recently and should not be until 2016 but is included here to show that it was implemented.
While the Crash Data System had used an injury scale (of Incapacitating, non-incapacitating, possible) until

2019 and then changed over to suspected serious injury, for the purpose of capturing "Serious Injuries" both incapacitating and suspected serious injuries were used.
The VMTs used to calculate the rates are based on the statewide VMTS and not restricted to the VMTS of that emphasis area. (As an example, older drivers fatality rates are calculated by dividing the total number of older driver fatalities by the total statewide VMTs not just the VMTs of older drivers).. 2020 and 2021 is not finalized for FARS nor for the serious injuries to get to this level of information.
The queries used to pull the number of serious injuries for each emphasis area can be found here: https://www.mass.gov/info-details/impact-emphasis-area-definitions#query-definitions-for-the-shsp-dashboard-

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

No
Last year, MassDOT submitted a countermeasure evaluation of flashing yellow arrows. MassDOT has not performed additional countermeasure evaluations in the past year.

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)
606347 - STURBRIDGE- RESURFACING AND RELATED WORK ON ROUTE 20, FROM ROUTE 49 TO I-84	Urban Principal Arterial (UPA) - Other	Roadway	Pavement surface - other	65.00	80.00			1.00	3.00	25.00	31.00	91.00	114.00	-5.38
606485 - MILLBURY- SUTTON- MEDIAN BARRIER REPLACEMENT ON ROUTE 146, FROM ROUTE 122A TO BOSTON ROAD	Urban Principal Arterial (UPA) - Other	Roadside	Barrier – concrete	48.00	41.00					13.00	8.00	61.00	49.00	1.68
606279 - TAUNTON- RECONSTRUCTION ON COUNTY STREET (ROUTE 140), FROM THE ROUTE 24 (SB OFF-RAMP) NORTHERLY TO MOZZONE BOULEVARD	Urban Minor Arterial	Roadway	Roadway widening - travel lanes	22.00	40.00			3.00	1.00	10.00	14.00	35.00	55.00	-2.56
607222 - GREENFIELD- INTERSECTION IMPROVEMENTS AT ROUTE 5/10 & CHEAPSIDE STREET	Urban Minor Arterial	Intersection geometry	Intersection realignment	5.00	5.00	1.00	1.00		1.00	3.00	1.00	9.00	8.00	0.90
607246 - ERVING- INTERSECTION IMPROVEMENTS AT ROUTE 2 & 2A	Rural Principal Arterial (RPA) - Other Freeways and Expressways	Intersection geometry	Intersection realignment	6.00	2.00					2.00	1.00	8.00	3.00	2.85
607735 - SOUTH HADLEY- SIGNAL & INTERSECTION IMPROVEMENTS AT ROUTE 202 (GRANBY ROAD) &	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	33.00	32.00					10.00	4.00	43.00	36.00	1.84

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)
ROUTE 33 (LYMAN STREET)														
607745 - LENOX- INTERSECTION & SIGNAL IMPROVEMENTS AT US 7 & US 20 (VETERAN'S MEMORIAL HIGHWAY) @ SR 183 (WALKER STREET)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	13.00	8.00					5.00	4.00	18.00	12.00	2.70
607755 - WEYMOUTH- INTERSECTION & SIGNAL IMPROVEMENTS AT 2 LOCATIONS: SR 53 (WASHINGTON STREET) AT MUTTON LANE & PLEASANT STREET	Urban Minor Arterial	Intersection traffic control	Modify control – new traffic signal	53.00	37.00			2.00		8.00	8.00	63.00	45.00	3.83
608033 - BARNSTABLE- LIGHTING & LANDSCAPING OF THE ROUNDABOUT AT THE MID-CAPE HIGHWAY (ROUTE 6) EASTBOUND EXIT RAMP & ROUTE 149	Urban Minor Arterial	Lighting	Intersection lighting	3.00	2.00						1.00	3.00	3.00	-2.34
608075 - LAWRENCE- INTERSECTION IMPROVEMENTS AT LAWRENCE STREET AND PARK STREET	Urban Minor Arterial	Intersection traffic control	Modify control – new traffic signal	22.00	25.00			1.00	1.00	11.00	9.00	34.00	35.00	1.86
608087 - BROCKTON- PEDESTRIAN IMPROVEMENTS AT VARIOUS LOCATIONS	Urban Minor Arterial	Pedestrians and bicyclists	Install new crosswalk	7.00	6.00	1.00	2.00	8.00	6.00	27.00	22.00	43.00	36.00	28.81

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)
608168 - DOUGLAS- RESURFACING AND RELATED WORK ON WEBSTER STREET (ROUTE 16), FROM T.L. (MM 2.8) TO MAIN STREET (MM 6.9)	Rural Major Collector	Roadway	Pavement surface - other	16.00	17.00			2.00	1.00	9.00	4.00	27.00	22.00	6.69
608170 - STURBRIDGE- SIGN AND PAVEMENT MARKING INSTALLATION AND UPGRADES, LIMITED ROADWAY IMPROVEMENTS AND RELATED WORK ON BROOKFIELD ROAD (ROUTE 148)	Rural Major Collector	Roadway signs and traffic control	Roadway signs (including post) - new or updated	38.00	18.00				3.00	4.00	4.00	42.00	25.00	-17.37

Project ID	FI Crashes Reduced, Annual	PDO Crashes Reduced, Annual	Service Life Benefits	Cost	
606347	-6.34	-3.2	$ (17,455,834.10)	$ 3,242,413.90	
606485	1.66	2.32	$ 9,761,746.81	$ 5,794,360.00	
606279	-0.85	-6.31	$ (5,803,737.19)	$ 2,269,070.32	
607222	0.14	-0.07	$ 505,996.49	$ 562,866.00	
607246	0.35	1.4	$ 1,571,638.34	$ 551,584.20	
607735	1.9	-9.6	$ 1,630,947.87	$ 888,549.00	
607745	0.31	1	$ 1,252,327.07	$ 463,735.00	
607755	1.07	2.89	$ 4,218,597.69	$ 1,101,707.00	
608033	-0.33	0.28	$ (1,076,171.02)	$ 459,905.60	
608075	0.73	-3.53	$ 1,850,146.19	$ 997,211.30	
608087	0.67	1.67	$ 7,327,320.12	$ 254,322.50	
608168	1.92	-0.45	$ 17,778,218.39	$ 2,659,265.65	
608170	-1.1	6.25	$ (9,147,059.63)	$ 526,710.00	B/C
Sum	0.13	-7.35	$ 12,414,137.04	$ 19,771,700.47	0.627874019
Sum, without 606347	6.47	-4.15	$ 29,869,971.14	$ 16,529,286.57	1.807093791
Sum, without 606347, 608170			$ 39,017,030.77	$ 16,002,576.57	2.43817179

Compliance Assessment

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

12/31/2018

What are the years being covered by the current SHSP?

From: 2012 To: 2016

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

2023

The SHSP update will most likely be completed and signed in 2022.

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]	1	1					1	1	1	1
	Route Number (8) [8]	1	1								
	Route/Street Name (9) [9]	0.9973	0.9979								
	Federal Aid/Route Type (21) [21]	0.9998	0.9999								
	Rural/Urban Designation (20) [20]	1	1					1	1		
	Surface Type (23) [24]	0.9957	0.9735					1	1		
	Begin Point Segment Descriptor (10) [10]	1	1					1	1	1	1
	End Point Segment Descriptor (11) [11]	1	1					1	1	1	1
	Segment Length (13) [13]	1	1								
	Direction of Inventory (18) [18]	1	1								
	Functional Class (19) [19]	1	1					1	1	1	1

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Median Type (54) [55]	0.9953	0.9729								
	Access Control (22) [23]	0.995	0.9725								
	One/Two Way Operations (91) [93]	0.9954	0.9686								
	Number of Through Lanes (31) [32]	1	1					1	1		
	Average Annual Daily Traffic (79) [81]	0.9946	0.9834					0.9747	0.9794		
	AADT Year (80) [82]	0.9946	0.9834								
	Type of Governmental Ownership (4) [4]	1	1					1	1	1	1
INTERSECTION	Unique Junction Identifier (120) [110]			1	1						
	Location Identifier for Road 1 Crossing Point (122) [112]			1	1						
	Location Identifier for Road 2 Crossing Point (123) [113]			1	1						
	Intersection/Junction Geometry (126) [116]			1	1						
	Intersection/Junction Traffic Control (131) [131]			0.541723171503481	0.723116638467844						
	AADT for Each Intersecting Road (79) [81]			0.999896336634012	0.999946245877989						
	AADT Year (80) [82]			0.999896336634012	0.999946245877989						
	Unique Approach Identifier (139) [129]			1	1						
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					1	1				
	Location Identifier for Roadway at										

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Beginning of Ramp Terminal (197) [187]										
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]										
	Ramp Length (187) [177]					1	1				
	Roadway Type at Beginning of Ramp Terminal (195) [185]										
	Roadway Type at End Ramp Terminal (199) [189]										
	Interchange Type (182) [172]										
	Ramp AADT (191) [181]					1	0.96				
	Year of Ramp AADT (192) [182]					1	0.96				
	Functional Class (19) [19]					1	1				
	Type of Governmental Ownership (4) [4]					1	1				
Totals (Average Percent Complete):		**1.00**	**0.99**	**0.94**	**0.97**	**0.55**	**0.54**	**1.00**	**1.00**	**1.00**	**1.00**

*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.

MassDOT is in the process of updating the Road Inventory to be compliant with MIRE 2.0 FDEs for the 2026 deadline. Some examples include current projects where the interchange type attribute will be implemented to characterize interchanges in the Road Inventory by type as required, and MassDOT has hired VHB to review and update intersections with state to state or state or state to local segments to insure they possess required MIRE 2.0 FDEs. MassDOT will tackle the remaining FDEs once these projects are completed.

Optional Attachments

Program Structure:

Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

Glossary

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

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

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

HMVMT: means hundred million vehicle miles traveled.

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

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

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

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

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

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

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

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

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