PENNSYLVANIA

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2017 ANNUAL REPORT

U.S. Department of Transportation
Federal Highway Administration

Photo source: Federal Highway Administration

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

Executive Summary

The Pennsylvania Department of Transportation is pleased to present this Annual Report of our progress with the Highway Safety Improvement Program.
In 2016, 1,188 people lost their lives on Pennsylvania's roadways - a record low since record keeping began in the 1920s. But we have miles to go to reach our ultimate goal of zero deaths on our roads, and our journey includes ongoing work on both the behavioral side of crash causations as well as continuing to improve our highway infrastructure.

Since the last Annual Report, we have maintained our progress on several key initiatives. Pennsylvania started using the PA Regionalized SPFs developed January 2016 for a statewide network screening of about 20,000 locations. These new evaluations will use the Highway Safety Manual's analysis method of Excess Expected Average Crash Frequency with Empirical Bayes (EB) adjustments also known as Potential for Safety Improvement (PSI). This method will use the calculated expected crashes for a location and subtract the Predicted crashes for that same location to produce an excess (or PSI) value. All locations will have that calculated difference value ordered highest to lowest. Any excess (or PSI) value above zero shows a potential for safety improvement over the state's predicted annual crashes for that category of roadway or intersection. Locations can then be prioritized using the PSI value. This method is explained in section 4.4.2.13 of the 2010 AASHTO HSM. The network screening is broke down into four categories which are:

- Rural intersections
- Urban Intersections
- Rural segments
- Urban segments

These network screenings will be provided to the Engineering District by EXCEL workbooks for all 67 counties. There will be one county workbook for the intersections and a second for the segments. The new lists will not include ramps, ramp terminals and freeway locations since Pennsylvania does not have regionalized SPFs for freeways or ramp terminals or calibration factors for these highways conditions. Existing roundabouts will also be excluded from the new network screening since no SPFs are available for roundabouts in the 2010 HSM or in the regionalized PA specific SPFs. These types of locations are still eligible for safety projects, but will require the Engineering Districts' to perform a more advanced safety analysis to justify an HSIP project. The intersection analysis requires several local highway traffic volume counts. So as part of this effort PennDOT will be collecting traffic volume on about 3000 plus local highways. This extra traffic volume task for the network screening will also be a benefit for the new MIRE FDE collection mandate in the FAST Act.

The new regionalized SPFs have been added to a Pennsylvania specific HSM analytical tool. PennDOT provided several Pennsylvania specific HSM trainings last year. The classes covered not only the manual, but also different tools to use and when to use them. This class gives practical examples and then allows attendees to use the revised PennDOT tool to perform HSM analysis.

PennDOT is currently in the process of updating Publication 638, *The District Highway Safety Guidance Manual*, to include these new SPFs along with the new FAST Act rules for HSIP funding criteria and updates to our crash data reporting tools. We will also be working to update several publications to incorporate the concepts of the Highway Safety Manual into our policies and practices.

As shown later in this report, many of our engineering districts are planning and completing projects associated with the Intersection Safety Implementation and Roadway Departure Safety Implementation Plans. PennDOT working with the FHWA completed a new Speed Management Action Plan (SMAP). The SMAP assessments and strategies is another tool to use in reducing speed related injury crashes.

PennDOT implemented a new SharePoint application website to ensure better tracking of HSIP funding applications from the engineering districts and the regional planning partners. This now allows both engineering Districts and MPOs/RPOs to apply for HSIP projects. This HSIP SharePoint site will ensure applications are technically complete and properly reviewed by both PennDOT's central office. The new HSIP SharePoint application program went live in January 2017.

PennDOT also created a new SHSP for 2017. The new SHSP will be discussed in the SHSP section of this report. The SHSP was approved in February 2017 with an Errata added to define HRRRs in PA. While there remains much work required to reach our goal of reducing highway fatalities to zero in thirty years, we remain encouraged by the progress that has been made and the opportunities for the future.

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.

HSIP projects are identified by using crash location lists or by implementing known systemic safety improvements identified by the Highway Safety & Traffic Operations Division. Project locations and systemic project scopes are developed by the Engineering Districts and /or the regional planning partners. These project proposals are then sent to PennDOT's Highway Safety & Traffic Operations Division (HSTOD) for a technical review and then to the Center for Program Development and Management for funding and fiscal review. Then projects receive final approval from the FHWA Division office. Projects are selected for implementation based on the projected safety benefit of the safety countermeasures and the allowable funding. Projects are then developed and designed by the Engineering Districts. The Engineering Districts let the construction projects (Letting is the day construction project bids are received for the project and the lowest bidder is shown), provide construction inspection and oversight. As part of the annual HSIP report HSTOD evaluates projects before and after the project was constructed to determine a perceived net benefit based the reduction of fatal, injury, and property damage only crashes. PennDOT also tracks the implementation of systemic improvements like rumble strips, High Friction Surface treatments, and High Tension Cable Median Barrier. A network analysis of these systemic improvements is completed when there is enough data in a given time span.

Where is HSIP staff located within the State DOT?

Other-Engineering, Planning, Design, and operations

Enter additional comments here to clarify your response for this question or add supporting information.

The HSIP staff are spread out in the Engineering District and in PennDOT's Central office. Districts and MPOs implement HSIP projects. PennDOT's central Highway Safety & Traffic Operation Division provides technical reviews and approvals. The central Center for Program Development and Management provides funding and fiscal reviews and approvals.

How are HSIP funds allocated in a State?

Central Office via Statewide Competitive Application Process

Enter additional comments here to clarify your response for this question or add supporting information.

$35 million is set aside each year for a competitive application process. The remaining yearly balance is distributed to the MPO/RPOs by a formula.

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

Local highways (those not owned and maintained by the Commonwealth) make up two-thirds of the approximately 120,000 miles of highways in Pennsylvania. These roads are owned by the 2,561 municipalities across the state. In 2016 15.2% of fatalities and 25% of reportable crashes have occurred on the local road network. Local highway fatalities decreased to 180 in 2016 from 233 in the 2015. Local road fatalities have hovered above or below 200/year over the past two decades with the highest total of 279 in the year 2007 and the lowest count of 163 in the year 2002.

PennDOT is currently working with LTAP and the Pennsylvania State Association of Township Supervisors (PSATS) to conduct technical reviews on local roads which result in low cost safety projects. PennDOT provides direction for the studies which are conducted by LTAP staff. The studies result in a report that has an itemized list of safety countermeasures ready for a construction contract or force account work. PennDOT is currently working on a contract to implement safety improvements in 8 different municipalities in western Pennsylvania. Other safety studies have been conducted or are in process in other parts of the state for future local safety projects. So far 12 PennDOT Directed Technical Assist Reports have been completed for municipalities through this LTAP program.

PennDOT plans to work closely with the FHWA PA Division office over the next year to implement force account safety work on local roads.

Locals remain engaged in the enforcement, education and emergency response side of highway safety. These behavioral safety efforts are detailed in the Pennsylvania HSP report submitted to NHTSA every year.

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

Traffic Engineering/Safety
Design
Planning
Maintenance
Operations
Districts/Regions
Governors Highway Safety Office
Other-Engineering Districts, Planning Organizations, Program Center

Enter additional comments here to clarify your response for this question or add supporting information.

Describe coordination with internal partners.

Design - Designers manage safety projects through the design contract process out to construction

Districts - Districts implement highway safety projects selected for construction

Governors Highway Safety Office- In Pennsylvania this falls under PennDOT and combines its behavioral efforts with Safety Engineering efforts

Maintenance - Maintenance helps to select projects and then has the task to maintain the projects. Also in Pennsylvania Highway Safety falls under the Bureau of Maintenance and Operations

Operations - Highway Safety is part of the Bureau of Maintenance and
Operations. As we move forward with autonomous vehicles and vehicle to infrastructure technologies this group will play a bigger role in safety.

Planning - Programs funding for safety projects and manages the spending of safety funds.

These internal partners participate in the Multi Agency Safety Team (MAST) which is charged with implementing the SHSP focus areas and strategies. MAST is described in more detail in the 2017 SHSP available on PennDOT's website.

Traffic Engineering/Safety - Lead Division that manages the HSIP program across the state.

Identify which external partners are involved with HSIP planning.

Regional Planning Organizations (e.g. MPOs, RPOs, COGs)
Local Technical Assistance Program
Local Government Agency
Law Enforcement Agency
Academia/University
FHWA
Other-MAST Team - See Question 8 for description

Enter additional comments here to clarify your response for this question or add supporting information.

Describe coordination with external partners.

PennDOT works with Universities (Academia) to produce research into safety programs. Some recent work involved the development of regionalized SPFs.

FHWA is involved in the HSIP program in all aspects. They provide final approval on HSIP funded projects, national guidance for the HSIP funding program, and participate in monthly coordination for all safety related topics.

Law enforcement & public education partners are involved in many Behavioral safety programs such as reducing Impaired driving, increasing seatbelt use, speed enforcement, aggressive driving enforcement,

reducing districted driving, mature driver safety, motorcycle safety training, young & inexperienced driver training, enhancing safety on local roads, and several other topics.

Local Government Agencies like PSATS and PSABS help provide safety training to municipalities.

Regional Planning Organizations help to implement HSIP funded projects.

MAST is a Multi Agency Safety Team that takes the latest SHSP strategies and then coordinated the implementation of those strategies.

Have any program administration practices used to implement the HSIP changed since the last reporting period?

Yes

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

PennDOT now processes all HSIP project applications using a new Share Point application site.

Are there any other aspects of HSIP Administration on which the State would like to elaborate?

Yes

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

The HSIP Program fully aligns with the 2017 Pennsylvania Strategic Highway Safety Plan (SHSP).

HSIP funds are now being used to collect traffic volumes on local highways. This traffic volume data will be used to complete network screening in all 67 counties. The data collected is also necessary for the MIRE FDE September 30, 2026 mandate.

Program Methodology

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

No

Enter additional comments here to clarify your response for this question or add supporting information.

Guidance for HSIP is in PennDOT's District Highway Safety Guidance Manual (Publication 638). Publication 638 is currently undergoing an update that will include a new HSIP chapter that describes the planning, implementation and evaluation processes.

Select the programs that are administered under the HSIP.

2017 Pennsylvania Highway Safety Improvement Program
Median Barrier
Intersection
Horizontal Curve
Bicycle Safety
Rural State Highways
Skid Hazard
HSIP (no subprograms)
Roadway Departure
Low-Cost Spot Improvements
Local Safety
Pedestrian Safety
Left Turn Crash
Shoulder Improvement
HRRR
Wrong Way Driving

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Bicycle Safety

Date of Program Methodology: 1/1/2018

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		Roadside features

What project identification methodology was used for this program? [Check all that apply]

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?

2017 Pennsylvania Highway Safety Improvement Program

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Horizontal Curve

Date of Program Methodology: 10/1/2012

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area
FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Other-HSIP regional, HSIP set Aside, and State 715 Safety Funds

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		Horizontal curvature Roadside features

What project identification methodology was used for this program? [Check all that apply]

2017 Pennsylvania Highway Safety Improvement 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

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: HRRR

Date of Program Methodology: 1/1/2009

What is the justification for this program? [Check all that apply]

Other-Old Surface Transportation Act requirement no longer required by FAST Act

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes **Exposure** **Roadway**

All crashes Functional classification

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

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).

Other-Potential for Safety Improvement :

Enter additional comments here to clarify your response for this question or add supporting information.
Pennsylvania does not have a HRRR program in PA since the FAST Act removed the requirement. Pennsylvania does have a definition as required by the FAST Act. These locations are still address though focus areas like lane and roadway departures and intersection safety improvements.

Program: HSIP (no subprograms)

Date of Program Methodology: 12/1/2014

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area
FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Other-HSIP

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway

All crashes

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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).

Available funding : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Intersection

Date of Program Methodology: 8/1/2012

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area
FHWA focused approach to safety

2017 Pennsylvania Highway Safety Improvement Program

What is the funding approach for this program? [Check one]

Other-HSIP regional, HSIP set Aside, and State 715 Safety Funds

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		Functional classification Roadside features

What project identification methodology was used for this program? [Check all that apply]

Crash frequency
Crash rate

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

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Left Turn Crash

2017 Pennsylvania Highway Safety Improvement Program

Date of Program Methodology: 8/1/2012

What is the justification for this program? [Check all that apply]

Other-ISIP

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

2017 Pennsylvania Highway Safety Improvement Program
Falls under ISIP.

Program: Local Safety

Date of Program Methodology: 2/1/2009

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		Functional classification

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Low-Cost Spot Improvements

Date of Program Methodology: 2/1/2009

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

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

2017 Pennsylvania Highway Safety Improvement Program

Available funding : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Median Barrier

Date of Program Methodology: 1/1/2010

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area
FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		Median width Functional classification Roadside features Other-median slopes/cross-section

What project identification methodology was used for this program? [Check all that apply]

Crash frequency

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?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

2017 Pennsylvania Highway Safety Improvement Program
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Pedestrian Safety

Date of Program Methodology: 2/1/2017

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Roadway Departure

Date of Program Methodology: 8/1/2012

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area
FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Other-HSIP funds and State 715 safety funds

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes	Volume	Horizontal curvature Functional classification Roadside features

What project identification methodology was used for this program? [Check all that apply]

Crash frequency
Crash rate
Other-Exhibit 3-15 from AASHTO's 2004, A Policy on Geometric Design of Highways and Streets.
Other-MUTCD Table 2C.05

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

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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).

Available funding : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Rural State Highways

Date of Program Methodology: 10/1/2009

What is the justification for this program? [Check all that apply]

Other-Old Surfaec Transportation Act

What is the funding approach for this program? [Check one]

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		

What project identification methodology was used for this program? [Check all that apply]

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

Describe the methodology used to identify local road projects as part of this program.

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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Shoulder Improvement

Date of Program Methodology: 2/1/2009

What is the justification for this program? [Check all that apply]

Other-Maintenace and Highway safety

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes **Exposure** **Roadway**

All crashes Roadside features

What project identification methodology was used for this program? [Check all that apply]

Crash frequency

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?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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).

Available funding : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Skid Hazard

Date of Program Methodology: 2/2/2009

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area
FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes		Roadside features
Other-Wet road, SVROR and HFO		Other-Skid testing

What project identification methodology was used for this program? [Check all that apply]

Crash frequency

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?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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 : 2

Other-Potential for Improvement based on Crash History : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Wrong Way Driving

Date of Program Methodology: 6/2/2014

What is the justification for this program? [Check all that apply]

2017 Pennsylvania Highway Safety Improvement Program
Addresses SHSP priority or emphasis area
FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Other-HSIP regional allocations, HSIP set aside, and state 715 safety funds

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes Fatal crashes only	Other-none	Functional classification

What project identification methodology was used for this program? [Check all that apply]

Crash frequency

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?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Competitive application process
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

Enter additional comments here to clarify your response for this question or add supporting information.
The wrong way program only reviews Expressways and ramps. PA is looking at expanding to other roadway types where wrong way driving may be a problem.

What percentage of HSIP funds address systemic improvements?

HSIP funds are used to address which of the following systemic improvements? Please check all that apply.

Cable Median Barriers
Rumble Strips
Traffic Control Device Rehabilitation
Pavement/Shoulder Widening
Install/Improve Signing
Install/Improve Pavement Marking and/or Delineation
Upgrade Guard Rails
Clear Zone Improvements
Safety Edge
Add/Upgrade/Modify/Remove Traffic Signal
Horizontal curve signs
High friction surface treatment
Wrong way driving treatments

Enter additional comments here to clarify your response for this question or add supporting information.

What process is used to identify potential countermeasures? [Check all that apply]

Engineering Study
Road Safety Assessment
Crash data analysis
SHSP/Local road safety plan
Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
Stakeholder input
Other-RDIP, ISIP, and other specific countermeasure crash lists that include high tension cable median barriers and wrong way crash lists

Enter additional comments here to clarify your response for this question or add supporting information.

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

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

The new 2017 Pennsylvania Strategic Highway Safety Plan has 16 major focus areas and we added a 17th focus area which is Autonomous technologies. Pennsylvania recognizes the safety benefits of connected and automated vehicles. As a result, PennDOT is committed to ensuring

Pennsylvania is prepared to facilitate the deployment of connected and automated vehicle technology. To accomplish these goals, PennDOT participates on numerous national committees including:

Vehicle to Infrastructure Deployment Coalition (V2I DC)
Autonomous Vehicle Best Practices Working Group - American Association of Motor Vehicle Administrators (AAMVA)
Connected and Automated Vehicle Technical Working Group - American Association of State Highway and Transportation Officials (AASHTO)
Additionally, PennDOT is working with academia and planning partners to equip traffic signals throughout the State with Dedicated Short-Range Communications (DSRC) to aid in the deployment of connected and automated vehicles. Currently, Pennsylvania has deployments in the Pittsburgh and Harrisburg regions, with planned deployments in the Philadelphia area.
PennDOT is also working with the House and Senate Transportation Committees to develop automated vehicle testing legislation for the Commonwealth. PennDOT has assembled the "Autonomous Vehicle Policy Task Force" to prepare draft legislative policy recommendations for the testing of automated vehicles in Pennsylvania. The Task Force is made up of a diverse and comprehensive set of stakeholders including representatives from federal, state and local government, law enforcement, technology companies, higher education, manufacturers, motorists and trucking groups, and academic research institutions.

There was the Safety Symposium in September 2016. This Symposium brought together many different people involved with highway safety. Safety topics at the Safety Symposium fell into the following four categories: Technology, Legislative, Behavioral, and Infrastructure/ Engineering. As a part of the engineering and Technology presentations the event provided a first-time ride experience for many state executives that included the Governor of PA Tom Wolf and the DOT Secretary Leslie Richards in an autonomous vehicle. The Carnegie Mellon 2012 Cadillac SRX autonomous vehicle made a loop around the capitol complex. The featured lunch time speakers of the Safety Symposium from PennDOT and Carnegie Mellon University discussed the future of Autonomous vehicles and vehicle to infrastructure deployment.

PennDOT also has a Traveler Information and Advanced Vehicle Technology Unit which is handling the Autonomous vehicles and vehicle to infrastructure planning in Pennsylvania.

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.

PennDOT is currently developing a new Publication 638A, The Pennsylvania Safety Prediction Analysis Methods Manual (SPAMM). This new publication will provide clear guidance on using Pennsylvania regionalized SPFs, how to apply CMFs, and how to determine values for dependent variables or adjustment factors for the regionalized SPFs.

Also, see question #28 for PennDOT's HSM based network screening project.

Have any program methodology practices used to implement the HSIP changed since the last reporting period?

Yes

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

Pennsylvania is in the process of developing an HSM based network screening lists for all 67 counties. The categories include:

- rural and urban segments
- rural and urban intersections

The network screening does not include Freeways, ramps, and ramp terminals.

This does not include local highway segments or local to local intersections.

Are there any other aspects of the HSIP methodology on which the State would like to elaborate?

No

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

Enter additional comments here to clarify your response for this question or add supporting information.

7/1/16 - 6/30/17

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$97,379,238	$83,659,998	85.91%
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)	$0	$0	0%
State and Local Funds	$10,000,000	$10,000,000	100%
Totals	$107,379,238	$93,659,998	87.22%

Enter additional comments here to clarify your response for this question or add supporting information.

State funds reflect the PA 715 safety funds for low cost safety improvements. Federal grants provided to PA through NHTSA can be viewed through the annual HSP report submitted in July 2017.

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

$500,000

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

$500,000

Enter additional comments here to clarify your response for this question or add supporting information.

These funds are used by the PA-LTAP program to conduct safety studies on local roads to determine safety improvements. The funds are used to complete "PennDOT Directed Technical Assists Report" which

produce an itemized list of ECMS ready countermeasures. These reports and the project items are used to then create the construction contracts or set up a force account construction project.

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

$984,644

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

$984,644

Enter additional comments here to clarify your response for this question or add supporting information.

Non-infrastructure projects meet the requirements of 23 CFR 924 & 490 and 23 USC 148(a)(4)(B). These include road safety Audits, improvements to the collection of MIRE Data, and transportation safety planning activities such as developing a state wide HSM based network screening and evaluating locally owned highways for low cost safety improvements.

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

Enter additional comments here to clarify your response for this question or add supporting information.

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

There are a few Engineering Districts that have struggled in the project development of HSIP funded safety project. This results in several projects missing let dates and HSIP funds not being used for those projects in the planned years. To overcome these project delivery issues, the Highway Safety Section is working with PennDOT's Bureau of Project Delivery to track the milestones of HSIP projects to ensure design project managers stay on schedule to deliver good safety improvement projects on time. A District's past project delivery track record may also become part of a weighted criteria for HSIP set aside project selection.

We are also in the process of revising our District Highway Safety Guidance Manual (Publication 638) which will provide updated HSIP funding guidance.

Does the State want to elaborate on any other aspects of it’s progress in implementing HSIP projects?

Yes

Describe any other aspects of the State's progress in implementing HSIP projects on which the State would like to elaborate.

PennDOT is now rating location specific projects based on the perceived benefit to cost ratio using a net present value calculation. This has led to more partially HSIP funded projects than in previous years. Any new projects submitted for a spot location should show a 1:1 or better B/C ratio. This will also allow HSIP funds to be used on other projects where partial funding can be used to implement safety improvements.

Currently the Department is creating network screening lists for all 67 counties in Pennsylvania. These highway safety priority lists will be developed using the Highway Safety Manual's analysis method of Excess Expected Average Crash Frequency with Empirical Bayes (EB) adjustments also known as Potential for Safety Improvement (PSI). This method will use the calculated Expected crashes for a location and subtract the Predicted crashes for that same location to produce a value. All locations will have that calculated difference value ordered highest to lowest. Any value above zero shows a potential for safety improvement over the state's predicted annual crashes for that category of roadway or intersection. Locations that have a value below zero will be marked with black cells with white text on the final display on the final analysis lists. The Department is using the Pennsylvania Regionalized Safety Performance Functions (SPFs) and cluster lists to develop the following types of lists:

- Urban Intersections
- Rural intersections
- Urban Segments
- Rural Segments

The lists exclude ramps, ramp terminal locations and expressways since Pennsylvania does not have regionalized SPFs for freeways, ramps, or ramp terminals. Also, existing roundabouts will also be excluded since no SPFs are available for roundabouts. The lists will use the formulas for all crashes, not just the Fatal & Injury formulas.

The work is being completed with Department staff and consultant support. In some situations, a county may not have extensive cluster lists for one of the four categories due to the location's demographics. An example is Philadelphia. We would not expect to have rural classifications for most highways in Philadelphia. Nor would we expect to have many urban highways in a rural county like Cameron County.

The information needed to calculate accurate predicted and expected crash frequencies are in the Pennsylvania State University's Regionalized Safety Performance Functions final report from January 2016. Roadway data is obtained from PennDOT databases like ITMS, video log, and other readily available PennDOT resources. The Department is also using Google Earth for gathering some roadway data like driveway densities. Curve data is being obtained from PennDOT's new horizontal curve database developed by J.D. Kronicz. Since traffic volumes are necessary for the HSM evaluations, PennDOT has contracted with a consultant to collect traffic volumes for approximately 4000 local highways.

This detailed network screening will be used to help select the best locations for HSIP funded safety projects. In total this network screening will cover about 20,000 locations.

General Listing of Projects

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

													RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
PA 198 Bridge/French Creek	Roadway	Roadway - other	0.81	Miles	$2970120	$8635443	HSIP (23 U.S.C. 148)	Urban Minor Arterial	3,816	45	State Highway Agency	Spot	Lane Departure	483
Lewistown Signal Reconstruction	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	0.05	Miles	$125000	$125000	HSIP (23 U.S.C. 148)	Urban Local Road or Street	1,062	35	County Highway Agency	Spot	Intersections	4689
SR15 Intersect T-365	Intersection traffic control	Intersection traffic control - other	3.95	Miles	$188531.55	$3358112.58	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	8,792	50	State Highway Agency	Spot	Intersections	7576
Route 145 Safety Project	Roadway	Roadway - other	2.47	Miles	$118135.02	$11039277.79	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	10,521	40	State Highway Agency	Systemic	Lane Departure	11237
Scotrun - Swiftwater	Roadway	Roadway widening - add lane(s) along segment	4.57	Miles	$5021434	$18766864	HSIP (23 U.S.C. 148)	Urban Minor Arterial	12,585	45	State Highway Agency	Systemic	Lane Departure	11817
Pinecroft Curves	Roadway	Roadway widening - curve	0.56	Miles	$316881.75	$3002948.95	HSIP (23 U.S.C. 148)	Urban Major Collector	2,058	35	State Highway Agency	Spot	Lane Departure	21630
PA 68/Dolby Street Intersection	Intersection geometry	Auxiliary lanes - miscellaneous/other/unspecified	0.96	Miles	$668700	$1717700	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Other	10,866	40	State Highway Agency	Spot	Intersections	24890
PA 28/US 322 Brookville Intersection	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	0.66	Miles	$1699000	$2411220	HSIP (23 U.S.C. 148)	Rural Minor Arterial	4,090	55	State Highway Agency	Spot	Intersections	26064
PA 519 at PA 980 and I-79	Interchange design	Interchange design - other	1.52	Miles	$10000	$910000	HSIP (23 U.S.C. 148)	Urban Minor Arterial	9,837	45	State Highway Agency	Spot	Infrastructure Improvements	57201
N Center Avenue Signals	Intersection traffic control	Modify traffic signal - modernization/replacement	4.96	Miles	$2307.23	$2843037.35	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	6,951	35	State Highway Agency	Systemic	Intersections	57396
Lehigh Race St Intersectn	Intersection traffic control	Intersection traffic control - other	0.36	Miles	$37800	$1751598	HSIP (23 U.S.C. 148)	Urban Minor Arterial	12,825	35	State Highway Agency	Spot	Intersections	57433
Kennedy Drive/County Road	Intersection traffic control	Modify traffic signal - modernization/replacement	0.05	Miles	$2624837	$4070837	HSIP (23 U.S.C. 148)	Urban Minor Arterial	7,799	35	State Highway Agency	Spot	Intersections	57706
SR 183/4016 (Schaeffers)	Intersection traffic control	Intersection traffic control - other	0.88	Miles	$180000	$2308343	HSIP (23 U.S.C. 148)	Rural Minor Arterial	12,724	45	State Highway Agency	Spot	Intersections	57840
Preloh Hill Curve	Alignment	Horizontal curve realignment	0.52	Miles	$36083.87	$2219861.89	HSIP (23 U.S.C. 148)	Rural Major Collector	1,130	55	State Highway Agency	Spot	Infrastructure Improvements	62253
SR61/209 Intersection	Intersection traffic control	Intersection traffic control - other	3.65	Miles	$277155	$462155	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	8,196	50	State Highway Agency	Spot	Intersections	72466
234 & 3001 Improvements	Shoulder treatments	Pave existing shoulders	2.44	Miles	$13500	$598500	HSIP (23 U.S.C. 148)	Rural Minor Arterial	5,323	40	State Highway Agency	Systemic	Lane Departure	73602
PA 27/North St. Connector	Intersection traffic control	Intersection traffic control - other	0.48	Miles	$252000	$9227600	HSIP (23 U.S.C. 148)	Urban Minor Arterial	13,220	35	State Highway Agency	Spot	Intersections	75045
SR 26/45 Shingletown Intersection	Intersection geometry	Intersection geometry - other	0.62	Miles	$450000	$500000	HSIP (23 U.S.C. 148)	Urban Minor Arterial	6,565	45	State Highway Agency	Spot	Intersections	76136

													RELATIONSHIP TO SHSP	
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	EMPHASIS AREA	STRATEGY
SR 183/ 4018 Intersection	Intersection traffic control	Intersection traffic control - other	0.35	Miles	$1304	$1277717.83	HSIP (23 U.S.C. 148)	Rural Minor Arterial	7,564	45	State Highway Agency	Spot	Intersections	78528
Bigelow/BloomfieldBr-Baum	Roadway signs and traffic control	Roadway signs and traffic control - other	1.55	Miles	$40645	$14818982	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	10,689	35	State Highway Agency	Spot	Intersections and Lane Departure	79450
222 & Shantz & 863 Improv	Intersection geometry	Intersection geometry - other	0.24	Miles	$4831800	$7649518	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Other	21,913	55	State Highway Agency	Spot	Intersections	79554
Henry Ave Congested Corr1	Roadway	Roadway - other	7.94	Miles	$950000	$3363000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	14,146	35	State Highway Agency	Systemic	Lane Departure	80104
PA74/Spring Lane Rd Inter	Intersection geometry	Auxiliary lanes - miscellaneous/other/unspecified	0.27	Miles	$3882	$1581882	HSIP (23 U.S.C. 148)	Urban Minor Arterial	8,484	45	State Highway Agency	Spot	Intersections	80694
Martins RdtoChristians Rd	Roadside	Barrier - concrete	2.03	Miles	$1016100	$1201100	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	12,348	55	State Highway Agency	Systemic	Lane Departure	82869
I-279 / McKnight Deicing	Roadway	Pavement surface - miscellaneous	0.79	Miles	$2160000	$2160000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Interstate	19,014	55	State Highway Agency	Spot	Lane Departure	84481
PA-283/I-76 Interchange	Interchange design	Interchange design - other	2.94	Miles	$1913000	$4925582	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Interstate	27,115	55	State Highway Agency	Spot	Infrastructure Improvements	84548
AlleghnyAv:Ridge-Aramingo (C)	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	7.33	Miles	$3000000	$9974600	HSIP (23 U.S.C. 148)	Urban Minor Arterial	12,662	30	State Highway Agency	Systemic	Pedestrians and Bicyclists	85417
Erie Av: Broad St. - K St(C)	Pedestrians and bicyclists	Pedestrian signal	2.47	Miles	$269510	$5474085.68	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	12,624	30	State Highway Agency	Systemic	Pedestrians	85419
PA26/PA305 Intrsctn Imp	Intersection traffic control	Intersection traffic control - other	0.86	Miles	$86655	$626655	HSIP (23 U.S.C. 148)	Rural Minor Arterial	3,324	55	State Highway Agency	Spot	Intersections	88229
Post & Cable Guide Rail	Roadside	Barrier - cable	1.7	Miles	$125000	$231734	HSIP (23 U.S.C. 148)	Urban Local Road or Street	161	25	Town or Township Highway Agency	Systemic	Lane Departure	89233
United High School Curve	Alignment	Alignment - other	1.36	Miles	$316800	$10349100	HSIP (23 U.S.C. 148)	Rural Minor Arterial	5,649	45	State Highway Agency	Spot	Infrastructure Improvements	90194
PA 272 Intersection Impvt	Intersection geometry	Intersection geometry - other	1.78	Miles	$288000	$513000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	8,232	55	State Highway Agency	Spot	Intersections	90490
US222/322 Interchange Imp	Interchange design	Interchange design - other	1.19	Miles	$600152.89	$1175152.89	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	10,143	35	State Highway Agency	Spot	Infrastructure Improvements	90491
N Waterford Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	0.6	Miles	$760000	$1540000	HSIP (23 U.S.C. 148)	Rural Minor Arterial	5,708	40	State Highway Agency	Spot	Intersections and Lane Departure	91394
Cooks Store Intersection	Intersection geometry	Intersection geometry - other	0.38	Miles	$340092	$814092	HSIP (23 U.S.C. 148)	Urban Minor Arterial	7,001	45	State Highway Agency	Spot	Intersections	92444
US22 Frankstown Intrsctns	Intersection geometry	Intersection geometrics - realignment to align offset cross streets	1.42	Miles	$2162170	$8078976	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	7,578	55	State Highway Agency	Spot	Intersections	92537
SR 0739 Shld Widen / ELRS	Shoulder treatments	Shoulder treatments - other	2.36	Miles	$4061000	$6126000	HSIP (23 U.S.C. 148)	Rural Major Collector	1,114	35	State Highway Agency	Systemic	Lane Departure	92900
SR 73/662 Corridor Safety	Intersection traffic control	Intersection traffic control - other	1.34	Miles	$1547118	$2990178	HSIP (23 U.S.C. 148)	Urban Minor Arterial	8,110	40	State Highway Agency	Spot	Intersections	92921

													RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
248/946 Intersctn Impr Berlinsville	Intersection traffic control	Modify traffic signal - modernization/replacement	0.14	Miles	$1261733	$2060033	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	10,216	40	State Highway Agency	Spot	Intersections	93116
Lock Haven Signal Improvement	Intersection traffic control	Intersection traffic control - other	0.16	Miles	$300765	$300765	HSIP (23 U.S.C. 148)	Urban Minor Arterial	13,009	35	State Highway Agency	Spot	Intersections	93343
SR 66/948 Intchg Improve	Intersection geometry	Intersection geometry - other	1.29	Miles	$1903087	$2590688	HSIP (23 U.S.C. 148)	Rural Minor Arterial	1,862	55	State Highway Agency	Spot	Intersections	93587
PA 287 to West Fourth Street	Roadway signs and traffic control	Roadway signs and traffic control - other	12.88	Miles	$393650	$3565072	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	12,348	55	State Highway Agency	Systemic	Intersections and Lane Departure	93732
SR 348 Intersection Imp	Intersection geometry	Auxiliary lanes - miscellaneous/other/unspecified	0.24	Miles	$168520	$2141520	HSIP (23 U.S.C. 148)	Rural Minor Arterial	10,548	40	State Highway Agency	Spot	Intersections	94567
17th/Vly View/Pleas Vly	Interchange design	Installation of new lane on ramp	2.00	Miles	$1057981	$3276500	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	17,303	40	State Highway Agency	Spot	Infrastructure Improvements	94670
SR 29/3003 Sugar Hollow	Intersection traffic control	Intersection traffic control - other	0.34	Miles	$130000	$430000	HSIP (23 U.S.C. 148)	Rural Minor Arterial	8,889	55	State Highway Agency	Spot	Intersections	94688
SR 11 Shoulders / ELRS	Roadway	Rumble strips - edge or shoulder	3.1	Miles	$210450	$959450	HSIP (23 U.S.C. 148)	Rural Major Collector	1,814	55	State Highway Agency	Systemic	Lane Departure	94737
SR 11 Shoulder / ELRS	Roadway	Rumble strips - edge or shoulder	2.59	Miles	$150000	$690000	HSIP (23 U.S.C. 148)	Rural Major Collector	1,865	45	State Highway Agency	Systemic	Lane Departure	94740
SR 11 Shoulder / ELRS.	Roadway	Rumble strips - edge or shoulder	3.11	Miles	$280054.35	$823000	HSIP (23 U.S.C. 148)	Rural Major Collector	1,453	45	State Highway Agency	Systemic	Lane Departure	94741
SR 248 and Walnut Drive	Intersection traffic control	Systemic improvements - signal-controlled	0.12	Miles	$70000	$1486905	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	10,294	50	State Highway Agency	Systemic	Intersections	94864
94 & 394 Intersection Imp	Intersection traffic control	Intersection traffic control - other	2.69	Miles	$446000	$800611	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Other	9,628	40	State Highway Agency	Spot	Intersections	94894
422 & Ramona Rd Intersect	Intersection traffic control	Intersection traffic control - other	1.15	Miles	$2004109	$2754109	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	14,138	45	State Highway Agency	Spot	Intersections	94937
209 Mt Nebo to Municipal	Shoulder treatments	Widen shoulder - paved or other	2.47	Miles	$66000	$1391718	HSIP (23 U.S.C. 148)	Urban Minor Arterial	16,156	45	State Highway Agency	Systemic	Lane Departure	95398
SR 4012: Intrchng Rd Impr	Roadway	Roadway widening - add lane(s) along segment	1.92	Miles	$1929210	$1929210	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	13,767	45	State Highway Agency	Spot	Lane Departure	95558
City Ave Adaptive Signals(C)	Intersection traffic control	Modify traffic signal - modernization/replacement	5.81	Miles	$2800000	$3275502	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	16,265	35	State Highway Agency	Systemic	Intersections	96215
Cameron St Low Cost Safe	Roadway signs and traffic control	Roadway signs and traffic control - other	6.1	Miles	$100000	$822002	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	7,072	35	State Highway Agency	Systemic	Intersections and Lane Departure	97407
US220 & PA199 Int	Intersection geometry	Intersection geometry - other	0.82	Miles	$1240000	$2390000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other Freeways and Expressways	14,522	55	State Highway Agency	Spot	Intersections	97630
SR220/SR2027 Intersection	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	1.22	Miles	$1323755	$1473755	HSIP (23 U.S.C. 148)	Rural Minor Arterial	3,682	45	State Highway Agency	Spot	Intersections	97972
Atherton Street Phase II	Roadway	Pavement surface - miscellaneous	2.76	Miles	$652000	$1974355	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	20,633	35	State Highway Agency	Spot	Lane Departure	98126

													RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
US 40:PA 917 to Maiden St	Roadway	Pavement surface - miscellaneous	4.41	Miles	$105077	$2271044	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Other	4,570	30	State Highway Agency	Spot	Lane Departure	98362
Lewistown Safety Corridor	Intersection traffic control	Modify traffic signal - modernization/replacement	1.43	Miles	$371316	$371316	HSIP (23 U.S.C. 148)	Urban Minor Arterial	9,669	25	State Highway Agency	Spot	Intersections	101959
PA 115 Edge Line Rumble Strips	Shoulder treatments	Shoulder treatments - other	4.22	Miles	$574872	$584872	HSIP (23 U.S.C. 148)	Rural Minor Arterial	4,887	55	State Highway Agency	Systemic	Lane Departure	102002
Roadway Depart. Safety(C)	Roadside	Roadside - other	0	Miles	$392000	$2562000	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	102132
SR2016 at RiverAve Signal	Intersection traffic control	Modify traffic signal - modernization/replacement	0.03	Miles	$71790	$595000	HSIP (23 U.S.C. 148)	Urban Minor Arterial	8,930	35	State Highway Agency	Spot	Intersections	102133
DW HFS-2014	Roadway	Pavement surface - high friction surface	0.69	Miles	$16500	$369550	HSIP (23 U.S.C. 148)	Rural Major Collector	2,045	40	State Highway Agency	Systemic	Lane Departure	102152
15th Street Corridor	Roadway signs and traffic control	Roadway signs and traffic control - other	0.7	Miles	$269400	$956949	HSIP (23 U.S.C. 148)	Urban Minor Arterial	14,540	30	State Highway Agency	Spot	Intersections and Lane Departure	102155
SR 2014 Corridor Improvem	Roadway signs and traffic control	Roadway signs and traffic control - other	1.1	Miles	$355572	$355572	HSIP (23 U.S.C. 148)	Urban Minor Arterial	9,109	25	State Highway Agency	Spot	Intersections and Lane Departure	102162
2005 Corridor Improvement	Roadway signs and traffic control	Roadway signs and traffic control - other	2.06	Miles	$2196832	$3517828	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	11,960	30	State Highway Agency	Systemic	Intersections and Lane Departure	102168
SR 0652 Shoulders / ELRS	Roadway	Rumble strips - edge or shoulder	2.34	Miles	$402804	$460000	HSIP (23 U.S.C. 148)	Rural Minor Arterial	7,051	50	State Highway Agency	Systemic	Lane Departure	102326
PA 944 Safety Improvemnts	Non-infrastructure	Transportation safety planning	14.46	Miles	$240000	$240000	HSIP (23 U.S.C. 148)	Urban Minor Arterial	8,405	45	State Highway Agency	Systemic	Data	102372
High Friction Surfaces(F)	Roadway	Pavement surface - high friction surface	6.77	Miles	$11149	$2365831	HSIP (23 U.S.C. 148)	Urban Major Collector	11,360	40	State Highway Agency	Systemic	Lane Departure	102572
Lycoming Cable Guiderail	Roadside	Barrier - cable	0	Miles	$479250	$539250	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	102876
NTIER Cable Guiderail	Roadside	Barrier - cable	0	Miles	$693000	$754550	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	102877
SR 54 Corridor Safety Improvement	Intersection geometry	Intersection geometrics - re-assign existing lane use	2.43	Miles	$160000	$480000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	11,075	55	State Highway Agency	Spot	Intersections	103853
873 & Best Station Road	Shoulder treatments	Shoulder treatments - other	0.21	Miles	$210855	$325020	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	9,767	55	State Highway Agency	Spot	Lane Departure	104166
Dist. GuideRail Upgrade	Roadside	Barrier end treatments (crash cushions, terminals)	14.00	Miles	$20000	$1020000	HSIP (23 U.S.C. 148)	Rural Minor Arterial	4,733	55	State Highway Agency	Systemic	Lane Departure	104349
ISIP Open End Project (C)	Non-infrastructure	Transportation safety planning	0	Miles	$3825628	$5400628	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Data	104363
RDIP Open End Project (C)	Non-infrastructure	Transportation safety planning	0	Miles	$3184687	$4759687	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Data	104364
High Friction Surfaces 2016(C)	Roadway	Pavement surface - high friction surface	0	Miles	$849489	$2793278	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	104366
Robbins Ave ISIP(C)	Pedestrians and bicyclists	Pedestrian signal - install new at intersection	7.93	Miles	$1143582	$1318582	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	8,231	30	State Highway Agency	Systemic	Pedestrians	104367

													RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
Cottman Ave ISIP(C)	Pedestrians and bicyclists	Pedestrian signal - install new at intersection	6.7	Miles	$865000	$1145000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	9,713	30	State Highway Agency	Systemic	Pedestrians	104368
Hanover Adaptive Signals	Intersection traffic control	Modify traffic signal - modernization/replacement	6.87	Miles	$1258543	$1258543	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	11,352	35	State Highway Agency	Systemic	Intersections	104371
Wrong Way Rmp Upgrades	Interchange design	Interchange design - other	60.48	Miles	$2019	$142719	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	7,046	70	State Highway Agency	Systemic	Infrastructure Improvements	104376
Levick Street ISIP(C)	Pedestrians and bicyclists	Pedestrian signal - install new at intersection	2.01	Miles	$733436	$1077486	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	19,160	25	State Highway Agency	Systemic	Pedestrians	104381
Cable Guide Rail Removal	Roadside	Barrier - removal	15.79	Miles	$80000	$780000	HSIP (23 U.S.C. 148)	Rural Minor Collector	342	55	State Highway Agency	Systemic	Lane Departure	104384
Cobbs Creek HFS(C)	Roadway	Pavement surface - high friction surface	3.41	Miles	$498922	$1218922	HSIP (23 U.S.C. 148)	Urban Minor Arterial	19,747	25	State Highway Agency	Systemic	Lane Departure	104386
DW Systematic Impr 2015	Intersection traffic control	Systemic improvements - stop-controlled	0	Miles	$420385	$3035441	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Intersections	104430
I-80 Median Barrier	Roadside	Barrier - cable	102.74	Miles	$925441	$2850441	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	10,567	65	State Highway Agency	Systemic	Lane Departure	104433
I-176 Median Barrier	Roadside	Barrier - cable	21.51	Miles	$269880	$269880	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	12,918	65	State Highway Agency	Systemic	Lane Departure	104435
I-380 Median Barrier	Roadside	Barrier - cable	26.51	Miles	$7528	$227528	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	15,005	70	State Highway Agency	Systemic	Lane Departure	104436
33 Median Barrier-Northmp	Roadside	Barrier - cable	29.07	Miles	$373680	$373680	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	26,790	65	State Highway Agency	Systemic	Lane Departure	104437
SR 11/SR 3023& Birch, SR 11& Hickory, SR 3023& Elm	Intersection traffic control	Intersection traffic control - other	0.26	Miles	$186855	$804029	HSIP (23 U.S.C. 148)	Urban Minor Arterial	11,796	25	State Highway Agency	Spot	Intersections	104443
SR 18/Rutledge Rd Intersection	Intersection traffic control	Intersection traffic control - other	3.12	Miles	$758425	$858425	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Other	6,144	45	State Highway Agency	Spot	Intersections	105773
Gordon Mountain Road Truck Signing	Roadway delineation	Longitudinal pavement markings - new	2.26	Miles	$48969	$136321	HSIP (23 U.S.C. 148)	Urban Major Collector	2,736	55	State Highway Agency	Systemic	Lane Departure	106123
Bellefonte Interchange Safety Study	Non-infrastructure	Transportation safety planning	6.17	Miles	$75000	$226000	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	12,161	70	State Highway Agency	Spot	Data	106282
SR 89 & SR 430 Intersection	Intersection traffic control	Intersection traffic control - other	0.84	Miles	$400528.87	$490528.87	HSIP (23 U.S.C. 148)	Rural Minor Arterial	2,268	55	State Highway Agency	Spot	Intersections	106446
SR 12 Median Barrier	Roadside	Barrier - cable	3.02	Miles	$4291	$48441	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other Freeways and Expressways	10,923	55	State Highway Agency	Systemic	Lane Departure	106483
2018 Cable Median Barrier	Roadside	Barrier - cable	0	Miles	$250000	$250000	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	106508
Municipal Safety LTAP	Non-infrastructure	Outreach	0	Miles	$500000	$1000000	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Data	106544

													RELATIONSHIP TO SHSP	
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Riverlands Safety Implementation	Roadway signs and traffic control	Roadway signs and traffic control - other	24.38	Miles	$200000	$200000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other Freeways and Expressways	21,792	55	State Highway Agency	Systemic	Intersections and Lane Departure	106554
2017 HSIP HFS Contract	Roadway	Pavement surface - high friction surface	2.62	Miles	$833608	$833608	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	12,611	55	State Highway Agency	Systemic	Lane Departure	106560
D12 Interstate Delineation	Roadway delineation	Delineators post-mounted or on barrier	43.76	Miles	$850000	$850000	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	15,080	70	State Highway Agency	Systemic	Lane Departure	106566
Districtwide Rumble Strips	Roadway	Rumble strips - center	42.82	Miles	$229930	$229930	HSIP (23 U.S.C. 148)	Rural Minor Arterial	3,873	45	State Highway Agency	Systemic	Lane Departure	106599
SR 652 Safety Improvement	Shoulder treatments	Widen shoulder - paved or other	3.17	Miles	$10000	$557254	HSIP (23 U.S.C. 148)	Rural Minor Arterial	5,056	40	State Highway Agency	Systemic	Lane Departure	106632
Franklin I-81 Cable Median Barrier	Roadside	Barrier - cable	47.39	Miles	$2230609	$2230609	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Interstate	24,214	65	State Highway Agency	Systemic	Lane Departure	106712
2017 District Cable Median Barrier	Roadside	Barrier - cable	55.09	Miles	$80000	$3109386	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Interstate	29,905	65	State Highway Agency	Systemic	Lane Departure	106769
2017 Wrong Way Entry	Interchange design	Interchange design - other	0	Miles	$509700	$509700	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Spot	Infrastructure Improvements	106776
D9 2017 HSIP HFST	Roadway	Pavement surface - high friction surface	0.77	Miles	$415500	$415500	HSIP (23 U.S.C. 148)	Rural Principal Arterial - Other	3,776	55	State Highway Agency	Systemic	Lane Departure	106777
D9 2017 HSIP Cable GR	Roadside	Barrier - cable	11.67	Miles	$581150	$581150	HSIP (23 U.S.C. 148)	Rural Major Collector	493	40	State Highway Agency	Systemic	Lane Departure	106780
D11 Road Safety Audit Open End	Non-infrastructure	Road safety audits	0	Miles	$100000	$100000	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Other	Data	106846
I-79 Roll Over Detection System	Advanced technology and ITS	Advanced technology and ITS - other	3.77	Miles	$50000	$50000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Interstate	5,003	55	State Highway Agency	Systemic	Commercial Vehicle Safety	106847
PA 400 Signal Corridor	Roadway signs and traffic control	Roadway signs and traffic control - other	1.92	Miles	$2513402	$2513402	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	4,295	25	State Highway Agency	Spot	Intersections and Lane Departure	106848
Districtwide CGR Upgrades	Roadside	Barrier - cable	0	Miles	$175000	$755597	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	106879
Districtwide UBE	Roadside	Barrier end treatments (crash cushions, terminals)	0	Miles	$145000	$1093294	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Systemic	Lane Departure	106882
Districtwide Long Term UBE	Roadside	Barrier end treatments (crash cushions, terminals)	0.01	Miles	$215000	$215000	HSIP (23 U.S.C. 148)	Rural Minor Collector	1,190	40	State Highway Agency	Systemic	Lane Departure	106885
District Roundabout Program	Intersection traffic control	Modify control - modifications to roundabout	0	Miles	$500000	$500000	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Other	Intersections	106990
Wrong Way Ramps Secondary	Roadway delineation	Improve retroreflectivity	17.67	Miles	$848010	$848010	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other	2,880	25	State Highway Agency	Systemic	Lane Departure	107525
LVTS High Friction Sites - 2017	Roadway	Pavement surface - high friction surface	1.44	Miles	$544940	$544940	HSIP (23 U.S.C. 148)	Urban Minor Arterial	9,706	40	State Highway Agency	Systemic	Lane Departure	107891
NEPA High Friction Surface-2017	Roadway	Pavement surface - high friction surface	0.48	Miles	$168774	$168774	HSIP (23 U.S.C. 148)	Urban Major Collector	5,705	45	State Highway Agency	Systemic	Lane Departure	107892

2017 Pennsylvania Highway Safety Improvement Program

													RELATIONSHIP TO SHSP	
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	EMPHASIS AREA	STRATEGY
RATS High Friction Surface- 2017	Roadway	Pavement surface - high friction surface	0.81	Miles	$205999	$205999	HSIP (23 U.S.C. 148)	Rural Minor Arterial	5,289	40	State Highway Agency	Systemic	Lane Departure	107893
Highway Safety Priority Lists (2012-2016 data)	Non-infrastructure	Data/traffic records	0	Miles	$567065.08	$800000	HSIP (23 U.S.C. 148)	Unknown	0	0	State Highway Agency	Other	Data	108893
Wrong Way Ramp Upgrades	Interchange design	Interchange design - other	0.09	Miles	$15000	$15000	HSIP (23 U.S.C. 148)	Urban Principal Arterial - Other Freeways and Expressways	5,278	25	State Highway Agency	Spot	Infrastructure Improvements	109012
Erie County RSA's	Non-infrastructure	Road safety audits	4.09	Miles	$30000	$30000	HSIP (23 U.S.C. 148)	Urban Minor Arterial	8,956	45	State Highway Agency	Other	Data	109223

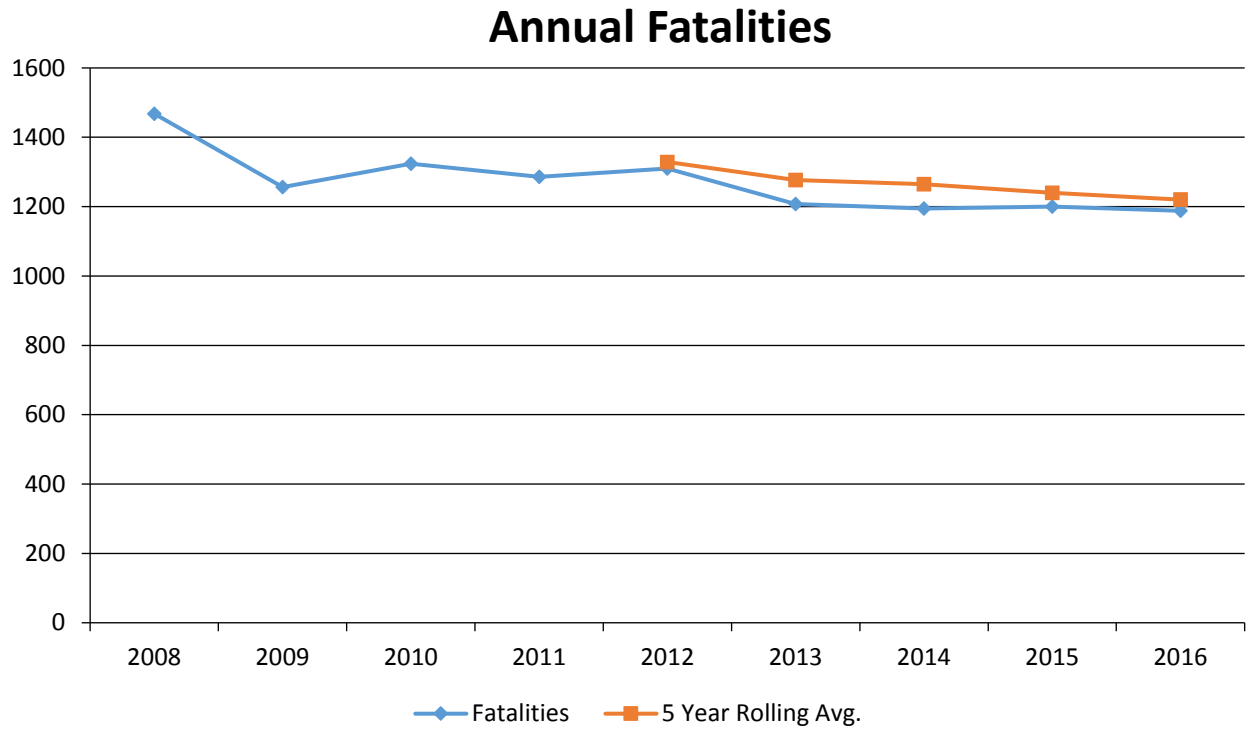
Enter additional comments here to clarify your response for this question or add supporting information.

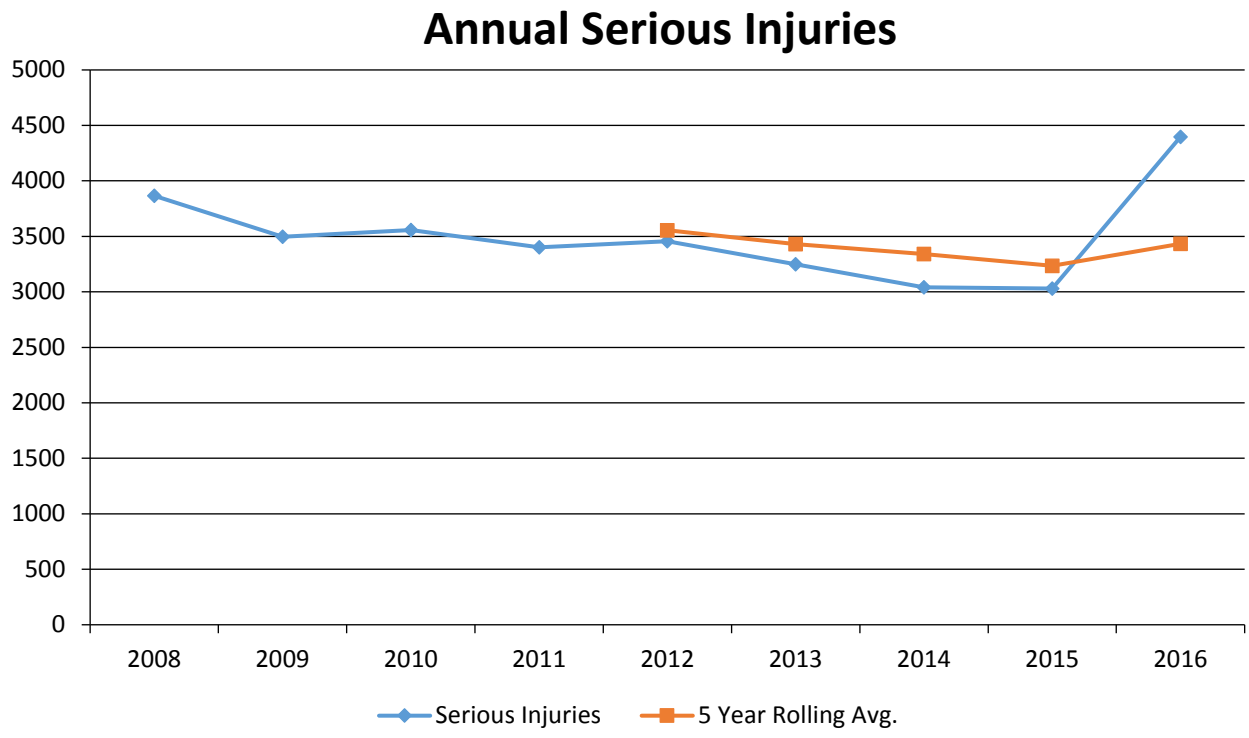
Safety Performance

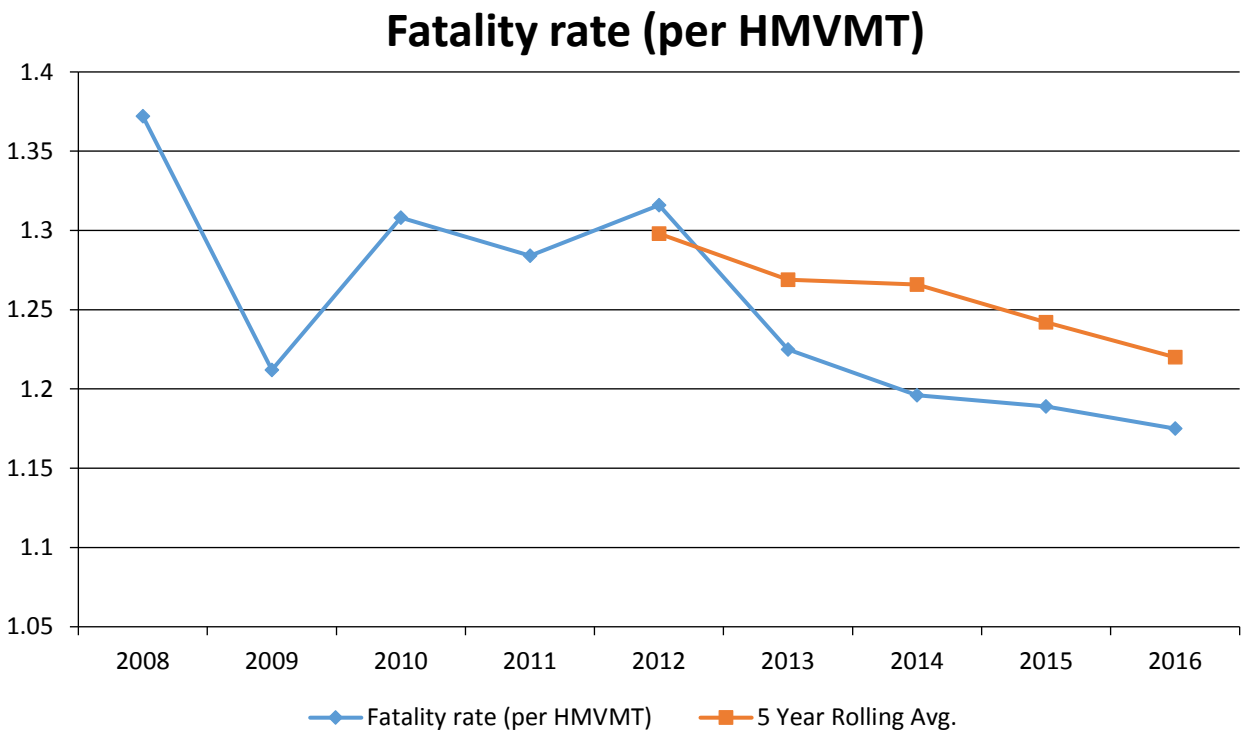
General Highway Safety Trends

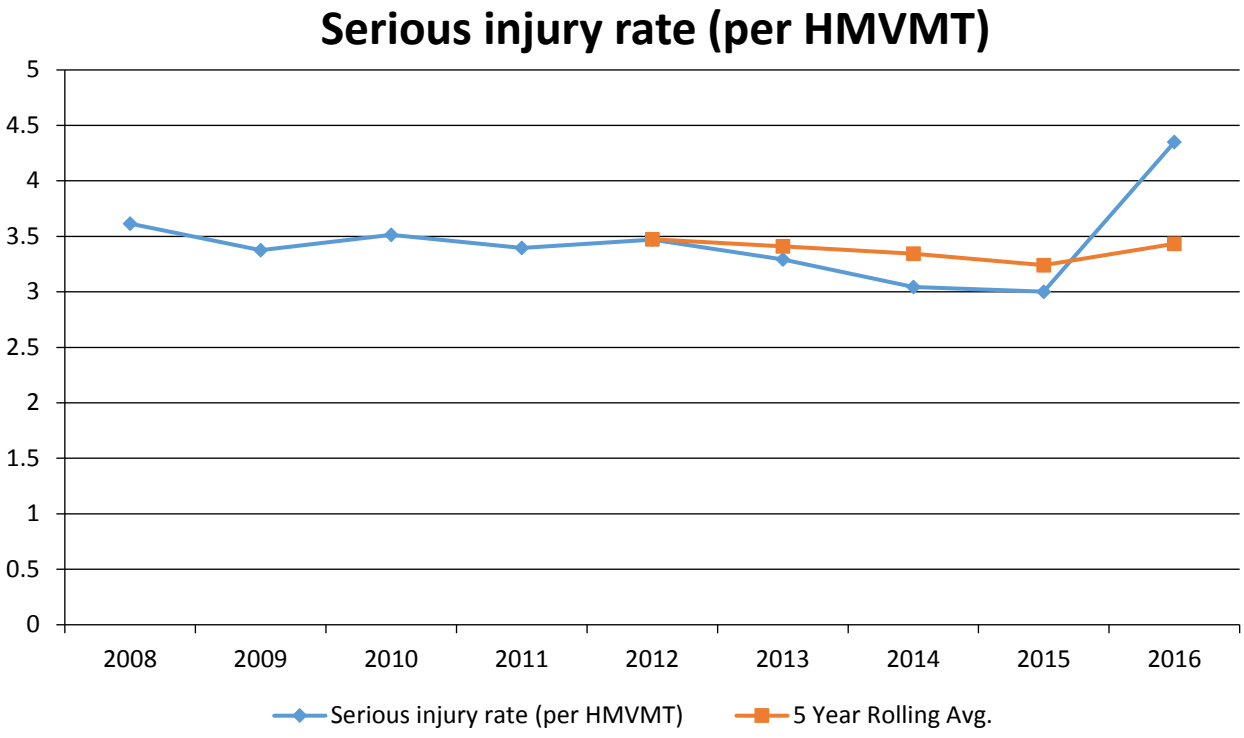
Present data showing the general highway safety trends in the State for the past five years.

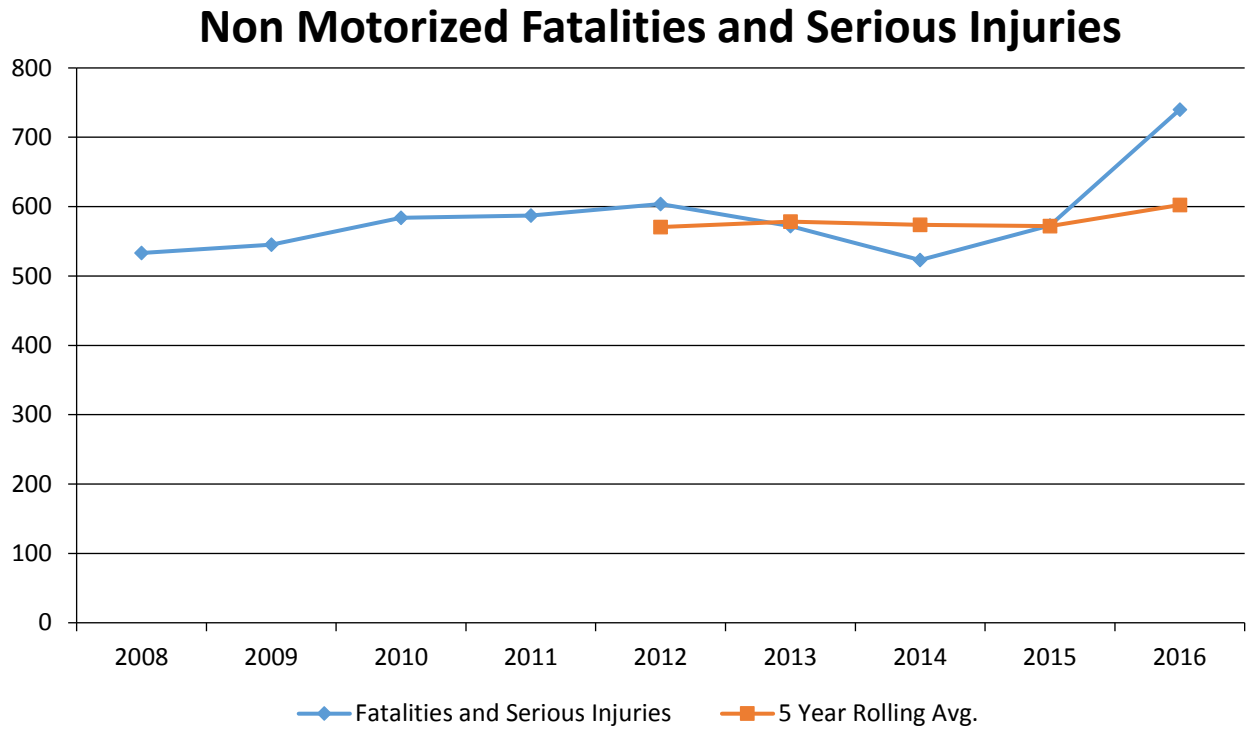
PERFORMANCE MEASURES	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fatalities	1,468	1,256	1,324	1,286	1,310	1,208	1,195	1,200	1,188
Serious Injuries	3,867	3,498	3,556	3,402	3,455	3,248	3,040	3,030	4,397
Fatality rate (per HMVMT)	1.372	1.212	1.308	1.284	1.316	1.225	1.196	1.189	1.175
Serious injury rate (per HMVMT)	3.614	3.377	3.513	3.396	3.471	3.293	3.044	3.002	4.349
Number non-motorized fatalities	152	156	171	160	184	166	187	172	192
Number of non-motorized serious injuries	381	389	413	427	420	406	336	401	548


Annual Fatalities
1600
1400
1200
1000
800
600
400
200
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.4
1.35
1.3
1.25
1.2
1.15
1.1
1.05
2008
2009
2010
2011
2012
2013
2014
2015
2016
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
2008
2009
2010
2011
2012
2013
2014
2015
2016
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Enter additional comments here to clarify your response for this question or add supporting information.

The number of serious injuries increased by 45% from 2015 to 2016 due to the change from "Major Injury" to "Suspected Serious Injury" in Pennsylvania. This change also had a significant impact on the serious injury rate and non-motorized serious injury performance measures above.

Describe fatality data source.

State Motor Vehicle Crash Database

Enter additional comments here to clarify your response for this question or add supporting information.

Pennsylvania uses both state motor vehicle crash data and the Fatality Analysis Reporting System (FARS).

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

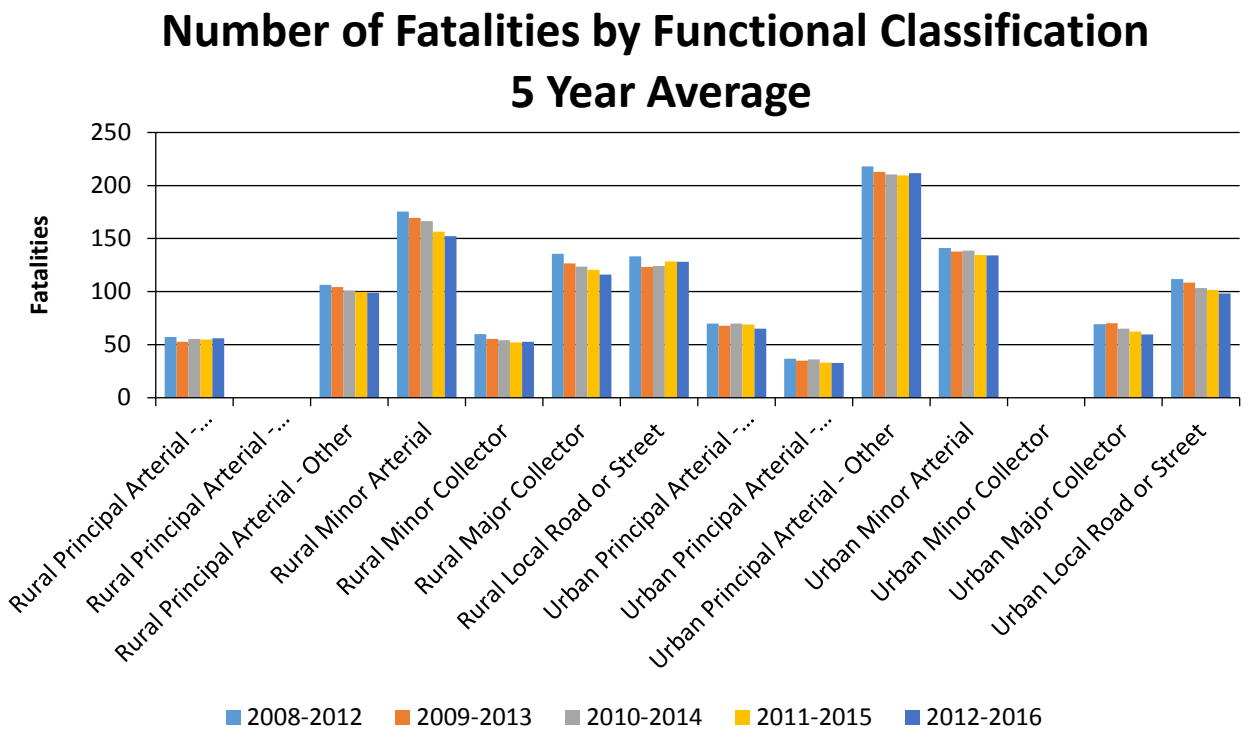
Year 2016

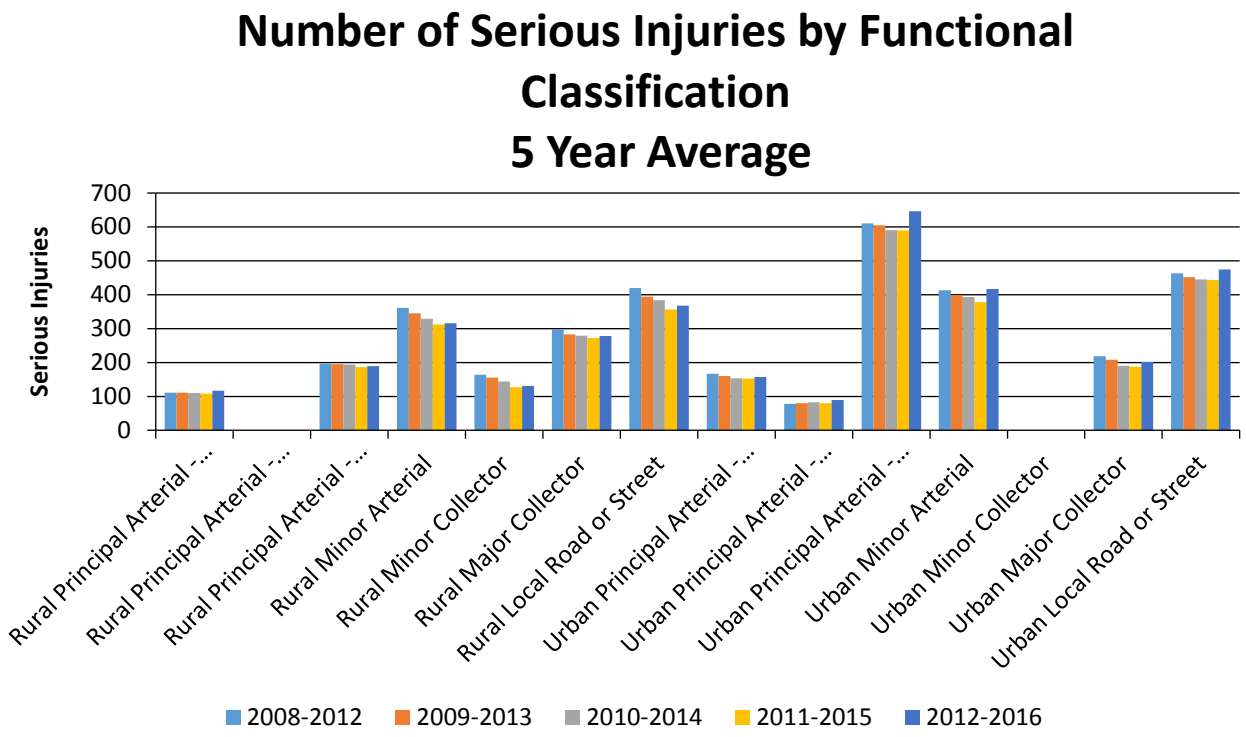
Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial - Interstate	56	116.2	0.55	1.13
Rural Principal Arterial - Other Freeways and Expressways	0	0	0	0

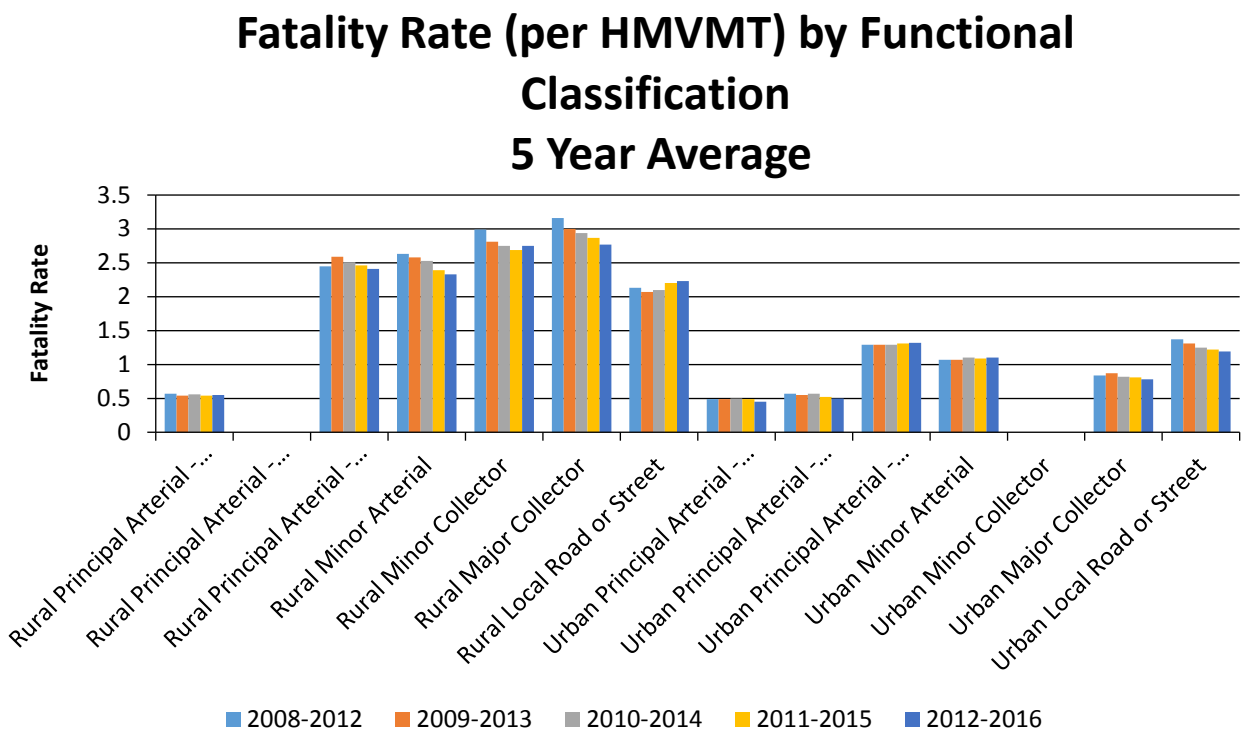
Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial - Other	98.8	189.4	2.41	4.63
Rural Minor Arterial	152.2	316.2	2.33	4.84
Rural Minor Collector	52.6	130.6	2.75	6.84
Rural Major Collector	116	278	2.77	6.64
Rural Local Road or Street	128.2	367.4	2.23	6.37
Urban Principal Arterial - Interstate	65.2	157.6	0.45	1.09
Urban Principal Arterial - Other Freeways and Expressways	32.8	88.8	0.5	1.33
Urban Principal Arterial - Other	211.6	646.2	1.32	4.04
Urban Minor Arterial	134.2	416.8	1.1	3.42
Urban Minor Collector	0	0	0	0
Urban Major Collector	59.6	202	0.78	2.64
Urban Local Road or Street	98.4	474.8	1.19	5.77

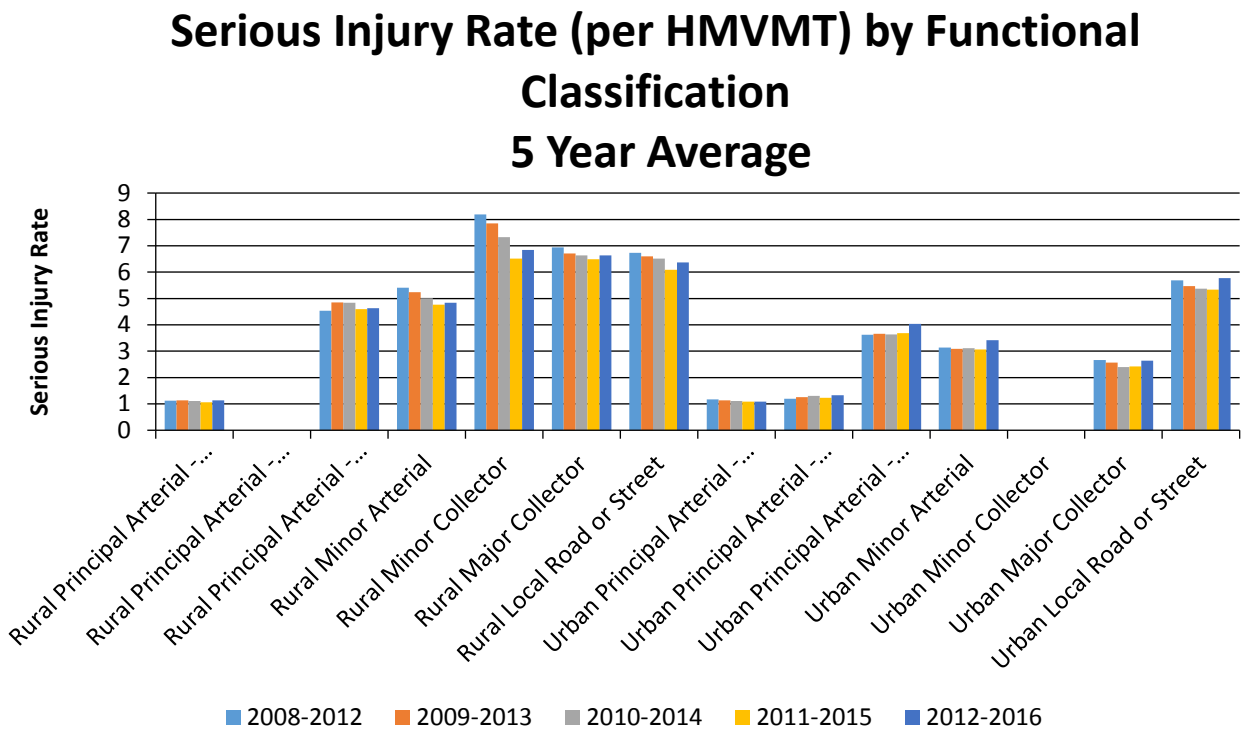
Year 2015

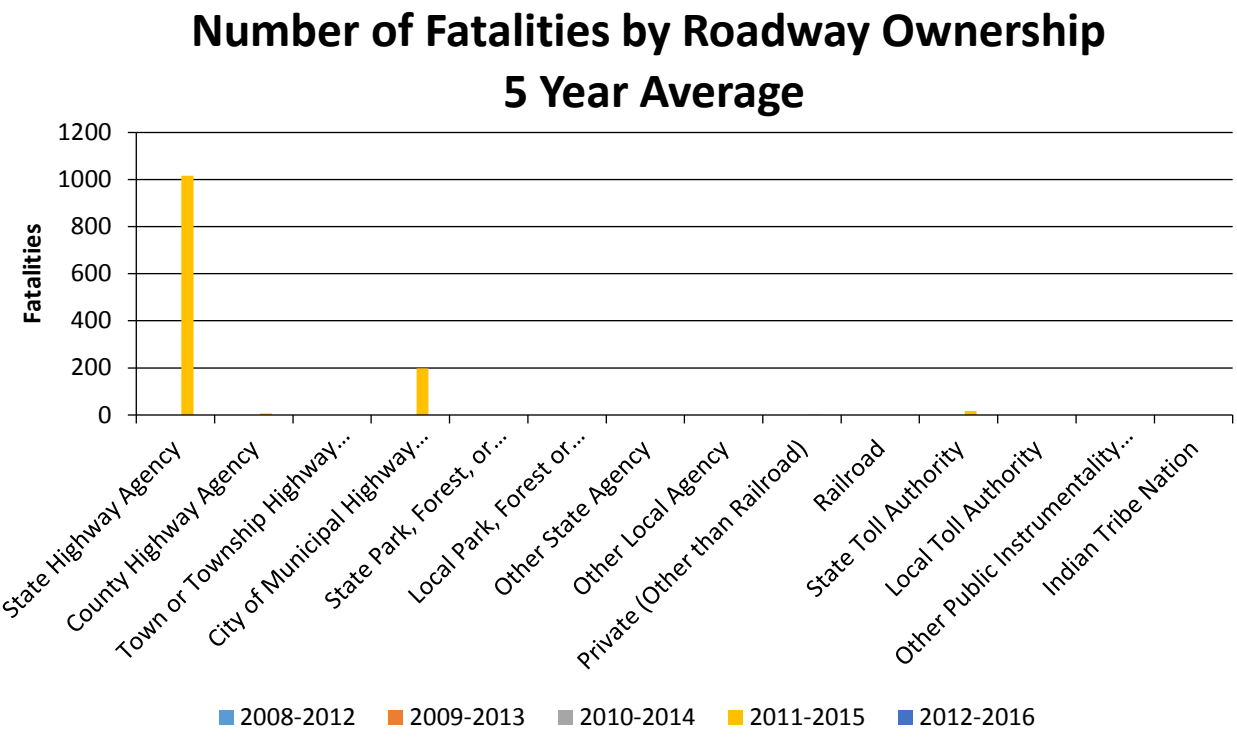
Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	1,017	2,479	1.02	2.48
County Highway Agency	7	19	0.01	0.02
Town or Township Highway Agency	0	0	0	0
City of Municipal Highway Agency	198	694	0.2	0.69
State Park, Forest, or Reservation Agency	0	0	0	0
Local Park, Forest or Reservation Agency	0	0	0	0
Other State Agency	0	0	0	0
Other Local Agency	0	0	0	0
Private (Other than Railroad)	1	6	0	0.01
Railroad	0	0	0	0
State Toll Authority	17	46	0.02	0.05
Local Toll Authority	0	0	0	0
Other Public Instrumentality (e.g. Airport, School, University)	0	0	0	0
Indian Tribe Nation	0	0	0	0

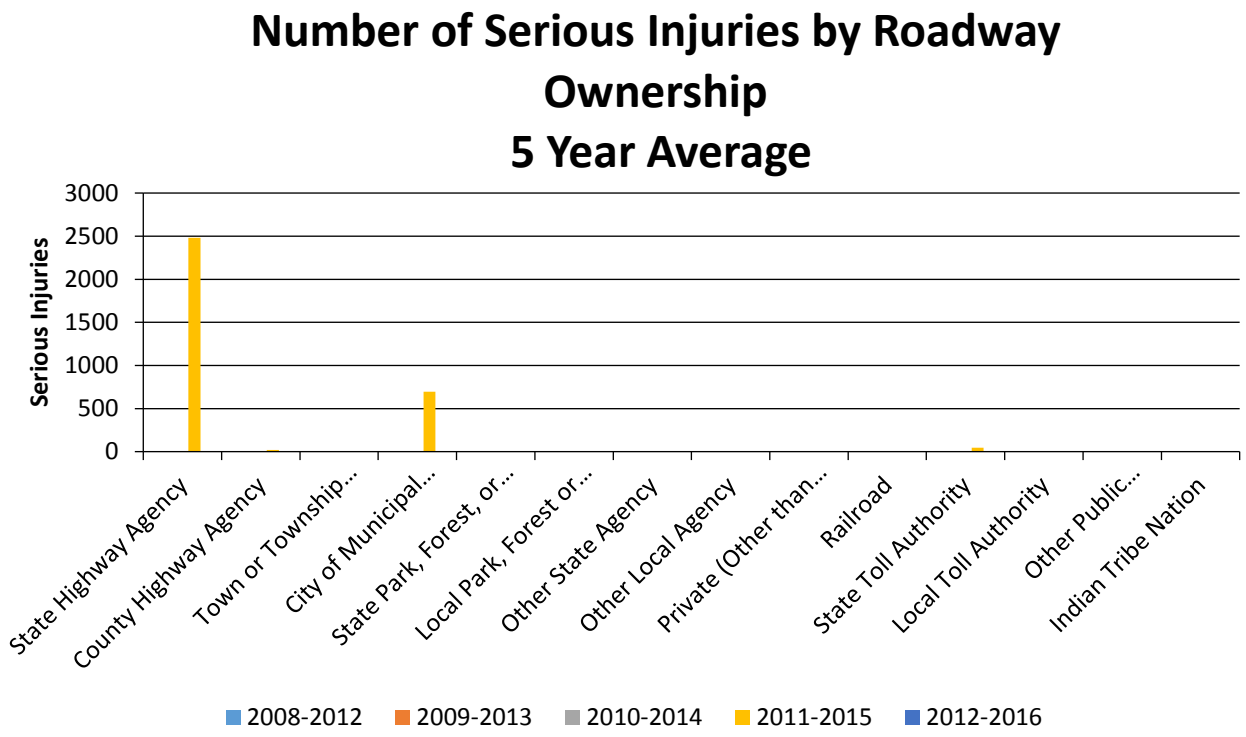

Number of Fatalities by Functional Classification
5 Year Average
Fatalities
250
200
150
100
50
0
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Principal Arterial - Other
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Principal Arterial - Other
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016

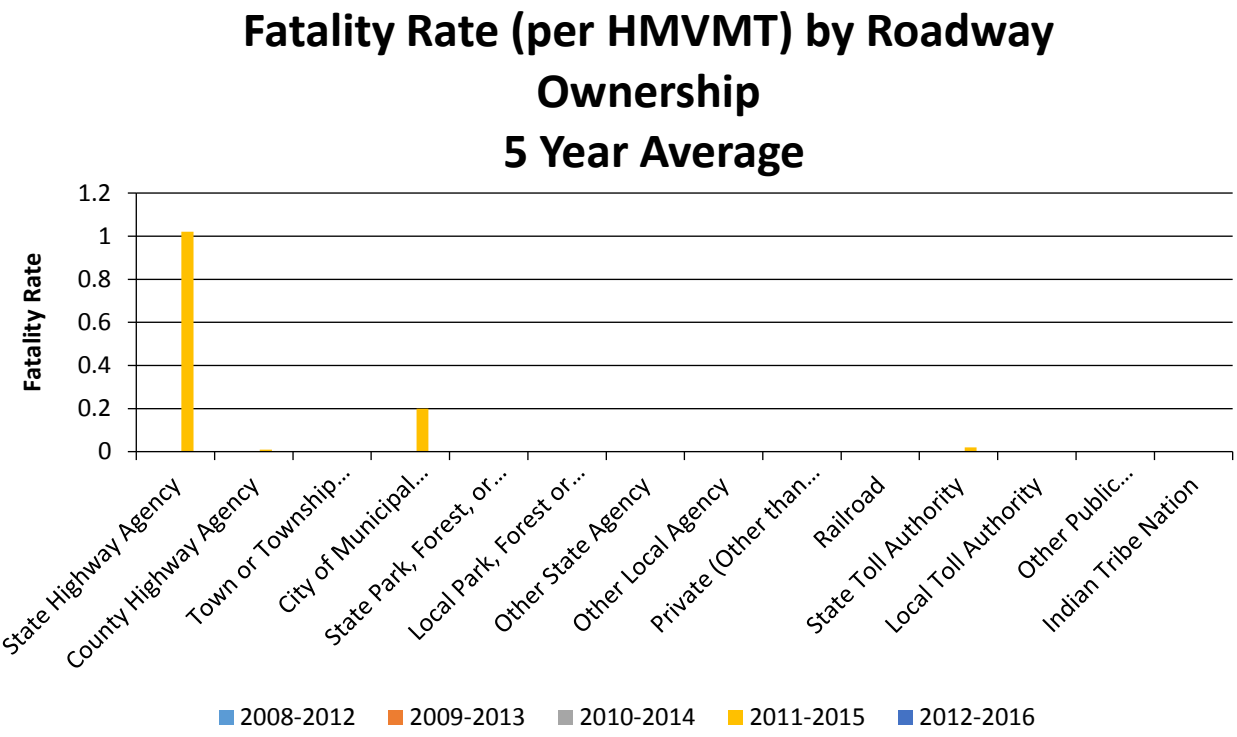

Number of Serious Injuries by Functional Classification
5 Year Average
Serious Injuries
700
600
500
400
300
200
100
0
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016

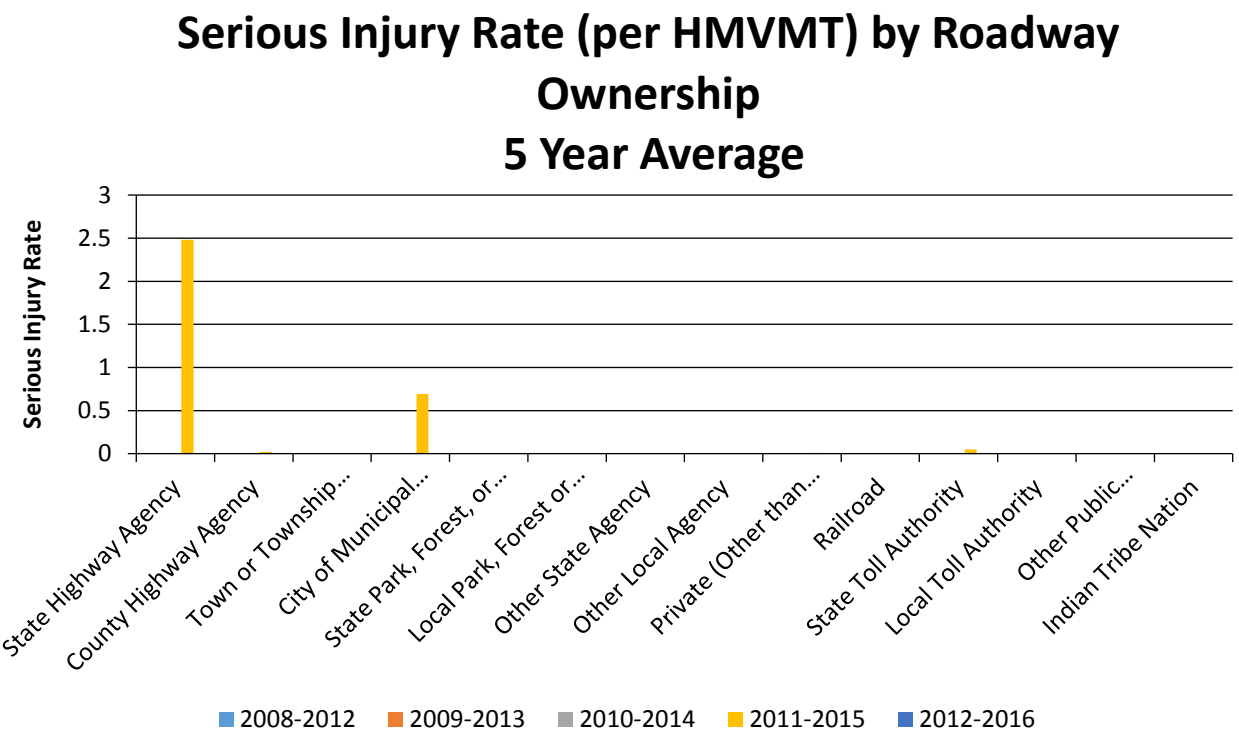

Fatality Rate (per HMVMT) by Functional Classification
5 Year Average
Fatality Rate
3.5
3
2.5
2
1.5
1
0.5
0
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Serious Injury Rate (per HMVMT) by Functional Classification
5 Year Average
Serious Injury Rate
0
1
2
3
4
5
6
7
8
9
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Principal Arterial -...
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Principal Arterial -...
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Number of Fatalities by Roadway Ownership
5 Year Average
Fatalities
1200
1000
800
600
400
200
0
State Highway Agency
County Highway Agency
Town or Township Highway...
City of Municipal Highway...
State Park, Forest, or...
Local Park, Forest or...
Other State Agency
Other Local Agency
Private (Other than Railroad)
Railroad
State Toll Authority
Local Toll Authority
Other Public Instrumentality...
Indian Tribe Nation
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Number of Serious Injuries by Roadway Ownership
5 Year Average
Serious Injuries
3000
2500
2000
1500
1000
500
0
State Highway Agency
County Highway Agency
Town or Township...
City of Municipal...
State Park, Forest, or...
Local Park, Forest or...
Other State Agency
Other Local Agency
Private (Other than...
Railroad
State Toll Authority
Local Toll Authority
Other Public...
Indian Tribe Nation
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Fatality Rate (per HMVMT) by Roadway Ownership
5 Year Average
Fatality Rate
1.2
1
0.8
0.6
0.4
0.2
0
State Highway Agency
County Highway Agency
Town or Township...
City of Municipal...
State Park, Forest, or...
Local Park, Forest or...
Other State Agency
Other Local Agency
Private (Other than...
Railroad
State Toll Authority
Local Toll Authority
Other Public...
Indian Tribe Nation
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016



Enter additional comments here to clarify your response for this question or add supporting information.

Pennsylvania does not have crash data for "Rural Principal Arterial - Other Freeways and Expressways".

Also Urban Collector is not broken down by Major and Minor. Data for all Urban Collectors is reflected in the "Urban Major Collector" field.

Are there any other aspects of the general highway safety trends on which the State would like to elaborate?

Yes

Provide additional discussion related to general highway safety trends.

Both the number of Pennsylvania residents and licensed drivers over the age of 65 have increased consistently each year since 2010. These trends will have a significant impact on the special rule for drivers/pedestrians over the age of 65 (Question #38).

Also the number of serious injuries increased by 45% from 2015 to 2016. This is due to both the change in definition and the new title of this injury type. 2016 crash data included the change from "Major Injury" to the MMUCC compliant "Suspected Serious Injury".

Safety Performance Targets

Safety Performance Targets

Calendar Year 2018 Targets *

Number of Fatalities 1177.6

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

In October 2016, the National Highway Traffic Safety Administration (NHTSA) committed to eliminate traffic deaths within 30 years. Pennsylvania's 2017 SHSP has adopted a goal to support this national effort. This ambitious timeline will rely heavily on the implementation of autonomous vehicle technology, anticipated between 2025 and 2030. Pennsylvania's current target is to reduce 2016 fatalities by two percent per year through 2018. The target shown above (1177.6) is the five-year rolling average for 2014-2018. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends and reduction in fatalities over the next 30 years will not be linear. As autonomous vehicle technologies are implemented beyond 2018, the fatality reduction goals will increase.

Number of Serious Injuries 3799.8

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

Pennsylvania's current target is to reduce 2016 serious injuries by two percent per year through 2018. The target shown above (3799.8) is the five-year rolling average for 2014-2018. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends and reduction in serious injuries over the next 30 years will not be linear. As autonomous vehicle technologies are implemented beyond 2018, the serious injury reduction goals will increase.

Fatality Rate 1.161

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

The target shown above (1.161) is calculated using the 2018 five-year rolling average for fatalities shown in the first metric and applying an estimated growth rate of 1% per year for vehicle miles traveled.

Serious Injury Rate 3.746

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

The target shown above (3.746) is calculated using the 2018 five-year rolling average for serious injuries shown in the second metric and applying an estimated growth rate of 1% per year for vehicle miles traveled.

Total Number of Non-Motorized Fatalities and Serious Injuries	654.4

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

Pennsylvania’s current target is to reduce 2016 non-motorized fatalities and serious injuries by two percent per year through 2018. The target shown above (654.4) is the five-year rolling average for 2014-2018. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania’s historical data and observations of national trends.

Enter additional comments here to clarify your response for this question or add supporting information.

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

Pennsylvania's State Highway Safety Office is part of the DOT and in the same section as Highway Safety Engineering. We work regularly with the SHSO to establish safety targets and sync the HSP with the SHSP. Our most recent edition of the SHSP was completed earlier this year and contains our statewide goals for fatalities and serious injuries over the next 3-4 years. The 2017 SHSP was developed in conjunction with over 45 stakeholders including federal, state, local and private sector agencies; MPO/RPO's, both safety engineering and driver behavior partners.

PennDOT also holds quarterly conference calls with our 24 MPO/RPO's across the state to discuss the HSIP and establish regional safety performance targets. PennDOT's Center for Program Development and Management is involved in all of the planning and budgeting aspects of HSIP funds.

Does the State want to report additional optional targets?

No

Enter additional comments here to clarify your response for this question or add supporting information.

Applicability of Special Rules

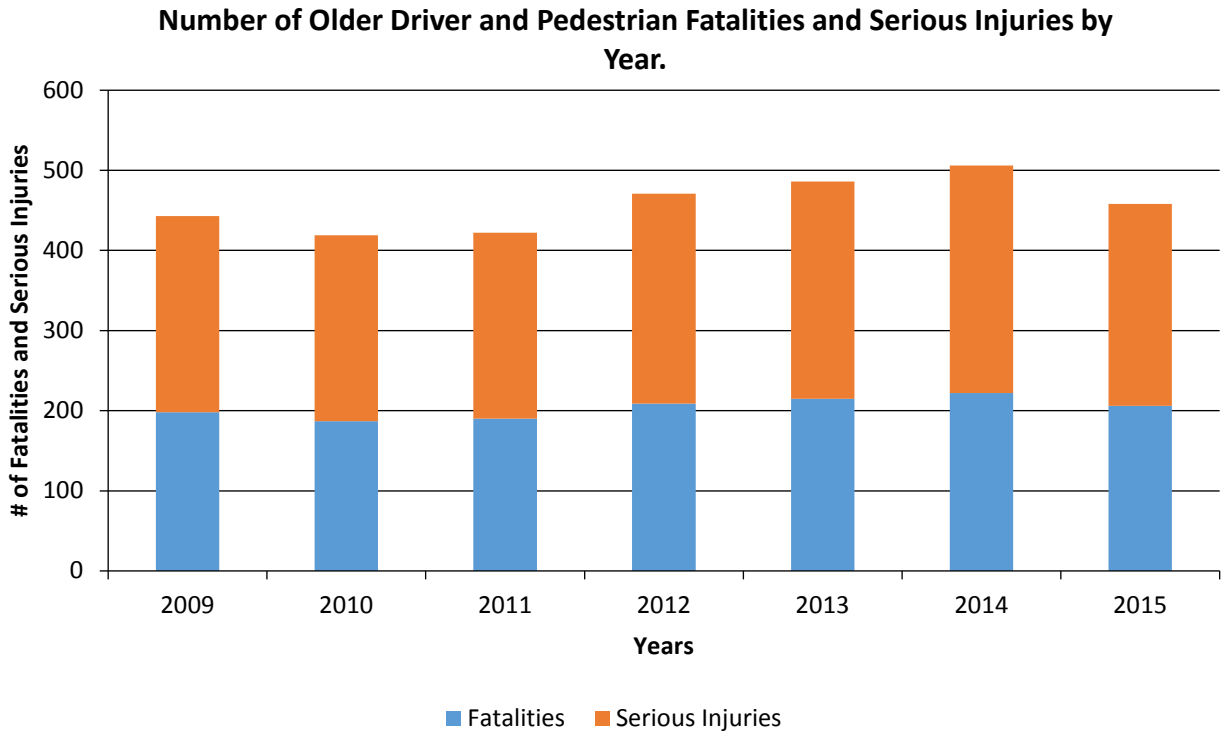
Does the HRRR special rule apply to the State for this reporting period?

No

Enter additional comments here to clarify your response for this question or add supporting information.

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

PERFORMANCE MEASURES	2009	2010	2011	2012	2013	2014	2015
Number of Older Driver and Pedestrian Fatalities	198	187	190	209	215	222	206
Number of Older Driver and Pedestrian Serious Injuries	245	232	232	262	271	284	252



Enter additional comments here to clarify your response for this question or add supporting information.

These numbers reflect the count of just drivers and pedestrians over the age of 65 and not all persons involved in the crash.

Fatality numbers came from the FARS website using the query tool.

Both the number of PA residents and licensed drivers over the age of 65 have increased consistently each year since 2010. This increase has had a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries.

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

Change in fatalities and serious injuries
Benefit/Cost Ratio
Lives saved
Other-3 FHWA Implementation Plans (ISIP, RDIP, SMAP)

Enter additional comments here to clarify your response for this question or add supporting information.

In conjunction with FHWA, PennDOT has developed and implemented an Intersection Safety Implementation Plan (ISIP), Roadway Departure Implementation Plan (RDIP) and Speed Management Action Plan (SMAP). These 3 plans can be accessed on the PennDOT website.

We can estimate from our HSIP Benefit/Cost Analysis that 86 lives have been saved since 2002.

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

Changes in fatality/serious injury reporting will be based on the new FAST-ACT target requirements. Benefit Cost analysis is provided at the end of the report (Question #45).

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

More systemic programs
RSAs completed
Policy change
Increased awareness of safety and data-driven process
HSIP Obligations
Other-A more focused LTAP safety program

Enter additional comments here to clarify your response for this question or add supporting information.

PennDOT is using HSIP funding for technical reviews on local highways which resulted in itemized safety improvements that will lead to construction projects and implementing safety countermeasures on local highways. Previously old reports and evaluations did not provide countermeasure specific items and quantities.

Are there any significant programmatic changes that have occurred since the last reporting period?

Yes

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

2017 Pennsylvania Highway Safety Improvement Program
Pennsylvania implemented a new 2017 SHSP in February 2017. PennDOT also worked with FHWA to create a new 2016 Speed Management Action Plan (SMAP).

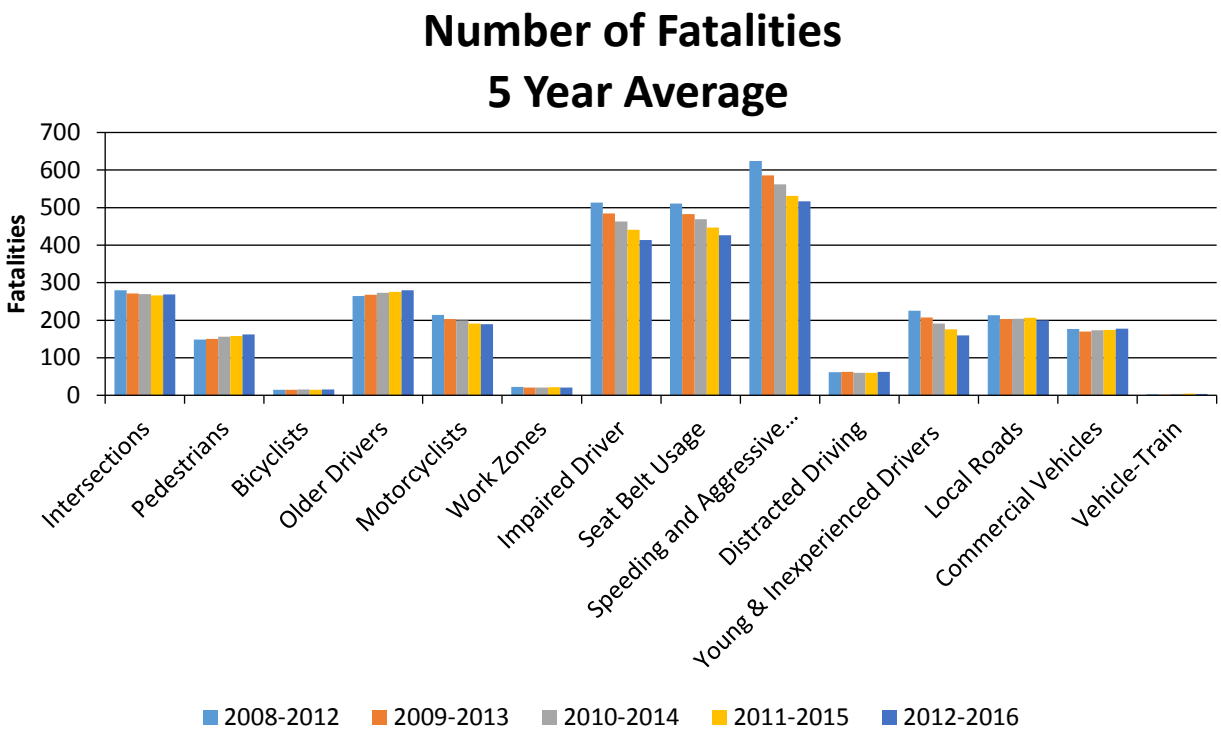
http://www.penndot.gov/TravelInPA/Safety/Pages/default.aspx

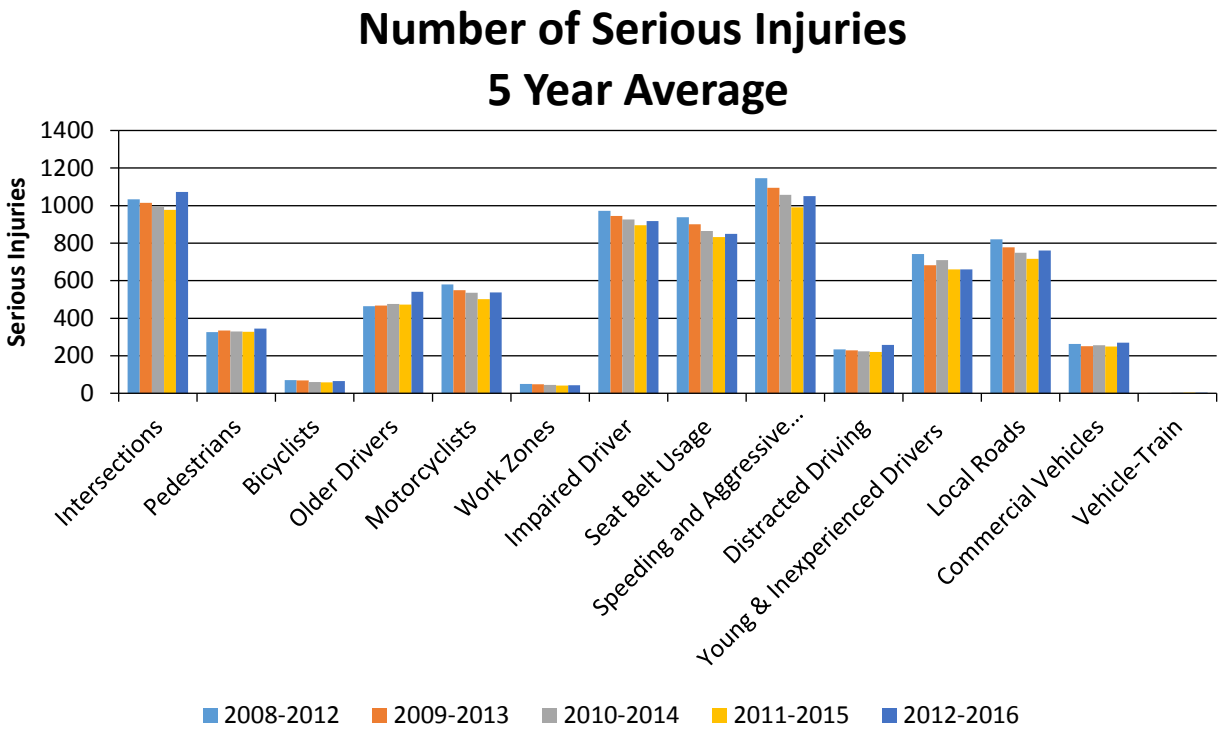
Effectiveness of Groupings or Similar Types of Improvements

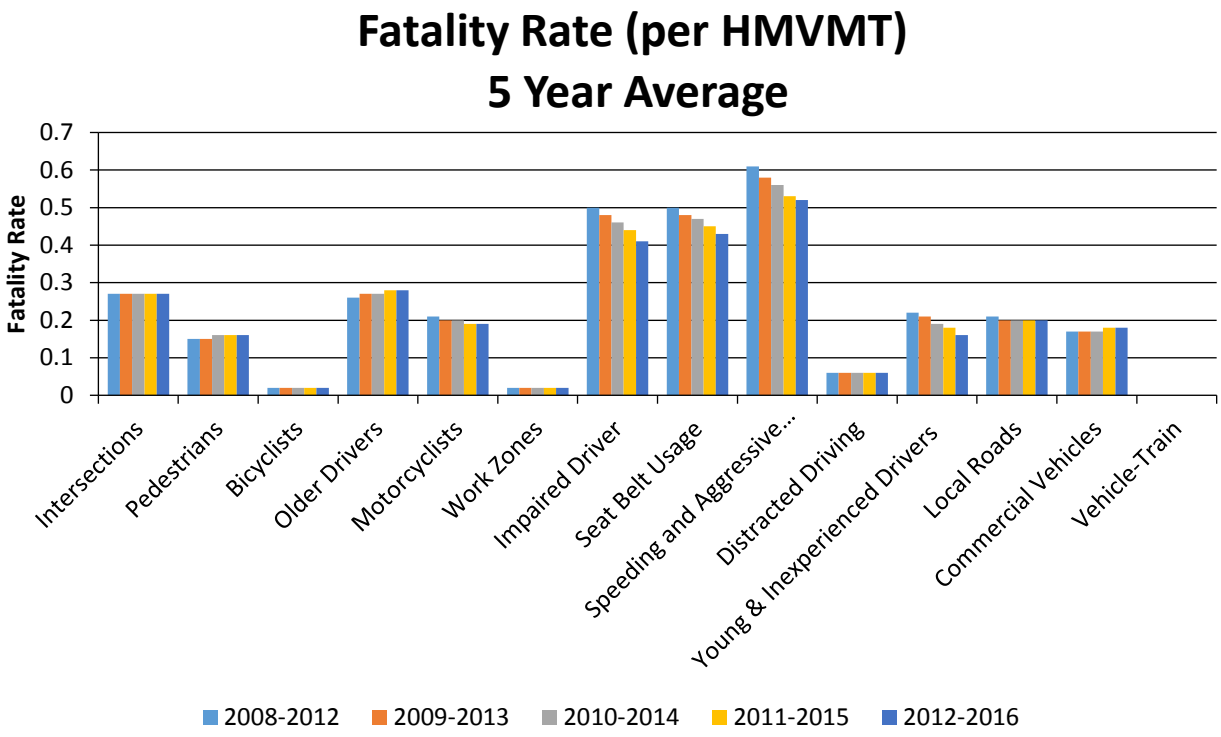
Present and describe trends in SHSP emphasis area performance measures.

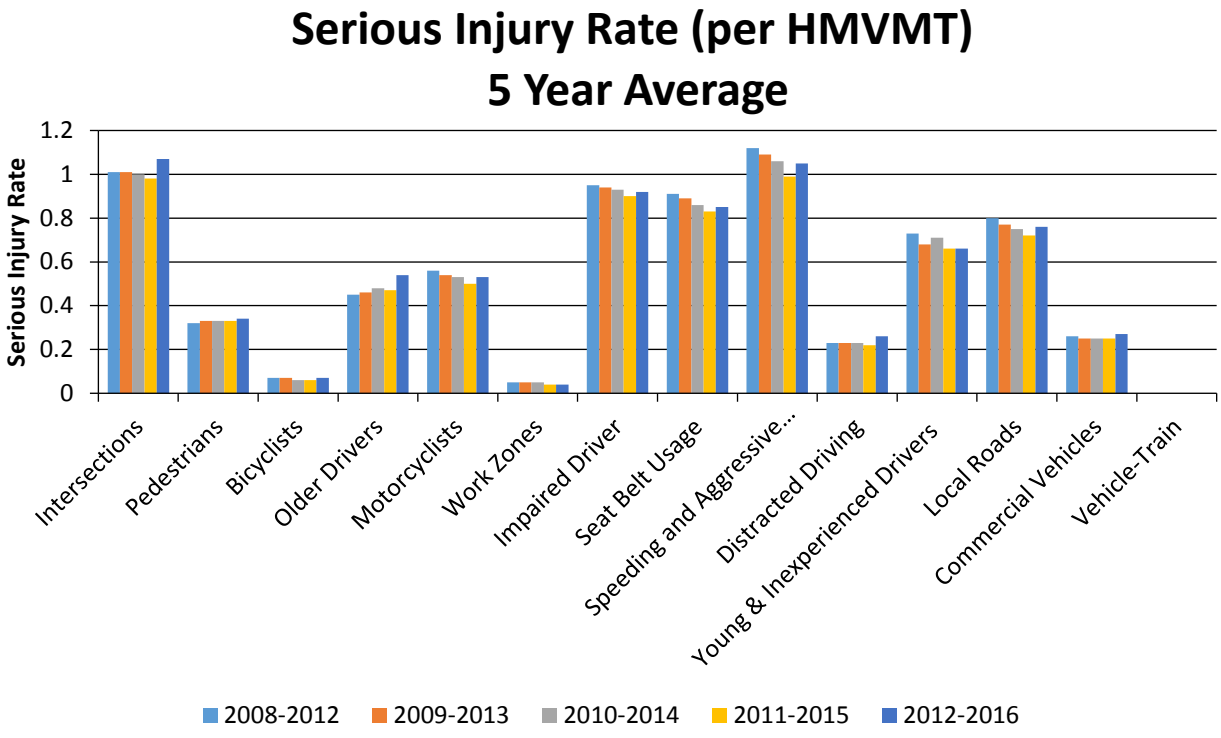
Year 2016

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)	Other 1	Other 2	Other 3
Intersections	Intersections	268.2	1,073.2	0.27	1.07			
Pedestrians	Vehicle/pedestrian	162	344.6	0.16	0.34			
Bicyclists	Vehicle/bicycle	15.6	64.2	0.02	0.07			
Older Drivers	Older Driver	279.8	540.8	0.28	0.54			
Motorcyclists	Motorcycle	189.6	537.4	0.19	0.53			
Work Zones	Work Zone	20.4	42.6	0.02	0.04			
Impaired Driver	Impaired Driver	413.6	917	0.41	0.92			
Seat Belt Usage	Unbelted	426.4	849	0.43	0.85			
Speeding and Aggressive Driving	Speeding Related	516.4	1,049.8	0.52	1.05			
Distracted Driving	Distracted Driving	62.2	257	0.06	0.26			
Young & Inexperienced Drivers	Young Drivers	159.4	660.2	0.16	0.66			
Local Roads	Local Road	199.6	760.2	0.2	0.76			
Commercial Vehicles	Commercial Vehicles	177.6	268.8	0.18	0.27			
Vehicle-Train	Vehicle-Train	3.4	3	0	0			


Number of Fatalities
5 Year Average
Fatalities
700
600
500
400
300
200
100
0
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Impaired Driver
Seat Belt Usage
Speeding and Aggressive...
Distracted Driving
Young & Inexperienced Drivers
Local Roads
Commercial Vehicles
Vehicle-Train
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Number of Serious Injuries
5 Year Average
Serious Injuries
1400
1200
1000
800
600
400
200
0
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Impaired Driver
Seat Belt Usage
Speeding and Aggressive...
Distracted Driving
Young & Inexperienced Drivers
Local Roads
Commercial Vehicles
Vehicle-Train
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016





Enter additional comments here to clarify your response for this question or add supporting information.

The numbers for "Older Drivers" reflect the count of all persons involved in a crash with a driver aged 65 or older. These numbers will differ from question #38.

Also the change in definition/title for serious injuries mentioned in question #33 is the reason for the increase in numbers in the serious injury/serious injury rate columns.

Roadway Departures are a sub-category of Lane Departures and involve a much more detailed analysis to determine correct crash numbers. This method is still under development and refinement. PennDOT should be able to report on Roadway Departures next reporting year after errors and outlying issues are addressed.

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

Yes

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

CounterMeasures:	High friction surface treatments
Description:	Four years before and after analysis of 18 locations. Main crashes reviewed were single vehicle roadway departures and wet road condition crashes.
Target Crash Type:	All
Number of Installations:	187
Number of Installations:	187
Miles Treated:	
Years Before:	4
Years After:	4
Methodology:	Simple before/after
Results:	PennDOT began installation of High Friction Surface Treatments (HFST) in June 2007 on a curve in Northampton County along State Route 611. In 2012 & 2013 PennDOT installed HFST at another 18 locations. This has led to a total of 187 total HFST locations in Pennsylvania to date. This is roughly 31.43 miles of HFST. Locations for the application of a HFST have been mostly curves that have had crash cluster histories of wet road crashes, single vehicle run-off-road crashes (SVROR) and hit fixed object (HFO) crashes. Eighteen of the original locations have been evaluated over a four period and

	have shown dramatic improvements. The four years prior to the HSFT installation these 18 locations had a total of 190 wet pavement crashes, which included 3 fatalities and 122 injuries of various severity. The four years after shows the total wet road crashes dropped to 15 which resulted in zero fatalities and only 13 injuries of various severity. This is a 100% reduction in fatalities and almost a 90% decrease in fatalities & injuries. When looking at the SVROR crashes at these same locations there were 197 SVROR crashes in the four years before with 6 fatalities and 95 injuries of various severity. The four years after installation show the total SVROR crashes dropped to 23. Fatalities dropped to zero and all other injuries to 20. A graphical plot of the SVROR crashes across the entire state shows the statewide 5-year average of 49,660 in 2006-2011when only one HFST location was in place. The graph shows in 2012-2016 there are now an average of 46,661 SVROR crashes over 5 years with 183 HFST locations in place. HFST has become one of the best safety countermeasures for wet roads crashes and SVROR crashes in Pennsylvania. There are currently 118 planned HFST project locations on various highways in Pennsylvania.
File Name: Hyperlink	
CounterMeasures:	High Tension Cable Median Barrier
Description:	Benefit/Cost of High Tension Cable Median Barrier for 44 locations in PA.
Target Crash Type:	Cross median
Number of Installations:	
Number of Installations:	
Miles Treated:	272.22
Years Before:	5
Years After:	5

Methodology:	Simple before/after
Results:	Pennsylvania currently has 272.22 miles of HTCMB installed in medians of freeways. The most recent evaluation shows a network B/C of 28:1. The B/C report reviewed 116.13 miles of HTCMB with 5 years before and 5 years after installation crash data. The five year maintenance costs were calculated using two District's actual maintenance costs and then calculated to cost per mile. That cost per mile was then multiplied by the miles of HTCMB in the study and then multiplied by five for the years of the after study. Actual construction installation costs for each location were used in the B/C calculation.
File Name:	Hyperlink

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 INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0330-0054	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	5.00	9.00				1.00	7.00	14.00	12.00	24.00	-0.63 : 1
0530-0100	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	14.00	4.00					25.00	13.00	39.00	17.00	0.15 : 1
0640-INT	Urban Minor Collector	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	15.00	18.00					26.00	30.00	41.00	48.00	-0.01 : 1
1200-RMBL	Rural Minor Arterial	Roadway	Rumble strips - unspecified or other	24.00	24.00	2.00	3.00	2.00	4.00	42.00	45.00	70.00	76.00	-14.47 : 1
0320-0015	Rural Principal Arterial - Other	Roadside	Roadside - other	11.00	12.00	2.00		1.00		5.00	2.00	19.00	14.00	2.91 : 1
0320-0015	Rural Principal Arterial - Other	Roadside	Roadside - other	2.00	3.00	1.00		1.00		5.00	1.00	9.00	4.00	1.74 : 1
1120-0051	Rural Principal Arterial - Other	Roadway	Pavement surface - miscellaneous	17.00	28.00	1.00		2.00		23.00	22.00	43.00	50.00	31.67 : 1
0810-0015	Rural Principal Arterial - Other	Roadway	Pavement surface - miscellaneous	24.00	24.00	1.00		1.00	1.00	11.00	20.00	37.00	45.00	170.38 : 1
1110-INT	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	26.00	33.00	3.00		1.00	4.00	65.00	59.00	95.00	96.00	14.96 : 1
1040-0422	Rural Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00	2.00	1.00				5.00	7.00	9.00	9.00	4.25 : 1
0120-INT	Urban Principal Arterial - Interstate	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	56.00	55.00		1.00			117.00	56.00	173.00	112.00	-0.55 : 1
0920-3013	Urban Minor Collector	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00	1.00			1.00		7.00	4.00	11.00	5.00	0.65 : 1
0870-0222	Urban Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	2.00						9.00	3.00	11.00	3.00	-0.42 : 1
0140-0208	Rural Minor Arterial	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	8.00	7.00		1.00	1.00		20.00	19.00	29.00	27.00	-3.27 : 1
0850-INT	Urban Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	31.00	23.00	1.00	1.00		2.00	53.00	40.00	85.00	66.00	-0.18 : 1
0140-SGNL	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	22.00	19.00				1.00	32.00	21.00	54.00	41.00	-4.01 : 1
1110-2040	Urban Principal Arterial - Other	Roadway	Roadway - other	6.00	2.00			1.00		23.00	7.00	30.00	9.00	80.59 : 1
0290-INT	Rural Local Road or Street	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	7.00	9.00			1.00	3.00	8.00	10.00	16.00	22.00	-2.48 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0850-3019	Urban Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00	16.00			1.00		11.00	8.00	15.00	24.00	1.28 : 1
0650-0001	Urban Principal Arterial - Other	Pedestrians and bicyclists	Pedestrian signal - install new at intersection	128.00	147.00	10.00	22.00	19.00	21.00	975.00	1086.00	1132.00	1276.00	-23.63 : 1
0200-HTCB	Rural Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	62.00	71.00	15.00	4.00	7.00	10.00	167.00	121.00	251.00	206.00	795.87 : 1
0380-1004	Rural Major Collector	Roadway	Roadway - other	1.00	1.00					1.00		2.00	1.00	0.00 : 1
0510-ALGN	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	14.00	7.00				1.00	27.00	5.00	41.00	13.00	-0.45 : 1
1110-ITS	Urban Principal Arterial - Interstate	Advanced technology and ITS	Advanced technology and ITS - other	14.00	11.00			3.00		19.00	21.00	36.00	32.00	2.57 : 1
0260-0044	Rural Major Collector	Roadway	Roadway widening - curve	1.00	3.00			1.00		11.00	4.00	13.00	7.00	4.77 : 1
0420-6006	Urban Principal Arterial - Other Freeways and Expressways	Interchange design	Interchange design - other	11.00	4.00					7.00	7.00	18.00	11.00	0.01 : 1
0970-INT	Rural Minor Collector	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified											0.00 : 1
1120-0051	Rural Principal Arterial - Other	Roadway	Roadway widening - travel lanes	17.00	14.00	4.00		3.00	1.00	32.00	28.00	56.00	43.00	28,595.21 : 1
0450-0267	Rural Minor Arterial	Roadway	Rumble strips - edge or shoulder	10.00	7.00					3.00	9.00	13.00	16.00	-0.15 : 1
0420-0307	Urban Minor Arterial	Roadway	Rumble strips - edge or shoulder	25.00	16.00	2.00		1.00	3.00	47.00	16.00	75.00	35.00	13.23 : 1
0500-SURF	Urban Minor Collector	Roadway	Pavement surface - high friction surface	76.00	7.00	1.00		5.00	4.00	102.00	18.00	184.00	29.00	15.50 : 1
1110-3069	Urban Principal Arterial - Other	Roadway	Pavement surface - high friction surface	83.00	110.00	2.00	2.00	1.00	10.00	115.00	160.00	201.00	282.00	-18.62 : 1
0820-INT	Urban Minor Collector	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified		9.00					20.00	15.00	20.00	24.00	0.01 : 1
0390-0220	Rural Minor Arterial	Roadway	Rumble strips - center	8.00	9.00				1.00	5.00	8.00	13.00	18.00	-0.79 : 1
0560-GDRL	Rural Minor Arterial	Roadside	Barrier- metal	380.00	500.00	24.00	9.00	31.00	27.00	708.00	993.00	1143.00	1529.00	61.89 : 1
0500-GDRL	Urban Minor Collector	Roadside	Barrier- metal	37.00	64.00			3.00	2.00	61.00	56.00	101.00	122.00	1.68 : 1
0510-GDRL	Urban Minor Collector	Roadside	Barrier- metal	328.00	351.00	15.00	10.00	26.00	22.00	497.00	461.00	866.00	844.00	26.38 : 1
0150-0322	Rural Principal Arterial - Other	Roadside	Barrier- metal	5.00	1.00	2.00				13.00	2.00	20.00	3.00	4.43 : 1
0440-2001	Rural Major Collector	Roadside	Barrier- metal	21.00	11.00	1.00		1.00	1.00	43.00	11.00	66.00	23.00	5.24 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0630-1034	Urban Minor Collector	Roadway	Roadway widening - add lane(s) along segment	15.00	1.00			1.00		12.00		28.00	1.00	0.69 : 1
1240-0040	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	212.00	130.00	7.00	8.00	25.00	22.00	334.00	256.00	578.00	416.00	0.30 : 1
0510-INT	Rural Minor Arterial	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	8.00	11.00				1.00	14.00	15.00	22.00	27.00	-2.00 : 1
0650-2014	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	22.00	30.00	4.00	9.00	22.00	8.00	569.00	508.00	617.00	555.00	-2.19 : 1
0930-1021	Rural Major Collector	Roadway	Roadway widening - curve	1.00								1.00		0.00 : 1
1010-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	3.00	3.00					12.00	2.00	15.00	5.00	0.12 : 1
0120-0020	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	100.00	117.00		1.00	4.00	5.00	195.00	222.00	299.00	345.00	-31.16 : 1
1210-0021	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	1.00	1.00					7.00	7.00	8.00	8.00	0.00 : 1
0360-0042	Rural Major Collector	Roadside	Drainage improvements											0.00 : 1
0270-1005	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	11.00	21.00					22.00	30.00	33.00	51.00	-1.46 : 1
0210-0026	Rural Minor Arterial	Roadway	Roadway - other	8.00	7.00				1.00	9.00	16.00	17.00	24.00	-0.94 : 1
0280-0219	Rural Principal Arterial - Other	Roadside	Barrier- metal	8.00	6.00					17.00	3.00	25.00	9.00	0.25 : 1
1110-0910	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	6.00	1.00					4.00	2.00	10.00	3.00	0.04 : 1
0120-0005	Urban Principal Arterial - Other	Roadway	Roadway - other	104.00	87.00	2.00		1.00	6.00	148.00	124.00	255.00	217.00	3.51 : 1
0150-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	8.00	9.00		1.00	1.00	2.00	7.00	16.00	16.00	28.00	-12.48 : 1
0150-0322	Rural Principal Arterial - Other	Roadway	Roadway - other	8.00	6.00			2.00		18.00	15.00	28.00	21.00	5.60 : 1
0220-INT	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	101.00	89.00	3.00	5.00	3.00	13.00	156.00	142.00	263.00	249.00	-19.51 : 1
0380-0015	Rural Principal Arterial - Other	Roadway	Roadway - other	12.00	11.00					22.00	21.00	34.00	32.00	-0.05 : 1
0430-0309	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	5.00	5.00			2.00		10.00	14.00	17.00	19.00	2.40 : 1
0840-0030	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - replace existing indications (incandescent-to-LED and/or 8-to-12 inch dia.)	10.00	27.00	1.00	1.00	2.00	1.00	54.00	41.00	67.00	70.00	10.76 : 1
0970-3041	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	1.00	1.00					3.00	1.00	4.00	2.00	0.63 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
1030-INT	Rural Minor Arterial	Intersection geometry	Auxiliary lanes - miscellaneous/other/unspecified	2.00	2.00			2.00		7.00	4.00	11.00	6.00	2.02 : 1
1110-0065	Urban Principal Arterial - Other	Roadside	Roadside - other	25.00	33.00		1.00	4.00	3.00	65.00	37.00	94.00	74.00	-2.68 : 1
1240-0088	Urban Minor Arterial	Pedestrians and bicyclists	Pedestrian signal	9.00	7.00			3.00		20.00	3.00	32.00	10.00	18.91 : 1
0320-0015	Rural Principal Arterial - Other	Roadway	Roadway - other	11.00	6.00	2.00		2.00		8.00	9.00	23.00	15.00	3.66 : 1
0320-0015	Rural Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	4.00						5.00	2.00	9.00	2.00	0.07 : 1
0400-RMBL	Rural Local Road or Street	Roadway	Rumble strips - unspecified or other	89.00	76.00	4.00	5.00	7.00	8.00	95.00	93.00	195.00	182.00	-32.17 : 1
1120-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	3.00	3.00					6.00	3.00	9.00	6.00	2.19 : 1
1110-0051	Urban Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	3.00	11.00			1.00		2.00	15.00	6.00	26.00	15.25 : 1
1110-0279	Urban Principal Arterial - Interstate	Non-infrastructure		4.00	11.00		1.00			6.00	9.00	10.00	21.00	-7.24 : 1
0840-0124	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	97.00	32.00			6.00	2.00	201.00	58.00	304.00	92.00	53.26 : 1
0840-0462	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	3.00	9.00			1.00		11.00	23.00	15.00	32.00	14.48 : 1
0510-0222	Urban Principal Arterial - Other Freeways and Expressways	Roadside	Barrier- metal	116.00	157.00	6.00	4.00	8.00	9.00	90.00	127.00	220.00	297.00	563.73 : 1
0220-0080	Rural Principal Arterial - Interstate	Roadway	Roadway - other	244.00	235.00	10.00	5.00	24.00	19.00	357.00	184.00	635.00	443.00	44.00 : 1
0210-0350	Rural Minor Arterial	Roadway	Roadway widening - curve	15.00	23.00	2.00				21.00	14.00	38.00	37.00	429.08 : 1
0540-0033	Urban Principal Arterial - Interstate	Roadside	Barrier - other	110.00	143.00	2.00	3.00	2.00	3.00	113.00	116.00	227.00	265.00	-9.43 : 1
0500-WDNG	Rural Minor Arterial	Roadway	Roadway widening - travel lanes	70.00	52.00	4.00	5.00	7.00	3.00	91.00	99.00	172.00	159.00	-1.18 : 1
0400-SGNS	Urban Minor Collector	Roadway signs and traffic control	Roadway signs and traffic control - other	110.00	99.00	10.00	3.00	12.00	8.00	264.00	193.00	396.00	303.00	513.36 : 1
0420-0011	Urban Principal Arterial - Other Freeways and Expressways	Roadway delineation	Improve retroreflectivity	79.00	100.00	1.00	4.00	4.00	5.00	132.00	147.00	216.00	256.00	-100.68 : 1
0880-INT	Rural Local Road or Street	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	13.00	8.00		1.00	2.00	1.00	18.00	7.00	33.00	17.00	-1.14 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0200-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - replace existing indications (incandescent-to-LED and/or 8-to-12 inch dia.)	223.00	245.00	5.00	3.00	14.00	12.00	391.00	362.00	633.00	622.00	40.98 : 1
0390-0220	Rural Minor Arterial	Alignment	Horizontal and vertical alignment	2.00	6.00	1.00	1.00		1.00	5.00	9.00	8.00	17.00	-0.85 : 1
0450-0081	Rural Principal Arterial - Interstate	Roadway	Roadway - other											0.00 : 1
0450-0081	Rural Principal Arterial - Interstate	Roadway	Roadway - other		1.00								1.00	-0.62 : 1
0450-0081	Rural Principal Arterial - Interstate	Roadway	Roadway - other	3.00	2.00						1.00	3.00	3.00	-0.04 : 1
0450-0081	Rural Principal Arterial - Interstate	Roadway	Roadway - other	1.00								1.00		0.03 : 1
0430-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	35.00	40.00			1.00	4.00	95.00	93.00	131.00	137.00	-8.33 : 1
0650-0001	Urban Principal Arterial - Other Freeways and Expressways	Roadside	Barrier- metal	103.00	105.00	7.00	3.00	14.00	10.00	675.00	603.00	799.00	721.00	9.63 : 1
0830-0316	Rural Minor Arterial	Roadside	Barrier- metal	3.00	1.00	1.00		1.00		11.00	2.00	16.00	3.00	27.50 : 1
1110-WDNG	Urban Principal Arterial - Other	Roadway	Roadway widening - add lane(s) along segment	164.00	165.00	6.00	6.00	8.00	10.00	239.00	187.00	417.00	368.00	-2.97 : 1
0450-RMBL	Rural Minor Collector	Roadway	Rumble strips - unspecified or other	4.00	5.00				1.00	10.00	7.00	14.00	13.00	-5.75 : 1
0650-0611	Urban Principal Arterial - Other	Roadway	Roadway widening - add lane(s) along segment	88.00	79.00	18.00	8.00	35.00	22.00	1404.00	948.00	1545.00	1057.00	58.06 : 1
0650-0611	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified											0.00 : 1
0820-WDNG	Urban Principal Arterial - Other Freeways and Expressways	Roadway	Roadway widening - add lane(s) along segment	203.00	192.00	3.00	3.00	4.00	4.00	193.00	205.00	403.00	404.00	1.21 : 1
0920-1001	Urban Principal Arterial - Other	Roadway	Roadway widening - add lane(s) along segment	14.00	13.00					12.00	9.00	26.00	22.00	0.06 : 1
1050-0119	Rural Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	2.00	2.00			1.00		7.00	1.00	10.00	3.00	2.17 : 1
0910-0030	Rural Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add right-turn lane	8.00	1.00					17.00	2.00	25.00	3.00	0.17 : 1
0970-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	59.00	62.00				2.00	95.00	81.00	154.00	145.00	-0.97 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0340-0061	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	32.00	31.00		2.00	2.00	2.00	71.00	40.00	105.00	75.00	-11.49 : 1
0120-0006	Rural Principal Arterial - Other	Roadside	Barrier- metal	10.00	15.00			3.00	4.00	23.00	25.00	36.00	44.00	-69.64 : 1
0530-0100	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	12.00	11.00	1.00				29.00	9.00	42.00	20.00	6.05 : 1
0320-0220	Urban Principal Arterial - Other	Alignment	Alignment - other	2.00	1.00					6.00	1.00	8.00	2.00	0.12 : 1
0140-GDRL	Rural Local Road or Street	Roadside	Barrier- metal	2.00	2.00							2.00	2.00	0.00 : 1
0400-SGNS	Rural Minor Arterial	Roadway signs and traffic control	Roadway signs and traffic control - other	84.00	108.00	6.00	1.00	10.00		131.00	135.00	231.00	244.00	209.90 : 1
0370-LGHT	Rural Minor Arterial	Lighting	Lighting - other	10.00	10.00		1.00			7.00	15.00	17.00	26.00	-15.73 : 1
0140-0208	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	8.00	3.00					21.00	2.00	29.00	5.00	0.08 : 1
0310-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	32.00	9.00			1.00		54.00	11.00	87.00	20.00	0.45 : 1
0390-GDRL	Urban Minor Arterial	Roadside	Barrier- metal		4.00					4.00	1.00	4.00	5.00	2.77 : 1
0400-SGNS	Urban Principal Arterial - Other	Roadway signs and traffic control	Roadway signs and traffic control - other	123.00	135.00		2.00		3.00	202.00	202.00	325.00	342.00	-89.54 : 1
0450-0267	Rural Minor Arterial	Roadway	Rumble strips - edge or shoulder	9.00	18.00				1.00	13.00	11.00	22.00	30.00	-12.40 : 1
0140-3014	Urban Minor Collector	Roadway	Roadway - other	13.00	10.00			1.00		41.00	5.00	55.00	15.00	9.76 : 1
1040-INT	Rural Major Collector	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified		1.00					5.00		5.00	1.00	0.15 : 1
1210-0040	Rural Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	10.00	10.00		1.00	1.00		14.00	18.00	25.00	29.00	-3.28 : 1
0910-INT	Rural Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	41.00	61.00		2.00	3.00	2.00	73.00	60.00	117.00	125.00	-5.83 : 1
0510-0100	Urban Principal Arterial - Other	Roadside	Barrier- metal	5.00	1.00	2.00		1.00		2.00	9.00	10.00	10.00	384.40 : 1
1110-0060	Urban Principal Arterial - Interstate	Roadside	Barrier - cable	12.00	21.00			1.00		5.00	6.00	18.00	27.00	4.20 : 1
0110-0089	Rural Major Collector	Alignment	Alignment - other	4.00	1.00					1.00	2.00	5.00	3.00	0.00 : 1
0880-0022	Rural Minor Arterial	Roadway	Pavement surface - miscellaneous	41.00	36.00	3.00	5.00	8.00	2.00	64.00	45.00	116.00	88.00	-6.60 : 1
0220-ALGN	Rural Principal Arterial - Other	Alignment	Alignment - other	10.00	8.00			2.00		17.00	25.00	29.00	33.00	14.00 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0390-0006	Rural Principal Arterial - Other	Roadway	Pavement surface - miscellaneous	18.00	14.00					6.00	14.00	24.00	28.00	-0.35 : 1
1040-INT	Urban Minor Collector	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	6.00	11.00					6.00	16.00	12.00	27.00	-1.28 : 1
0430-0093	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	21.00	20.00				2.00	66.00	26.00	87.00	48.00	-1.60 : 1
0830-INT	Urban Minor Collector	Intersection traffic control	Modify traffic signal - modernization/replacement	26.00	26.00	1.00	1.00		1.00	52.00	62.00	79.00	90.00	-2.21 : 1
0560-0061	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	8.00	6.00	1.00		2.00		20.00	12.00	31.00	18.00	50.45 : 1
0250-0446	Rural Minor Arterial	Lighting	Lighting - other		1.00					3.00	1.00	3.00	2.00	0.64 : 1
0830-INT	Rural Major Collector	Intersection traffic control	Modify traffic signal - modernization/replacement	10.00	1.00	1.00	1.00		1.00	21.00	2.00	32.00	5.00	-3.77 : 1
0870-4025	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	6.00	2.00					10.00	2.00	16.00	4.00	0.05 : 1
1120-0030	Rural Minor Arterial	Intersection traffic control	Intersection flashers - add miscellaneous/other/unspecified	10.00	12.00	1.00		4.00	1.00	22.00	16.00	37.00	29.00	66.08 : 1
1120-0030	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	8.00	2.00	1.00		1.00		16.00	2.00	26.00	4.00	36.67 : 1
0880-0022	Rural Minor Arterial	Roadway	Pavement surface - miscellaneous	22.00	17.00		3.00	1.00	1.00	50.00	24.00	73.00	45.00	-13.47 : 1
0120-0089	Rural Minor Arterial	Roadside	Barrier- metal	13.00	18.00		1.00	1.00	4.00	19.00	24.00	33.00	47.00	-133.15 : 1
0270-0322	Rural Principal Arterial - Other	Roadway signs and traffic control	Curve-related warning signs and flashers	11.00	7.00				3.00	10.00	7.00	21.00	17.00	-136.45 : 1
0320-0220	Urban Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add acceleration lane	10.00	18.00	7.00	4.00	1.00	1.00	16.00	29.00	34.00	52.00	94.38 : 1
0340-1007	Rural Minor Collector	Lighting	Lighting - other		6.00	1.00		1.00		15.00	3.00	17.00	9.00	197.50 : 1
0320-0015	Rural Principal Arterial - Other	Roadway	Roadway - other	8.00	6.00	1.00				5.00	4.00	14.00	10.00	11.95 : 1
0440-ALGN	Rural Minor Arterial	Alignment	Alignment - other	3.00	7.00	1.00			2.00	7.00	24.00	11.00	33.00	4.90 : 1
0430-0309	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	3.00	8.00					14.00	15.00	17.00	23.00	0.13 : 1
0420-0081	Urban Principal Arterial - Interstate	Interchange design	Interchange design - other	12.00	12.00					28.00	19.00	40.00	31.00	1.47 : 1
0400-RMBL	Rural Minor Arterial	Roadway	Rumble strips - edge or shoulder	141.00	91.00	3.00	2.00	8.00	5.00	260.00	197.00	412.00	295.00	29.86 : 1
0840-INT	Urban Minor Collector	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	10.00	14.00	1.00			2.00	14.00	13.00	25.00	29.00	6.39 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0840-0851	Rural Minor Collector	Roadway	Pavement surface - miscellaneous	37.00	18.00	2.00		5.00	2.00	36.00	25.00	80.00	45.00	18.40 : 1
0120-0079	Rural Principal Arterial - Interstate	Roadway	Pavement surface - high friction surface	59.00	28.00	1.00		1.00		46.00	8.00	107.00	36.00	12.24 : 1
0200-RMBL	Rural Major Collector	Roadway	Rumble strips - center	292.00	267.00	13.00	5.00	34.00	23.00	590.00	388.00	929.00	683.00	94.54 : 1
0520-INT	Rural Minor Collector	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified							4.00	6.00	4.00	6.00	0.40 : 1
1250-0056	Urban Minor Arterial	Intersection traffic control	Systemic improvements - signal-controlled	3.00	5.00			1.00		32.00	18.00	36.00	23.00	202.49 : 1
1020-INT	Urban Minor Collector	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	6.00	6.00			1.00		12.00	3.00	19.00	9.00	2.08 : 1
0510-0078	Urban Principal Arterial - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	487.00	453.00	16.00	8.00	48.00	25.00	628.00	496.00	1179.00	982.00	969.29 : 1
0500-SGNS	Urban Principal Arterial - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1770.00	1664.00	45.00	58.00	105.00	119.00	2008.00	1717.00	3928.00	3558.00	-160.25 : 1
0930-3007	Urban Minor Arterial	Intersection traffic control	Intersection traffic control - other	3.00	3.00					5.00	2.00	8.00	5.00	0.05 : 1
1010-0422	Urban Principal Arterial - Other Freeways and Expressways	Roadside	Roadside - other		1.00								1.00	0.00 : 1
1240-INT	Urban Local Road or Street	Intersection traffic control	Intersection traffic control - other	8.00	4.00			2.00	1.00	22.00	7.00	32.00	12.00	0.50 : 1
0530-SGNL	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - replace existing indications (incandescent-to-LED and/or 8-to-12 inch dia.)	242.00	253.00	4.00	1.00	16.00	5.00	591.00	349.00	853.00	608.00	346.08 : 1
0870-SGNL	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	37.00	26.00		1.00	1.00	2.00	83.00	20.00	121.00	49.00	-11.74 : 1
0210-0322	Urban Principal Arterial - Other	Roadway	Roadway widening - add lane(s) along segment		3.00		1.00			5.00	2.00	5.00	6.00	-1.61 : 1
0950-3047	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	4.00	10.00					33.00	5.00	37.00	15.00	0.70 : 1
0110-0006	Urban Minor Arterial	Access management	Access management - other	8.00	2.00	1.00		1.00		17.00	4.00	27.00	6.00	13.00 : 1
0210-0550	Urban Minor Arterial	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	7.00	3.00			1.00		9.00	2.00	17.00	5.00	4.32 : 1
0340-0147	Rural Minor Arterial	Roadway	Roadway widening - add lane(s) along segment	9.00	3.00			4.00	1.00	14.00	5.00	27.00	9.00	1.61 : 1
0340-0901	Rural Minor Arterial	Alignment	Horizontal curve realignment	4.00	1.00	1.00				4.00		9.00	1.00	6.17 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0430-2035	Urban Minor Collector	Intersection traffic control	Modify traffic signal - modernization/replacement	3.00						4.00	2.00	7.00	2.00	0.43 : 1
0460-0006	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	7.00	3.00					7.00	5.00	14.00	8.00	0.64 : 1
0440-0739	Rural Major Collector	Roadway	Roadway - other	7.00	9.00					27.00	12.00	34.00	21.00	0.36 : 1
0450-0267	Rural Major Collector	Roadway	Rumble strips - center	1.00						2.00	2.00	3.00	2.00	0.76 : 1
0540-INTC	Urban Principal Arterial - Interstate	Interchange design	Extend existing lane on ramp	6.00	7.00	1.00				17.00	2.00	24.00	9.00	25.96 : 1
0530-0100	Urban Principal Arterial - Other	Roadside	Barrier- metal	21.00	36.00	1.00		3.00		76.00	40.00	101.00	76.00	27.06 : 1
0560-0061	Urban Principal Arterial - Other	Roadside	Barrier- metal	10.00	11.00	1.00		1.00		23.00	7.00	35.00	18.00	58.06 : 1
0510-0061	Urban Principal Arterial - Other	Roadside	Barrier- metal		2.00				1.00	6.00	2.00	6.00	5.00	-3.15 : 1
0530-0078	Rural Principal Arterial - Interstate	Roadway delineation	Longitudinal pavement markings - remarking		3.00			1.00		2.00	15.00	3.00	18.00	8.00 : 1
0550-LNPM	Urban Principal Arterial - Other Freeways and Expressways	Roadway delineation	Longitudinal pavement markings - remarking	215.00	294.00	3.00	6.00	15.00	8.00	355.00	277.00	588.00	585.00	-36.66 : 1
0510-0078	Rural Principal Arterial - Interstate	Roadway delineation	Longitudinal pavement markings - remarking	3.00	1.00					1.00	1.00	4.00	2.00	0.02 : 1
0510-SGNL	Urban Minor Arterial	Intersection traffic control	Modify traffic signal timing - signal coordination	21.00	21.00	2.00				29.00	28.00	52.00	49.00	44.07 : 1
0620-INT	Urban Minor Collector	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	16.00	11.00			4.00		22.00	16.00	42.00	27.00	3.89 : 1
0810-0034	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	2.00	2.00			2.00		4.00	3.00	8.00	5.00	13.54 : 1
0850-0022	Urban Principal Arterial - Other	Roadway	Roadway - other	60.00	46.00	2.00		6.00		114.00	47.00	182.00	93.00	8.35 : 1
0840-0462	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	2.00	1.00			2.00		6.00	2.00	10.00	3.00	18.39 : 1
1020-0068	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	14.00	6.00		1.00	1.00		15.00	7.00	30.00	14.00	-16.46 : 1
1030-0068	Rural Minor Arterial	Roadway	Roadway widening - travel lanes	2.00	1.00			1.00		10.00	4.00	13.00	5.00	1.03 : 1
1030-0068	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	7.00	6.00					13.00	11.00	20.00	17.00	-0.44 : 1
1040-0422	Rural Principal Arterial - Other	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	37.00	22.00		3.00	5.00	2.00	74.00	31.00	116.00	58.00	-4.58 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
1200-WDNG	Rural Local Road or Street	Roadway	Roadway widening - add lane(s) along segment	1.00		1.00				2.00	4.00	4.00	4.00	1.35 : 1
1220-0088	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	7.00	1.00			1.00		24.00	1.00	32.00	2.00	9.30 : 1
1240-0018	Urban Minor Arterial	Intersection traffic control	Intersection traffic control - other	2.00								2.00		0.01 : 1
1240-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	27.00	25.00			1.00	1.00	45.00	23.00	73.00	49.00	0.06 : 1
0120-0005	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	138.00	128.00	1.00	2.00	8.00	7.00	275.00	263.00	422.00	400.00	-6.60 : 1
0230-0120	Rural Minor Arterial	Roadway delineation	Raised pavement markers	2.00				1.00			1.00	3.00	1.00	3.48 : 1
0320-0015	Rural Principal Arterial - Other	Roadway delineation	Raised pavement markers	130.00	149.00	3.00	9.00	5.00	12.00	111.00	133.00	249.00	303.00	-187.34 : 1
0450-GDRL	Rural Minor Collector	Roadside	Barrier- metal	54.00	52.00	2.00		8.00	3.00	106.00	108.00	170.00	163.00	65.35 : 1
0460-0170	Rural Minor Collector	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	3.00		1.00		1.00		5.00	1.00	10.00	1.00	23.96 : 1
0430-0239	Rural Major Collector	Intersection geometry	Intersection geometry - other	4.00				1.00		3.00		8.00		4.28 : 1
0450-GDRL	Rural Minor Arterial	Roadside	Barrier- metal	58.00	47.00	9.00	3.00	16.00	11.00	131.00	64.00	214.00	125.00	66.55 : 1
0460-0296	Rural Major Collector	Roadway	Superelevation / cross slope	1.00	1.00	2.00			1.00		1.00	3.00	3.00	66.39 : 1
0440-0006	Rural Minor Arterial	Roadside	Removal of roadside objects (trees, poles, etc.)	4.00	3.00	1.00				2.00	10.00	7.00	13.00	25.77 : 1
0430-RMBL	Rural Principal Arterial - Other	Roadway	Rumble strips - center	252.00	38.00	9.00	8.00	18.00	17.00	562.00	341.00	841.00	404.00	35.56 : 1
0520-0209	Urban Principal Arterial - Other	Roadside	Barrier- metal	5.00	4.00				2.00	3.00	7.00	8.00	13.00	-12.82 : 1
0540-0209	Rural Principal Arterial - Other	Roadside	Barrier- metal	2.00	3.00			1.00		9.00	1.00	12.00	4.00	13.73 : 1
0510-0422	Urban Principal Arterial - Other Freeways and Expressways	Access management	Median crossover - unspecified	8.00	13.00			2.00	2.00	6.00	13.00	16.00	28.00	-2.79 : 1
0510-0078	Rural Principal Arterial - Interstate	Roadway delineation	Roadway delineation - other	3.00	2.00					8.00	4.00	11.00	6.00	-0.18 : 1
0400-RPMS	Urban Principal Arterial - Other Freeways and Expressways	Roadway delineation	Raised pavement markers	449.00	513.00	16.00	6.00	23.00	25.00	949.00	944.00	1437.00	1488.00	128.77 : 1
0420-SGNS	Rural Principal Arterial - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated	173.00	166.00	3.00	3.00	3.00	6.00	170.00	218.00	349.00	393.00	-32.24 : 1

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0400-SGNS	Urban Principal Arterial - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	7.00	23.00	3.00		1.00	2.00	17.00	54.00	28.00	79.00	56.06 : 1
0510-GDRL	Urban Minor Arterial	Roadside	Barrier- metal	341.00	398.00	8.00	10.00	40.00	29.00	487.00	473.00	876.00	910.00	8.40 : 1
0630-0003	Urban Principal Arterial - Other	Intersection geometry	Auxiliary lanes - extend existing left-turn lane	100.00	55.00	2.00	1.00	4.00	3.00	158.00	121.00	264.00	180.00	8.69 : 1
0870-INT	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	32.00	44.00			1.00	4.00	49.00	84.00	82.00	132.00	-9.16 : 1
0820-INT	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	9.00	9.00					8.00	5.00	17.00	14.00	0.19 : 1
0910-0026	Rural Major Collector	Intersection traffic control	Modify traffic signal - modernization/replacement	5.00	6.00		1.00		2.00	10.00	14.00	15.00	23.00	-53.25 : 1
1030-INT	Rural Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified		1.00	1.00			1.00	10.00	5.00	11.00	7.00	5.67 : 1
1050-0028	Rural Minor Arterial	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	1.00	2.00					6.00		7.00	2.00	0.02 : 1
1250-0819	Urban Minor Collector	Intersection traffic control	Modify traffic signal timing - general retiming	5.00	1.00	1.00				7.00	4.00	13.00	5.00	19.05 : 1
1200-RPMS	Rural Minor Arterial	Roadway delineation	Raised pavement markers	136.00	160.00	9.00	13.00	22.00	13.00	297.00	249.00	464.00	435.00	-29.01 : 1
0120-0019	Urban Principal Arterial - Other	Roadway	Roadway widening - add lane(s) along segment	24.00	20.00	1.00		1.00	1.00	70.00	40.00	96.00	61.00	1.89 : 1
0320-0044	Rural Major Collector	Roadside	Drainage improvements	1.00	1.00						1.00	1.00	2.00	-0.01 : 1
0370-0015	Rural Principal Arterial - Other	Roadway	Pavement surface - miscellaneous	3.00	5.00						7.00	3.00	12.00	-0.46 : 1
0470-GDRL	Rural Minor Collector	Roadside	Barrier- metal	36.00	32.00	3.00	1.00	4.00	2.00	49.00	72.00	92.00	107.00	18.39 : 1
0460-0006	Rural Minor Arterial	Roadside	Removal of roadside objects (trees, poles, etc.)	9.00	16.00					7.00	30.00	16.00	46.00	-2.26 : 1
0470-GDRL	Rural Minor Collector	Roadside	Barrier- metal	54.00	54.00	3.00	1.00	4.00	2.00	55.00	79.00	116.00	136.00	54.38 : 1
0460-GDRL	Rural Local Road or Street	Roadside	Barrier- metal	13.00	6.00	2.00		1.00		9.00	2.00	25.00	8.00	23.91 : 1
0430-GDRL	Rural Minor Collector	Roadside	Barrier- metal	133.00	152.00	7.00	12.00	33.00	17.00	180.00	239.00	353.00	420.00	-7.62 : 1
0450-GDRL	Rural Minor Collector	Roadside	Barrier- metal	43.00	52.00	1.00		6.00	8.00	92.00	59.00	142.00	119.00	5.08 : 1
0500-RPMS	Rural Minor Arterial	Roadway delineation	Raised pavement markers	3521.00	3552.00	91.00	96.00	224.00	208.00	4485.00	4097.00	8321.00	7953.00	45.65 : 1
0540-MDNB	Urban Principal Arterial - Interstate	Access management	Median crossover - unspecified	95.00	155.00	8.00	5.00	6.00	8.00	122.00	145.00	231.00	313.00	5.30 : 1

2017 Pennsylvania Highway Safety Improvement Program

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0970-0031	Rural Minor Arterial	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified							1.00	1.00	1.00	1.00	-0.03 : 1
1020-INT	Rural Major Collector	Intersection traffic control	Intersection traffic control - other	6.00	6.00					17.00	3.00	23.00	9.00	0.24 : 1
1050-0119	Rural Principal Arterial - Other	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified	2.00	2.00			1.00		8.00	1.00	11.00	3.00	0.70 : 1
1210-0119	Urban Principal Arterial - Other	Roadside	Drainage improvements	1.00	3.00	1.00				6.00	11.00	8.00	14.00	4.72 : 1
1220-0019	Rural Minor Arterial	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified		2.00						1.00		3.00	-0.05 : 1
1250-0130	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	17.00	15.00				1.00	36.00	18.00	53.00	34.00	-4.61 : 1
1220-2026	Urban Minor Collector	Intersection traffic control	Intersection signing - miscellaneous/other/unspecified							1.00	1.00	1.00	1.00	0.37 : 1
1010-0268	Rural Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	2.00	1.00					2.00		4.00	1.00	0.01 : 1
1040-0286	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	11.00	21.00					27.00	43.00	38.00	64.00	-0.17 : 1
1240-0088	Urban Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	5.00	3.00					6.00	2.00	11.00	5.00	0.05 : 1
0810-ALGN	Rural Minor Collector	Alignment	Horizontal curve realignment		2.00					7.00		7.00	2.00	0.98 : 1
0400-GDRL	Rural Minor Collector	Roadside	Barrier- metal	130.00	177.00	3.00	5.00	14.00	17.00	250.00	290.00	397.00	489.00	-6.79 : 1
0400-SGNS	Urban Principal Arterial - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1266.00	1076.00	34.00	27.00	58.00	60.00	1511.00	1439.00	2869.00	2602.00	113.94 : 1
0840-4001	Urban Minor Arterial	Alignment	Horizontal curve realignment	31.00	16.00	1.00	2.00		1.00	68.00	13.00	100.00	32.00	-22.70 : 1
1110-ENDT	Urban Principal Arterial - Interstate	Roadside	Barrier end treatments (crash cushions, terminals)	60.00	119.00	3.00	1.00		7.00	89.00	184.00	152.00	311.00	3.37 : 1
0110-0322	Urban Principal Arterial - Other	Roadside	Barrier- metal	35.00	29.00	1.00				55.00	37.00	91.00	66.00	7.32 : 1
1110-4003	Urban Principal Arterial - Other	Intersection geometry	Auxiliary lanes - extend acceleration/deceleration lane		2.00					1.00	2.00	1.00	4.00	-0.95 : 1
0150-0257	Rural Minor Arterial	Roadway	Roadway widening - add lane(s) along segment	26.00	24.00					75.00	26.00	101.00	50.00	0.31 : 1
0630-0003	Urban Principal Arterial - Other	Intersection geometry	Auxiliary lanes - extend existing left-turn lane	96.00	135.00		1.00	7.00	2.00	318.00	248.00	421.00	386.00	0.83 : 1
0120-0098	Urban Minor Arterial	Intersection geometry	Intersection geometrics - modify intersection corner radius	7.00	6.00					21.00	12.00	28.00	18.00	0.29 : 1
0110-0006	Urban Principal Arterial - Other	Intersection traffic control	Modify traffic signal timing - signal coordination	10.00	13.00		1.00	2.00		28.00	25.00	40.00	39.00	-11.04 : 1

2017 Pennsylvania Highway Safety Improvement Program

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL INJURY BEFORE	ALL INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
0120-0832	Urban Minor Arterial	Intersection geometry	Auxiliary lanes - miscellaneous/other/unspecified	2.00	1.00					7.00	9.00	9.00	10.00	-0.01 : 1
0640-3053	Urban Principal Arterial - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	41.00	30.00			1.00		61.00	45.00	103.00	75.00	0.68 : 1
1110-0279	Urban Principal Arterial - Interstate	Intersection geometry	Auxiliary lanes - extend acceleration/deceleration lane	126.00	129.00		4.00	3.00	2.00	168.00	183.00	297.00	318.00	-165.28 : 1

Enter additional comments here to clarify your response for this question or add supporting information.

Are there any other aspects of the overall HSIP effectiveness on which the State would like to elaborate?

Yes

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

Despite national trends, Pennsylvania is trending downwards in average fatalities. PA just had lowest number of fatalities on record in 2016.

Compliance Assessment

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

02/17/2017

What are the years being covered by the current SHSP?

From: 2017 To: 2021

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

2021

Enter additional comments here to clarify your response for this question or add supporting information.

Pennsylvania's 2017 SHSP development process started on April 19th, 2016 with our Highway Safety Summit. We then held three Steering Committee meetings with our stakeholders and partners throughout the Summer of 2016 to discuss the goals and strategies of the strategic plan. The SHSP was also a main topic at our September Safety Symposium which was held to exchange ideas and information in the following safety fields: legislation, driver behavior, technology and engineering.

PA's SHSP features over 300 strategies across 16 safety focus areas. New to the 2017 plan is the inclusion of Autonomous Vehicle Technology.. our accomplishments with autonomous and connected vehicles and future direction in this field. Also new is the addition of 3 more strategy categories (Legislation, Marketing, and Technology) to go along with the already existing "4 E's of Highway Safety" (Engineering, Education, Enforcement & Emergency Medical Services).

PennDOT will continue to work with our stakeholders and partners and hold quarterly Multi-Agency Safety Team (MAST) meetings to implement the 2017 SHSP over the next 5 years.

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

	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
MIRE NAME (MIRE NO.)	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT										
Segment Identifier (12)	100	0					0	85	100	50
Route Number (8)	100	0								
Route/Street Name (9)	100	0								
Federal Aid/Route Type (21)	100	0								
Rural/Urban Designation (20)	100	0					0	100		
Surface Type (23)	100	0					0	1		

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
Begin Point Segment Descriptor (10)	100	0					0	85	100	50
End Point Segment Descriptor (11)	100	0					0	85	100	50
Segment Length (13)	100	0								
Direction of Inventory (18)	100	0								
Functional Class (19)	100	0					0	100	100	100
Median Type (54)	100	0								
Access Control (22)	100	0								
One/Two Way Operations (91)	100	0								
Number of Through Lanes (31)	100	0					0	1		
Average Annual Daily Traffic (79)	100	0					0	1		
AADT Year (80)	100	0								
Type of Governmental Ownership (4)	100	0					0	100	100	100
INTERSECTION										
Unique Junction Identifier (120)			98	0						
Location Identifier for Road 1 Crossing Point (122)			98	0						
Location Identifier for Road 2 Crossing Point (123)			98	0						
Intersection/Junction Geometry (126)			50	0						
Intersection/Junction Traffic Control (131)			8	0						
AADT for Each Intersecting Road (79)			98	0						
AADT Year (80)			98	0						
Unique Approach Identifier (139)			0	0						
INTERCHANGE/RAMP										

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
Unique Interchange Identifier (178)					100	0				
Location Identifier for Roadway at Beginning of Ramp Terminal (197)					100	0				
Location Identifier for Roadway at Ending Ramp Terminal (201)					100	0				
Ramp Length (187)					100	0				
Roadway Type at Beginning of Ramp Terminal (195)					100	0				
Roadway Type at End Ramp Terminal (199)					100	0				
Interchange Type (182)					0	0				
Ramp AADT (191)					100	0				
Year of Ramp AADT (192)					100	0				
Functional Class (19)					100	0				
Type of Governmental Ownership (4)					100	0				
Totals (Average Percent Complete):	**100.00**	**0.00**	**68.50**	**0.00**	**90.91**	**0.00**	**0.00**	**62.00**	**100.00**	**70.00**

Enter additional comments here to clarify your response for this question or add supporting information.

Pennsylvania has no "State" Local Paved Roads

Segment Identifier - We have defined segments for 100% of Liquid Fuels local roads, we have defined segments for some of the non-liquid fuels local roads.

Urban Rural designation - This is collected for every state road segment. Local roads determine urban/rural based on the municipality code.

Intersection/ Junction Traffic Control - PennDOT's Traffic Signal Asset Management System (TSAMS) currently stores all signalized intersections in PA except the city of Philadelphia which will be added by the end of 2017.

AADT/AADT Year - This is collected for 100% of the state roads. We have collected less than 1% of this information for local roads.

Surface Type, Number of Through Lanes and AADT - These are collected for local roads and we have so far collected less than 1%.

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.

PennDOT plans on using future HSIP set-aside funds and consultant support to help meet the requirement. We are currently initiating a contract to collect traffic volumes at approximately 4,000 local-state road intersections. PennDOT is also progressing towards a linear referencing system for local roads. Our local road network is complete for all 77,620 miles of liquid fuel payment eligible roads. Integration work is progressing on local roads ineligible for liquid fuels payments; 20 counties are integrated and in quality review status.

Provide the suspected serious injury identifier, definition and attributes used by the State for both the crash report form and the crash database using the table below. Please also indicate whether or not these elements are compliant with the MMUCC 4th edition criteria for data element P5. Injury Status, suspected serious injury.

CRITERIA	SUSPECTED SERIOUS INJURY IDENTIFIER(NAME)	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY DEFINITION	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY ATTRIBUTES(DESCRIPTORS)	MMUCC 4TH EDITION COMPLIANT *
Crash Report Form	Suspected Serious Injury	Yes	N/A	Yes	N/A	Yes
Crash Report Form Instruction Manual	Suspected Serious Injury	Yes	Suspected Serious Injury – any injury other than fatal which results in one or more of the following: - Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood - Broken or distorted extremity (arm or leg) - Crush injuries - Suspected skull, chest or abdominal injury other than bruises or minor lacerations - Significant burns (second and third degree burns over 10% or more of the body) - Unconsciousness when taken from the crash scene - Paralysis	Yes	- Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood - Broken or distorted extremity (arm or leg) - Crush injuries - Suspected skull, chest or abdominal injury other than bruises or minor lacerations - Significant burns (second and third degree burns over 10% or more of the body) - Unconsciousness when taken from the crash scene - Paralysis	Yes
Crash Database	Suspected Serious Injury	Yes	N/A	Yes	N/A	Yes
Crash Database Data Dictionary	Suspected Serious Injury	Yes	N/A	Yes	N/A	Yes

Enter additional comments here to clarify your response for this question or add supporting information.

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

Yes

Describe the purpose and outcomes of the State's HSIP program assessment.

The purpose of the program assessment was to:

1. Determine the effectiveness of the HSIP in Pennsylvania
2. Meet the PY 2017 FHWA Strategic Implementation Plan {SIP) requirement to perform HSIP assessment every five years
3. Develop additional objective measures of effectiveness for the HSIP moving forward
4. Identify specific action items to improve the HSIP

The latest program assessment was complete in July of 2017. The HSIP assessment was broke down into the following categories:

- Policy
- Planning
- Implementation
- Evaluation/Reporting

Each category had specific questions that were answered by the Engineering Districts, MPO/RPOs, PennDOT Central office, and the FHWA Division office. The questionnaire responses were used to develop the assessment report. The results of the report show the following recommendations:

1. Develop measures of the clarity, ease of use, and interpretation of HSIP policies.
2. The District Highway Safety Manual (Publication 638) should be updated to include clear guidance and policies on the HSIP.
3. Provide training and education on HSIP policies and processes.
4. Develop a performance measure on cost estimate increases using ECMS or MPMS.
5. Track, possibly through SharePoint, the HSM tools utilized for analysis and project selection, and countermeasure selection.
6. Promote and increase the use of the HSM.
7. Gather and utilize more local road data to address local road safety effectively.
8. Develop an objective performance measure on let date slippage using ECMS or FMIS.
9. Implement SharePoint improvements:
    - Add Systemic vs. Project Specific Flags
    - Improve project amendment approval process.
    - Could project evaluations be rolled into the SharePoint Site? Can project information be linked to GIS to map HSIP projects?
    - Track the percentage of projects developed from RSAs
10. Improve the implementation of recommendations developed from a Road Safety Audit (RSA).
11. Develop B/C ratios for all HSIP construction projects.
12. Engage staff in the District Offices in the development of statewide policies and procedures.

A copy of the 2017 HSIP assessment report is available for review from the FHWA PA Division office.

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.