



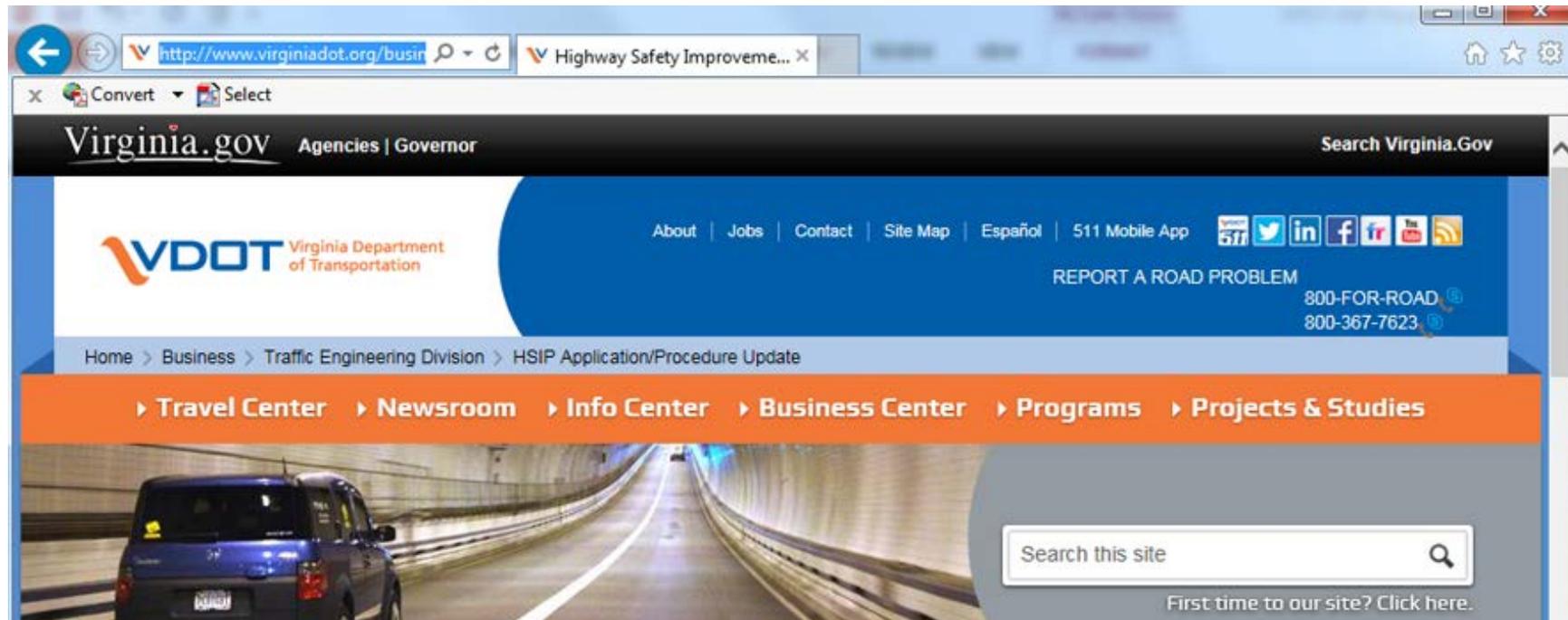
Highway Safety Improvement Program Manual and Application Forms

September 2015

- 1. Orientation: The HSIP Program Website**
- 2. Getting Started: The HSIP Implementation Guidelines**
 - HSIP Process
 - Application Forms
- 3. Proposed Project Submissions: Highway Safety Program Proposed Safety Improvement Form**
 - Benefit Cost Ratio Analysis Example
 - How to Submit
- 4. Q&A**

Orientation

1. The HSIP Program Website



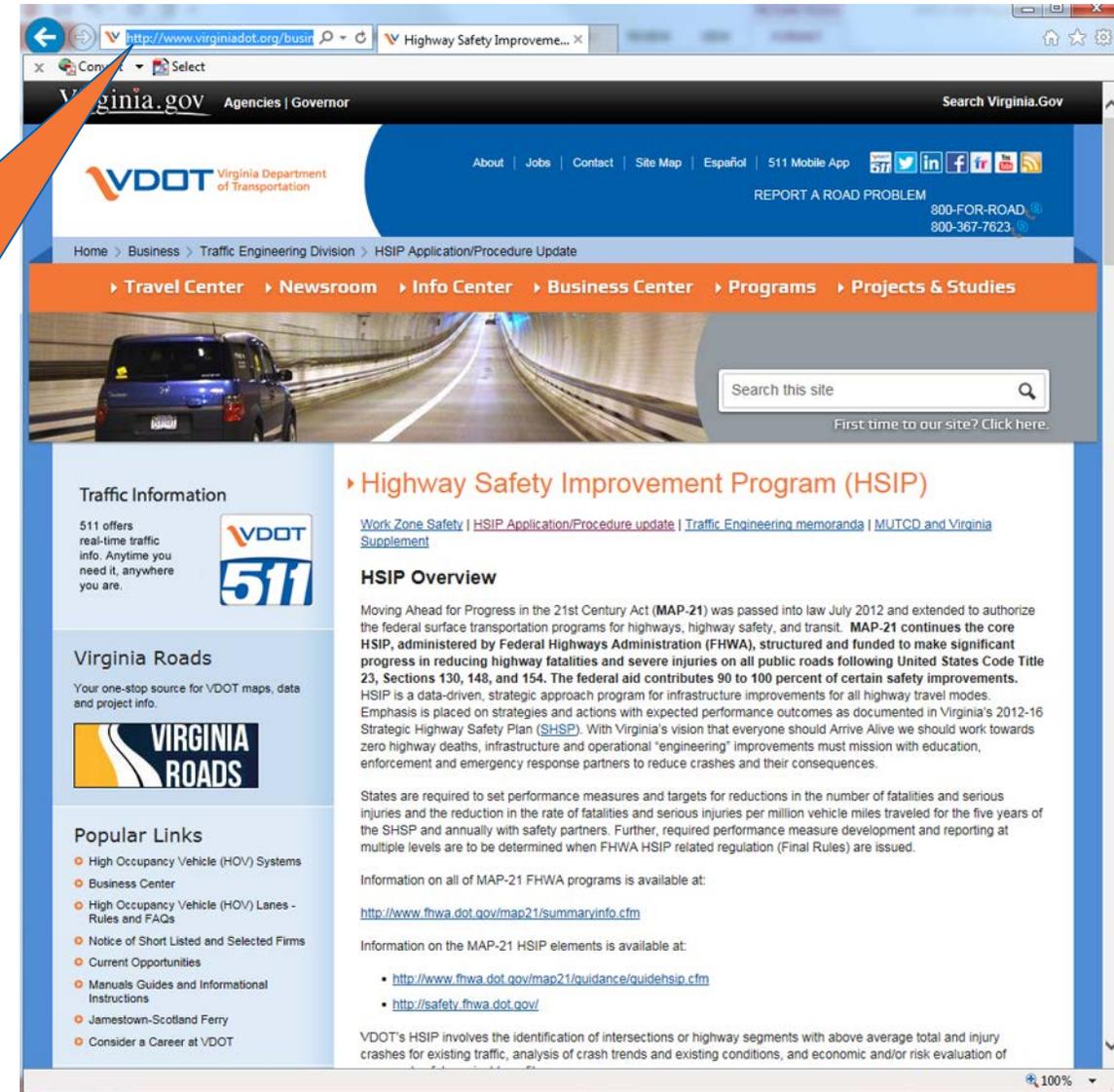
The HSIP Program Website

VDOT HSIP Program Website

- Overview of HSIP Program
- Links to:
 - Supplemental information (MAP-21, new and active projects, Tableau, etc.)
 - HSIP Implementation Guidelines
 - HSIP Application Forms

Website:

http://www.virginiadot.org/business/ted_app_pro.asp

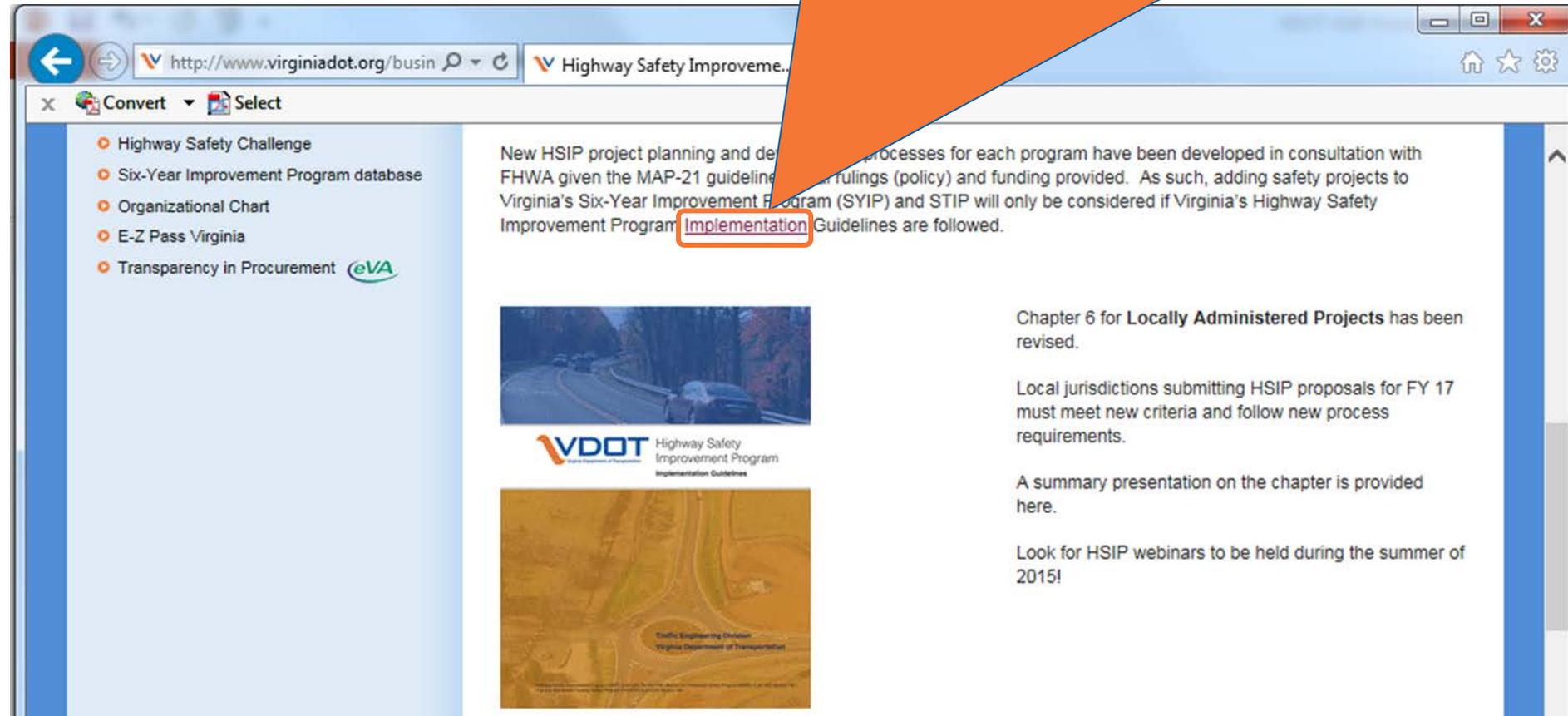


The HSIP Program Website

Website: http://www.virginiadot.org/business/HSIP_Implementation_Manual_060315.docx

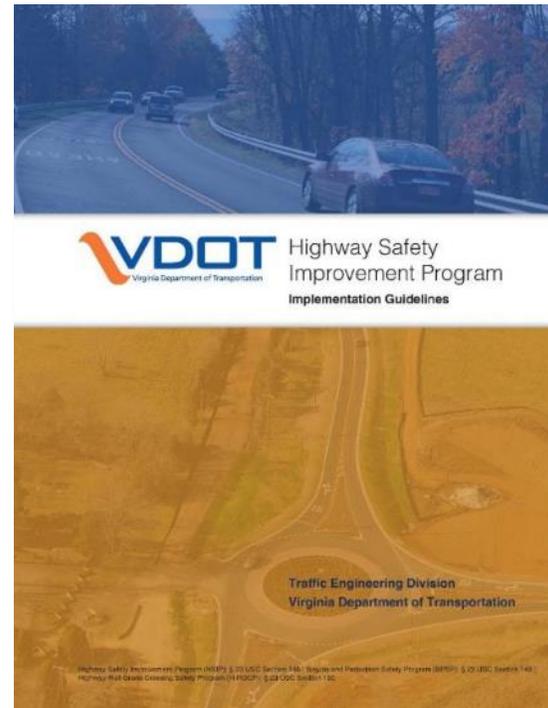
VDOT HSIP Program Website

- Links to:
 - **HSIP Implementation Guidelines**



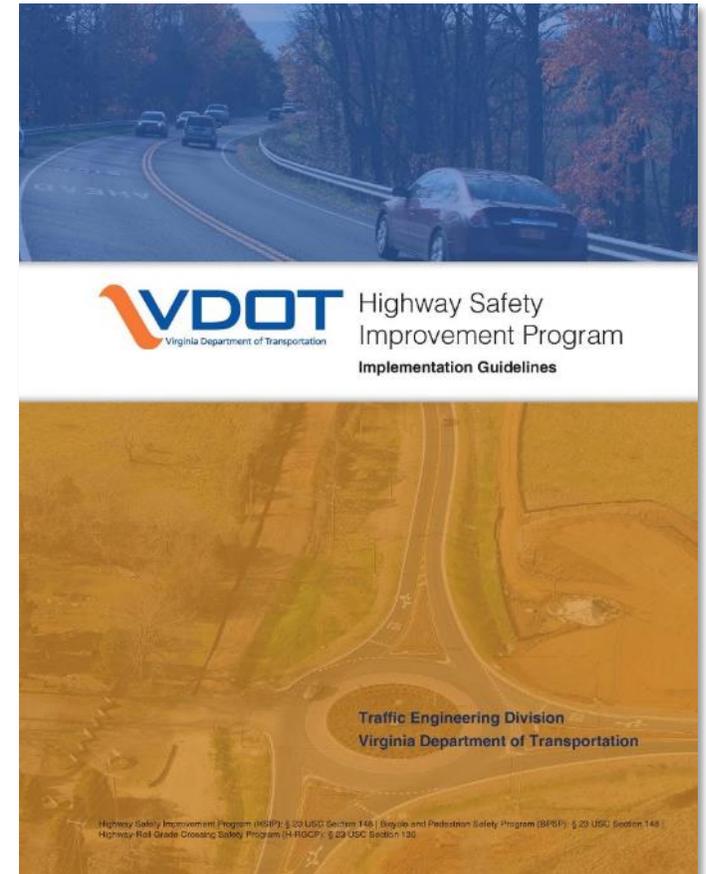
Getting Started

2. The HSIP Implementation Guidelines



The Highway Safety Improvement Program (HSIP)

- Core program administered by FHWA Office of Safety
- Purpose is to reduce fatalities and serious injuries
- Requirements include development and implementation of a Strategic Highway Safety Plan (SHSP)
- VDOT's Program consists of the following programs:
 - Highway Safety Program (HSP)
 - Bicycle and Pedestrian Safety Program (BPSP)
 - Highway-Rail Grade Crossing Safety Program (H-RGCP)
 - Local Agency Safety Program (LASP)
- Documented in VDOT's HSIP Implementation Guidelines
- Administered by VDOT TED



HSIP projects must:

1. Be relevant to the program purpose of reducing severe crashes, or risks to transportation users.
2. Address hazardous situations through good safety planning and identified by safety data driven network screening.
3. Demonstrate compliance with the appropriate VDOT design guidelines and standards.
4. Upgrade non-standard safety features to existing standards, when those features are related to the targeted crashes identified within the work area of the engineering study (or Roadway Safety Assessment).

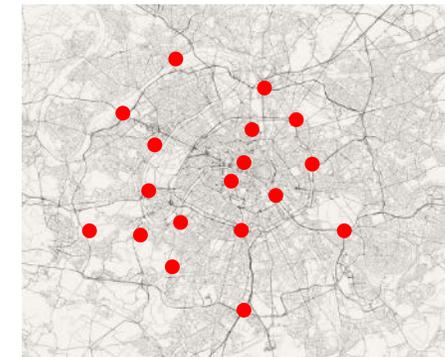
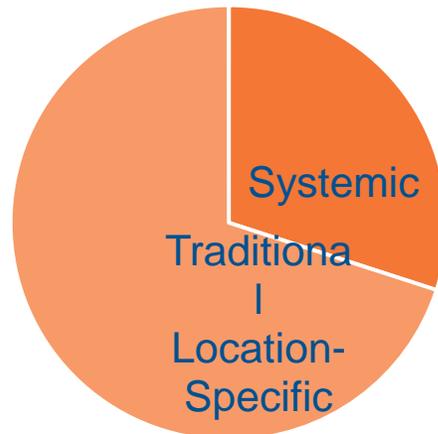
HSIP Overview

- **HSIP funds are available for two types of projects:**
 - **Location-specific:** supported by data on severe crashes
 - **Systemic:** locations where risk based analysis has demonstrated the need for low-cost, widely implemented countermeasures



Location-specific

Initial VDOT HSIP Funding Target



Systemic

HSIP Overview

- **Proposed safety projects accepted through November 1**
- **HSIP allocations approved by FHWA in Statewide Transportation Improvement Program (STIP)**
- **Intent is proposals will be designed and constructed within 3 years**
- **Proposals should not require acquisition of right-of-way**

HSIP forms

1. Highway Safety Program Proposed Safety Improvement Form (benefit/cost analysis)
2. Bicycle and Pedestrian Safety Program Proposed Safety Improvement Form (risk analysis)
3. Highway-Rail Grade Crossing Safety Program Proposed Safety Improvement Form (risk analysis)
4. *Highway Safety Program Proposed Systemic Safety Improvement Form (In Development)* (risk assessment methodology)

HSIP Implementation Supporting Proposal Forms

VDOT HSIP Program

- **Links to:**
 - **HSIP Proposal Forms**

Highway Safety Program

Proposed Safety Improvement Form:

http://www.virginiadot.org/business/FY2016-17HSP_Proposal_Form.xls

HSIP Implementation Supporting Proposal Forms

VDOT HSIP Program

- **Links to:**
 - **HSIP Proposal Forms**

Bicycle and Pedestrian Safety Program

Proposed Safety Improvement Form:

http://www.virginiadot.org/business/FY2016-17BPS_Proposal_Form.xls

HSIP Implementation Supporting Proposal Forms

VDOT HSIP Program

- **Links to:**
 - **HSIP Proposal Forms**

Highway-Rail Grade Crossing Safety Program

Proposed Safety Improvement Form:

http://www.virginiadot.org/business/FY2016-17HRGC_Proposal_Form.xls



Systemic Improvements Proposal Form

- Currently in development
- Utilizes risk assessment methodology
- Links following:
 - Crash type
 - Risk factor
 - Improvement

VDOT Highway Safety Improvement Program FOR OFFICE USE ONLY
Project #: 0000000000 HSP Proposal Rev (7/15/14)
Receive #: 0000000000 Priority #:
HSP File: 0000000000

Systemic Improvements Proposals FY2016-17 Date Received: Month, 2014
Repeat Proposal:

Agency:	Project Sponsor:		VDOT District:	Area Location Code	Study Period (Begin and End Dates)			
Street Address:	City, State, Zip:		VDOT Region:	Rural (1 - 4,999)				
County:	System	Traffic Control	Functional Class Code	Email:	Fed. Sys. Code			
		No Traffic Control	Urban Interstate	Tel:	NHS Regular			
Focus Crash Type	Risk Factor	Proposed Systemic Improvement	Total Locations	Crash Threshold	Locations meeting threshold	Deployment Level Estimate	No. of Systemic Improvements	Targeted KAB Crashes
Rear End	Poor visibility of signal	Replace 8" signal head with a 12" signal head	500	2 pedestrian crashes in 5 years involving turning vehicles	100	0.5	50	1250
Focus Facility Type	Desire speed	Dynamic warning sign for high-speed approaches	500	10 crashes in 5 years	50	0.95	48	500
Signalized Intersection	Inadequate signal timing	Re-time traffic signals for better coordination and for proper red and amber clear intervals	500	None	500	0.75	375	300

Cost: Compute the economic cost of each improvement											
Proposed Systemic Improvement	Service Life	Total PE + \$5,000	ROW - Utility Per Unit	Construction		Total	Contingency (10%)	Annual Maintenance	Total Present Value Cost	Years of Cash Data	Discount Rate
				Per Unit							
Replace 8" signal head with a 12" signal head	6	\$ 25,000.00	\$ -	\$ 5,000.00	\$ -	\$ 30,000.00	\$ 3,000.00	\$ -	\$ 33,000.00		
Dynamic warning sign for high-speed approaches	20	\$ 48,000.00	\$ 48,000.00	\$ 5,000.00	\$ -	\$ 53,000.00	\$ 5,300.00	\$ 4,800.00	\$ 63,100.00	5	0.03
Re-time traffic signals for better coordination and for proper red and amber clear intervals	20	\$ 300,000.00	\$ 10,000.00	\$ 5,000.00	\$ -	\$ 315,000.00	\$ 31,500.00	\$ -	\$ 346,500.00		

Benefit: Compute the economic benefit of each improvement						Benefit-Cost Ratio			
Proposed Systemic Improvement	CMF Value	Applicable Crash Types	Include CMF in Final Analysis? (yes/no)	Source	C-2: Include in Analysis? (yes/no)	Present Value of Benefit	Present Value of Cost	B/C by CMF	B/C Ratio
Replace 8" signal head with a 12" signal head	0.85		yes	http://www.vcr.klarin.gov/usage/details/#cd=1945	yes	\$ 44,244,911.12	\$ 300,000.00	147.5	84.2
Dynamic warning sign for high-speed approaches	0.5		yes	http://www.vcr.klarin.gov/usage/details/#cd=2040	yes	\$ 220,930,501.68	\$ 420,661.00	515.4	
Re-time traffic signals for better coordination and for proper red and amber clear intervals	0.99		yes		yes	\$ 2,651,166.02	\$ 2,452,500.00	1.1	
	0		yes						

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of \$5,000 for VDOT PE costs.

Project Administrated by: _____

Signature of Sponsor with Authority to Expend 10% Matching Funds
Name (Print) _____ Signature _____ Date _____

VDOT anticipates providing the 10 percent match; however, the sponsor should be able to supply the local match if state funding becomes unavailable. Please submit an electronic copy of this spreadsheet to HSPProgram@virginiadot.org and mail a paper copy with signature to the address below.

Mailing address: _____
County, Town, and City: _____

County, Town, and City Staff are requested to submit proposed improvement forms and supporting documents through the VDOT District Local Assistance staff for concurrence and a project sponsor. VDOT staff will also be in concurrence from District PE Managers and PIMs to assign a sponsor.

Mr. Raymond Khouby, PE
Site Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street, Richmond, Virginia 23219

HSIP Implementation

Preliminary Engineering

- For selected safety proposals sponsor must ensure cost of project does not exceed submission cost
- Authorization requires:
 - Allocations programmed
 - Project phases must be in STIP/TIP
 - All agreements executed

Construction

- Scheduling and Contract Prepares construction and bid documents

Performance Measurement

- Monitor project schedule and cost

Highway Safety Program (HSP)

Primary Objective: Identify and improve locations where there is a high concentration, or risk, of vehicle crashes that result in deaths or injuries and to implement strategies to attain Virginia's Towards Zero Deaths vision

- **HSIP staff produces high, severe crash locations lists annually**
- **Employing advanced network screening using Highway Safety Manual**
- **Eligibility**
 - **Documented crashes**
 - **Risk assessment**
 - **Tied to SHSP emphasis area**
- **Ineligible projects**
 - **Bridge replacement**
 - **Automated enforcement**
 - **General maintenance**

Benefit/Cost Analysis

Benefit-Cost (B/C) Ratio

- Result of B/C analysis
- Used to assess eligibility
- B/C greater than 1.0 required

Benefit/Cost Analysis

B/C Analysis Inputs

- Latest three years of crash history by type and severity
- Cost of each proposed improvement
 - Lifecycle cost

STEP 2 :: COST (Compute the economic cost of each improvement)

Proposed Improvement	Service Life	PE Cost + \$5000 (#)	Right-of-Way & Utility Cost	Construction Cost	Total Construction Cost (PV)	Contingency (10%)	Annual Maintenance	Maintenance Cost (PV)	Total Cost (PV)
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- **Benefit of each improvement**
 - Benefits derived from reduction in crashes
 - Calculated using Crash Modification Factors (CMFs)
 - CMF Clearinghouse (www.cmfclearinghouse.org)



Benefit/Cost Analysis

Single or Multiple Improvements

- **If a single proposed improvement, complete one B/C spreadsheet**
- **If multiple improvements, complete single or multiple spreadsheets**
 - Do selected CMFs for each treatment apply to the same crash types and severities?
 - If no, use multiple spreadsheets
 - If yes, proceed to next question
 - Do the treatments target the same underlying safety issue?
 - If yes, use multiple spreadsheets if more than 3 proposed treatments

Bicycle and Pedestrian Safety Program (BPSP)

- Purpose is to evaluate proposals addressing non-motorized crashes and risks
- Proposals must encompass the following factors
 - Document the expected reduction in crashes
 - Address existing hazardous conditions
 - Demonstrate proposal will meet necessary VDOT design guidelines
 - Upgrade non-standard safety features to existing standards

 Highway Safety Improvement Program Bike and Pedestrian Safety Improvement Proposal Form FY16-17						Project #: _____ Applicant #: _____ BPS File: _____ Initiate Date: _____		Priority # (if submitting 2+ proposals): _____ Repeated Proposal from prev. yrs?: _____			
Agency:			Project Sponsor:			VDOT District:		VDOT Region:			
Street Address:			City, State, Zip:			Phone:		Email:			
County / City	Route (Include Name)	System	Frm/Mjr Road (RNS Node-Offset If Applicable)	To/Cross Rd (RNS Node-Offset If Applicable)	ADT(s)	Study Period Begins	Study Period Ends	Functional Class Code	Area Location Code	Federal System Code	
Type of Plans		Fully Describe Project (Sketch Maps or Arial Photos are required with all proposals)									
Identify the Issues (Attachment A)		Points	0								
		Attachment-A	30								
Identify potential measures to address the issues. (Attachment B)		Points	0								
		Attachment-B	45								
		Points	0								
		Attachment-C	15								
						Begin Date	End Date	Estimated Cost	Remarks		

Highway-Rail Grade Crossing Safety Program (H-RGCP)

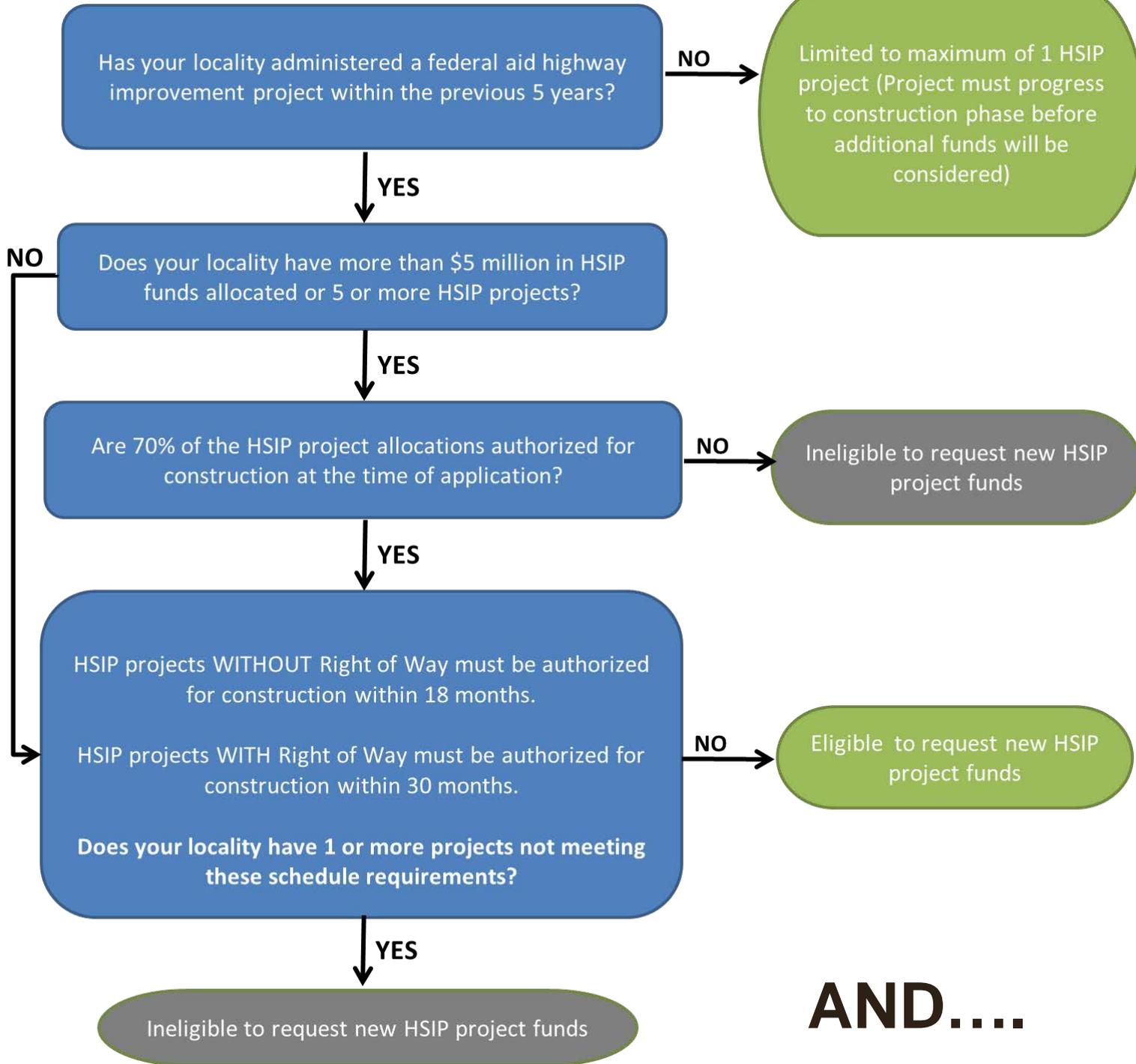
Purpose to reduce risk and number of crashes involving trains at highway-rail grade crossings

 Highway Safety Improvement Program <small>Virginia Department of Transportation</small>		FOR OFFICE USE ONLY Project #: xxxxxxxxxxxx Receive #: xxxxxxxx HSIP File: xxxxxxxx								
Highway-Rail Grade Crossing Safety Improvement Proposal Form FY2016-17										Date Received: Month x, 2014
Agency:		Project Sponsor:		Tel:		Email:				
Street Address:		Fax:		VDOT District:		VDOT Region:				
City, State, Zip:		Priority # (If submitting 2 + proposals)				Repeated Proposal from prev. yrs?				
<p style="color: red; text-align: center;">Note: The gray and white are required fields. The black areas are automatically generated by embedded formulas.</p>										
Program Type	Project Type	County	Route (Include Name)	System (1)	Traffic Control	Frm/Mjr Road (HTRIS/RNS Node-Offset If Applicable)	To/Cross Rd(HTRIS/RNS Node-Offset If Applicable)	Study Period Begins	Study Period Ends	
Rail	Surface Improvement			Primary (P)						
Functional Class Code				Area Location Code			Federal System Code			
Fully Describe Project (Specific Location of Proposed Grade Crossing Improvement Project-Sketch/Map or Arial Photos are required with all proposals)										



Local Agency Safety Program

Eligibility Criteria

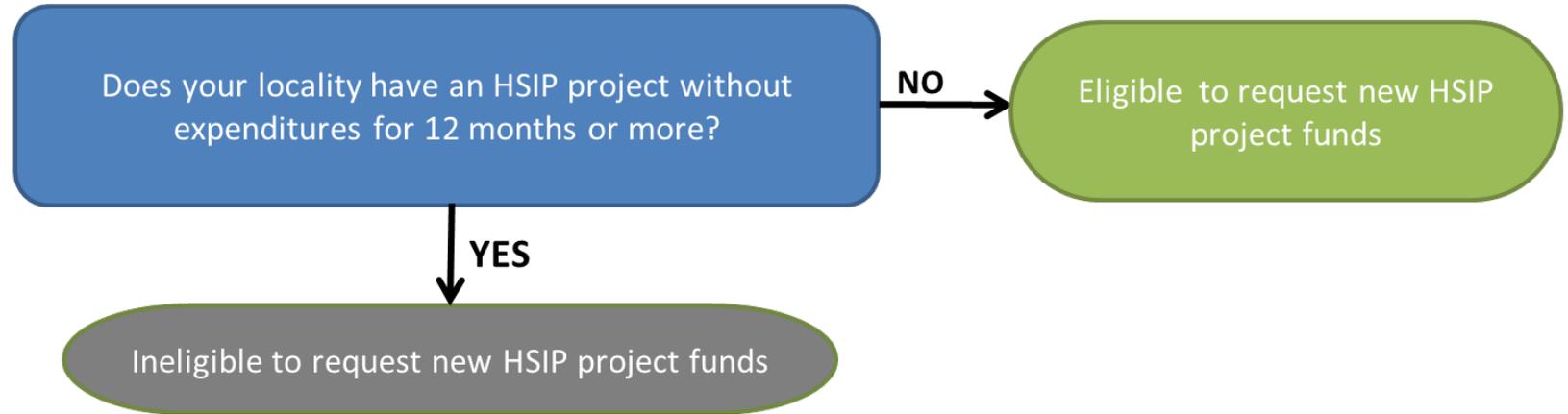


AND....

Local Agency Safety Program

Eligibility Criteria (Cont.)

AND....



3. Highway Safety Program Proposed Safety Improvement Form Example



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information



Highway Safety Improvement Program

Agency:
The name of the governmental agency, municipality, organization, citizen's group or private individual who is proposing a safety improvement project.

Safety Improvement Proposal (FY16-17)

[View Read-Me File for methodology for considering multiple CMFs](#)

PROJECT INFORMATION						
Agency	Project Sponsor	Address	City	State	Zip	
VDOT	VDOT CO	1401 E Broad Street	Richmond	VA	23219	
Email Address	Phone	Priority Number	State Milepoint	VDOT District	VDOT Region	
HSIProgram@VirginiaDOT.org	804-786-6610	1	19.91	CO	Central	
Program Type	Project Type	Functional Class Code	Area Location Code	Fed. Sys. Code	Study Period Begins	Study Period Ends
Regular	Intersection	Urban Minor Arterial	Small Urban (5,000 - 49,999)	NHS	1/1/2012	12/31/2014
County	Safety Proposal Location / Route	System	Traffic Control	From / Major Road	To / Cross Street	
Chesterfield	W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618 <small>(Include Name)</small>	Primary	Traffic Signal	203162 -	203162 -	-

(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information



Highway Safety Improvement Program

Project Sponsor:
The name of the person representing the governmental agency, municipality, organization, citizen's group or private individual who is proposing a safety improvement project.

Safety Improvement Proposal (FY16-17)

[View Read-Me File for methodology for considering multiple CMFs](#)

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Email Address		Phone	Priority Number	State Milepoint	VDOT District	VDOT Region
HSIProgram@VirginiaDOT.org		804-786-6610	1	19.91	CO	Central
Program Type	Project Type	Functional Class Code	Area Location Code	Fed. Sys. Code	Study Period Begins	Study Period Ends
Regular	Intersection	Urban Minor Arterial	Small Urban (5,000 - 49,999)	NHS	1/1/2012	12/31/2014
County	Safety Proposal Location / Route		System	Traffic Control	From / Major Road	To / Cross Street
Chesterfield	W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618 <small>(Include Name)</small>		Primary	Traffic Signal	203162 -	203162 -

(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information

Contact Information:

The contact information for the person representing the governmental agency, municipality, organization, citizen's group or private individual who is proposing a safety improvement project. Contact information includes the Address, City, State, Zip, Email, and Phone Number.



Highway Safety Improvement Program

Safety Improvement Proposal (FY16-17)

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Chesterfield	W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618 <small>(Include Name)</small>	Primary	Traffic Signal	203162 -	203162 -	-

(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information

Priority Number:

If there are multiple proposals submitted by the same jurisdiction, use this field to identify the priority ranking number of each proposal.



Safety Improvement Proposal (FY16-17)

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PROJECT INFORMATION						
Agency	Project Sponsor	Address		City	State	Zip
VDOT	VDOT CO	1401 E Broad Street		Richmond	VA	23219
Email Address	Phone	Priority Number	State Milepoint	VDOT District	VDOT Region	
HSIProgram@VirginiaDOT.org	804-786-6610	1	19.91	CO	Central	
Program Type	Project Type	Functional Class Code	Area Location Code	Fed. Sys. Code	Study Period Begins	Study Period Ends
Regular	Intersection	Urban Minor Arterial	Small Urban (5,000 - 49,999)	NHS	1/1/2012	12/31/2014
County	Safety Proposal Location / Route		System	Traffic Control	From / Major Road	To / Cross Street
Chesterfield	W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618 <small>(Include Name)</small>		Primary	Traffic Signal	203162 -	203162 -

(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information



General Location:

This section defines the general location of the proposed work. Select from the dropdown menus to identify the VDOT District and Region.

Safety Improvement Proposal (FY16-17)

[View Read-Me File for methodology for considering multiple CMFs](#)

PROJECT INFORMATION						
Agency	Project Sponsor	Address	City	State	Zip	
VDOT	VDOT CO	1401 E Broad Street	Richmond	VA	23219	
Email Address	Phone	Priority Number	State Milepoint	VDOT District	VDOT Region	
HSIProgram@VirginiaDOT.org	804-786-6610	1	19.91	CO	Central	
Program Type	Project Type	Functional Class Code	Area Location Code	Fed. Sys. Code	Study Period Begins	Study Period Ends
Regular	Intersection	Urban Minor Arterial	Small Urban (5,000 - 49,999)	NHS	1/1/2012	12/31/2014
County	Safety Proposal Location / Route	System	Traffic Control	From / Major Road	To / Cross Street	
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(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information



Highway Safety Improvement Program

Safety Improvement Proposal (FY16-17)

[View Read-Me File for methodology for considering multiple CMFs](#)

General Project Description:
This section defines the general type of proposed work. Select from the dropdown menus to identify the Program Type and Project Type. The Program Type is defined as a "Regular" Highway Safety Improvement Program (HSIP), High Risk Rural Roads (HRRR), Strategically Targeted Affordable Roadway Solutions (STARS), or Corridors of Statewide Significance (COSS) project. The Project Type is defined as a Segment, Intersection, or Corridor project.

PROJECT INFORMATION						
Agency	Project Sponsor	Address				
VDOT	VDOT CO	1401 E Broad Street				
Email Address	Phone	Priority Number				
HSIProgram@VirginiaDOT.org	804-790-6610	1	19.91	CO	Central	
Program Type	Project Type	Functional Class Code	Area Location Code	Fed. Sys. Code	Study Period Begins	Study Period Ends
Regular	Intersection	Urban Minor Arterial	Small Urban (5,000 - 49,999)	NHS	1/1/2012	12/31/2014
County	Safety Proposal Location / Route	System	Traffic Control	From / Major Road	To / Cross Street	
Chesterfield	W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618 <small>(Include Name)</small>	Primary	Traffic Signal	203162 -	203162 -	-

(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information

Roadway Description:

This section defines the type of roadway on which the proposed work is to be performed. Select from the dropdown menus to identify the Functional Class Code, Area Location Code, Federal System Code, System, and Traffic Control.



Highway Safety Improvement Program

Safety Improvement Proposal (FY16-17)

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PROJECT INFORMATION						
Agency	Project Sponsor	Address		City	State	Zip
VDOT	VDOT CO	1401 E Broad Street		Richmond	VA	23219
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HSIProgram@VirginiaDOT.org		804-786-6610	1	19.91	CO	Central
Program Type	Project Type	Functional Class Code	Area Location Code	Fed. Sys. Code	Study Period Begins	Study Period Ends
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(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information

Study Period:

This section defines the study period of the analysis. Identify the begin date of the study period under Study Period Begins. Identify the end date of the study period under Study Period Ends.

FOR OFFICE USE ONLY
Project #: xxxxxxxxxxxx
Receive #: xxxxxxxx
HSIP File: xxxxxxxxxxxx
Date Received: Month x, 2015



Safety Improvement Proposal (FY16-17)

[View Read-Me File for methodology for considering multiple CMFs](#)

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Chesterfield	W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618 <small>(Include Name)</small>	Primary	Traffic Signal	203162 -	203162 -	

(RNS Node-Offset If Applicable)



Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information



Specific Location:
This section defines the specific location and limits of the proposed work. Identify the County, Safety Proposal Location/Route, From / Major Road, and To / Cross Street.

Safety Improvement Proposal (FY16-17)

[View Read-Me File for methodology for considering multiple CMFs](#)

PROJECT INFORMATION						
Agency	Project Sponsor	Address		City	State	Zip
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Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

STEP 1 :: CRASH HISTORY (Define crashes by type and severity)

APPLICABLE CRASH TYPE AND SEVERITY

Crash Type Categories		Crash Severity					
		All	Fatal (K)	Incapacitating Injury (A)	Minor Injury (B+C)	Property Damage (O)	Not specified
Total Crashes	All	32	1	1	11	19	0

Primary Crash Categories (sum of all 3 must equal total crashes)

Cross median	0	0	0	0	0	0
Fixed object	0	0	0	0	0	0
Run off road	0	0	0	0	0	0
Head on	0	0	0	0	0	0

Enter total crashes by crash severity

Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

Crash Type Categories		Crash Severity				
		All	Fatal (K)	Incapacitating Injury (A)	Minor Injury (M)	Property Damage Only (P)
Total Crashes	All	32	1	1		
Primary Crash Categories (sum of all 3 must equal total crashes)						
Roadway Departure or Intersection	Cross median	0	0	0	0	0
	Fixed object	0	0	0	0	0
	Run off road	0	0	0	0	0
	Head on	0	0	0	0	0
	Non-Collision	0	0	0	0	0
	Sideswipe	0	0	0	0	0
	Angle	7	0	1	4	2
	Left turn	8	1	0	3	4
	Right turn	1	0	0	0	1
Rear end	16	0	0	4	12	
Non-Motorized	Pedestrian	0	0	0	0	0
	Bicycle	0	0	0	0	0

Enter crashes by primary crash category and crash severity

Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

Crash Type Categories		Crash Severity				
		All	Fatal (K)	Incapacitating Injury (A)	Minor Injury (B)	Property Damage Only (C)
Total Crashes	All	32	1	1	0	0
Primary Crash Categories (sum of all 3 must equal total crashes)						
Roadway Departure or Intersection	Cross median	0	0	0	0	0
	Fixed object	0	0	0	0	0
	Run off road	0	0	0	0	0
	Head on	0	0	0	0	0
	Non-Collision	0	0	0	0	0
	Sideswipe	0	0	0	0	0
	Angle	7	0	1	4	2
	Left turn	8	1	0	3	4
	Right turn	1	0	0	0	1
Rear end	16	0	0	4	12	
Non-Motorized	Pedestrian	0	0	0	0	0
	Bicycle	0	0	0	0	0

Note: The number of crashes in the primary crash category MUST equal the total crash summary

Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

Secondary Crash Types: The breakdown of crashes by secondary crash type is necessary because some crash modification factors (CMFs) apply to these crash types.

Secondary Crash Categories								
Environmental Factors	Nighttime	7	1	0	0	0	0	6
	Wet weather	5	0	0	3	2	0	
Number of Vehicles	Single vehicle	0	0	0	0	0	0	0
	Multiple vehicle	32	1	1	11	19	0	
Driver Behavior	Speed related	2	1	0	1	0	0	
	Unbelted	0	0	0	0	0	0	0
	Alcohol related	0	0	0	0	0	0	0

Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

- The safety proposal must show the estimated project costs broken down by project phase (PE, R/W and Utilities, and Construction).
- Detailed and accurate cost estimates should utilize VDOT's Project Cost Estimation System (PCES) worksheets.
- Project sponsors who do not have access to the PCES worksheets shall submit detailed costs with a descriptive reason for not using PCES. VDOT district local assistance staff will work with local jurisdictions to ensure project cost estimates are consistent with PCES.

STEP 2 :: COST (Compute the economic cost of each improvement)

Proposed Improvement	Service Life	PE Cost + \$5000 (*)	Right-of-Way & Utility Cost	Construction Cost	Total Construction Cost (PV)	Contingency (10%)	Annual Maintenance	Maintenance Cost (PV)	Total Cost (PV)
1. Install traffic signal	20	\$15,000	\$5,000	\$250,000	\$270,000	\$25,000	\$1,500	\$22,316	\$317,316
2. Install left-turn lane	20	\$10,000	\$20,000	\$100,000	\$130,000	\$10,000	\$0	\$0	\$140,000
3. Install roundabout	20	\$50,000	\$100,000	\$1,250,000	\$1,400,000	\$125,000	\$0	\$0	\$1,525,000

Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

Enter:

- PE Cost +\$5000
- Right-of-Way & Utility Cost
- Construction Cost

STEP 2 :: COST (Compute the economic cost of each improvement)

Proposed Improvement	Service Life	PE Cost + \$5000 (*)	Right-of-Way & Utility Cost	Construction Cost	Total Construction Cost (PV)	Contingency (10%)	Annual Maintenance	Maintenance Cost (PV)	Total Cost (PV)
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3. Install roundabout	20	\$50,000	\$100,000	\$1,250,000	\$1,400,000	\$125,000	\$0	\$0	\$1,525,000

Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

Enter:

- Service Life
- Annual Maintenance

Note: Refer to Service Life and Maintenance & Utility Costs tabs

Service Life (YRS)

IMPROVEMENT DESCRIPTION	SERVICE LIFE
Intersection / Traffic Control Devices	Years
1A Channelization, Turning Lanes	20
1B Sight Distance Improvements	10
1C Traffic Signs	6
1D Markings and/or Delineators	2

Navigation: Question Form | **Service Life (YRS)** | Maintenance & Utility Costs | C

STEP 2 :: COST (Compute the economic cost of each improvement)

Proposed Improvement	Service Life	PE Cost + \$5000 (*)	Right-of-Way & Utility Cost	Construction Cost	Total Construction Cost (PV)	Contingency (10%)	Annual Maintenance	Maintenance Cost (PV)	Total Cost (PV)
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2. Install left-turn lane	20	\$10,000	\$20,000	\$100,000	\$130,000	\$10,000	\$0	\$0	\$140,000
3. Install roundabout	20	\$50,000	\$100,000	\$1,250,000	\$1,400,000	\$125,000	\$0	\$0	\$1,525,000

Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

Enter:

- Service Life
- Annual Maintenance

Note: Refer to Service Life and Maintenance & Utility Costs tabs

Service Life (YRS)

IMPROVEMENT DESCRIPTION	SERVICE LIFE
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Navigation: Question Form | **Service Life (YRS)** | Maintenance & Utility Costs | C

STEP 2 :: COST (Compute the economic cost of each improvement)

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2. Install left-turn lane	20	\$10,000	\$20,000	\$100,000	\$130,000	\$10,000	\$0	\$0	\$140,000
3. Install roundabout	20	\$50,000	\$100,000	\$1,250,000	\$1,400,000	\$125,000	\$0	\$0	\$1,525,000

Highway Safety Program Proposed Safety Improvement Form Example

Step 3: Benefit (Compute the economic benefit of each improvement)

STEP 3 :: BENEFIT (Compute the economic benefit of each improvement)						
Proposed Improvement	CMF Value	Applicable Crash Type	Applicable Crash Severity Type	Include CMF in Final Analysis? (Yes/No)	Reference Link to CMF ID from CMF Clearinghouse	Other Notes
1. Install traffic signal	0.23	Angle	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	0.4	Left turn	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	1.58	Rear end	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
2. Install left-turn lane	0.52	All	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	0.42	All	K, A, B+C	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
3. Install roundabout	0.29	All	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	0.13	All	A, B+C	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections

Highway Safety Program Proposed Safety Improvement Form Example

Step 3: Benefit (Compute the economic benefit of each improvement)

- Single vs. Multiple Improvements
- Multiple improvements for the same location:
 1. Do the selected CMFs for each treatment apply to the same crash types and severities?
 2. Do the treatments target the same underlying safety issue?

Highway Safety Program Proposed Safety Improvement Form Example

Step 3: Benefit (Compute the economic benefit of each improvement)

Example: There are multiple proposed treatments for a single location, including the addition of **four-foot paved shoulders** and the installation of **shoulder rumble strips**.

Multiple improvements for the same location:

1. Do the selected CMFs for each treatment apply to the same crash types and severities? **Yes. One can assume that both CMFs apply to all crash types and severities.**
2. Do the treatments target the same underlying safety issue? **Yes**
aspaved shoulders and shoulder rumble strips can both help to address run-off-road crashes.

Since there are only two proposed treatments, a single spreadsheet can be used, recognizing that the B/C ratio may be slightly inflated because the two proposed treatments address similar safety issues.

Highway Safety Program Proposed Safety Improvement Form Example

Step 3: Benefit (Compute the economic benefit of each improvement)

From CMF Clearinghouse Enter:

- CMF Value
- Applicable Crash Type
- Applicable Crash Severity Type
- Reference Link
- Other Notes



STEP 3 :: BENEFIT (Compute the economic benefit of each improvement)

Proposed Improvement	CMF Value	Applicable Crash Type	Applicable Crash Severity Type	Include CMF in Final Analysis? (Yes/No)	Reference Link to CMF ID from CMF Clearinghouse	Other Notes
1. Install traffic signal	0.23	Angle	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	0.4	Left turn	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	1.58	Rear end	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
2. Install left-turn lane	0.52	All	All	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections
	0.42	All	K, A, B+C	Yes	http://www.cmfclearinghouse.org/detail.cfm?f	Applies to rural intersections

Highway Safety Program Proposed Safety Improvement Form Example

Step 4: B/C Ratio (Compute the B/C ratio for specific combinations of CMFs)

Decide whether to include proposed improvement in B/C Analysis (Yes/No)

The spreadsheet can be used to compare the B/C ratio for various combinations of improvements to determine the most cost-effective combination

Note that VDOT District and Central Office personnel charge review and administration time to projects managed by localities. Safety Projects not managed by VDOT shall include a minimum of \$5,000 for VDOT PE costs.

STEP 4 :: B/C RATIO (Compute the B/C ratio for specific combinations of CMFs)

Proposed Improvement	Include in Analysis? (Yes/No)	Present Value of Benefit	Present Value of Cost	B/C by CMF	B/C Ratio	Annual Estimated Lives Saved and Injuries Prevented	Other Notes
1. Install traffic signal	Yes	\$2,021,745	\$317,316	6.37	8.33	2	1. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of \$5,000 for VDOT PE costs.
2. Install left-turn lane	Yes	\$7,650,538	\$140,000	54.65		3	
3. Install roundabout	Yes	\$6,843,676	\$1,525,000	4.49		4	

Highway Safety Program Proposed Safety Improvement Form Example

Project Schedule

- To be completed, if applicable, after STIP approval.
- Note: The Begin PE date should be set no earlier than October 1st of the first year to allow for FHWA STIP approval and project authorization to begin. With this start, the advertisement date should be with 12 months but shall not be any later than January of the second year for projects added to the current fiscal year. The completion date of a project should not be any later than January of the fourth year. In other words, a project will be advertised in two years and completed in three years from STIP approval at the latest. The project sponsor and project manager are responsible for coordinating the proposal schedule.



PROJECT SCHEDULE (AFTER STIP APPROVAL)					
Begin PE	Target Advert.	Begin Construction	Estimated Complete Date	Type of Plan	Project Administered By

SIGNATURE OF SPONSOR

Please submit an electronic copy of this spreadsheet and a scanned digital copy with signature to HSIPProgram@virginiadot.org. Paper copies of reference materials may be mailed Attn: HSP BCR Improvement Proposal Mr. Raymond Khoury, P.E., State Traffic Engineer, Virginia Department of Transportation 1401 East Broad Street, Richmond, Virginia 23219.

Name (Print):	
Signature:	Date:

Submission Information

Signature of Sponsor



Highway Safety Program Proposed Safety Improvement Form Example

Submission Requirements:

1. Must use the latest HSP or Systemic Safety Improvement Proposal Form.
2. Must be received in VDOT's Traffic Engineering office by November 1st.
3. Must be renamed HSP_YEAR_”Physical Jurisdiction”_Project##.xls
4. Must be submitted both as:
 - a) An electronic version with the email title format “HSP_YEAR_”Safety Partner Name”_ Project Proposal(s)” to HSIProgram@VirginiaDOT.org
 - b) As a signed hardcopy to:

Attn: HSP BCR Improvement Proposal
Mr. Raymond Khoury , P.E.,
State Traffic Engineer,
Virginia Department of Transportation
1401 East Broad Street,
Richmond, Virginia 23219

Highway Safety Program Proposed Safety Improvement Form Example

- **Submitting the proposal:**

- ✓ 1. Used the latest HSP Proposal Form.
- ✓ 2. Renamed proposal form “HSP_2017_Chesterfield County_Project01.xls”
- ✓ 3. Submitted the following to VDOT’s Traffic Engineering office by November 1st:
 - ✓ a) Electronic version of HSP form with email titled “HSP_2017_Richmond District_Project Proposals” to HSIPProgram@VirginiaDOT.org
 - ✓ b) Signed hardcopy of HSP form to:

Attn: HSP BCR Improvement Proposal
Mr. Raymond Khoury , P.E.,
State Traffic Engineer,
Virginia Department of Transportation
1401 East Broad Street,
Richmond, Virginia 23219

Questions?
