ROJECTS	
ADOT Guidance on HSIP Funded Road Safety Improvement Projects	
1	***Two categories of road safety improvements: "Systemic" projects and "Spot Specific" projects. All projects must be identified through a data-driven***
	"Systemic Projects" are those projects that implement systemic road safety improvements across a road nework. These are projects that can be implemented with minimal clearances required, usually system-or corridor-wide. A data anaylysis that identifies crash trends and risk factors with a prioritized list of potential locations that could benefit from the systemic safety improvements utilizing highly-effective countermeasures is required. Applications for this category of projects require network screening, supporting crash data, a 4 or 5 star CMF, and a benefit-cost ratio ≥ 1.5. Contact ADOT Traffic Safety Section for technical assistance if needed. See http://safety.fhwa.dot.gov/systemic/ for more information.
	"Spot Specific Projects" are those projects that would implement a safety countermeasure focused at a specific location. Applications for this category of projects require network screening, supporting crash data, a 4 or 5 star CMF, and a benefit-cost ratio ≥ **1.5.** These projects may require environmental, utility and ROW clearances.
2	***Examples of Potential Road Safety Improvement Projects***
	Improve Roadway Segment Safety: Milled in shoulder and centerline rumble strips Install delineation for barriers and obstacles Upgrade markings (wider and more durable materials) including Raised Pavement Markers Upgrade regulatory and warning signs (Sign Inventory system **must** be in place as of June 14, 2014. Replacement based on retroreflectivity) Shoulder widening Enhanced delineation at horizontal curves Road Diets High Friction course applications
	Improve Signalized Intersection Safety: Converting traffic signal heads from 8-inch incandescent/LED to 12-inch LED
	Improve Unsignalized Intersection Safety: Upgrade STOP signs – larger and/or retroreflective upgrade Install advance stop ahead pavement markings
	Improve Pedestrian Safety: Install pedestrian countdown signals Install and/or upgrade pedestrian crosswalk pavement markings Installation of yellow-green signs and signals at ped and bike crossings and in school zones Provide mid-block crosswalk advance stop bars Provide pedestrian refuge islands and medians Install Pedestrian Hybrid Beacons (Ref: http://safety.fhwa.dot.gov/provencountermeasures/)
	Improve Emergency Response: Establish or upgrade mileposts and milepost system (Not applicable to urban arterial streets)

	Establish Inventory of Traffic Control Devices: Inventory of signs, traffic signals, etc. required for implementing systematic improvements. Agencies had until **June 14, 2014** to implement and continue to use an assessment or managment method that is designaed to maintain regulatory and warning sign retroreflectivity at or above the minimum levels in Table 21-3 of the 2009 MUTCD. Agencies requesting Federal funds to upgrade signage must attest that they have their system in place are are utilizing it to prioritze sign replacement.
3	***Example Safety Improvements that may qualify to be 100% HSIP funded (see 23 U.S.C. 120 (c) for complete list):***
	Roundabouts Traffic Signals - Pavement Markings - Upgrade to meet minimum retroreflectivitiy standards New or Replacement Road Signs - i.e. to meet MUTCD retroreflectivity requirements Install centerline and shoulder rumble strips and stripes Install NEW guardrails - Not upgrade or improve existing NOTE: Guardrails that are deemed too low
4	***Additional Requirements***
	The cover letter is the document that commits the agency to the safety project, how much HSIP funding is being requested,the source of additional funding if necessary, etc. A short summary of your application with B/C and Weighted Scores included. When completed please print and sign your letter and .pdf it along with the final version of this Excel application. The final version of the Excel application must include any modifications to project scope and project cost made during the project review process .
	The amount of HSIP funding shown in the Cost Estimate of the final Excel application MUST match the amount approved by COG/MPO if local OA is being used.
	ADOT is responsible for ensuring that all individual elements of a project are eligible. Eligibility does not give an agency authorization to begin work. Final eligibility and participation determinations (Federal Authorization) are retained by FHWA and any work performed prior to Federal Authorization are not eligible for reimbursement.
	Any changes in project cost above 20% will need to be re-submitted along with justification for eligibility and approval. If project cost increases <20%, the LPA needs to notify ADOT by email of increase with justification for the record prior to requesting increased Federal Authorization or inclusion in the TIP.
	Any changes in project scope or work limits will need to be re-submitted for eligibility determination and approval prior to award of construction contract.
	ADOT clearances and an executed IGA are required and must be completed prior to January 31, 20XX. If you are a Certified Acceptance (CA) Agency no IGA is required, but you are still required to have all clearances completed by May 1, 20XX.
	Merchandise, i.e. sign panels, signal heads, etc. must be installed within one year of purchase. Merchandise **can not** be stockpiled for future use.
	Supporting structures, i.e. guradrails for new end treatments, posts for signs, etc., must meet local minimum standards before federally funded upgrades can be added.

	Work must not be classified as **maintenance** such as normal operating expenses and routine repair. HSIP funds cannot be used to "salvage" items without crediting costs back to the project. HSIP funds cannot be used to "upgrade" items, but they can be used to bring an item up to current standards when replacing if they were substandard prior to approval of this project.
	If you are doing planning/study project; must result in a design/construction project. The B/C ratio analysis should be based on the most expensive alternative for consturcting the total cost of the safety countermeasure.
	Reimbursement for Installation: As indicated in 23 CFR 635.112(e): "No public agency shall be permitted to bid in competition or to enter into subcontracts with private contractors." There are no exceptions to this competitive bidding policy. However, under limited circumstances a public agency may be permitted to undertake efforts normally reserved for the private sector (Publicly Owned Equipment, Convict Produced Materials, and State Owned/Furnished/Designated Materials). Otherwise, unless it is an emergency situation or an attempt was made to bid installation competitively and was not successful, installation **will not** be eligible for Federal-aid reimbursement.
	Clearance Letters: Templates are provided for your use. Once you have received an executed IGA and federal authorization you can submit your clearance letters to the appropriate ADOT Technical Section. **Required:** Environmental, Utilities and Right of Way Clearance. Materials Memo may be required for certain types of work.
5	**Countermeasures:**
	The list of countermeasures included in the Tabs in this application is not an all-inclusive list, and only includes those 4 and 5 star countermeasures with fatal, serious and in some cases, minor injuries. The mix of contermeasures and CMFs included in this document is intended to meet ADOT's goal for a data-driven award process for all agencies to follow that allows for a fair and accurate compairson of project applications.
	Safety practitioners in the agency should evaluate the potentially applicable CMFs, eliminating any that are not appropriate for the countermeasure(s). Practioners should only choose the most appropriate CMFs for their specific project based on factors including but not limited to : urban areas vs rural areas; low vs high traffic volumes; 2-lane vs 6 lane roadways, manner of collision, etc. If there is not a published CMF for the countermeasure, then the project probably will not be eligibilbe for HSIP funding.
6	**SFY16 Special Guidance:**
	1. Local HSIP Obligation Authority (OA) remains in place in SFY16. 2. Loans between COGs & MPOs are still valid for SFY17 and SFY18. 3. Loans between COGs & MPOs **will not** be recoginzed in SFY19. 4. If a COG/MPO chooses to submit a HSIP application(s) to ADOT for consideration as a potential HSIP project utilizing State FY17 HSIP funds, the total project cost has to exceed the local HSIP OA and the COG/MPO has to agree to transfer their **TOTAL** local HSIP OA for SFY17 to State HSIP if the project qualifies for HSIP funding. 5. Those applications submitted for consideration for State FY17 HSIP funding will be reviewed for eligibility determination along with other agency submittals, and projects meeting eligibility requirements will be ranked based on the “Weighted Score” in the application.

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:		**Title of Project:**	
County:		**COG/MPO:**	
District:		**HSIP Funds:**	☐ STATE ☐ LOCAL

Contact:	**Phone:**	**E-Mail:**

Type of Safety Improvement: **Spot:** ☐ YES ☐ NO **Systemic:** ☐ YES ☐ NO

Mark all that apply to your project: ☐ PE ☐ Const. ☐ Procurement ☐ Planning ☐ Non-Infrastructure

Anticipated Total Cost Estimate:	**$30,000.00**	
Anticipated dollar amount of HSIP Funding:	**$30,000.00**	
Anticipated Dollar amount of Local Match (5.7%) (5.66%):	**$0.00**	
Anticipated Dollar amount of Other:	**$0.00**	
Funding Source: ☐ 100% HSIP ☐ 94.3% HSIP ☐ 94.34% HSIP	**Cost Estimate Tab:**	

Local Initiated Projects

Anticipated Design Year (Construction/procurement year cannot be the same): ☐ FY16 ☐ FY17 (State)

If additional ROW is needed, what FY is purchase anticipated?: ☐ FY17 ☐ FY18

Anticipated Construction Year: ☐ FY16* ☐ FY17 ☐ FY18

Administration of Project: **Agency:** ☐ YES ☐ NO **ADOT:** ☐ YES ☐ NO

If competing for State Funds, COG/MPO agrees to transfer TOTAL local HSIP OA to State. ☐ YES

Name and Title of COG/MPO Representative:	

State Initiated Projects

Anticipated Design Year (Construction/procurement year cannot be the same): ☐ FY17

If additional ROW is needed, what FY is purchase anticipated?: ☐ FY17 ☐ FY18

Anticipated Construction Year: ☐ FY17* ☐ FY18 ☐ FY19 ☐ FY20

Basic Project Information

1.	**Have lower cost countermeasures been considered or implemented?**	☐ YES ☐ NO
1a.	**If "Yes", describe: If "No", explain why not:**	
2.	**Describe your safety improvement project in detail: (50 words or less)**	

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:		**Title of Project:**	
County:		**COG/MPO:**	
District:		**HSIP Funds:**	☐ STATE ☐ LOCAL

2a.		
3.	**Describe the location of this safety project:**	
3a.		
4.	**What crash data screening method was used to identify this project?**	
4a.		
5.	**What is the safety justification for the proposed project?**	
5a.		
6.	**Will there be ground disturbing activities?**	☐ YES ☐ NO
7.	**Is project within applicants permanent ROW?**	☐ YES ☐ NO
7a.	**If NO please explain:**	
8.	**Will any temporaty right-of-way acquisitions be required?**	☐ YES ☐ NO
9.	**Will there be any utility relocation needed?**	☐ YES ☐ NO

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:		**Title of Project:**	
County:		**COG/MPO:**	
District:		**HSIP Funds:**	☐ STATE ☐ LOCAL

9a.	**If YES please explain:**		
10.	**Does Section 4(f) apply to any portion of this project?**	☐ YES	☐ NO
10a.	**If YES please explain:**		
11.	**Are there any other issues that may impact or delay development or construction of this project?**	☐ YES	☐ NO
11a.	**If YES please explain:**		
12.	**Is this project in compliance with revised ADA Standards?**	☐ YES	☐ NO
12a.	**If NO please explain:**		
13.	**Does the project support Arizona's Strategic Highway Safety Plan?**	☐ YES	☐ NO
14.	**Are there any Studies, RSA's or Other evaluations that support this project?**	☐ YES	☐ NO
15.	**HSIP Roadway Functional Classification:**		
16.	**Average Daily Traffic Volume and Year Collected:**	**ADT:**	**Year:**
17.	**What is the source of ADT?:**		
18.	**What is the posted speed limit?**		
19.	**Detailed engineer's cost estimate attached:**	☐ YES	☐ NO

"Systemic" Safety Project

20.	**Completed B/C Ratio Tabulation Sheet Attached (Required):**	☐ YES	☐ NO
21.	**Most current 3-5 Years Crash Data from ADOT ALISS database sorted by year & severity (required):**	☐ YES	☐ NO
22.	**What are the inclusive dates of the crash data?**		

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:		**Title of Project:**	
County:		**COG/MPO:**	
District:		**HSIP Funds:**	☐ STATE ☐ LOCAL

23.	**If purchasing equipment or materials, who will install?**	☐ Town/City ☐ County ☐ Contractor ☐ Tribe
24.	**Does the project require proprietary Items (23CFR 635.411)?:**	☐ YES ☐ NO
25.	**Is a list of locations for systemic projects provided on the attached form?**	☐ YES ☐ NO
26.	**How are (will) the proposed locations be prioritized for replacement? (explain below)**	
26a.		
27.	**Are the supporting structures in good condition, meet local standards and have an anticipated service life longer than the countermeasure being installed?**	☐ YES ☐ NO

"Spot" Improvement Projects Only

28.	**Completed B/C Ratio Tabulation Sheet Attached (required):**	☐ YES ☐ NO
29.	**Most current 3-5 Years Crash Data from ADOT ALISS database sorted by year & severity (required):**	☐ YES ☐ NO
30.	**What are the inclusive dates of the crash data?**	
31.	**Have any infrastructure changes occurred within the work limits of this project during the years the crash data covers?**	☐ YES ☐ NO
32.	**If YES please explain:**	
33.	**Project vicinity map is provided:**	☐ YES ☐ NO
34.	**Project work limits map is provided:**	☐ YES ☐ NO

SHSP - All Projects

35.	**Which SHSP Emphasis Area (EA) does this project support?:**		
35a.	**Which EA Strategy does it support?:**		

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:		**Title of Project:**	
County:		**COG/MPO:**	
District:		**HSIP Funds:**	☐ STATE ☐ LOCAL

35b.	**Does this project support a second SHSP EA? If so, which EA.:**		
35c.	**Which EA Strategy supports the second EA?**		
35d.	**Does this project support a third SHSP EA? If so, which EA.:**		
35e.	**Which EA Strategy supports the third EA?**		

36.	**Does this project support one of the nine FHWA proven countermeasures?:**	☐ YES	☐ NO
36a.	**If so, which countermeasure?:**		
37.	**Does this project support one of the three Arizona Focus Areas?:**	☐ YES	☐ NO
37a.	**If so, which focus area?:**		
38.	**Which HSIP Improvement Category does this project support?:**		
38a.	**Which HSIP Improvement Sub-Category does this project support?:**		
39.	**Does your COG/MPO have a Strategic Transportation Safety Plan (STSP)?:**	☐ YES	☐ NO
39a.	**If "YES", does this project support an Emphasis Area in the COG/MPO STSP?:**	☐ YES	☐ NO
39b.	**List the EA:**		
40.	**Are any temporaty safety countermeasures needed prior to this permanent solution being installed?**	☐ YES	☐ NO
40a.	**If yes, please explain:**		

B/C Ratio and Weighted Score

41.	**The calculated B/C Ratio is:**	**3.20**	**The Weighted Score is:**	**17.20**

Non-Infrastructure Project or Element

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:		**Title of Project:**	
County:		**COG/MPO:**	
District:		**HSIP Funds:**	☐ STATE ☐ LOCAL

42.	**Does the crash data for this project indicate any of the following driver/pedestrian/bicyclist behaviors contributed to the identification of this project location?**		
42a.	**Impaired Driving (Alcohol or Drug)**	☐ YES	☐ NO
42a.	**Occupant Protection**	☐ YES	☐ NO
42a.	**Pedestrian and Bicycle Safety**	☐ YES	☐ NO
42a.	**Motorcycle Safety**	☐ YES	☐ NO
42a.	**Police Traffic Services/Speed Control**	☐ YES	☐ NO
42a.	**Lack of accurate/complete crash data**	☐ YES	☐ NO
42a.	**Emergency Medical Services**	☐ YES	☐ NO
42b.	**If "YES" to any of the above, has a grant proposal been submitted to any other agency/source for funding for the non-infractructure portion of this project?**	☐ YES	☐ NO
42b.	**If "NO", then explain why other sources have not been explored.**		
42b.	**If "YES", then a copy of the proposal and disapproval must be submitted as an attachment.**		
42c.	**Is a letter attached from the agency department, i.e. PD, implementing this NI element if the agency is different from the "road owner"?**	☐ YES	☐ NO

LOCAL AGENCY LETTERHEAD

November 12, 2018

Ms. Mona Aglan-Swick, P.E.
Traffic Engineering Group, Traffic Safety Section
Arizona Department of Transportation
1615 W. Jackson ST., MD 065R
Phoenix, AZ 85007-3217

RE: Highway Safety Improvement Program (HSIP) Project Determination and Application
COG/MPO:
Agency:
Project Name:
Project Location:

Dear Ms. Aglan-Swick:

The [insert agency name] is submitting herewith a project application for [state or local] Highway Safety Improvement Program (HSIP) funding. This road safety improvement project was identified through the [state or local] network crash data screening process and meets all requirements of Title 23. The proposed request is for the [describe each countermeasure being constructed or the safety item being procured and the limits of the project] and [does/does not] include any non-infrastructure funding request. [Describe how the installation or procurement of this countermeasure will correct or improve the highway safety problem.] [Insert a statement that indicates who is doing the work i.e. City Staff or Contractor]. [Insert a statement that there will or will not be ground distrubing activities or utility relocations anticipated.]

[This paragraph has to identify how many crashes that occurred during the most recent 5-year period that the proposed countermeasure is based on.] [i.e. intersection related pedestrian crashes for pedestrian countdown heads] During the most recent five year period ending xxxxxx 20xx, the City/Town experienced xxx total pederstrian intersection related crashes including xx fatal and xx incapacitating crashes. With a Crash Reduction Factor (CRF) of xx% obtained from the ADOT 4/5 Star [or other ADOT prior approved CRF] list for all pedestrian crashes, the City/Town could see a 5-year reduction of xxx crashes including xx fatal and xx serious injury crashes. [Contact ADOT Traffic Section for this information if you do not have it available.]

[insert agency name] has determined that, in accordance with 23 USC 148(a)(4))(A), this project is consistent with the [COG/MPO's and] State's 2014 SHSP. It supports [insert appropriate emphasis area(s) and supporting strategy for one or both of the SHSPs].
B/C Ratio = xx (Element 41 in Application, Tab 2)
Weighted HSIP Score = xx (Element 41 in Application, Tab 2)

[insert agency name] has estimated the total project cost of this project to be $xxx,xxx. Of that amount request ADOT determine if $xx,xxx is HSIP eligible, with $xx,xxx being non-HSIP eligible, $xx,xxx being local match, and $xxx,xxx being Other funds (if appropriate). In accordance with Title 23, the Federal share for safety improvement items are eligible to be funded at 100% or 94.3% [which is appropriate]Federal share per 23 U.S.C. 120(c) as described in Code of Federal Register 23 CFR Part 924. Therefore, the [insert agency name] does not propose to contribute any local match for the above mentioned project or proposes committing the 5.7% local match in the amount of $XXXX. Furthermore, the [insert agency name] is not requesting reimbursement for staff time for installation. [if applicable] Table x summarizes the anticipated cost estimate projected for this project.

RE: Highway Safety Improvement Program (HSIP) Project Determination and Application
COG/MPO:
Agency:

[insert agency name] is aware that, if funded, additional HSIP funds above the attached estimated cost are not available to pay for excess costs and that other funds whether STP, local or other will have to provided or secured by [insert agency name] to cover the additional costs or the project will have to be withdrawn and resbumitted in the next call-for-projects.

[insert agency name] agrees to conduct and provide to ADOT TSS on a yearly basis a written before-and-after study utilizing the same crash data included in the countermeasure influence area in order to determine the effectiveness of the conuntermeasure on fatal and serious injury crashes.

[insert agency name] further understands that Federal funds can only be used once to install or upgrade either a spot or systemic countermeasure and that once installed, the [insert agency name] will maintain the countermeasure at or above the standard to which it was installed.

If you have any questions, please contact me at XXX-XXX-XXXX or email XXXXXXXX@XXXXXXX.XXX .

Sincerely,

your name & title
your section/department
address
city, state and zip code

Attachments: Application (excel format) to include cost estimate, vicinity map and/or list of locations
Study/RSA Reports
B/C Ratio and Crash Data
Grant Proposal and Non-acceptance Documentation (Non-infrastructure element)

HIGHWAY SAFETY IMPROVEMENT PROGRAM
APPLICATION - COST ESTIMATE

Agency:		Name of Project:	Procurement of Sign Panels - Local Agency Staff Installs					
HSIP Project Cost Estimate Worksheet								
Project Cost Estimate:	**Description:**	**Quantity:**	**Cost (Unit):**	**Total Cost**	**HSIP:**	**Local Match:**	**Other Amt:**	**TOTAL COST**
					100.00%	**0.00%**	**0.00%**	
Planning or Study:		0	$ -	$ -	$ -	$ -	$ -	$ -
Preliminary Engineering:		0	$ -	$ -	$ -	$ -	$ -	$ -
ADOT Admin Costs:		1	**$ 30,000.00**	$ 30,000.00	$ 30,000.00	$ -	$ -	$ 30,000.00
Sub-Total			**$ 30,000.00**	**$ 30,000.00**	**$ 30,000.00**	**$ -**	**$ -**	**$ 30,000.00**
Materials:	RWM Signs (SF)	0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:	Mounting Hardware (ea)	0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials Sub-Total:				$ -	$ -	$ -	$ -	$ -
Sales Tax		**10.00%**		$ -	$ -	$ -	$ -	$ -
Sub-Total			**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Construction Admin :		**14.00%**			$ -	$ -	$ -	$ -
Contingencies :		**5.00%**			$ -	$ -	$ -	$ -
Post Design:		**1.00%**			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
Sub-Total				**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
								$ -
TOTAL REQUEST					**$ 30,000.00**	**$ -**	**$ -**	**$ 30,000.00**

Comments:

ADOT LOCAL HIGHWAY SAFETY IMPROVEMENT PROGRAM
APPLICATION - COST ESTIMATE

Agency:		**Name of Project:**	Procurement of Sign Panels - Contractor Installed					
HSIP Project Cost Estimate Worksheet								
Project Cost Estimate:	**Description:**	**Quantity:**	**Cost (Unit):**	**Total Cost**	**HSIP:**	**Local Match:**	**Other Amt:**	**TOTAL COST**
					100.00%	**0.00%**	**0.00%**	
Planning or Study:		0	$ -	$ -	$ -	$ -	$ -	$ -
Preliminary Engineering:		0	$ -	$ -	$ -	$ -	$ -	$ -
ADOT Admin Costs:		1	**$ 30,000.00**	$ 30,000.00	$ 30,000.00	$ -	$ -	$ 30,000.00
Sub-Total			**$ 30,000.00**	**$ 30,000.00**	**$ 30,000.00**	**$ -**	**$ -**	**$ 30,000.00**
Materials:	RWM Signs (SF)	1000	$ 20.00	$ 20,000.00	$ 20,000.00	$ -	$ -	$ 20,000.00
Materials:	Mounting Hardware (ea)	500	$ 6.00	$ 3,000.00	$ 3,000.00	$ -	$ -	$ 3,000.00
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials:		0	$ -	$ -	$ -	$ -	$ -	$ -
Materials Sub-Total:				$ 23,000.00	$ 23,000.00	$ -	$ -	$ 23,000.00
Traffic Control:		**10.00%**		$ 2,300.00	$ 2,300.00	$ -	$ -	$ 2,300.00
Mobilization:		**10.00%**		$ 2,300.00	$ 2,300.00	$ -	$ -	$ 2,300.00
Sub-Total			**$ -**	**$ 25,300.00**	**$ 25,300.00**	**$ -**	**$ -**	**$ 25,300.00**
Construction Admin :		**14.00%**			$ 3,542.00	$ -	$ -	$ 3,542.00
Contingencies :		**5.00%**			$ 1,265.00	$ -	$ -	$ 1,265.00
Post Design:		**1.00%**			$ 253.00	$ -	$ -	$ 253.00
Communications		**5.00%**			$ 1,265.00	$ -	$ -	$ 1,265.00
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
		0			$ -	$ -	$ -	$ -
Sub-Total					**$ 6,325.00**	**$ -**	**$ -**	**$ 6,325.00**
								$ -
TOTAL REQUEST					**$ 61,625.00**	**$ -**	**$ -**	**$ 61,625.00**

Comments:

Agency:		Name of Project:	Inventory/Procure Regulatory/Warning/Streetname Signs and phased local agency install					
Project Cost Estimate Worksheet								
Project Cost Estimate:	**Description:**	**Quantity:**	**Cost (Unit):**	**Total Cost**	**HSIP:** 100.00%	**Local Match:** 0.00%	**Other Amt:** 0.00%	**TOTAL COST**
Preliminary Engineering:		1	$ 100,000.00	$ 100,000.00	$ 100,000.00	$ -	$ -	$ 100,000.00
ADOT Admin Costs - Phase 1:		1	$ 30,000.00	$ 30,000.00	$ 30,000.00	$ -	$ -	$ 30,000.00
Total Phase 1 - Project Year 1				**$ 130,000.00**	**$ 130,000.00**	**$ -**	**$ -**	**$ 130,000.00**
ADOT Admin Costs-Year 2:		1	$ 30,000.00	$ 30,000.00	$ 30,000.00	$ -	$ -	$ 30,000.00
Materials:	Regulatory Signs	1	$ 50.00	$ 50.00	$ 50.00	$ -	$ -	$ 50.00
Materials:	Mounting Hardware	1	$ 6.00	$ 6.00	$ 6.00	$ -	$ -	$ 6.00
Sub-Total Material Cost - Phase 2				$ 56.00	$ 56.00	$ -	$ -	$ 56.00
Sales Tax:		**10.00%**		$ 5.60	$ 5.60	$	$	$ 5.60
Equipment and Installation Sub-Total Phase 2 - Year 2				$ 61.60	$ 61.60	$ -	$ -	$ 61.60
Construction Admin :		**14.00%**		$ 8.62	$ 8.62	$	$ -	$ 8.62
Contingencies :		**5.00%**		$ 3.08	$ 3.08	$	$ -	$ 3.08
Post Design:		**1.00%**		$ 0.62	$ 0.62	$	$	$ 0.62
Administration Sub-Total Phase 2 - Year 2				$ 12.32	$ 12.32	$ -	$ -	$ 12.32
Total Phase 2 - Project Year 2				**$ 30,073.92**	**$ 30,073.92**	**$ -**	**$ -**	**$ 30,073.92**
ADOT Admin Costs-Year 3:		1	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ -	$ -	$ 15,000.00
Materials:	Regulatory Signs	1	$ 50.00	$ 50.00	$ 50.00	$ -	$ -	$ 50.00
Materials:	Mounting Hardware	1	$ 6.00	$ 6.00	$ 6.00	$ -	$ -	$ 6.00
Sub-Total Material Cost - Phase 3				$ 56.00	$ 56.00	$ -	$ -	$ 56.00
Sales Tax:		**10.00%**		$ 5.60	$ 5.60			$ 5.60
Equipment and Installation Sub-Total Phase 3 - Year 3				$ 61.60	$ 61.60	$ -	$ -	$ 61.60
Construction Admin :		**14.00%**		$ 8.62	$ 8.62	$	$ -	$ 8.62
Contingencies :		**5.00%**		$ 3.08	$ 3.08	$	$ -	$ 3.08

Post Design:		**1.00%**		$ 0.62	$ 0.62			$ 0.62
Administration Sub-Total Phase 3 - Year 3				$ 12.32	$ 12.32	$ -	$ -	$ 12.32
Total Phase 3 - Project Year 3				**$ 15,073.92**	**$ 15,073.92**	**$ -**	**$ -**	**$ 15,073.92**
ADOT Admin Costs-Year 4:		1	**$ 15,000.00**	$ 15,000.00	$ 15,000.00	$ -	$ -	$ 15,000.00
Materials:	Regulatory Signs	1	$ 50.00	$ 50.00	$ 50.00	$ -	$ -	$ 50.00
Materials:	Mounting Hardware	1	$ 6.00	$ 6.00	$ 6.00	$ -	$ -	$ 6.00
Sub-Total Material Cost - Phase 4				$ 56.00	$ 56.00	$ -	$ -	$ 56.00
Sales Tax:		**10.00%**		$ 5.60	$ 5.60	$	$	$ 5.60
Equipment and Installation Sub-Total Phase 4 - Year 4				$ 61.60	$ 61.60	$ -	$ -	$ 61.60
Construction Admin :		**14.00%**		$ 8.62	$ 8.62	$	$ -	$ 8.62
Contingencies :		**5.00%**		$ 3.08	$ 3.08	$	$ -	$ 3.08
Post Design:		**1.00%**		$ 0.62	$ 0.62			$ 0.62
Administration Sub-Total Phase 2 - Year 2				$ 12.32	$ 12.32	$ -	$ -	$ 12.32
Total Phase 4 - Project Year 4				**$ 15,073.92**	**$ 15,073.92**	**$ -**	**$ -**	**$ 15,073.92**
Total Request				**$ 190,221.76**	**$ 190,221.76**	**$ -**	**$ -**	**$ 190,221.76**

ADOT LOCAL HIGHWAY SAFETY IMPROVEMENT PROGRAM
APPLICATION - COST ESTIMATE

Agency:		**Name of Project:**		Procurement of Safety Items not 100% HSIP eligible (no contractor)				
HSIP Project Cost Estimate Worksheet								
Project Cost Estimate:	**Description:**	**Quantity:**	**Unit Cost:**	**Total Cost:**	**HSIP:**	**Local Match:**	**Other Amt:**	**TOTAL COST**
					94.30%	**5.70%**	**0.00%**	
Planning or Study:		0	$ -	$ -	$ -	$ -	$ -	$ -
Preliminary Engineering:		0	$ -	$ -	$ -	$ -	$ -	$ -
Non-Infastructure (NI) Elements:		0	$ -	$ -	$ -	$ -	$ -	$ -
ADOT Admin Costs:		1	$ 30,000.00	$ 30,000.00	$ 28,290.00	$ 1,710.00	$ -	$ 30,000.00
Sub-Total				**$ 30,000.00**	**$ 28,290.94**	**$ 1,710.00**	**$ -**	**$ 30,000.00**
Construction:		0		$ -	$ -	$ -	$ -	$ -
Materials:	Item not 100% HSIP eligible	4000	$ 20.00	$ 80,000.00	$ 75,440.00	$ 4,560.00	$ -	$ 80,000.00
Materials:		0		$ -	$ -	$ -	$ -	$ -
Materials:		0		$ -	$ -	$ -	$ -	$ -
Materials:		0		$ -	$ -	$ -	$ -	$ -
Materials:		0		$ -	$ -	$ -	$ -	$ -
Materials Sub-Total		0		$ 80,000.00	$ 75,440.00	$ 4,560.00	$ -	$ 80,000.00
Sales Tax:		**10.00%**		$ 8,000.00	$ 7,544.00	$ 456.00	$ -	$ 8,000.00
Sub-Total				**$ 88,000.00**	**$ 82,984.00**	**$ 5,016.00**	**$ -**	**$ 88,000.00**
Construction Admin :		**14.00%**		$ 12,320.00	$ 11,617.76	$ 702.24	$ -	$ 12,320.00
Contingencies :		**5.00%**		$ 4,400.00	$ 4,149.20	$ 250.80	$ -	$ 4,400.00
Post Design		**1.00%**		$ 880.00	$ 829.84	$ 50.16	$ -	$ 880.00
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
Sub-Total				**$ 17,600.00**	**$ 16,596.80**	**$ 1,003.20**	**$ -**	**$ 17,600.00**
TOTAL REQUEST				**$ 135,600.00**	**$ 127,871.74**	**$ 7,729.20**	**$ -**	**$ 135,600.00**

Comments:

ADOT LOCAL HIGHWAY SAFETY IMPROVEMENT PROGRAM
APPLICATION - COST ESTIMATE

Agency:			Name of Project:		Spot Improvement with Non-HSIP construction included				
HSIP Project Cost Estimate Worksheet									
Project Cost Estimate:	**Description:**	**Unit**	**Quantity:**	**Unit Cost:**	**Total Cost:**	**HSIP:** 94.30%	**Local Match:** 5.70%	**Other Amt:** 6.03%	**TOTAL COST**
Design:			1	$200,000.00	$ 200,000.00	$ 188,600.00	$ 11,400.00	$ 12,053.30	$ 212,053.30
ROW Acquisition:			1	$ 60,000.00	$ 60,000.00	$ 56,580.00	$ 3,420.00	$ 3,615.99	$ 63,615.99
Environmental Clearance			1	$ 15,000.00	$ 15,000.00	$ 14,145.00	$ 855.00	$ 904.00	$ 15,904.00
ADOT Admin Costs:			1	$ 31,828.00	$ 31,828.00	$ 30,013.80	$ 1,814.20	$ -	$ 31,828.00
Design Sub-Total					**$ 306,828.00**	**$ 289,339.74**	**$ 17,489.20**	**$ 16,573.28**	**$ 323,401.28**
Construction:	Removal of existing structures	EA	1	$ 10,000.00	$ 10,000.00	$ 9,430.00	$ 570.00	$ -	$ 10,000.00
Construction:	Base Course Prep	SY	200	$ 3.00	$ 600.00	$ 565.80	$ 34.20	$ -	$ 600.00
Construction:	Wearing surface	Ton	2,000	$ 100.00	$ 200,000.00	$ 188,600.00	$ 11,400.00	$ -	$ 200,000.00
Construction:	Pavement Marking	LF	3,000	$ 0.50	$ 1,500.00	$ 1,414.50	$ 85.50	$ -	$ 1,500.00
Construction:	Relocate signage	EA	6	$ 150.00	$ 900.00	$ 848.70	$ 51.30	$ -	$ 900.00
Construction:			0		$ -	$ -	$ -	$ -	$ -
HSIP Eligible Sub-Total			0		$ 213,000.00	$ 200,859.00	$ 12,141.00	$ -	$ 213,000.00
Construction:	Base Course Prep	SY	40	$ 2.00	$ 80.00			$ 80.00	$ 80.00
Construction:	Concrete	CY	100	$ 125.00	$ 12,500.00			$ 12,500.00	$ 12,500.00
Consturction:	Install New Signage	EA	8	$ 135.00	$ 1,080.00			$ 1,080.00	$ 1,080.00
Construction:					$ -			$ -	$ -
Non-HSIP Eligible Sub-Total					$ 13,660.00			$ 13,660.00	$ 13,660.00
Construction Sub-Total					$ 226,660.00	$ 200,859.00	$ 12,141.00	$ 13,660.00	$ 226,660.00
Traffic Control:			**10.00%**		$ 22,666.00	$ 20,085.90	$ 1,214.10	$ 1,366.00	$ 22,666.00
Mobilization:			**10.00%**		$ 22,666.00	$ 20,085.90	$ 1,214.10	$ 1,366.00	$ 22,666.00
Construction Sub-Total					$ 271,992.00	$ 241,030.80	$ 14,569.20	$ 16,392.00	$ 271,992.00
Construction Admin :			**14.00%**		$ 38,078.88	$ 35,908.38	$ 2,170.50	$ 2,294.88	$ 40,373.76
Contingencies :			**5.00%**		$ 13,599.60	$ 12,824.42	$ 775.18	$ 819.60	$ 14,419.20
Post Design:			**1.00%**		$ 2,719.92	$ 2,564.88	$ 155.04	$ 163.92	$ 2,883.84
Communications:			**5.00%**		$ 13,599.60	$ 12,824.42	$ 775.18	$ 819.60	$ 14,419.20
					$ -	$ -	$ -	$ -	$ -
Post Sub-Total					$ 67,998.00	$ 64,122.10	$ 3,875.90	$ 4,098.00	$ 72,096.00
Post Const Sub-Total					**$ 339,990.00**	**$ 305,152.90**	**$ 18,445.10**	**$ 20,490.00**	**$ 344,088.00**
TOTAL REQUEST					**$ 667,489.28**	**$ 594,492.64**	**$ 35,934.30**	**$ 37,063.28**	**$ 667,489.28**

Comments:

ADOT LOCAL HIGHWAY SAFETY IMPROVEMENT PROGRAM
APPLICATION - COST ESTIMATE

Agency:		Name of Project:		ADOT State Agencies Use this Form or if project is on a Federal or State Roadway				
HSIP Project Cost Estimate Worksheet								
Project Cost Estimate:	**Description:**	**Quantity:**	**Unit Cost:**	**Total Cost:**	**HSIP:**	**State Match:**	**Other Amt:**	**TOTAL COST**
					94.30%	5.70%	0.00%	
Planning or Study:		0	$ -	$ -	$ -	$ -	$ -	$ -
Preliminary Engineering:		0	$ -	$ -	$ -	$ -	$ -	$ -
Non-Infastructure (NI) Elements:		0	$ -	$ -	$ -	$ -	$ -	$ -
ADOT Admin Costs:		1	$ 30,000.00	$ 30,000.00	$ 28,290.00	$ 1,710.00	$ -	$ 30,000.00
Sub-Total				**$ 30,000.00**	**$ 28,290.94**	**$ 1,710.00**	**$ -**	**$ 30,000.00**
ADOT ICAP:		**10.39%**		$ 3,117.00	$ 2,939.33	$ 177.67		$ 3,117.00
Design Sub-Total				**$ 33,117.00**	**$ 31,230.27**	**$ 1,887.67**		**$ 33,117.00**
Construction:		0		$ -	$ -	$ -	$ -	$ -
Construction:	Item not 100% HSIP eligible	4000	$ 20.00	$ 80,000.00	$ 75,440.00	$ 4,560.00	$ -	$ 80,000.00
Construction:		0		$ -	$ -	$ -	$ -	$ -
Construction:		0		$ -	$ -	$ -	$ -	$ -
Construction:		0		$ -	$ -	$ -	$ -	$ -
Construction:		0		$ -	$ -	$ -	$ -	$ -
Sub-Total		0		$ 80,000.00	$ 75,440.00	$ 4,560.00	$ -	$ 80,000.00
Sales Tax:	(if applicable)	**10.00%**		$ 8,000.00	$ 7,544.00	$ 456.00	$ -	$ 8,000.00
Sub-Total				**$ 88,000.00**	**$ 82,984.00**	**$ 5,016.00**	**$ -**	**$ 88,000.00**
Construction Admin :		**14.00%**		$ 12,320.00	$ 11,617.76	$ 702.24	$ -	$ 12,320.00
Contingencies :		**5.00%**		$ 4,400.00	$ 4,149.20	$ 250.80	$ -	$ 4,400.00
Post Design		**1.00%**		$ 880.00	$ 829.84	$ 50.16	$ -	$ 880.00
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
Post Sub-Total				**$ 17,600.00**	**$ 16,596.80**	**$ 1,003.20**	**$ -**	**$ 17,600.00**
Construction Sub-Total				**$ 105,600.00**	**$ 99,580.80**	**$ 6,019.20**	**$ -**	**$ 105,600.00**
ADOT ICAP:		**10.39%**		$ 10,971.84	$ 10,346.45	$ 625.39		$ 10,971.84
Construction Sub-Total				**$ 116,571.84**	**$ 109,927.25**	**$ 6,644.59**		**$ 116,571.84**
TOTAL REQUEST				**$ 149,688.84**	**$ 141,157.52**	**$ 8,532.26**	**$ -**	**$ 149,689.78**

Comments:

Required for all HSIP Applications

Agency:		Title of Project:	0

Benefit / Cost Ratio Tabulation

Annual Benefit Tabulation

Severity	Annual Average	Estimated CMF* Reduction	Total Reduction	Unit Cost	Annual Benefit
Fatal	**0.50**	**50%**	0.25	$5,800,000	$1,450,000
Incapacitating Injury	**0.00**	**0%**	0.00	$400,000	$0
				Total Annual Benefits	$1,450,000

Costs

Total Project Cost	$3,000,000
Project Life (years)	10
Interest Rate (%)	8%
Capital Recovery Factor	0.1490
Annual Construction Cost	$447,088
Annual Maintenance Cost	$100.00
Total Annual Costs	$447,188

Benefit / Cost

Annual Benefit	Annual cost	Benefit / Cost Ratio
$1,450,000	$447,188	3.2

***REQUIRED: Use 4 and 5 star CMFs from ADOT Lists Only at Tabs 17 - 19 preferred.**

Emphasis_Area
Speeding_and_Aggressive_Driving
Impaired_Driving
Occupant_Protection
Motorcycles
Distracted_Driving
Roadway_Infrastructure_and_Operations
Age_Related
Nonmotorized_Users
Heavy_Vehicles_Buses_Transit
Natural_Risks
Traffic_Incident_Management
Interjurisdictional

Speeding and Aggressive Driving Strategies
Increase highly visible and effective enforcement to reduce the frequency of crashes associated with speeding and aggressive
Institute a statewide speed-management strategic initiative.
Educate all road users about the dangers and consequences of speeding and aggressive driving.
Use engineering design to reduce speeds.
Use crash-related data to target enforcement and public information campaigns.
Utilize marketing efforts, such as a multimedia approach, to educate drivers.

DUI Strategies
Conduct high-visibility impaired-driving enforcement initiatives.
Increase educational efforts for everyone about the dangers and consequences of driving impaired.
Work with the court system to promote policies and practices that result in the imposition of meaningful penalties for impaired-driving convictions.
Partner with employers to suggest policies and procedures aimed at reducing impaired driving by their employees.
Improve public awareness of and access to alternate forms of transportation.
Improve data collection to understand and address impaired driving more effectively.
Treat alcohol and drug dependency of DUI offenders.

Occupant Protection Strategies
Couple enhanced enforcement of existing restraint-use laws with high-visibility marketing about enforcement efforts.
Strengthen outreach and education about the proper use of seat belts and child-restraint devices to identified target audiences.
Strengthen driver education and safety-restraint-usage outreach to identified target audiences.
Improve restraint-usage data collection, integration, analysis and sharing between agencies at all levels.
Research and identify effective policies to increase restraint usage that can be implemented by state, local and tribal governments.
Promote employer engagement in efforts to encourage restraint usage 100 percent of the time.

Motorcycle Strategies
Improve public awareness, education and training for motorcyclists, motorists and all safety stakeholders to promote safer driving behaviors.
Research, identify and implement effective policies to improve motorcycle safety at the state, local and tribal government levels.
Enhance rider training programs to improve motorcycle safety.
Develop and execute enforcement programs to improve motorcycle safety.
Improve infrastructure features to help reduce the number and severity of motorcycle crashes.
Improve motorcycle crash, registration and licensing data collection, integration, analysis and sharing between agencies at all levels.
Seek funding to support motorcycle-related safety projects and programs.

Distracted Drivers
Increase enforcement of existing laws to reduce distracted-driving-related crashes.
Conduct aggressive public information campaigns to discourage all forms of distracted driving.
Encourage using technology to eliminate using cell phones, other mobile devices and texting while driving.
Improve data collection and reporting for distracted-driving crashes.
Research and identify effective policies to discourage all forms of distracted driving that can be implemented by state, local and tribal governments.
Improve infrastructure and roadways to reduce the number and severity of crashes resulting from distracted driving.

Roadway Infrastructure and Operations
(Intersections) Reduce frequency and severity of intersection crashes through traffic-control and operational improvements.
(Intersections) Implement speeding and red-light-running enforcement efforts.
(Intersections) Reduce frequency and severity of intersection crashes through geometric improvements.
(Railroad Crossings) Implement programs that create safety partnerships between railroads and state and local agencies.
(Railroad Crossings) Make engineering and infrastructure improvements to increase safety at railroad crossings.
(Railroad Crossings) Increase public education about safe railroad crossing.
(Railroad Crossings) Utilize railroad-crossing safety enforcement techniques.
(Lane/Roadway Departure) Reduce the frequency and severity of land- and roadway-departure crashes through roadway infrastructure improvements.
(Lane/Roadway Departure) For vehicles that run off the road for any reason, minimize the potential for overturning or colliding with another object.
(Lane/Roadway Departure) Increase public education on corrective roadway-departure driving techniques.
(Lane/Roadway Departure) Research and evaluate the impact of recent vehicle technology improvements relating to the frequency and severity of crashes to better assess potential policy changes.

Age_Related
(Older Driver) Enhance license testing and renewal for older drivers (requires review and possible revision of ADOT policies and processes).
(Older Driver) Require re-education of older drivers and periodic updates (requires review and possible revision of ADOT policies and processes).
(Older Driver) Strengthen reporting and referral of drivers with reduced skills by doctors, law-enforcement officers, emergency responders and others (requires review and possible revision of ADOT policy and processes).
(Older Driver) Increase awareness about, and availability of, alternative transportation options.
(Older Driver) Make engineering and infrastructure improvements and enhancements to roadways.
(Older Driver) Promote insurance and other incentives for safe driving.
(Older Driver) Improve or enhance technology and vehicle engineering.
(Older Driver) Make use of other potential data sources to improve data collection on older drivers.
(Older Driver) Strengthen laws to protect older drivers.
(Young Driver) Strengthen driver education.
(Young Driver) Strengthen provisions and policies for graduated driver license (GDL).
(Young Driver) Strengthen driver license testing (written and road tests).
(Young Driver) Enhance outreach campaigns to young drivers and their families about safe driving behavior and programs.
(Young Driver) Strengthen enforcement of GDL restrictions and compliance with GDL terms and conditions.

(Young Driver) Promote stronger parental/guardian education and engagement in the licensure process for young drivers.
(Young Driver) Promote technology monitoring young-driver behavior.
(Young Driver) Improve data collection, integration, analysis and sharing at all levels.
(Young Driver) Make engineering and infrastructure improvements and enhancements to roadways.

Nonmotorized_Users
(Bicyclists) Improve public awareness to promote safer behavior by all roadway users relative to bicycle traffic.
(Bicyclists) Improve infrastructure features to reduce the frequency of bicycle crashes.
(Bicyclists) Conduct enforcement programs for all roadway users relative to bicycle traffic.
(Bicyclists) Enhance training programs for all roadway users and safety practitioners.
(Bicyclists) Improve data collection, integration, analysis and sharing at all levels.
(Bicyclists) Seek funding to support safety programs to improve bicycle safety.
(Bicyclists) Research and identify effective policies to improve bicycle safety that can be implemented by state, local and tribal governments.
(Pedestrians) Reduce pedestrian exposure to vehicle traffic.
(Pedestrians) Improve sight distance and/or visibility between motor vehicles and pedestrians.
(Pedestrians) Increase enforcement of existing laws designed to promote pedestrian safety, such as jaywalking and vehicles failing to stop for pedestrians at pedestrian crossings.
(Pedestrians) Increase pedestrian-safety education for all roadway users.
(Pedestrians) Reduce vehicle speeds in predictable locations, such as areas of high pedestrian traffic and school bus stops.
(Pedestrians) Utilize the Safe Routes to School Program.

Heavy_Vehicles/Buses/Transit
Identify and improve infrastructure and operational characteristics on Arizona's roadways.
Use engineering to reduce fatigue-related heavy-vehicle crashes on Arizona's roadways.
Improve enforcement-related efforts for heavy vehicles.
Strengthen commercial driver license program to enhance the testing process and the skill sets of heavy-vehicle operators on Arizona's roadways.
Increase knowledge about "sharing the road" with heavy vehicles for all roadway users.
Improve and enhance truck-safety data.
Increase development and execution of educational programs and information sharing to all roadway users regarding heavy vehicles.
Improve maintenance of heavy vehicles to reduce the frequency of heavy-vehicle crashes caused by equipment failure.
Promote industry safety initiatives.
Utilize connected vehicle technology in commercial vehicles.

Natural_Risks
(Weather) Advance the use of detection and warning systems to reduce the frequency and severity of weather-related crashes.
(Weather) Increase proactive driver awareness of weather-related safety procedures to reduce the frequency and severity of weather-related crashes.
(Weather) Develop corridor or area-wide programs to address locations with a high number of weather-related crashes.
(Weather) Alter the state of roadway devices to permit or restrict traffic flow to reduce weather-related crashes.
(Weather) Develop and implement comprehensive enforcement programs focused on weather-related crashes.
(Weather) Improve data collection and analysis of weather-related incidents to better determine crash causes.
(Weather) Utilize infrastructure improvements to reduce the number and severity of crashes caused by weather incidents.
(Wildlife/Animal) Implement comprehensive infrastructure improvements and maintenance to separate animals from the roadway while improving and maintaining wildlife connectivity.
(Wildlife/Animal) Enhance wildlife planning through research, planning and collaboration.
(Wildlife/Animal) Increase driver awareness to reduce the frequency of animal-involved crashes.
(Wildlife/Animal) Improve the collection and quality of data for a better understanding of animal-involved crashes.
(Wildlife/Animal) Utilize technology to reduce animal-involved incidents.
(Wildlife/Animal) Advance research in wildlife-crash-reduction programs and their effectiveness to reduce or eliminate wildlife-involved crashes.
(Wildlife/Animal) Reduce the number of animals on the roadway to reduce the frequency of animal-involved crashes.

(Wildlife/Animal) Explore opportunities to manage speed limits in animal-prone areas to reduce the number and severity of animal-involved crashes.
(Wildlife/Animal) Utilize infrastructure improvements to reduce or eliminate animal-involved crashes on Arizona’s roadways.
(Wildlife/Animal) Better utilize existing funding options, and explore new funding opportunities for effective mitigation efforts to reduce or eliminate animal-involved crashes on Arizona’s roadways.
(Wildlife/Animal) Explore local ordinance opportunities to reduce animal-involved crashes on Arizona’s roadways.

Traffic_Incident_Management
(Secondary Crashes) Develop cross-cutting TIM programs that include training, public education, research, evaluation and application of technology.
(Secondary Crashes) Develop and implement practices, policies and public education efforts to increase TIM responder safety.
(Secondary Crashes) Develop and implement procedures that achieve safe and quick incident clearance.
(Secondary Crashes) Develop and implement prompt and reliable communications systems that support TIM.
(Work Zones) Develop and improve work-zone design and management practices.
(Work Zones) Improve driver compliance with work-zone traffic controls.
(Work Zones) Increase knowledge and awareness of work zones and work-zone safety.

Interjurisdictional
Coordinate and promote interjurisdictional cooperation and practices throughout Arizona.
Improve data collection, integration, analysis and sharing at all levels.
Develop interjurisdictional methods and agreements to improve rural road infrastructure.
Assist regions and tribal governments in evaluating safety data, identifying priorities and developing projects.
Prioritize research funding to support implementation of the SHSP.
Review and provide recommendations to ADOT on the HSIP allocation process; work with ADOT to incorporate future performance measures and targets into the HSIP upon announcement of the final MAP-21 ruling.
Work with ADOT to incorporate data-driven strategies from local, regional and tribal safety plans into the HSIP.
Coordinate engineering and operational efforts across jurisdictions.

Proven_Countermeasure
Backplates with Retroreflective Borders
Corridor Access Management
Enhanced Delineation and Friction for Horizontal Curves
Longitudinal Rumble Strips and Stripes on Two-Lane Roads
Medians and Pedestrian Crossing Islands in Urban and Suburban Areas
Pedestrian Hybrid Beacon
Road Diet
Roundabouts
Safety Edge

County	COG/MPO	Focus Area	Cost Estimate Tab
Apache	CAG	Roadway Lane Departure	4. 100% LPA Install
Cochise	CYMPO	Intersection	5. 100% Contract Install
Coconino	FMPO	Pedestrian	6. Phased Cost Est.
Gila	LHMPO		7. 94.3% Cost Estimate
Graham	MAG		8. 94.3% Spot Improvement
Greenlee	NACOG		
LaPaz	PAG		
Maricopa	SCMPO		
Mohave	SEAGO		
Navajo	SVMPO		
Pima	WACOG		
Pinal	YMPO		
Santa Cruz			
Yavapai			
Yuma			

ADOT Districts	HSIP_Functional_Classification
Flagstaff	Rural Principal Arterial - Interstate
Globe	Rural Principal Arterial - Other
Holbrook	Rural Minor Arterial
Kingman	Rural Major Collector
Phoenix Maintenance	Rural Minor Collector
Prescott	Rural Local Road or Street
Safford	Urban Principal Arterial - Interstate
Tucson	Urban Principal Arterial - Other Freeways and Expressways
Yuma	Urban Principal Arterial - Other
Statewide	Urban Minor Arterial
	Urban Major Collector
	Urban Minor Collector
	Urban Local Road or Street
	Other

HSIP Improvement Category	Access Management
Access_Management	Access management - other
Advanced _Technology_and_ITS	Change in access – close or restrict existing access
Alignment	Change in access – miscellaneous/unspecified
Animal_Related	Grassed median - extend existing
Interchange_Design	Median crossover - close crossover
Intersection_Geometry	Median crossover - directional crossover
Intersection_Traffic _Control	Median crossover - relocate existing
Lighting	Median crossover - unspecified
Miscellaneous	Raised island - install new
Non_Infrastructure	Raised island - modify existing
Parking	Raised island - remove existing
Pedestrians_and_Bicyclists	Raised island – unspecified
Railroad_Grade_Crossings	
Roadside	
Roadway	
Roadway_Delineation	
Roadway_Signs_and_Traffic_Control	
Shoulder_Treatments	
Speed_Management	
Work_Zone	

Advanced _Technology_and_ITS	Alignment
Congestion detection / traffic monitoring system	Alignment - other
Dynamic message signs	Horizontal curve realignment
Over height vehicle detection	Horizontal and vertical alignment
	Vertical alignment or elevation change

Animal_Related	Interchange_Design
Animal related	Acceleration / deceleration / merge lane
	Convert at-grade intersection to interchange
	Extend existing lane on ramp
	Improve intersection radius at ramp terminus
	Installation of new lane on ramp
	Interchange design - other
	Ramp closure
	Ramp metering

Intersection_Geometry
Auxiliary lanes – add acceleration lane
Auxiliary lanes – add acceleration lane
Auxiliary lanes – add auxiliary through lane
Auxiliary lanes – add left-turn lane
Auxiliary lanes – add right-turn lane
Auxiliary lanes – add right-turn lane (free-flow)
Auxiliary lanes – add slip lane
Auxiliary lanes – add two-way left-turn lane
Auxiliary lanes – extend acceleration/deceleration lane
Auxiliary lanes – extend existing left-turn lane
Auxiliary lanes – extend existing right-turn lane
Auxiliary lanes – miscellaneous/other/unspecified
Auxiliary lanes – modify acceleration lane
Auxiliary lanes – modify auxiliary through lane
Auxiliary lanes – modify free-flow turn lane
Auxiliary lanes – modify left-turn lane offset
Auxiliary lanes – modify right-turn lane offset
Auxiliary lanes – modify turn lane storage
Auxiliary lanes – modify turn lane taper
Auxiliary lanes – modify two-way left-turn lane
Intersection geometrics – miscellaneous/other/unspecified
Intersection geometrics – modify intersection corner radius
Intersection geometrics – modify skew angle
Intersection geometrics – realignment to align offset cross streets
Intersection geometrics – realignment to increase cross street offset
Intersection geometrics – re-assign existing lane use
Intersection geometry - other
Splitter island – install on one or more approaches
Splitter island – remove from one or more approaches
Splitter island – unspecified
Through lanes – add additional through lane

Intersection_Traffic_Control
Intersection flashers – add “when flashing” warning sign-mounted
Intersection flashers – add advance emergency vehicle warning sign-mounted
Intersection flashers – add advance heavy vehicle warning sign-mounted
Intersection flashers – add advance intersection warning sign-mounted
Intersection flashers – add miscellaneous/other/unspecified
Intersection flashers – add overhead (actuated)
Intersection flashers – add overhead (continuous)
Intersection flashers – add stop sign-mounted
Intersection flashers – modify existing
Intersection flashers – remove existing
Intersection signing – add basic advance warning
Intersection signing – add enhanced advance warning (double-up and/or oversize)
Intersection signing – add enhanced regulatory sign (double-up and/or oversize)
Intersection signing – miscellaneous/other/unspecified
Intersection signing – relocate existing regulatory sign
Intersection traffic control - other
Modify control – all-way stop to roundabout
Modify control – modifications to roundabout
Modify control – no control to roundabout
Modify control – no control to two-way stop
Modify control – remove right-turn yield
Modify control – reverse priority of stop condition
Modify control – traffic signal to roundabout
Modify control – two-way stop to all-way stop
Modify control – two-way stop to roundabout
Modify control – two-way yield to two-way stop
Pavement Markings – add advance signal ahead
Pavement markings – add advance stop ahead
Pavement markings – add dashed edge line along mainline
Pavement markings – add lane use symbols
Pavement markings – add stop line
Pavement markings – add yield line
Pavement markings – miscellaneous/other/unspecified
Pavement markings – refresh existing pavement markings
Modify traffic signal – add additional signal heads
Modify traffic signal – add backplates
Modify traffic signal – add backplates with retroreflective borders
Modify traffic signal – add closed loop system
Modify traffic signal – add emergency vehicle preemption
Modify traffic signal – add flashing yellow arrow
Modify traffic signal – add long vehicle detection
Modify traffic signal – add railroad preemption
Modify traffic signal – add wireless system
Modify traffic signal – miscellaneous/other/unspecified

Modify traffic signal – modernization/replacement
Modify traffic signal – modify signal mounting (spanwire to mast arm)
Modify traffic signal – remove existing signal
Modify traffic signal – replace existing indications (incandescent-to-LED and/or 8-to-12 inch dia.)
Modify traffic signal timing – left-turn phasing (permissive to protected/permissive)
Modify traffic signal timing – left-turn phasing (permissive to protected-only)
Modify traffic signal timing – adjust clearance interval (yellow change and/or all-red)
Modify traffic signal timing – general retiming
Modify traffic signal timing – signal coordination
Systemic improvements – signal-controlled
Systemic improvements – stop-controlled

Lighting	Miscellaneous
Continuous roadway lighting	Miscellaneous
Intersection lighting	
Lighting - other	
Site lighting – horizontal curve	
Site lighting – intersection	
Site lighting – interchange	
Site lighting – pedestrian crosswalk	

Non-Infrastructure	Parking
Educational efforts	Modify parking
Enforcement	Parking - other
Data/traffic records	Remove parking
Non-infrastructure - other	Restrict parking
Outreach	Truck parking facilities
Road safety audits	
Training and workforce development	
Transportation safety planning	

Pedestrians_and_Bicyclists	Railroad_Grade_Crossing
Crosswalk	Grade separation
Install new "smart" crosswalk	Model enforcement activity
Install new crosswalk	Protective devices
Install sidewalk	Railroad grade crossing gates
Medians and pedestrian refuge areas	Railroad grade crossing signing
Miscellaneous pedestrians and bicyclists	Railroad grade crossings - other
Modify existing crosswalk	Surface treatment
Pedestrian beacons	Upgrade railroad crossing signal
Pedestrian bridge	Widen crossing for additional lane
Pedestrian signal	
Pedestrian signal - audible device	
Pedestrian signal – Pedestrian Hybrid Beacon	
Pedestrian signal - install new at intersection	
Pedestrian signal - install new at non-intersection location	
Pedestrian signal - modify existing	
Pedestrian signal - remove existing	
Pedestrian warning signs - add/modify flashers	
Pedestrian warning signs – overhead	

Roadside
Barrier end treatments (crash cushions, terminals)
Barrier transitions
Barrier - cable
Barrier - concrete
Barrier- metal
Barrier - other
Barrier - removal
Curb or curb and gutter
Drainage improvements
Fencing
Removal of roadside objects (trees, poles, etc.)
Roadside grading
Roadside - other

Roadway
Install / remove / modify passing zone
Pavement surface – high friction surface
Pavement surface - miscellaneous
Roadway narrowing (road diet, roadway reconfiguration)
Roadway - other
Roadway - restripe to revise separation between opposing lanes and/or shoulder widths
Roadway widening - add lane(s) along segment
Roadway widening - curve
Roadway widening - travel lanes
Rumble strips - center
Rumble strips – edge or shoulder
Rumble strips - transverse
Rumble strips – unspecified or other
Superelevation / cross slope

Roadway_Delineation	Roadway_Signs_and_Traffic_Control
Improve retroreflectivity	Curve-related warning signs and flashers
Longitudinal pavement markings - new	Sign sheeting – upgrade or replacement
Longitudinal pavement markings - remarking	Roadway signs and traffic control - other
Delineators post-mounted or on barrier	Roadway signs (including post) – new or updated
Raised pavement markers	
Roadway delineation - other	

Shoulder_Treatments	Speed_Management
Widen shoulder – paved or other	Modify speed limit
Pave existing shoulders	Radar speed signs
Shoulder grading	Speed detection system / truck warning
Shoulder treatments - other	Speed management - other
	Traffic calming feature

Work_Zone

Work Zone

LOCAL AGENCY LETTERHEAD

11/12/2018

Mr. Louis Malloque
Right of Way Agent III
ADOT Right of Way Group – Project Management
Arizona Department of Transportation
205 South 17th Avenue, MD 612E
Phoenix, AZ 85007-3212
(602) 712-8755
LMalloque@azdot.gov

RE: **TIP No.:**

ADOT Project No.:

Federal Project No.:

ADOT FY **Highway Safety Improvement Program (HSIP) - Regionally Managed Gove**

Right of Way Clearance and Certification

0

0

Dear Mr. Malloque,

This project consists of …… All work is to be done within the City/Town/County of XXXXX public right of way. easements are needed to do the work necessary for this project.

All procurement costs are to be funded with federal Highway Safety Improvement Program (HSIP) funds program native ground disturbing activities are anticipated. (TIP Number) provides the City/Town/County with $XXX,XXX in match is required. All installation costs will be borne by the City/Town/County of XXXXX.

Attached please find the required certification to clear the right of way so this project can proceed. Your review and respectively requested.

RE: **TIP No.:**

ADOT Project No.:

Federal Project No.:

ADOT FY **Highway Safety Improvement Program (HSIP) - Regionally Managed Gover**

Right of Way Clearance and Certification

0

If you have any questions, please contact me at XXX-XXX-XXXX or by email at XXXXXX .

Sincerely,

your name & title
your section/department
address
city, state and zip code

CC: XXXXX, HSIP Local Gov't Program Manager
XXXXX, Urban/Statewide Project Manager

Attachments: HSIP Right of

rnment Project

No additional rights of way or

med for Fiscal Year 20XX. No
HSIP federal funds and no local

d approval of this finding is

rnment Project

Way Certification

HSIP RIGHT OF WAY CERTIFICATION

Project:

Name of Project:

Location:

The County/City/Town of _____ hereby certifies in connection with the r
_____ that:

All required right of way for construction of this project has now been acquired, or is covered by Right
Immediate Possession, except as noted in Certificate, as set forth in detail below:

1. STATUS OF NEW RIGHT OF WAY:

a.	Total number of parcels required	
b.	Parcels acquired by purchase	
b1.	Amount of Federal dollars spent on acquisition	$ -
b2.	Amount of Local dollars spent on acquisition	$ -
c.	Parcels acquired by dedication	
d.	Parcels covered by Right of Entry	
e.	Parcels covered by Order of Immediate Possession	

2. RIGHT OF WAY ACQUIRED FOR OTHER PURPOSES:

Was any right of way not included above acquired since January 1, 1971?

Yes_____ No_____

(If answer is "Yes", attach a statement listing each such parcel indicating the date and how it was

HSIP RIGHT OF WAY CERTIFICATION

Project:

Name of Project:

Location:

3. SCHEDULE FOR REMOVAL OF IMPROVEMENTS AND OBSTRUCTION:

Initial one (1) statement below:

a. No improvements or obstructions are involved. **N/A**

b. Removal of improvements and obstructions is included in the State's construction contract. _____

c. Improvements and obstructions will be removed by City/County forces or by separate contract prior to _____. _____
(Date)

(If "c" is checked, attach detailed list with schedule of their removal)

4. <u>PARCEL INVENTORY</u>:

Attached hereto is an inventory listing each parcel required for this project. The listing shows parcel number, name of owner, interest acquired, or to be acquired, and status of acquisition (acquired, Right of Entry, Order of Immediate Possession, or other). **N/A**

HSIP RIGHT OF WAY CERTIFICATION

Project:

Name of Project:

Location:

5. COMPLIANCE WITH RELOCATION ASSISTANCE AND PAYMENTS PROVISIONS OF FEDER

Initial one (1) of the following two (2) statements:

a. No families or businesses are being displaced. N/A

b. Provisions of 49CFR PART 24 relating to assistance for displaced families and businesses are being complied with.

(If there are displacements, initial "b" and complete the schedule below)

1. Number of dwellings displaced: _____

a. Owner-occupied _____

b. Rental units _____

2. Number of other displacements: _____

a. Businesses displaced _____

b. Farm operations displaced _____

c. Non-profit organizations displaced _____

CERTIFICATE

This project may now be certified as conforming to one of the Statement Nos. (1, 2, 3, 4)

Please initial number 5 verifying all laws were followed.

1. All necessary rights of way have been acquired including legal and physical possession. _____

2. Although all necessary rights of way have not been fully acquired, the right to occupy and to use all rights of way required for the proper execution of the project has been acquired. _____

HSIP RIGHT OF WAY CERTIFICATION

Project:

Name of Project:

Location:

3. The circumstances with respect to acquisition or right of occupancy And use of a few parcels warrant proceeding with the advertisement of bids on the basis it will be in the best public interest to do so in advance of completion of the acquisition of the rights of the said few parcels. _____

4. No new right of way required. All existing right of way was obtained prior to January 2, 1971. _____

5. We certify all applicable state and Federal rules and regulations including the Uniform Act has been complied with. **Please initial here >>>>>>>>>>** _____

County/City: _____

Title: _____

By: _____
(Please Print Name)

Signature: _____

Date: _____

ight of way for

of Entry or Order of

s acquired)

AL AND STATE LAW:

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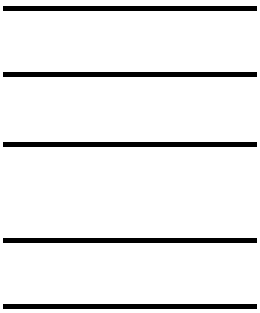
below:



LOCAL AGENCY LETTERHEAD

11/12/2018

Mr. Muhammad Saleque, PE
ADOT Utilities and Railroad Engineering Section
MAG Utility Coordinator Supervisor
Arizona Department of Transportation
205 South 17th Avenue, MD 618E
Phoenix, AZ 85007-3212
(602) 712-6228
MSaleque@azdot.gov

RE: **TIP No.:**

ADOT Project No.:

Federal Project No.:

ADOT FY **Highway Safety Improvement Program (HSIP) - Regionally Managed Go**

Utility Clearance Letter

0

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Dear Mr. Saleque,

This project consists of ..…… Due to the nature of the proposed work on this project no utility conflicts are

All work is to be done within the City/Town/County of XXXXX public right of way. All procurement costs are to b
Safety Improvement Program (HSIP) funds programmed for Fiscal Year 20XX. No native ground disturbing ac
Number) provides the City/Town/County with $XXX,XXX in HSIP federal funds and no local match is required.
by the City/Town/County of XXXXX.

With respect to utilities, this project to procure XXXXX can be released for bid when ready to do so. Your revie
respectively requested.

RE: **TIP No.:**

ADOT Project No.:

Federal Project No.:

ADOT FY **Highway Safety Improvement Program (HSIP) - Regionally Managed Go**

Utility Clearance Letter

0

If you have any questions, please contact me at XXX-XXX-XXXX or by email at XXXXXX .

Sincerely,

your name & title
your section/department
address
city, state and zip code

CC: XXXXX, HSIP Local Gov't Program Manager
XXXXX, Urban/Statewide Project Manager

Attachments: Vicinity map a

›vernment Project

anticipated.

e funded with federal Highway
tivities are anticipated. (TIP
All installation costs will be borne

w and approval of this finding is

›vernment Project

nd/or list of locations

LOCAL AGENCY LETTERHEAD

11/12/2018

Ms Patricia Hunter, RLA
Environmental Planning Group
Arizona Department of Transportation
1611 West Jackson Street, MD EM02
Phoenix, AZ 85007-3212
(602) 712-6895
PHunter@azdot.gov

RE: **ADOT FY** **Highway Safety Improvement Program (HSIP) - Regionally Managed Go**
Federal Project No.:
ADOT Project No.:
TIP No.:
Environmental Clearance Letter
0

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Dear Ms. Hunter

The City /Town/County of XXXXX has determined that this project meets the criteria of a Group One Categoric CFR 771.117(c) and the Arizona Programmatic Categorical Exclusion.

The scope of this project consists of purchasing of traffic signal equipment that will then be installed by City forc City of XXXXX. The installation by City/Town/ County forces will not involve any federal funding. The traffic sig pedestrian countdown heads. See the attachment map (or summary table) for the locations that they will be ins installed in existing housing that are on the existing poles. There will be no native ground disturbance as a resu rights-of-way or temporary construction easements planned or required.

Due to the nature of this project's scope of work, there are no hazardous materials concerns present and no efl species. The project will have no potential to affect historic properties, as it will not result in any ground disturbi atmospheric effects. Hence the finding that this project is consistent with the Group I CE parameters as definec Agreement between Arizona Division of FWHA and the ADOT Environmental Planning Group.

If you have any questions, please contact me at XXX-XXX-XXXX or by email at XXXXXX .

RE: **ADOT FY** **Highway Safety Improvement Program (HSIP) - Regionally Managed Go**
Federal Project No.:
ADOT Project No.:
TIP No.:
Environmental Clearance Letter
0

Sincerely,

your name & title
your section/department
address
city, state and zip code

CC: XXXXXX, HSIP Local Gov't Program Manager
XXXXX, Urban/Statewide Project Manager

Attachments: Vicinity map a

›overnment Project

al Exclusion in accordance with 23

ces at various locations within the
nal equipment consists of 154 new
talled. The new heads will be
ult of this project. There are no

fect to threatened or endangered
ing or in any visual, auditory, or
l by Item 15 in the 2010 Operating

nd/or list of locations

USE THIS TABLE TO CALCULATE "WEIGHTED S

SYSTEMIC AND SITE SPECIFIC

FHWA FOCUS AREAS

	SHSP Top Focus Emphasis Areas				
	Speed	**Impair ment**	**Un-restrained**	**MC**	**Distracted**
	Speed Limits			HF	Rumble Strips
	Traffic Calming			Barrier Design	
	Variable Speed Limits			Shoulders	
	Safety Corridors			Roundabouts	
				Left Turn Phasing	
INDICATE SHSP EMPHASIS AREA with "x" (Max 3) →		**X**			
	0	14	0	0	0
K+A % from SHSP	73	55	75	30	37
K+A WGT: 14	18	14	19	8	9
B/C Ratio: **3.20**					
Weighted Score: **17.2**					

This worksheet is used to calculate the weighted

http://azdot.gov/about/transportati

CORE" BY COMBINING B/C RATIO AND IDENTIFIED SHSP EMPHASIS AREAS INCLUDED

Road Departure	Intersection				Pedestrian		
Lane Departure	Intersection	YOUNG Driver	OLD Driver	BIKES	PED	WEATHER	Work Zone
Rumble Strips	Signal Timing		Delineation	Bike Facilities	Mid-Block Crossings	Storm Detection	Include Bikes and Peds in WZTC
Delineation	Left Turn Phasing		Signing, Lighting	Traffic Calming	MUTCD Ped Timing	DMS Notices	4e TM Plans
Signing	Clearance Times			Bike Friendly Rumble Strips	Countdown Signals	Signal Timing Plans	Temporary Rumble Strips
Shoulders	Dilemna Zone Detection			Bike Boulevards	Bus Stop Locations	HF	
Speed Limits	Roundabouts			Signing Striping	ADA	Shoulders	
Flatten Side Slopes	R/R Preemption			Bike Ways	PHB (Hawk)	Pull Outs	
Clear Zone	R/R Siging, Marking, Lighting			Crossing Treatments	Lighting	ITS detection	
Barrier					Speed Limits		
					Traffic Calming		
0	0	0	0	0	0	0	0
85	67	68	33	12	25	10	6
21	17	17	8	3	6	3	2

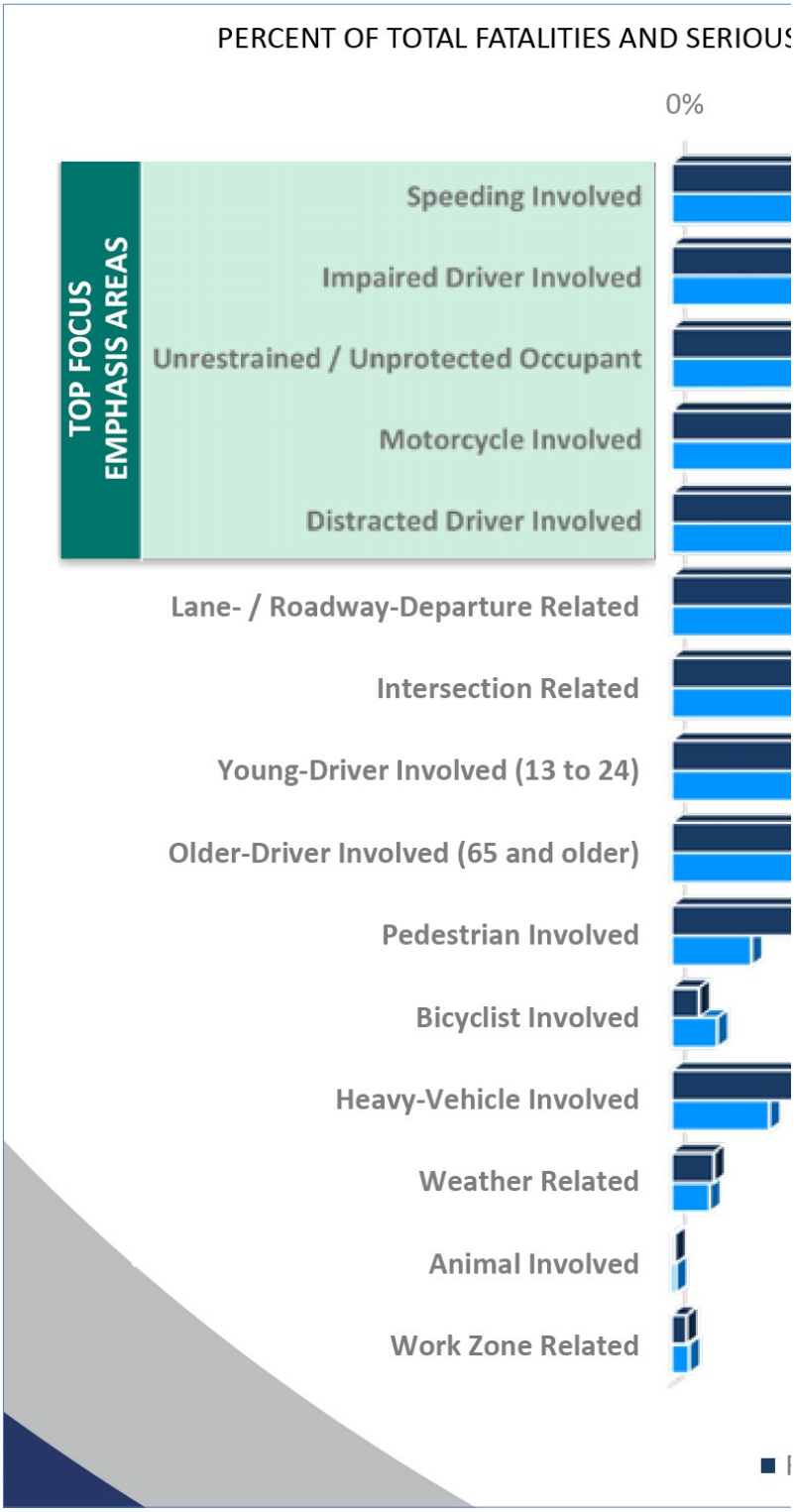
project score utilizing the SHSP emphasis areas identified in Question 34, 34b, and 34d from the Application, T

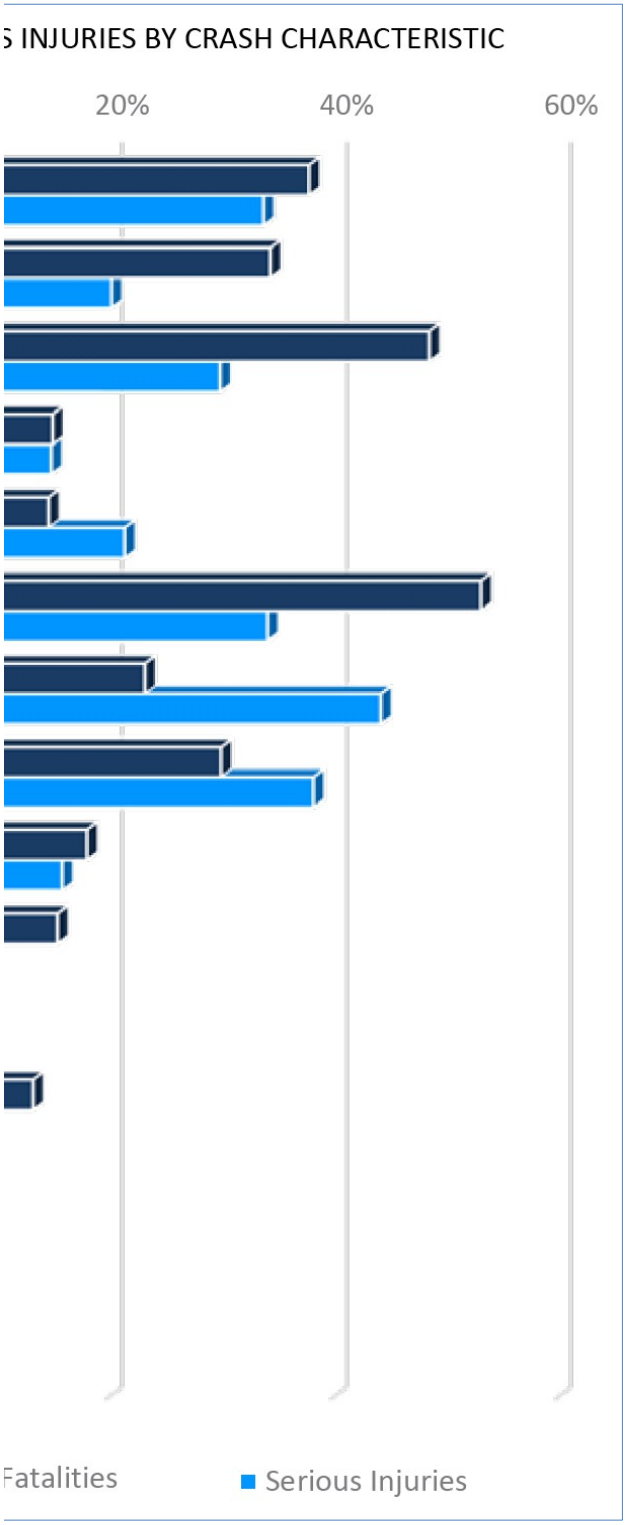
on-safety/arizona-strategic-highway-safety-plan

IN PROJECT

TRUCKS	ANIMAL
Rumble Strips	HF
	Speed Enforcement
	Crossings
	Active Warning Systems
	Signage
	Fencing
	Cattle Guards
0	0
25	4
6	1

ab 2.




S INJURIES BY CRASH CHARACTERISTIC
20%
40%
60%
Fatalities
Serious Injuries

Countermeasure Category
Access management
Advanced technology and ITS
Alignment
Delineation
Highway lighting
Intersection geometry
Intersection traffic control

On-street parking

Roadside

Roadway

Shoulder treatments

Signs

Speed management

Work zone
Total Result

Countermeasure	Count - Countermeasure
	9
Convert an open median to a	3
Decrease freeway ramp spaci	1
Increase intersection median	3
Install raised median	1
Provide a raised median	1
	7
Implement automated speed	1
Implement mobile speed cam	2
Install automated section sp	1
Install automated speed came	1
Install red-light camera (red l	1
Install red-light cameras at in	1
	1
Increase in horizontal curvatu	1
	24
Install wider edgelines (4 in to	5
Install wider markings and bo	1
Install wider markings and ed	6
Install wider markings and sh	4
Install wider markings with re	7
Install wider markings WITHO	1
	4
Full to partial interchange ligh	1
Illumination	2
Provide intersection illuminat	1
	33
Conversion of intersection in	1
Conversion of intersection in	1
Conversion of signalized inter	1
Conversion of stop-controlled	2
Conversion of two-way stop-c	1
Convert high-speed rural inter	2
Convert high-speed rural inte	1
Convert signalized intersecti	9
Convert to roundabout	1
Convert unsignalized intersec	1
Painted channelization of bot	1
Physical channelization of bo	1
Provide a left-turn lane on b	4
Provide a left-turn lane on o	5
Provide a right-turn lane on	2
	14
Change left-turn phase from p	1
Change permissive left-turn p	1
Changing left turn phasing on	1

Changing left turn phasing on	1
Convert minor-road stop cont	1
Convert two-way (without fla	1
Improve signal visibility, inclu	2
Improve visibility of signal he	1
Install a traffic signal	2
Install dynamic signal warning	1
Installation of an actuated a	1
Replace Night-Time Flash wit	1
	3
Prohibit on-street parking	3
	6
Change barrier along embank	1
Flatten sideslope from 1V:3H	1
Flatten sideslope from 1V:4H	1
Install any type of median bar	1
New guardrail along embank	2
	44
Convert traditional mainline t	1
Implement truck lane restrict	2
Implement truck lane restricti	2
Implement truck lane restrict	2
Implement truck lane restrict	1
Install centerline and shoulde	1
Install centerline rumble strip	10
Install centerline rumble strip	3
Install centerline rumble strip	4
Install edgeline rumble strips	2
Install edgeline rumble strips	2
Install periodic passing lanes	2
Install rectangular shaped cer	1
Install transverse rumble strip	4
Install TWLTL (two-way left tu	4
Introduce TWLTL (two-way lef	1
Removing mainline barrier tol	1
Resurface pavement	1
	35
Install shoulder rumble strips	20
Install shoulder rumble strips	1
Install shoulder rumble strips	1
Install shoulder rumble strips	1
Installation of safety edge tr	12
	4
Advance street name signs	1
Install a "Vehicles Entering	1
Install chevron signs on horizo	1
Install new fluorescent curve	1
	15
10% reduction in mean speed	2

15% reduction in mean speed	2
5% increase in mean speed	2
5% reduction in mean speed	2
Decreasing posted speed limi	1
Install speed humps	2
Install transverse rumble strip	1
Traffic calming	2
Transverse bar pavement mar	1
	7
Active work with no lane clos	2
Active work with temporary l	4
No active with no lane closur	1
	206

Countermeasures That Work	
CM No.	**Study Title**
CHAPTER 1: Alcohol-Impaired & Drugged Driving	
1.1	Countermeasures That Work - NHTSA
2.1	Countermeasures That Work - NHTSA
2.2	Countermeasures That Work - NHTSA
2.3	Countermeasures That Work - NHTSA
2.4	Countermeasures That Work - NHTSA
3.1	Countermeasures That Work - NHTSA
3.2	Countermeasures That Work - NHTSA
4.1	Countermeasures That Work - NHTSA
4.2	Countermeasures That Work - NHTSA
4.3	Countermeasures That Work - NHTSA
4.4	Countermeasures That Work - NHTSA
4.5	Countermeasures That Work - NHTSA

5.1	Countermeasures That Work - NHTSA
6.1	Countermeasures That Work - NHTSA
CHAPTER 2: Seat Belts & Child Restraints	
1.1	Countermeasures That Work - NHTSA
1.2	Countermeasures That Work - NHTSA
1.3	Countermeasures That Work - NHTSA
2.1	Countermeasures That Work - NHTSA
2.2	Countermeasures That Work - NHTSA
3.1	Countermeasures That Work - NHTSA
3.2	Countermeasures That Work - NHTSA
4.1	Countermeasures That Work - NHTSA
5.1	Countermeasures That Work - NHTSA
CHAPTER 3: Aggressive Driving & Speeding	
1.1	Countermeasures That Work - NHTSA

2.1	Countermeasures That Work - NHTSA
CHAPTER 4: Distracted & Drowsy Driving	
1.1	Countermeasures That Work - NHTSA
1.3	Countermeasures That Work - NHTSA
CHAPTER 5: Motorcycle Safety	
1.1	Countermeasures That Work - NHTSA
CHAPTER 6: Young Drivers	
1.1	Countermeasures That Work - NHTSA
1.2	Countermeasures That Work - NHTSA
1.3	Countermeasures That Work - NHTSA
1.4	Countermeasures That Work - NHTSA
CHAPTER 7: Older Drivers	
2.1	Countermeasures That Work - NHTSA
2.2	Countermeasures That Work - NHTSA
2.3	Countermeasures That Work - NHTSA

CHAPTER 8: Pedestrians	
4.1	Countermeasures That Work - NHTSA
CHAPTER 9: Bicycles	
1.1	Countermeasures That Work - NHTSA

KEY:

Effectiveness: (1 to 5 stars)

5-star: Demonstrated to be effective by several high-quality evaluations with consistent results
4-star: Demonstrated to be effective in certain situations
3-star: Likely to be effective based on balance of evidence from high-quality evaluations or other sources
2-star: Effectiveness still undetermined; different methods of implementing this countermeasure produce
1-star: Limited or no high-quality evaluation evidence
Effectiveness is measured by reductions in crashes or injuries unless noted otherwise. See individual coun

Cost to implement:

$$$: requires extensive new facilities, staff, equipment, or publicity, or makes heavy demands on current r
$$: requires some additional staff time, equipment, facilities, and/or publicity
$: can be implemented with current staff, perhaps with training; limited costs for equipment, facilities, an
These estimates do not include the costs of enacting legislation or establishing policies.

Use:

High: more than two-thirds of the States, or a substantial majority of communities
Medium: between one-third and two-thirds of States or communities
Low: less than one-third of the States or communities
Unknown: data not available

Time to implement:

Long: more than one year
Medium: more than three months but less than one year
Short: three months or less
These estimates do not include the time required to enact legislation or establish policies.

Resource	Countermeasure Category	Effectivenesss (1 to 5 Stars)	Countermeasure
Countermeasures That Wo	Deterrence: Laws	5	Administrative license revocation or suspension (ALR or ALS)
Countermeasures That Wo	Deterrence: Enforcement	5	High visibility sobriety checkpoints
Countermeasures That Wo	Deterrence: Enforcement	4	High visibility saturation patrols
Countermeasures That Wo	Deterrence: Enforcement	4	Preliminary Breath Test Devices (PBTs)
Countermeasures That Wo	Deterrence: Enforcement	4	Passive alcohol sensors
Countermeasures That Wo	Deterrence: Prosecution & Adjudication	4	DWI Courts
Countermeasures That Wo	Deterrence: Prosecution & Adjudication	4	Limits on diversion and plea agreements
Countermeasures That Wo	Deterrence: DWI Offender Treatment, Monitoring, & Control	5	Alcohol problem assessment, treatment
Countermeasures That Wo	Deterrence: DWI Offender Treatment, Monitoring, & Control	5	Alcohol interlocks
Countermeasures That Wo	Deterrence: DWI Offender Treatment, Monitoring, & Control	4	Vehicle and license plate sanctions
Countermeasures That Wo	Deterrence: DWI Offender Treatment, Monitoring, & Control	4	DWI offender monitoring
Countermeasures That Wo	Deterrence: DWI Offender Treatment, Monitoring, & Control	4	Lower BAC limit for repeat offenders

Countermeasures That Wo	Prevention, Intervention, Communication & Outreach	5	Alcohol screening and brief intervention
Countermeasures That Wo	Underage Drinking and Alcohol-Impaired Dirving	5	Minimum drinking age 21 laws
Resource	**Countermeasure Category**	**Effectivenesss (1 to 5 Stars)**	**Countermeasure**
Countermeasures That Wo	Seat Belt Use Laws	5	State primary enforcement belt use laws
Countermeasures That Wo	Seat Belt Use Laws	4	Local primary enforcement belt use laws
Countermeasures That Wo	Seat Belt Use Laws	4	Increased belt use law penalties
Countermeasures That Wo	Seat Belt Law Enforcement	5	Short high-visibility belt law enforcement
Countermeasures That Wo	Seat Belt Law Enforcement	4	Combined enforcement, nighttime
Countermeasures That Wo	Communications and Outreach	5	Supporting enforcement
Countermeasures That Wo	Communications and Outreach	4	Strategies for low-belt-use groups
Countermeasures That Wo	Child/Youth Occupant Restraint Laws	5	Strengthening child/youth occupant restraint laws
Countermeasures That Wo	Child Restraint/Booster Seat Law Enforcement	5	Short high-visibility CR law enforcement
Resource	**Countermeasure Category**	**Effectivenesss (1 to 5 Stars)**	**Countermeasure**
Countermeasures That Wo	Laws	5	Speed Limits

Countermeasures That Wo	Enforcement	5	Automated enforcement
Resource	**Countermeasure Category**	**Effectivenesss (1 to 5 Stars)**	**Countermeasure**
Countermeasures That Wo	Laws and Enforcement	5	Graduated drivers license requirements for beginning drivers
Countermeasures That Wo	Laws and Enforcement	4	High visibility cell phone/text messaging enforcement
Resource	**Countermeasure Category**	**Effectivenesss (1 to 5 Stars)**	**Countermeasure**
Countermeasures That Wo	Motorcycle Helmets	5	Universal coverage state motorcycle helmet use laws
Resource	**Countermeasure Category**	**Effectivenesss (1 to 5 Stars)**	**Countermeasure**
Countermeasures That Wo	Graduated Driver Licensing	5	Graduated Driver licensing
Countermeasures That Wo	Graduated Driver Licensing	5	Learner's permit length, surpervised hours
Countermeasures That Wo	Graduated Driver Licensing	5	Intermediate - Nighttime restrictions
Countermeasures That Wo	Graduated Driver Licensing	5	Intermediate - Passenger restrictions
Resource	**Countermeasure Category**	**Effectivenesss (1 to 5 Stars)**	**Countermeasure**
Countermeasures That Wo	Licensing	4	License screening and testing
Countermeasures That Wo	Licensing	4	Referring older drivers to DMVs
Countermeasures That Wo	Licensing	4	License restrictions

Resource	Countermeasure Category	Effectivenesss (1 to 5 Stars)	Countermeasure
Countermeasures That Wo	All Pedestrians	4	Pedestrian safety zones

Resource	Countermeasure Category	Effectivenesss (1 to 5 Stars)	Countermeasure
Countermeasures That Wo	Children	5	Bicycle helmet laws for children

Visit NCHRP Report 622 @:

different results

ıtermeasure descriptions for information on effectiveness size and how effectiveness is measured.

resources

d publicity

Expected Reduction of Crashes (Percent)	Expected Reduction of Fatalities (Percent)	Resource for Percent Reduction	Cost	Use	Time	Additional Information
N/A	13%	NCHRP 500	$$$	High	Medium	
10-30%	15%	NCHRP 500	$$$	Medium	Short	
			$$	High	Short	
			$$	High	Short	Proven for increasing arrests
			$$	Unknown	Short	
			$$$	Low	Medium	
10%	N/A	NCHRP 500	$	Medium	Short	Proven for increasing convictions
7-9%	N/A	NCHRP 500	Varies	High	Varies	
N/A	N/A	NCHRP 500	$$	Medium	Medium	Proven for reducing recidivism
			Varies	Medium	Medium	Proven for reducing recidivism
N/A	N/A	NCHRP 500	$$$	Unknown	Varies	Proven for reducing recidivism
N/A	N/A	NCHRP 500	$	Low	Short	

11%	N/A	NCHRP 500	$$	Medium	Short	
21%	N/A	NCHRP 500	$$	High	Low	
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
			$	Medium	Short	
			$	Low	Short	
			$	Low	Short	Effectiveness has been demonstrated for increased fines but has not yet been demonstrated for driver's license points.
			$$$	Medium	Medium	Used in many jurisdictions but often only once or twice each year
			$$$	Unknown	Medium	
			Varies	Medium	Medium	
			Unknown	Unknown	Unknown	
N/A	N/A	NCHRP 500	$	High	Short	
			$$$	Medium	Medium	Used in many jurisdictions but often only once or twice each year
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
N/A	N/A	NCHRP 500	$	High	Short	When enforced and obeyed effectiveness is rated a 5-star.

N/A	N/A	NCHRP 500	$$$	Medium	Medium	The cost can be covered by income of citations
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
N/A	N/A	NCHRP 500	$	High	Medium	Effectiveness proven for nighttime and passengar restrictions
N/A	N/A	NCHRP 500	$$$	Low	Medium	
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
26%	35%	NCHRP 500	$	Medium	Short	
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
25-35%	N/A	NCHRP 500	$	High	Medium	
22-40%	N/A	NCHRP 500	$	High	Medium	
40-50%	N/A	NCHRP 500	$	High	Medium	
15-20%	N/A	NCHRP 500	$	High	Medium	
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
			$$	High	Medium	
			$$	Low	Medium	
			$	Unknown	Short	

Expected Reduction of Crashes (Percent)	Expected Reduction of Fatalities (Percent)	Resource for Percent Reduction	Cost	Use	Time	Additional Information
			$$$	Low	Medium	
Expected Reduction of Crashes (Percent)	**Expected Reduction of Fatalities (Percent)**	**Resource for Percent Reduction**	**Cost**	**Use**	**Time**	**Additional Information**
88%		NCHRP 500	$$	Medium	Short	

http://www.cmfclearinghouse.org/collateral/NCHRP_Report_622.pdf

CRF Clearinghouse - CMF

CMF ID	Study Title	Resource	Countermeasure Category
144	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
145	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
147	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
148	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
150	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
151	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
141	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
142	Speed and Road Accidents An Evaluation of the Power Model	Click for CMF details	Speed management
528	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone
524	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone
503	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone
504	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone

501	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone
498	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone
2450	Safety Effectiveness of Advance Street Name Signs	Click for CMF details	Signs
41	Handbook of Road Safety Measures	Click for CMF details	Roadside
4578	Highway Safety Manual, 1st Edition	Click for CMF details	Intersection traffic control
4269	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection traffic control
4169	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection traffic control
4165	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection traffic control

5228	Evaluation of Roundabout Safety	Click for CMF details	Intersection geometry
4927	Evaluation of Roundabout Safety	Click for CMF details	Intersection geometry
4195	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details	Intersection geometry
210	Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method	Click for CMF details	Intersection geometry
211	Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method	Click for CMF details	Intersection geometry
4931	Evaluation of Roundabout Safety	Click for CMF details	Intersection geometry
5452	Safety Effects of Median Treatments Using Longitudinal Channelizers: Empirical Bayesian Before-and-After Study	Click for CMF details	Access management
5453	Safety Effects of Median Treatments Using Longitudinal Channelizers: Empirical Bayesian Before-and-After Study	Click for CMF details	Access management
5454	Safety Effects of Median Treatments Using Longitudinal Channelizers: Empirical Bayesian Before-and-After Study	Click for CMF details	Access management

4700	A Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways	Click for CMF details	Intersection geometry
4698	A Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways	Click for CMF details	Intersection geometry
4696	A Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways	Click for CMF details	Intersection geometry
3128	Evaluation of the Conversion from Two-Way Stop Sign Control to All-Way Stop Sign Control at 53 Locations in North Carolina	Click for CMF details	Intersection traffic control
4259	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection geometry
4255	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection geometry
4253	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection geometry
4261	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection geometry
4187	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details	Intersection geometry

4185	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details	Intersection geometry
4193	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details	Intersection geometry
4189	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details	Intersection geometry
214	Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users	Click for CMF details	Intersection geometry
213	Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users	Click for CMF details	Intersection geometry
5639	Safety Evaluation of Hybrid Mainline Toll Plazas	Click for CMF details	Roadway
3131	Evaluation of the Conversion from Two-Way Stop Sign Control to All-Way Stop Sign Control at 53 Locations in North Carolina	Click for CMF details	Intersection traffic control
215	Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users	Click for CMF details	Intersection geometry

4675	Safety Evaluation of Geometric Design Criteria for Entrance-Exit Ramp Spacing and Auxiliary Lane Use	Click for CMF details	Access management
2930	A fully Bayesian multivariate approach to before_x0013_after safety evaluation	Click for CMF details	Speed management
26	Handbook of Road Safety Measures	Click for CMF details	Roadside
29	Handbook of Road Safety Measures	Click for CMF details	Roadside
2361	Safety Effects of Reducing Freeway Illumination for Energy Conservation	Click for CMF details	Highway lighting
578	Handbook of Road Safety Measures	Click for CMF details	Highway lighting
581	Handbook of Road Safety Measures	Click for CMF details	Highway lighting
4583	Highway Safety Manual, 1st Edition	Click for CMF details	Advanced technology and ITS
2965	Safety Effects of Mobile Speed Cameras in Norfolk: No More than Regression to the Mean?	Click for CMF details	Advanced technology and ITS
2964	Safety Effects of Mobile Speed Cameras in Norfolk: No More than Regression to the Mean?	Click for CMF details	Advanced technology and ITS
1928	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway

1926	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway
1931	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway
1929	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway
1934	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway
1932	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway
1936	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details	Roadway
4111	Investigating Effect of Collision Aggregation on Safety Evaluations Using Multivariate Linear Intervention Models: Case Study of Signal Head Upgrade Program	Click for CMF details	Intersection traffic control

4110	Investigating Effect of Collision Aggregation on Safety Evaluations Using Multivariate Linear Intervention Models: Case Study of Signal Head Upgrade Program	Click for CMF details	Intersection traffic control
1431	Evaluating the Safety Impacts of Improving Signal Visibility at Urban Signalized Intersections	Click for CMF details	Intersection traffic control
59	Safety Models for Urban Four-Lane Undivided Road Segments	Click for CMF details	Alignment
302	NCHRP Report 375: Median Intersection Design	Click for CMF details	Access management
304	NCHRP Report 375: Median Intersection Design	Click for CMF details	Access management
303	NCHRP Report 375: Median Intersection Design	Click for CMF details	Access management

4918	Evaluation of the Safety Effectiveness of "Vehicle Entering When Flashing" Signs and Actuated Flashers at 74 Stop-Controlled Intersections in North Carolina	Click for CMF details	Signs
320	NCHRP Report 491: Crash Experience Warrant for Traffic Signals	Click for CMF details	Intersection traffic control
5534	Comparison of Safety Evaluation Approaches for Intersection Signalization in Florida	Click for CMF details	Intersection traffic control
42	Handbook of Road Safety Measures	Click for CMF details	Roadside
4142	Safety Evaluation of an Automated Section Speed Enforcement System	Click for CMF details	Advanced technology and ITS
4673	Evaluation of the Photo Enforcement Safety Program of the City of Winnipeg	Click for CMF details	Advanced technology and ITS
2420	Impact of Rumble Strips on Collision Reduction on BC Highways: A Comprehensive Before and After Safety Study	Click for CMF details	Roadway
3357	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway
3360	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway
3358	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway

5401	Study of KDOT Policy on Lane and Shoulder Minimum Width for Application of Centerline Rumble Strips	Click for CMF details	Roadway
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3382	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway
2438	Safety Evaluation of Improved Curve Delineation	Click for CMF details	Signs

4201	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details	Intersection traffic control
3396	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway
3394	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway
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3408	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details	Roadway
2433	Safety Evaluation of Improved Curve Delineation	Click for CMF details	Signs
4083	Safety Effectiveness of Super 2 Highways in Texas	Click for CMF details	Roadway
4082	Safety Effectiveness of Super 2 Highways in Texas	Click for CMF details	Roadway
3035	Analyzing Raised Median Safety Impacts Using Bayesian Methods	Click for CMF details	Access management
5397	Study of KDOT Policy on Lane and Shoulder Minimum Width for Application of Centerline Rumble Strips	Click for CMF details	Roadway

3860	Effects of Red Light Camera Enforcement on Fatal Crashes in Large US Cities	Click for CMF details	Advanced technology and ITS
3861	Effects of Red Light Camera Enforcement on Fatal Crashes in Large US Cities	Click for CMF details	Advanced technology and ITS
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134	Handbook of Road Safety Measures	Click for CMF details	Speed management

132	Handbook of Road Safety Measures	Click for CMF details	Speed management
139	Handbook of Road Safety Measures	Click for CMF details	Speed management
2705	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details	Roadway
2709	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details	Roadway
2704	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details	Roadway
2708	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details	Roadway
2342	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details	Roadway
2343	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details	Roadway
2346	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details	Roadway
2345	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details	Roadway

4741	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details	Delineation
4746	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details	Delineation
4737	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details	Delineation
4748	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details	Delineation
4742	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details	Delineation
4790	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details	Delineation
4777	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details	Delineation
4780	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details	Delineation
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4782	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details	Delineation
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4768	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details	Delineation

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4855	Safety Effect of Dilemma-Zone Protection Using Actuated Advance Warning Systems	Click for CMF details	Intersection traffic control
4362	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
4397	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
4323	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
4314	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments

4399	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
4326	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
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4393	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
4316	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
4324	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments

4315	Safety Evaluation of the Safety Edge Treatment	Click for CMF details	Shoulder treatments
584	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details	Roadway
37	Handbook of Road Safety Measures	Click for CMF details	Roadside
38	Handbook of Road Safety Measures	Click for CMF details	Roadside
551	Traffic Safety Evaluation of Daytime and Nighttime Work Zones	Click for CMF details	Work zone
294	Handbook of Road Safety Measures	Click for CMF details	Intersection geometry
292	Handbook of Road Safety Measures	Click for CMF details	Intersection geometry
4574	Highway Safety Manual, 1st Edition	Click for CMF details	On-street parking
156	Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1	Click for CMF details	On-street parking
153	Handbook of Road Safety Measures	Click for CMF details	On-street parking
272	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry

273	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
275	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
274	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
255	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
264	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
265	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
267	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
266	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
21	Handbook of Road Safety Measures	Click for CMF details	Access management
287	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry
288	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details	Intersection geometry

441	Handbook of Road Safety Measures	Click for CMF details	Highway lighting
4958	Effect of Removing Freeway Mainline Barrier Toll Plazas on Safety	Click for CMF details	Roadway
4888	Safety Evaluation of Discontinuing Late Night Flash Operations at Signalized Intersections	Click for CMF details	Intersection traffic control
2976	Safety Evaluation of Multilane Arterials in Florida	Click for CMF details	Roadway
129	Handbook of Road Safety Measures	Click for CMF details	Speed management
131	Handbook of Road Safety Measures	Click for CMF details	Speed management
406	A Review of Two Innovative Pavement Patterns that Have Been Developed to Reduce Traffic Speeds and Crashes	Click for CMF details	Speed management

Countermeasure Subcategory	Countermeasure	CRF	CMF	Crash Type
	10% reduction in mean speed	32	0.68	All
	10% reduction in mean speed	15	0.85	All
	15% reduction in mean speed	44	0.56	All
	15% reduction in mean speed	22	0.78	All
	5% increase in mean speed	-19	1.19	All
	5% increase in mean speed	-8	1.08	All
	5% reduction in mean speed	17	0.83	All
	5% reduction in mean speed	7	0.93	All
	Active work with no lane closure (compared to no work zone)	-17	1.17	All
	Active work with no lane closure (compared to no work zone)	-19	1.19	All
	Active work with temporary lane closure (compared to no work zone)	-42	1.42	Nighttime
	Active work with temporary lane closure (compared to no work zone)	-46	1.46	All

	Active work with temporary lane closure (compared to no work zone)	-49	1.49	Nighttime
	Active work with temporary lane closure (compared to no work zone)	-60	1.6	All
	Advance street name signs	1	0.99	All
Roadside barriers	Change barrier along embankment to less rigid type	32	0.68	Run off road
	Change left-turn phase from permissive to protected/permissive or permissive/protected phasing on one or more approaches	16	0.84	Left turn
	Change permissive left-turn phasing to protected/permissive	3.8	0.962	All
	Changing left turn phasing on more than one approach from permissive to protected-permissive	8.6	0.914	All
	Changing left turn phasing on one approach from permissive to protected-permissive	0.5	0.995	All

Intersection geometry reconfiguration	Conversion of intersection into low-speed roundabout	52.73	0.473	All
Intersection geometry reconfiguration	Conversion of intersection into multi-lane roundabout	63.28	0.367	All
Intersection geometry reconfiguration	Conversion of signalized intersection into single- or multi-lane roundabout	71	0.29	All
Intersection geometry reconfiguration	Conversion of stop-controlled intersection into single-lane roundabout	88	0.12	All
Intersection geometry reconfiguration	Conversion of stop-controlled intersection into single-lane roundabout	82	0.18	All
Intersection geometry reconfiguration	Conversion of two-way stop-controlled intersection into single- or multi-lane roundabout	35.03	0.65	All
	Convert an open median to a directional median	24	0.76	All
	Convert an open median to a directional median	23	0.77	All
	Convert an open median to a directional median	18	0.82	All

	Convert high-speed rural intersection (4 leg) to roundabout	89	0.11	All
	Convert high-speed rural intersection (4 leg) to roundabout	88	0.12	All
Intersection geometry reconfiguration	Convert high-speed rural intersection to roundabout	87	0.13	All
Traffic control type	Convert minor-road stop control to all-way stop control	77	0.23	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	74.1	0.259	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	71.2	0.288	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	65.8	0.342	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	55.5	0.445	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	74	0.26	All

Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	66	0.34	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	66	0.34	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	55	0.45	All
Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout	32	0.68	All
Intersection geometry reconfiguration	Convert to roundabout	39	0.61	All
	Convert traditional mainline toll plazas to hybrid mainline toll plazas	46	0.54	All
Traffic control type	Convert two-way (without flashing beacons) to all-way stop control (without flashing beacons)	72.4	0.276	All
Intersection geometry reconfiguration	Convert unsignalized intersection to roundabout	44	0.56	All

	Decrease freeway ramp spacing from infinity to S (ft) with/without auxiliary lane			Not specified
	Decreasing posted speed limit on expressways	-3.6	1.0358	All
Clear zone	Flatten sideslope from 1V:3H to 1V:4H	42	0.58	All
Clear zone	Flatten sideslope from 1V:4H to 1V:6H	22	0.78	All
	Full to partial interchange lighting	8.7	0.913	All
	Illumination	32	0.69	All
	Illumination	27	0.73	All
	Implement automated speed enforcement cameras	17	0.83	All
	Implement mobile speed cameras	-20	1.2	All
	Implement mobile speed cameras	-9	1.09	All
Lane restrictions	Implement truck lane restrictions on multilane freeways	1	0.99	Truck related

Lane restrictions	Implement truck lane restrictions on multilane freeways	-10	1.1	All
Lane restrictions	Implement truck lane restrictions on multilane freeways (	40	0.6	Truck related
Lane restrictions	Implement truck lane restrictions on multilane freeways (	32	0.68	All
Lane restrictions	Implement truck lane restrictions on multilane freeways (>10000 vpdpl)	-14	1.14	Truck related
Lane restrictions	Implement truck lane restrictions on multilane freeways (>10000 vpdpl)	-23	1.23	All
Lane restrictions	Implement truck lane restrictions on multilane freeways (screened)	-4	1.04	Truck related
	Improve signal visibility, including signal lens size upgrade, installation of new back-plates, addition of reflective tapes to existing back-plates, and installation of additional signal heads	9.8	0.902	Nighttime

	Improve signal visibility, including signal lens size upgrade, installation of new back-plates, addition of reflective tapes to existing back-plates, and installation of additional signal heads	-0.4	1.004	Day time
Traffic control visibility	Improve visibility of signal heads	3	0.97	All
	Increase in horizontal curvature by one degree	-6	1.06	Run off road
Other	Increase intersection median width by 3 ft increments	4	0.96	Multiple vehicle
Other	Increase intersection median width by 3 ft increments	-3	1.03	Multiple vehicle
Other	Increase intersection median width by 3 ft increments	-5	1.05	Multiple vehicle

	Install a "Vehicles Entering When Flashing" (VEWF) system (advance post mounted signs on major and loops on minor)	27	0.73	All
Traffic control type	Install a traffic signal	67	0.33	Angle
Traffic control type	Install a traffic signal	31.6	0.684	All
Median barriers	Install any type of median barrier	43	0.57	All
	Install automated section speed enforcement system	56	0.44	All
	Install automated speed camera at signalized intersection	24	0.76	Speed related
Roadway rumble strips	Install centerline and shoulder rumble strips	18	0.82	All
Roadway rumble strips	Install centerline rumble strips	45	0.55	Head on,Sideswipe
Roadway rumble strips	Install centerline rumble strips	45	0.55	Head on,Sideswipe
Roadway rumble strips	Install centerline rumble strips	44	0.56	Head on,Sideswipe

Roadway rumble strips	Install centerline rumble strips	34.05	0.66	All
Roadway rumble strips	Install centerline rumble strips	22	0.78	All
Roadway rumble strips	Install centerline rumble strips	12	0.88	All
Roadway rumble strips	Install centerline rumble strips	9	0.91	All
Roadway rumble strips	Install centerline rumble strips	9	0.91	All
Roadway rumble strips	Install centerline rumble strips	6	0.94	All
Roadway rumble strips	Install centerline rumble strips	-4	1.04	All
Roadway rumble strips	Install centerline rumble strips on horizontal curves	37	0.63	All
Roadway rumble strips	Install centerline rumble strips on horizontal curves	6	0.94	All
Roadway rumble strips	Install centerline rumble strips on horizontal curves	-10	1.1	All
Roadway rumble strips	Install centerline rumble strips on tangent sections	22	0.78	All
Roadway rumble strips	Install centerline rumble strips on tangent sections	18	0.82	All
Roadway rumble strips	Install centerline rumble strips on tangent sections	15	0.85	All
Roadway rumble strips	Install centerline rumble strips on tangent sections	-10	1.1	All
	Install chevron signs on horizontal curves	16	0.84	Non-intersection

	Install dynamic signal warning flashers	18	0.82	All
Roadway rumble strips	Install edgeline rumble strips	39	0.61	Run off road
Roadway rumble strips	Install edgeline rumble strips	33	0.67	Run off road
Roadway rumble strips	Install edgeline rumble strips on roadways with a shoulder width of 5 feet or greater	66	0.34	Run off road
Roadway rumble strips	Install edgeline rumble strips on roadways with a shoulder width of 5 feet or greater	43	0.57	Run off road
	Install new fluorescent curve signs or upgrade existing curve signs to fluorescent sheeting	25	0.75	Non-intersection
	Install periodic passing lanes on rural two-lane highways	42	0.58	All
	Install periodic passing lanes on rural two-lane highways	35	0.65	Non-intersection
	Install raised median	44	0.56	All
Roadway rumble strips	Install rectangular shaped centerline rumble strips	31.11	0.689	All

	Install red-light camera (red light running crashes)	24	0.76	All
	Install red-light cameras at intersections	17	0.83	All
Shoulder rumble strips	Install shoulder rumble strips	47	0.53	Run off road
Shoulder rumble strips	Install shoulder rumble strips	40	0.6	Run off road
Shoulder rumble strips	Install shoulder rumble strips	37	0.63	Run off road
Shoulder rumble strips	Install shoulder rumble strips	37	0.63	Run off road
Shoulder rumble strips	Install shoulder rumble strips	36	0.64	Run off road
Shoulder rumble strips	Install shoulder rumble strips	28	0.72	All
Shoulder rumble strips	Install shoulder rumble strips	18	0.82	All
Shoulder rumble strips	Install shoulder rumble strips	17	0.83	Run off road
Shoulder rumble strips	Install shoulder rumble strips	16	0.84	All
Shoulder rumble strips	Install shoulder rumble strips	16	0.84	Run off road
Shoulder rumble strips	Install shoulder rumble strips	13	0.87	All
Shoulder rumble strips	Install shoulder rumble strips	10	0.9	All

Shoulder rumble strips	Install shoulder rumble strips	8	0.92	All
Shoulder rumble strips	Install shoulder rumble strips	7	0.93	All
Shoulder rumble strips	Install shoulder rumble strips	7	0.93	Run off road
Shoulder rumble strips	Install shoulder rumble strips	6	0.94	All
Shoulder rumble strips	Install shoulder rumble strips	5	0.95	All
Shoulder rumble strips	Install shoulder rumble strips	3	0.97	Run off road
Shoulder rumble strips	Install shoulder rumble strips	0	1	Run off road
Shoulder rumble strips	Install shoulder rumble strips	-5	1.05	All
Shoulder rumble strips	Install shoulder rumble strips on roadways with a shoulder width equal to 5 feet	54	0.46	Run off road
Shoulder rumble strips	Install shoulder rumble strips with an offset of 0-8 inches relative to the edgeline	33	0.67	Run off road
Shoulder rumble strips	Install shoulder rumble strips with an offset of 9-20 inches relative to the edgeline	38	0.62	Run off road
	Install speed humps	50	0.5	All

	Install speed humps	40	0.6	All
	Install transverse rumble strips as traffic calming device	36	0.64	All
Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas	25.5	0.745	All
Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas	21.5	0.785	All
Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas	8.7	0.913	All
Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas	1.3	0.987	All
Number of lanes	Install TWLTL (two-way left turn lane) on two lane road	37.1	0.629	All
Number of lanes	Install TWLTL (two-way left turn lane) on two lane road	27.5	0.725	All
Number of lanes	Install TWLTL (two-way left turn lane) on two lane road	26.1	0.739	All
Number of lanes	Install TWLTL (two-way left turn lane) on two lane road	-1.9	1.019	All

Visibility of existing markings	Install wider edgelines (4 in to 6 in)	41.5	0.585	Day time
Visibility of existing markings	Install wider edgelines (4 in to 6 in)	36.8	0.632	Single vehicle
Visibility of existing markings	Install wider edgelines (4 in to 6 in)	36.5	0.635	All
Visibility of existing markings	Install wider edgelines (4 in to 6 in)	18.7	0.813	Nighttime,Single vehicle
Visibility of existing markings	Install wider edgelines (4 in to 6 in)	12.7	0.873	Nighttime
Visibility of existing markings	Install wider markings and both edgeline and centerline rumble strips with resurfacing	38	0.62	All
Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing	25	0.75	All
Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing	24	0.76	All
Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing	26	0.74	All
Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing	24	0.76	All

Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing	14	0.86	All
Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing	10	0.9	All
Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing	26	0.74	All
Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing	25	0.75	All
Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing	23	0.77	All
Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing	20	0.8	All
Visibility of existing markings	Install wider markings with resurfacing	38	0.62	All
Visibility of existing markings	Install wider markings with resurfacing	34	0.66	All
Visibility of existing markings	Install wider markings with resurfacing	21	0.79	All
Visibility of existing markings	Install wider markings with resurfacing	25	0.75	All
Visibility of existing markings	Install wider markings with resurfacing	9	0.91	All

Visibility of existing markings	Install wider markings with resurfacing	8	0.92	All
Visibility of existing markings	Install wider markings with resurfacing	4	0.96	All
Visibility of existing markings	Install wider markings WITHOUT resurfacing	22	0.78	All
Traffic control visibility	Installation of an actuated advance warning dilemma zone protection system at high-speed signalized intersections	11.3	0.887	All
	Installation of safety edge treatment	23.123	0.769	Run off road
	Installation of safety edge treatment	21.596	0.784	Other
	Installation of safety edge treatment	16.528	0.835	All
	Installation of safety edge treatment	10.959	0.89	All

	Installation of safety edge treatment	4.676	0.953	Other
	Installation of safety edge treatment	1.667	0.983	All
	Installation of safety edge treatment	-2.622	1.026	Run off road
	Installation of safety edge treatment	-3.609	1.036	Run off road
	Installation of safety edge treatment	-5.202	1.052	Other
	Installation of safety edge treatment	-5.982	1.06	All
	Installation of safety edge treatment	-6.361	1.064	All

	Installation of safety edge treatment	-15.555	1.156	All
Number of lanes	Introduce TWLTL (two-way left turn lanes) on rural two lane roads	35	0.65	All
Roadside barriers	New guardrail along embankment	44	0.56	Run off road
Roadside barriers	New guardrail along embankment	47	0.53	Run off road
	No active with no lane closure (compared to no work zone)	-11	1.11	Nighttime
Turn lanes	Painted channelization of both major and minor roads	57	0.43	All
Turn lanes	Physical channelization of both major and minor roads	27	0.73	All
	Prohibit on-street parking	22	0.78	All
	Prohibit on-street parking	35	0.65	All
	Prohibit on-street parking	20	0.8	All
Turn lanes	Provide a left-turn lane on both major-road approaches	58	0.42	All

Turn lanes	Provide a left-turn lane on both major-road approaches	50	0.5	All
Turn lanes	Provide a left-turn lane on both major-road approaches	48	0.52	All
Turn lanes	Provide a left-turn lane on both major-road approaches	17	0.83	All
Turn lanes	Provide a left-turn lane on one major-road approach	55	0.45	All
Turn lanes	Provide a left-turn lane on one major-road approach	35	0.65	All
Turn lanes	Provide a left-turn lane on one major-road approach	29	0.71	All
Turn lanes	Provide a left-turn lane on one major-road approach	28	0.72	All
Turn lanes	Provide a left-turn lane on one major-road approach	9	0.91	All
	Provide a raised median	39	0.61	All
Turn lanes	Provide a right-turn lane on one major-road approach	23	0.77	All
Turn lanes	Provide a right-turn lane on one major-road approach	9	0.91	All

	Provide intersection illumination	59	0.41	Vehicle/pedestrian
Other	Removing mainline barrier toll plazas on highways	40.3	0.597	All
Signal phasing or timing	Replace Night-Time Flash with Steady Operation	53	0.47	All
Pavement condition and friction	Resurface pavement	5	0.95	All
	Traffic calming	33	0.67	All
	Traffic calming	33	0.67	All
	Transverse bar pavement marking at roundabout approaches	57	0.43	Speed related

Crash Severity	Roadway Type	Area Type	Publication Year	Star Quality Rating
Fatal	All	All	2004	4
Serious injury,Minor injury	All	All	2004	5
Fatal	All	All	2004	4
Serious injury,Minor injury	All	All	2004	4
Fatal	All	All	2004	5
Serious injury,Minor injury	All	All	2004	5
Fatal	All	All	2004	5
Serious injury,Minor injury	All	All	2004	5
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4

Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4
Fatal,Serious injury,Minor injury	Not Specified	All	2010	4
Serious injury,Minor injury	Not specified	Not specified	2004	4
Fatal,Serious injury,Minor injury	Not specified	Urban	2010	5
Fatal,Serious injury,Minor injury	Not specified	Urban	2011	4
Fatal,Serious injury,Minor injury	Not Specified	Urban	2011	4
Fatal,Serious injury,Minor injury	Not Specified	Urban	2011	4

Fatal,Serious injury,Minor injury	Not specified	All	2013	4
Fatal,Serious injury,Minor injury	Not specified	All	2013	4
Serious injury,Minor injury	Not Specified	Urban and suburban	2012	4
Serious injury,Minor injury	Not specified	Urban	2001	4
Serious injury,Minor injury	Not specified	Rural	2001	4
Fatal,Serious injury,Minor injury	Not specified	All	2013	4
Fatal,Serious injury	Principal Arterial Other	Urban and suburban	2013	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Urban and suburban	2013	4
Serious injury	Principal Arterial Other	Urban and suburban	2013	4

Serious injury,Minor injury	Not specified	Rural	2012	4
Serious injury,Minor injury	Not specified	Rural	2012	4
Serious injury,Minor injury	Not specified	Rural	2012	4
Fatal,Serious injury,Minor injury	All	All	2010	4
Fatal,Serious injury,Minor injury	Not specified	Suburban	2011	4
Fatal,Serious injury,Minor injury	Not specified	Urban and suburban	2011	4
Fatal,Serious injury,Minor injury	Not specified	Urban and suburban	2011	4
Fatal,Serious injury,Minor injury	Not specified	Urban	2011	4
Serious injury,Minor injury	Not Specified	Suburban	2012	4

Serious injury,Minor injury	Not Specified	Urban and suburban	2012	4
Serious injury,Minor injury	Not Specified	Urban and suburban	2012	4
Serious injury,Minor injury	Not Specified	Urban	2012	4
Serious injury,Minor injury	Not specified	Not specified	2007	4
Serious injury,Minor injury	Not specified	Not specified	2007	4
Fatal,Serious injury	Principal Arterial Other	All	2014	4
Fatal,Serious injury,Minor injury	All	All	2010	4
Serious injury,Minor injury	Not specified	Not specified	2007	4

Fatal,Serious injury,Minor injury	Principal Arterial Interstate	Not specified	2012	4
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Not specified	2010	4
Serious injury,Minor injury	Not specified	Rural	2004	5
Serious injury,Minor injury	Not specified	Rural	2004	5
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Suburban	2008	4
Serious injury,Minor injury	All	Urban	2004	4
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	All	2004	4
Fatal,Serious injury,Minor injury	All	All	2010	5
Fatal,Serious injury	Not Specified	Rural	2010	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2010	4
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009	4

Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways		2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009	4
Fatal,Serious injury,Minor injury	Not Specified	Urban	2012	4

Fatal,Serious injury,Minor injury	Not Specified	Urban	2012	4
Fatal,Serious injury,Minor injury	Not specified	Urban	2007	4
Fatal,Serious injury,Minor injury	Not specified	Urban and Suburban	2004	5
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	1995	5
Fatal,Serious Injury,Minor Injury	Not Specified	Urban and Suburban	1995	5
Fatal,Serious Injury,Minor Injury	Not Specified	Urban and Suburban	1995	5

Fatal,Serious injury,Minor injury	Not specified	All	2013	4
Fatal,Serious Injury,Minor Injury	Not specified	Urban	2003	4
Fatal,Serious injury,Minor injury	Not specified	Not specified	2014	4
Fatal	Principal Arterial Other	Rural	2004	4
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Not specified	2012	4
Serious injury,Minor injury	Not specified	Not specified	2011	4
Fatal,Serious injury	Principal Arterial Other	Rural	2010	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	5
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4

Fatal,Serious injury,Minor injury	All	Rural	2012	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	5
Fatal,Serious injury,Minor injury	Not Specified	Urban	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	5
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	5
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	All	Rural	2009	4

Fatal,Serious injury,Minor injury	Not Specified	All	2011	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	All	Rural	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2012	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2012	4
Fatal,Serious injury	Not Specified		2011	4
Fatal,Serious injury,Minor injury	All	Rural	2012	4

Fatal	Not Specified	Urban	2011	4
Fatal	Not Specified	Urban	2011	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	5
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009	5
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4

Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2009	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009	4
Serious injury,Minor injury	Local	Urban and Suburban	2004	4

Serious injury,Minor injury	Local	Urban and Suburban	2004	4
Serious injury,Minor injury	Local	Urban and Suburban	2004	4
Fatal,Serious injury	Major Collector	All	2010	4
Fatal,Serious injury	Major Collector	Rural	2010	4
Fatal,Serious injury,Minor injury	Major Collector	Rural	2010	4
Fatal,Serious injury,Minor injury	Major Collector	Rural	2010	4
Fatal,Serious injury,Minor injury	Not Specified	All	2008	4
Fatal,Serious injury,Minor injury	Not Specified	All	2008	4
Fatal,Serious injury,Minor injury	Not Specified	All	2008	5
Fatal,Serious injury,Minor injury	Not Specified	All	2008	4

Fatal,Serious injury,Minor injury	Not specified	Rural	2012	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2012	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2012	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2012	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2012	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2011	4
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4
Fatal,Serious injury	Not specified	Rural	2011	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4

Fatal,Serious injury,Minor injury	Not specified	Urban	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2011	4
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2011	4
Fatal,Serious injury	Not specified	Urban	2011	4
Fatal,Serious injury	Not specified	Rural	2011	4
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4

Fatal,Serious injury,Minor injury	Not specified	Urban	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011	4
Serious injury,Minor injury	Not specified	Not specified	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4

Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4

Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011	4
Serious injury,Minor injury	Not specified	Rural	2008	4
Fatal	Not specified	Not specified	2004	4
Serious injury,Minor injury	Not specified	Not specified	2004	5
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2008	4
Serious injury,Minor injury	Not specified	Rural	2004	4
Fatal,Serious injury,Minor injury	Not specified	Rural	2004	4
Fatal,Serious injury,Minor injury	Principal Arterial Other	Urban	2010	5
Serious injury,Minor injury	Principal Arterial Other	Urban	1982	4
Serious injury,Minor injury	Minor Arterial	Urban	2004	5
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	2002	5

Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002	4
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002	4
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002	5
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	2002	4
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	2002	5
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002	5
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002	4
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002	5
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2004	4
Fatal,Serious Injury,Minor Injury	Not Specified	All	2002	4
Fatal,Serious Injury,Minor Injury	Not Specified	All	2002	5

Serious injury,Minor injury	Not specified	Not specified	2004	4
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2013	4
Fatal,Serious injury,Minor injury	All	All	2013	4
Fatal,Serious injury	Not Specified		2009	4
Serious injury,Minor injury	Minor Collector	Urban	2004	4
Serious injury,Minor injury	Minor Collector	Urban	2004	4
Serious injury,Minor injury	Not specified	Not specified	1996	4

Prior Condition	Adjusted Standard Error of CRF	Unadjusted Standard Error of CRF	Adjusted Standard Error of CMF	Unadjusted Standard Error of CMF
	9		0.09	
	5		0.05	
	14		0.14	
	8		0.08	
	4		0.04	
	3		0.03	
	5		0.05	
	3		0.03	
	5	4	0.05	0.04
	7	6	0.07	0.06
	10	9	0.1	0.09
	13	11	0.13	0.11

	14	12	0.14	0.12
	18	15	0.18	0.15
No advance signs at a signalized intersection		3.1		0.031
	10	6	0.1	0.06
Permitted phasing		2		0.02
Permissive phasting		3.5		0.035
Permissive only left turn phasing on all treated approaches		5.5		0.055
Permissive only left turn phasing on the treated approach		4.3		0.043

The intersection was operating under no control, yield, TWSC, AWSC, or signal control.		11.3		0.113
The intersection was operating under no control, yield, TWSC, AWSC, or signal control.		12.8		0.128
Signalized intersection		7		0.07
	14	8	0.14	0.08
	16	9	0.16	0.09
The intersection was operating under TWSC control.		10.4		0.104
Roadway with full median openings		5.48		0.0548
Roadway with full median openings		6.32		0.0632
Roadway with full median openings		6.32		0.0632

4 leg intersection				
4 leg intersection				
Stop controlled intersection (3 or 4 leg)				
Two-way stop sign control with and without flashing beacons.		2.5		0.025
Signalized intersection		6.6		0.066
Signalized intersection		6.5		0.065
Signalized intersection		5.8		0.058
Signalized intersection		10		0.1
Signalized intersection		7		0.07

Signalized intersection		6		0.06
Signalize intersection (4 leg)		6		0.06
Signalized intersection		10		0.1
	14	6	0.14	0.06
	8	4	0.08	0.04
Traditional mainline toll plazas		7		0.07
Two-way stop sign control without flashing beacons.		3.7		0.037
	10	5	0.1	0.05

Ramp spacing approaching infinity, which represents a basic freeway segment with no ramps.				
Expressway with posted speed limit of 100 km/h (with one exception posted at 80 km/h)		17.17		0.1717
	4	2	0.04	0.02
	4	2	0.04	0.02
Full interchange lighting.	4.2	4.2	0.042	0.042
	7		0.07	
	12		0.12	
No automated speed enforcement		1		0.01
		28.5		0.29
		13.9		0.14
No truck restrictions		5.1		0.051

No truck restrictions		3.1		0.031
No truck restrictions		8.2		0.082
No truck restrictions		4.6	0.046	
No truck restrictions		6.6		0.066
No truck restrictions		3.6	0.036	
No truck restrictions		7.1		0.071
Smaller signal lens size, old back-plates, no reflective tapes on existing back-plates, and less number of signal heads		5.6		0.056

Smaller signal lens size, old back-plates, no reflective tapes on existing back-plates, and less number of signal heads		3.9		0.039
Improvements included one or more of the following: signal lens size upgrade, installing new backboards, adding reflective tapes to existing backboards, and installing additional signal heads.				
	1	1	0.01	0.01
	2	1	0.02	0.01
	1	1	0.01	0.01
	2	1	0.02	0.01

stop-controlled		10.2		0.102
	24	20	0.24	0.2
Stop controlled intersection		9.3		0.093
	10	6	0.1	0.06
No automated section speed enforcement system		7		0.07
Signalized intersection with no automated speed enforcement camera.		10.59		0.1059
No centerline rumble strips		6.7		0.067
No centerline rumble strips		6.4		0.064
No centerline rumble strips		30.8		0.308

No centerline rumble strips		14.14		0.141
No centerline rumble strips		6.6		0.066
No centerline rumble strips		2.8		0.028
No centerline rumble strips		9.5		0.095
No centerline rumble strips		3.5		0.035
No centerline rumble strips		4.2		0.042
No centerline rumble strips		14.6		0.146
No centerline rumble strips		11.6		0.116
No centerline rumble strips		8.1		0.081
No centerline rumble strips		11.4		0.114
No centerline rumble strips		10		0.1
No centerline rumble strips		7.8		0.078
No centerline rumble strips		5.9		0.059
No centerline rumble strips		17.3		0.173
No sign		10.4		0.104

Signalized intersection without advance warning flashers.		8.3		0.083
		15.56		0.1556
		12.22		0.1222
Roadway with no rumble strips and a shoulder width less than 5 feet		18.55		0.1855
Roadway with no rumble strips and a shoulder width less than 5 feet		14.52		0.1452
No sign or sign without fluorescent sheeting		12.7		0.127
Two-lane rural highway with no passing lane		9		0.09
Two-lane rural highway with no passing lane		11		0.11
no raised median				
No centerline rumble strips		15.48		0.155

Absence of red-light cameras				
Absence of red-light camera				
		13.78		0.1378
		12.65		0.1265
		13.35		0.1335
		10.31		0.1031
		9.71		0.0971
		8.62		0.0862
		11.59		0.1159
		7.3		0.073
		7.25		0.0725
		8.22		0.0822
		14.62		0.1462
		10.22		0.1022

		8.04		0.0804
		5.9		0.059
		9.93		0.0993
		6.41		0.0641
		12.31		0.1231
		13.51		0.1351
		15.84		0.1584
		12.66		0.1266
Roadway with no rumble strips and a shoulder width less than 5 feet		12.55		0.1255
		12.3		0.123
		14.9		0.149
	13		0.13	

	16		0.16	
	12		0.12	
		12.1		0.121
		10.7		0.107
		12.4		0.124
		10.9		0.109
		11		0.11
		8.7		0.087
		6.8		0.068
		14.7		0.147

4 in wide edgelines		6.6		0.066
4 in wide edgelines		6.1		0.061
4 in wide edgelines		5.2		0.052
4 in wide edgelines		12.1		0.121
4 in wide edgelines		10.7		0.107
		9.5		0.095
		5.4		0.054
		6.5		0.065
		3.5		0.035
		3.1		0.031

		4.8		0.048
		2.7		0.027
		8.8		0.088
		12.3		0.123
		5.1		0.051
		4.3		0.043
		14.2		0.142
		9.7		0.097
		6		0.06
		5.5		0.055
		3.7		0.037

		2.2		0.022
		1.9		0.019
		8.1		0.081
Untreated signalized intersection		10.5		0.105
Rural highways prior to resurfacing and installation of safety edge treatment		11.053		0.111
Rural highways prior to resurfacing and installation of safety edge treatment		11.453		0.115
Rural highways prior to resurfacing and installation of safety edge treatment		11.919		0.119
Rural highways prior to resurfacing and installation of safety edge treatment		13.779		0.138

Rural highways prior to resurfacing and installation of safety edge treatment		9.672		0.097
Rural highways prior to resurfacing and installation of safety edge treatment		9.78		0.098
Rural highways prior to resurfacing and installation of safety edge treatment		10.228		0.102
Rural highways prior to resurfacing and installation of safety edge treatment		11.192		0.112
Rural highways prior to resurfacing and installation of safety edge treatment		11.444		0.114
Rural highways prior to resurfacing and installation of safety edge treatment		11.462		0.115
Rural highways prior to resurfacing and installation of safety edge treatment		15.147		0.151

Rural highways prior to resurfacing and installation of safety edge treatment		17.687		0.177
	8	7	0.08	0.07
	10	6	0.1	0.06
	5	3	0.05	0.03
	5	4	0.05	0.04
	12	7	0.12	0.07
		6		0.06
Provision of on-street parking		5		0.05
	14	6	0.14	0.06
	5	3	0.05	0.03
	4	3	0.04	0.03

	6	5	0.06	0.05
	7	6	0.07	0.06
	2	2	0.02	0.02
	10	8	0.1	0.08
	4	3	0.04	0.03
	5	4	0.05	0.04
	6	5	0.06	0.05
	2	1	0.02	0.01
	10	6	0.1	0.06
	8	7	0.08	0.07
	4	3	0.04	0.03

	20		0.2	
11 mainline toll plazas existed on the Gardens State Parkway (GSP) in New Jersey.		3.8		0.038
Traffic signals were operating in the late night flash (LNF) mode from late night to early morning hours.		8		0.08
		4.6		0.05
	9		0.09	
	9		0.09	
	19	8	0.19	0.08

Included in First Edition of Highway Safety Manual	Type of Study Methodology	State	Municipality	Sample Size
no	Meta-analysis			
no	Meta-analysis			
no	Meta-analysis			
no	Meta-analysis			
no	Meta-analysis			
no	Meta-analysis			
no	Meta-analysis			
no	Meta-analysis			
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes			

no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes	AZ,MA,WI		
bold	Meta-analysis			
yes	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes	notusa,NC		
no	Before/after using empirical Bayes or full Bayes	notusa,NC	Toronto & North Carolina	
no	Before/after using empirical Bayes or full Bayes	notusa,NC	Toronto & North Carolina	

no	Before/after using empirical Bayes or full Bayes	WI	Statewide	
no	Before/after using empirical Bayes or full Bayes	WI	Statewide	
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY,NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes	WI	Statewide	
no	Before/after using empirical Bayes or full Bayes	FL	Tampa	
no	Before/after using empirical Bayes or full Bayes	FL	Tampa	
no	Before/after using empirical Bayes or full Bayes	FL	Tampa	

no	Before/after using empirical Bayes or full Bayes	KS,MD,MN,OR,WA, WI		
no	Before/after using empirical Bayes or full Bayes	KS,MD,MN,OR,WA, WI		
no	Before/after using empirical Bayes or full Bayes	KS,MD,MN,OR,WA, WI		
no	Before/after using empirical Bayes or full Bayes	NC		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY, NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY, NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY, NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY, NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY, NC,SC,VT,WA		

no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY,NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY,NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes	CO,FL,IN,MD,MI,NY,NC,SC,VT,WA		
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes	FL		
no	Before/after using empirical Bayes or full Bayes	NC		
no	Before/after using empirical Bayes or full Bayes			

no	Regression cross-section	CA,WA		1212
no	Before/after using empirical Bayes or full Bayes	notusa		
no	Meta-analysis			
no	Meta-analysis			
no	Before/after using empirical Bayes or full Bayes	OR	Portland	
no	Meta-analysis			
no	Meta-analysis			
yes	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes	notusa	Norfolk County	
no	Before/after using empirical Bayes or full Bayes	notusa	Norfolk County	
no	Before/after using empirical Bayes or full Bayes	VA		

no	Before/after using empirical Bayes or full Bayes	VA		
no	Before/after using empirical Bayes or full Bayes	VA		
no	Before/after using empirical Bayes or full Bayes	VA		
no	Before/after using empirical Bayes or full Bayes	VA		
no	Before/after using empirical Bayes or full Bayes	VA		
no	Before/after using empirical Bayes or full Bayes	VA		
no	Before/after using empirical Bayes or full Bayes	notusa	British Columbia	

no	Before/after using empirical Bayes or full Bayes	notusa	British Columbia	
no	Before/after using empirical Bayes or full Bayes	notusa	City of Burnaby, City of Coquitlam, City of Kelowna, City of New Westminster, City of North Vancouver, City of Surrey	
no	Regression cross-section			
bold caret	Regression cross-section			
bold	Regression cross-section			
bold	Regression cross-section			

no	Before/after using empirical Bayes or full Bayes	NC		
no	Before/after using empirical Bayes or full Bayes			
no	Before/after using empirical Bayes or full Bayes	FL		
bold	Meta-analysis			
no	Before/after using empirical Bayes or full Bayes	notusa		
no	Simple before/after	notusa	Winnipeg	
no	Before/after using empirical Bayes or full Bayes	notusa	British Columbia	
no	Before/after using empirical Bayes or full Bayes	MN		
no	Before/after using empirical Bayes or full Bayes	MN,PA,WA		
no	Before/after using empirical Bayes or full Bayes	PA		

no	Before/after using empirical Bayes or full Bayes	KS		
no	Before/after using empirical Bayes or full Bayes	MN		
no	Before/after using empirical Bayes or full Bayes	CA,CO,DE,MD,MN,OR,PA,WA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	MN,PA,WA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	WA		
no	Before/after using empirical Bayes or full Bayes	MN		
no	Before/after using empirical Bayes or full Bayes	MN,PA,WA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	MN		
no	Before/after using empirical Bayes or full Bayes	MN,PA,WA		
no	Before/after using empirical Bayes or full Bayes	WA		
no	Before/after using empirical Bayes or full Bayes	WA		

no	Regression cross-section	NV,VA		1450
no	Regression cross-section	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Before/after using empirical Bayes or full Bayes	CT		
no	Before/after using empirical Bayes or full Bayes	TX		
no	Before/after using empirical Bayes or full Bayes	TX		
no	Before/after using empirical Bayes or full Bayes	UT		
no	Before/after using empirical Bayes or full Bayes	KS		

no	Regression cross-section	CA,MD,AZ,IL,TX,OR,NC,OH,DC,AK,VA,CO,AL,ID,MA,NY,MI,IN		1358
no	Regression cross-section	CA,MD,AZ,IL,TX,OR,NC,OH,DC,AK,VA,CO,AL,ID,MA,NY,MI,IN		3824
no	Regression cross-section	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Regression cross-section	MN,MO,PA		
no	Before/after using empirical Bayes or full Bayes	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	MO,PA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	MN,MO,PA		

no	Before/after using empirical Bayes or full Bayes	MN,MO,PA		
no	Before/after using empirical Bayes or full Bayes	MO,PA		
no	Before/after using empirical Bayes or full Bayes	PA		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MN,MO,PA		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MN		
no	Regression cross-section	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Regression cross-section	MN,MO,PA		
no	Meta-analysis			

italics	Meta-analysis			
no	Meta-analysis			
no	Before/after using empirical Bayes or full Bayes	IA,MN		
no	Before/after using empirical Bayes or full Bayes	IA,MN		
no	Before/after using empirical Bayes or full Bayes	IA,MN		
no	Before/after using empirical Bayes or full Bayes	IA,MN		
no	Before/after using empirical Bayes or full Bayes	AR		
no	Before/after using empirical Bayes or full Bayes	CA		
no	Before/after using empirical Bayes or full Bayes	AR,CA,IL,NC		
no	Before/after using empirical Bayes or full Bayes	NC		

no	Before/after using empirical Bayes or full Bayes	KS		
no	Before/after using empirical Bayes or full Bayes	KS		
no	Before/after using empirical Bayes or full Bayes	KS		
no	Before/after using empirical Bayes or full Bayes	KS		
no	Before/after using empirical Bayes or full Bayes	KS		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		

no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
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no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		

no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	MO		
no	Before/after using empirical Bayes or full Bayes	NE		
no	Before/after using empirical Bayes or full Bayes	GA,IN		
no	Before/after using empirical Bayes or full Bayes	GA,IN		
no	Before/after using empirical Bayes or full Bayes	GA,IN		
no	Before/after using empirical Bayes or full Bayes	GA		

no	Before/after using empirical Bayes or full Bayes	GA,IN		
no	Before/after using empirical Bayes or full Bayes	GA,IN		
no	Before/after using empirical Bayes or full Bayes	GA,IN		
no	Before/after using empirical Bayes or full Bayes	GA		
no	Before/after using empirical Bayes or full Bayes	GA		
no	Before/after using empirical Bayes or full Bayes	GA		
no	Before/after using empirical Bayes or full Bayes	GA,IN		

no	Before/after using empirical Bayes or full Bayes	GA		
no	Before/after using empirical Bayes or full Bayes			
no	Meta-analysis			
no	Meta-analysis			
no	Before/after using empirical Bayes or full Bayes			
no	Meta-analysis			
no	Meta-analysis			
yes	Before/after using empirical Bayes or full Bayes			
no	Simple before/after			
no	Meta-analysis			
bold	Before/after using empirical Bayes or full Bayes			

bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			
bold	Meta-analysis			
bold	Before/after using empirical Bayes or full Bayes			
bold	Before/after using empirical Bayes or full Bayes			

no	Meta-analysis			
no	Before/after using empirical Bayes or full Bayes	NJ		
no	Before/after using empirical Bayes or full Bayes	NC	Statewide	
no	Before/after using empirical Bayes or full Bayes	FL		
no	Meta-analysis			
no	Meta-analysis			
no	Simple before/after			

Sample Size Unit Type	Before Sample Size	After Sample Size	Required Sample Size	Required Before Sample Size

Crashes		3122		
Sites	71	71		
Crashes	600	695		
Crashes	1760	1063		

Crashes	55	26		
Crashes	46	23		
Sites	16	16		
Crashes	48	18		
Crashes		56		
Crashes		121		
Crashes		54		

Site-years	83	83		
Site-years				
Site-years	98	98		
Site-years				
Sites	15	15		
Sites	16	16		
Sites	28	28		
Sites	13	13		
Sites	15	15		

Sites	28	28		
Sites	22	22		
Sites	13	13		
	30	30		
Site-years				

Site-years				
Site-years	150	246		
Crashes		838		
Crashes	69	39		
Crashes	145	129		
Sites	22	22		

Sites	22	22		
Sites	11	11		
Sites	11	11		
Sites	11	11		
Sites	11	11		
Sites	22	22		
Crashes	1223	646		

Crashes	3288	1653		
Sites	171	171		

Crashes		91		
	214			
Crashes	243	49		
Site-years	315	233		
Site-years	141	94		
Crashes	66	24		
Crashes	300	96		
Crashes	206	68		

Crashes	129	107		
Crashes	397	193		
Crashes	2615	1456		
Crashes	239	116		
Crashes	1733	920		
Crashes	1114	664		
Crashes	222	63		
Crashes	94	34		
Crashes	308	164		
Crashes	158	120		
Crashes	137	79		
Crashes	303	159		
Crashes	606	291		
Crashes	166	53		
Mile-years	72	95		

Crashes				
Crashes				
Crashes				
Crashes				
Crashes				
Mile-years	46	22		
Crashes	170	46		
Crashes	148	40		
Site-years	32	28		
Crashes	122	102		

Crashes				
Crashes				
Crashes				
Crashes				
Crashes	64	24		
Crashes				
Crashes	107	45		
Crashes				
Crashes	101	56		
Crashes	300	143		
Crashes	231	162		
Crashes	248	115		
Crashes	60	44		
Crashes	157	84		

Crashes	228	141		
Crashes	477	285		
Crashes	131	97		
Crashes	417	241		
Crashes	108	66		
Crashes	103	56		
Crashes	70	44		
Crashes	100	70		
Crashes				
Crashes				
Crashes				

Crashes	1705	63		
Crashes	2354	86		
Crashes	2887	126		
Crashes	4141	181		
Mile-years	139	139		
Mile-years	89	89		
Mile-years	582	582		
Mile-years	319	319		

Miles	1178	1178		
Miles	1178	1178		
Miles	1178	1178		
Miles	1178	1178		
Miles	1178	1178		
Crashes	82	50		
Crashes	298	199		
Crashes	198	140		
Crashes	754	505		
Crashes	940	660		

Crashes	476	400		
Crashes	1422	1343		
Crashes	115	72		
Crashes	46	41		
Crashes	332	237		
Crashes	502	425		
Crashes	39	22		
Crashes	90	48		
Crashes	258	178		
Crashes	318	201		
Crashes	749	656		

Crashes	2557	2184		
Crashes	3332	3399		
Crashes	120	98		
Crashes	179	167		
Miles	430	430		
Miles	430	430		
Miles	430	430		
Miles	282	282		

Miles	1144	1144		
Miles	1144	1144		
Miles	1144	1144		
Miles	630	630		
Miles	630	630		
Miles	630	630		
Miles	714	714		

Miles	348	348		

Crashes	422	393		
Crashes	286	39		
Crashes	1853	1244		

Required After Sample Size	Begin Year of Data	End Year of Data	Intersection Related	Traffic Volume Unit
			no	
			no	
			no	
			no	
			no	
			no	
			no	
			no	
			no	
			no	Annual Average Daily Traffic (AADT)
			no	
			no	

			no	Annual Average Daily Traffic (AADT)
			no	Annual Average Daily Traffic (AADT)
	1994	2006	yes	
			no	
			yes	Annual Average Daily Traffic (AADT)
	1997	2007	yes	Annual Average Daily Traffic (AADT)
			yes	Annual Average Daily Traffic (AADT)
			yes	Annual Average Daily Traffic (AADT)

	1994	2010	yes	Annual Average Daily Traffic (AADT)
	1994	2010	yes	Annual Average Daily Traffic (AADT)
	2000	2009	yes	Annual Average Daily Traffic (AADT)
			yes	Annual Average Daily Traffic (AADT)
			yes	Annual Average Daily Traffic (AADT)
	1994	2010	yes	Annual Average Daily Traffic (AADT)
	2003	2010	no	Annual Average Daily Traffic (AADT)
	2003	2010	no	Annual Average Daily Traffic (AADT)
	2003	2010	no	Annual Average Daily Traffic (AADT)

			yes	Annual Average Daily Traffic (AADT)
			yes	Annual Average Daily Traffic (AADT)
			yes	Annual Average Daily Traffic (AADT)
	1990	2009	yes	
	1999	2009	yes	Annual Average Daily Traffic (AADT)
	1999	2009	yes	Annual Average Daily Traffic (AADT)
	1999	2009	yes	Annual Average Daily Traffic (AADT)
	1999	2009	yes	Annual Average Daily Traffic (AADT)
	2000	2009	yes	Annual Average Daily Traffic (AADT)

	2000	2009	yes	Average Daily Traffic (ADT)
	2000	2009	yes	Annual Average Daily Traffic (AADT)
	2000	2009	yes	Average Daily Traffic (ADT)
			yes	Not specified
			yes	Not specified
	2002	2012	no	
	1990	2009	yes	
			yes	Not specified

	2006	2008	no	Average Daily Traffic (ADT)
	1994	2006	no	Annual Average Daily Traffic (AADT)
			no	
			no	
	1995	2005	yes	Annual Average Daily Traffic (AADT)
			no	
			no	
			no	Annual Average Daily Traffic (AADT)
	1999	2003	no	
	1999	2003	no	
	2000	2005	no	

	2000	2005	no	
	2000	2005	no	
	2000	2005	no	
	2000	2005	no	
	2000	2005	no	
	2000	2005	no	
	1999	2004	yes	Average Daily Traffic (ADT)

	1999	2004	yes	Average Daily Traffic (ADT)
	1999	2004	yes	
			no	
			yes	Not Specified
			yes	Not Specified
			yes	Not Specified

	1996	2010	yes	Annual Average Daily Traffic (AADT)
			yes	Average Daily Traffic (ADT)
	2004	2009	yes	Annual Average Daily Traffic (AADT)
			no	
	2001	2009	no	Annual Average Daily Traffic (AADT)
	1997	2008	yes	
	2000	2006	no	
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)

	2003	2010	no	Annual Average Daily Traffic (AADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	2001	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	2001	2006	no	Average Daily Traffic (ADT)
	1993	2007	no	Annual Average Daily Traffic (AADT)

	1994	2008	yes	Annual Average Daily Traffic (AADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Annual Average Daily Traffic (AADT)
	1997	2009	no	Annual Average Daily Traffic (AADT)
	1997	2009	no	Annual Average Daily Traffic (AADT)
	1998	2008	no	Average Daily Traffic (ADT)
	2003	2010	no	Annual Average Daily Traffic (AADT)

	1992	2008	yes	
	1992	2008	yes	
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)

	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2005	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
	1997	2006	no	Average Daily Traffic (ADT)
			no	

			no	
			no	
	1987	2006	yes	Annual Average Daily Traffic (AADT)
	1987	2006	yes	Annual Average Daily Traffic (AADT)
	1987	2006	yes	Annual Average Daily Traffic (AADT)
	1987	2006	yes	Annual Average Daily Traffic (AADT)
	1994	2004	no	Annual Average Daily Traffic (AADT)
	1991	2004	no	
	1990	2004	no	
	1990	2004	no	

	2001	2007	no	
	2001	2007	no	
	2001	2007	no	
	2001	2007	no	
	2001	2007	no	
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)

	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)

	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	2002	2009	no	Average Daily Traffic (ADT)
	1996	2008	yes	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)

	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)
	1999	2008	no	Annual Average Daily Traffic (AADT)

	1999	2008	no	Annual Average Daily Traffic (AADT)
			no	
			no	
			no	
			no	
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			no	Annual Average Daily Traffic (AADT)
			no	Annual Average Daily Traffic (AADT)
			no	
			yes	Average Daily Traffic (ADT)

			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)
			no	
			yes	Average Daily Traffic (ADT)
			yes	Average Daily Traffic (ADT)

			yes	Not specified
	2001	2010	no	Annual Average Daily Traffic (AADT)
	2000	2007	yes	Annual Average Daily Traffic (AADT)
	2002	2007	no	
			no	Average Daily Traffic (ADT)
			no	Average Daily Traffic (ADT)
			yes	Not specified

Minimum Traffic Volume (non-intersection)	Maximum Traffic Volume (non-intersection)	Minimum Major Road Traffic Volume (intersection)	Maximum Major Road Traffic Volume (intersection)	Minimum Minor Road Traffic Volume (intersection)
All	All			
All	All			
All	All			
All	All			
All	All			
All	All			
All	All			
All	All			
All	All			
All	All			
All	All			

100000	Not specified			
Not specified	Not specified			
		3000	77000	1
		4857	74990	1466
		4857	74990	1466
		4857	74990	1466

		4100 (total entering)	48100 (total entering)	
		4100 (Total)	48100 (Total)	
		5300	52500	
		4100 (total entering)	48100 (total entering)	
27000	96000			
27000	96000			
27000	96000			

		680	15400	680
		5322	43123	
		5322	43123	
		5322	43123	
		5322	43123	
		5300	52500	

		5300	52500	
		5300	52500	
		5300	52500	
		Not specified	Not specified	
		Not specified	Not specified	
		680	15100	680
		Not specified	Not specified	

5,134	153,500			
3100	50300			
Not specified	Not specified			
Not specified	Not specified			
Not specified	Not specified			
Not specified	Not specified			
17049	74079			

17049	74079			
17049	74079			
17049	74079			
17049	74079			
17049	74079			
17049	74079			
		4637	51743	134

		4637	51743	134
Not specified	Not specified			
		Not Specified	Not Specified	
		Not Specified	Not Specified	
		Not Specified	Not Specified	

		3000	30000	
		35000		
20000	60000			
23000	42000			
1336	13240			
574	20784			
574	17591			

200	8000			
1336	13240			
574	20784			
2338	22076			
574	20784			
574	17591			
3167	20784			
1336	13240			
574	20784			
574	17591			
574	17591			
1336	13240			
574	20784			
3167	20784			
261	14790			

		7500	99000	40
180	12776			
180	12776			
4956	31692			
180	12776			
895	20479			
1655	7031			
1655	7031			
10000	55000			
200	8000			

180	12776			
180	12776			
948	9067			
180	12776			
782	10386			
180	12776			
948	9067			
6777	37112			
11254	59391			
11539	37112			
6777	24752			
4959	20763			

782	10386			
6777	37112			
11254	59391			
11539	37112			
5326	20763			
4959	20763			
5326	20763			
782	10386			
180	12776			
180	12776			
180	12776			
Not specified	Not specified			

Not specified	Not specified			
Not specified	Not specified			
8500	22500			

		2420	21477	995
397	18697			
397	18697			
397	18697			
397	18697			

310	18697			
310	18697			
310	18697			
310	18697			
310	18697			
310	18697			
310	15000			

310	15000			
Not specified	Not specified			
Not specified	Not specified			
Not specified	Not specified			
All	All			
30000	40000			
Not specified	Not specified			
		1500	32400	50

		1500	40600	200
		4600	40300	100
		7200	55100	550
		1600	32400	50
		1600	32400	50
		1500	40600	200
		4600	40300	100
		7200	55100	550
		1500	40600	25
		7200	55100	550

		Not specified	Not specified	
		2550	59000	1000
		Not specified	Not specified	

Maximum Minor Road Traffic Volume (intersection)	Number of Lanes	Intersection Type	Intersection Geometry	Traffic Control Type

		Roadway/roadway (not interchange related)	3-leg,4-leg	Signalized
45500		Roadway/roadway (not interchange related)	4-leg	Signalized
42723		Roadway/roadway (not interchange related)	4-leg	Signalized
42723		Roadway/roadway (not interchange related)	4-leg	Signalized
42723		Roadway/roadway (not interchange related)	4-leg	Signalized

	2,4	Roadway/roadway (not interchange related)	3-leg,4-leg	Other
	4	Roadway/roadway (not interchange related)	3-leg,4-leg	Other
	2	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
		Roadway/roadway (not interchange related)	Not specified	Stop-controlled
		Roadway/roadway (not interchange related)	Not specified	Stop-controlled
	2,4	Roadway/roadway (not interchange related)	3-leg,4-leg	Stop-controlled
	4,6,8			
	4,6,8			
	4,6,8			

	1	Roadway/roadway (not interchange related)	4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
15400	1		4-leg	Stop-controlled
	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
	2	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout

	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	4-leg	Roundabout
	2-Jan	Roadway/roadway (not interchange related)	3-leg,4-leg	Roundabout
		Roadway/roadway (not interchange related)	Not specified	Signalized
		Roadway/roadway (not interchange related)	Not specified	Not specified
15100	1		4-leg	Stop-controlled
		Roadway/roadway (not interchange related)	Not specified	Signalized

	Var.			
	2			
	2			
		Roadway/roadway (interchange ramp terminal)		Uncontrolled
	2			

	2			
	2			
	2			
	2			
	2			
	2			
48906	4-Mar	Roadway/roadway (not interchange related)	4-leg	Signalized

48906	4-Mar	Roadway/roadway (not interchange related)	4-leg	Signalized
		Roadway/roadway (not interchange related)	4-leg	Signalized
		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
		Roadway/roadway (not interchange related)	4-leg	Signalized
		Roadway/roadway (not interchange related)	4-leg	Stop-controlled

	2	Roadway/roadway (not interchange related)	4-leg	Stop-controlled
		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
	4-Feb	Roadway/roadway (not interchange related)	3-leg,4-leg	Stop-controlled
	Multilane			
	6			
		Roadway/roadway (not interchange related)	No values chosen.	Signalized
	4-Feb			
	2			
	2			
	2			

	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			
	2			

20100		Roadway/roadway (not interchange related)	3-leg,4-leg	Signalized
	2			
	2			
	2			
	2			
	2			
	2			
	2			

		Not specified	Not specified	Signalized
		Not specified	Not specified	Signalized
	2			
	2			
	2			
	2			
	2			
	2			

	2			
	2			
	2			
	2			
	2			
	2			

	2			
	2			
		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
		Roadway/roadway (not interchange related)	3-leg,4-leg	Stop-controlled
		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
		Roadway/roadway (not interchange related)	3-leg,4-leg	Stop-controlled
	2			
	2			
	2			
	2			

	2			
	2			
	2			
	2			
	2			
	2			
	multi			
	multi			
	multi			
	multi			

	multi			
	multi			
	multi			
	multi			
	multi			
	multi			
	2			
	multi			
	multi			
	multi			
	multi			

	multi			
	multi			
	multi			
8948		Roadway/roadway (not interchange related)	4-leg	Signalized
	2			
	2			
	2			
	2			

	2			
	2			
	2			
	2			
	2			
	2			
	2			

	2			
	2			
		Roadway/roadway (not interchange related)	4-leg	Not specified
		Roadway/roadway (not interchange related)	4-leg	Not specified
11800		Roadway/roadway (not interchange related)	4-leg	Stop-controlled

8000		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
13700		Roadway/roadway (not interchange related)	4-leg	Signalized
2600		Roadway/roadway (not interchange related)	4-leg	Signalized
11800		Roadway/roadway (not interchange related)	3-leg	Stop-controlled
11800		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
8000		Roadway/roadway (not interchange related)	4-leg	Stop-controlled
13700		Roadway/roadway (not interchange related)	4-leg	Signalized
2600		Roadway/roadway (not interchange related)	4-leg	Signalized
	2			
26000		Roadway/roadway (not interchange related)	3-leg,4-leg	Stop-controlled
8400		Roadway/roadway (not interchange related)	3-leg,4-leg	Signalized

		Roadway/roadway (not interchange related)	Not specified	Not specified
	7-Feb			
23333		Not specified	3-leg,4-leg	Signalized
	2			
	2			
		Roadway/roadway (not interchange related)	Not specified	Roundabout

Speed Limit (mph)	Crash Time of Day	Roadway Division Type	Date CMF Added to Clearinghouse

	All		
	Not specified		11/16/2012
	Not specified		9/1/2012
	Not specified		9/1/2012

	All	All	8/1/2013
	All	All	8/1/2013
15-35 mph	All		6/5/2012
	All	All	8/1/2013
40mph to 55 mph	Not specified	Divided by Median	2/24/2014
40mph to 55 mph	Not specified	Divided by Median	2/24/2014
40mph to 55 mph	Not specified	Divided by Median	2/24/2014

40-65 mph			2/20/2013
40-65 mph			1/30/2013
40-65 mph			1/30/2013
25-55	Not specified	All	7/15/2011
	Not specified		11/16/2012
	Not specified		11/16/2012
	Not specified		11/16/2012
	Not specified		11/16/2012
15-35 mph	All		6/5/2012

15-35 mph	All		6/5/2012
15-35 mph	All		6/5/2012
15-35 mph	All		6/5/2012
	All		7/12/2014
25-55	Not specified	Undivided	7/15/2011

Var.	Not specified	Divided by Median	1/29/2013
100 km/h reduced to 80 km/h	All	Divided by Median	3/21/2011
	Day		
	All		2/15/2010
	All		2/15/2010
	All		11/18/2009

	All		11/18/2009
	All		11/18/2009
	All		11/18/2009
	All		11/18/2009
	All		11/18/2009
	All		11/18/2009
50 km/h	Night		9/1/2012

50 km/h	Day		9/1/2012
50 km/h (30 mph)	All		7/29/2010

45-55 mph			8/1/2013
	Not specified		7/16/2014
		Divided	
130 km/h	All	Divided by Median	6/18/2012
	All		2/6/2013
	All	All	8/11/2010
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011

	All	Undivided	1/9/2014
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011

	All		9/1/2012
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Divided by Median	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	8/11/2010
	All	Undivided	9/1/2012
	All	Undivided	9/1/2012
	All	Divided by Median	1/4/2012
	All	Undivided	1/9/2014

	All		6/4/2012
	All		6/4/2012
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Divided by Median	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011

	All	Undivided	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Divided by Median	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011
	All	Undivided	3/31/2011

	All	Undivided	8/11/2010
	All	Undivided	8/11/2010
	All	Undivided	8/11/2010
	All	Undivided	8/11/2010
	All	Divided by TWLTL	4/20/2010
	All	Divided by TWLTL	4/20/2010
	All	Divided by TWLTL	4/20/2010
	All	Divided by TWLTL	4/20/2010

	Day		1/21/2013
	All		1/21/2013
	All		1/21/2013
	Night		1/21/2013
	Night		1/21/2013
	All	Undivided	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013

	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Undivided	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013

	All	Undivided	1/23/2013
	All	Divided by Median	1/23/2013
	All	Divided by Median	1/23/2013
	All		1/22/2013
	All		11/16/2012
	All		11/16/2012
	All		11/16/2012
	All		11/16/2012

	All		11/16/2012
	All		11/16/2012
	All		11/16/2012
	All		11/16/2012
	All		11/16/2012
	All		11/16/2012
	All		11/16/2012

	All		11/16/2012
			3/20/2013

	Not specified	Divided by Median	8/1/2013
	Night	All	8/1/2013
	All		2/15/2010

CRF Clearinghouse - CMF

CMF ID	Study Title	Resource
302	NCHRP Report 375: Median Intersection Design	Click for CMF details
5452	Safety Effects of Median Treatments Using Longitudinal Channelizers: Empirical Bayesian Before-and-After Study	Click for CMF details
5453	Safety Effects of Median Treatments Using Longitudinal Channelizers: Empirical Bayesian Before-and-After Study	Click for CMF details
5454	Safety Effects of Median Treatments Using Longitudinal Channelizers: Empirical Bayesian Before-and-After Study	Click for CMF details
4675	Safety Evaluation of Geometric Design Criteria for Entrance-Exit Ramp Spacing and Auxiliary Lane Use	Click for CMF details
3035	Analyzing Raised Median Safety Impacts Using Bayesian Methods	Click for CMF details
21	Handbook of Road Safety Measures	Click for CMF details
4583	Highway Safety Manual, 1st Edition	Click for CMF details
4142	Safety Evaluation of an Automated Section Speed Enforcement System	Click for CMF details
4673	Evaluation of the Photo Enforcement Safety Program of the City of Winnipeg	Click for CMF details
3860	Effects of Red Light Camera Enforcement on Fatal Crashes in Large US Cities	Click for CMF details
3861	Effects of Red Light Camera Enforcement on Fatal Crashes in Large US Cities	Click for CMF details

4741	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details
4746	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details
4737	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details
4748	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details
4742	Safety effects of wider edge lines on rural, two-lane highways	Click for CMF details
4790	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4781	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4777	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4780	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4778	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4782	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4779	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4783	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4787	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details

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4785	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4776	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
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4771	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
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4768	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4775	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4769	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
4792	Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II	Click for CMF details
2361	Safety Effects of Reducing Freeway Illumination for Energy Conservation	Click for CMF details
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581	Handbook of Road Safety Measures	Click for CMF details
441	Handbook of Road Safety Measures	Click for CMF details
5228	Evaluation of Roundabout Safety	Click for CMF details

4927	Evaluation of Roundabout Safety	Click for CMF details
4195	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details
210	Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method	Click for CMF details
211	Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method	Click for CMF details
4931	Evaluation of Roundabout Safety	Click for CMF details
4696	A Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways	Click for CMF details
4259	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
4187	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details
4255	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
4185	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details
4193	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details
4253	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
4261	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details

4189	Safety Effectiveness of Converting Signalized Intersections to Roundabouts	Click for CMF details
214	Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users	Click for CMF details
213	Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users	Click for CMF details
215	Safety Effects of Roundabouts in Flanders: Signal Type, Speed Limits, and Vulnerable Road Users	Click for CMF details
294	Handbook of Road Safety Measures	Click for CMF details
292	Handbook of Road Safety Measures	Click for CMF details
272	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
273	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
275	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
274	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
255	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
264	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
265	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
267	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details

266	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
287	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
288	Safety Effectiveness of Intersection Left- and Right-Turn Lanes	Click for CMF details
4700	A Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways	Click for CMF details
4698	A Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways	Click for CMF details
4888	Safety Evaluation of Discontinuing Late Night Flash Operations at Signalized Intersections	Click for CMF details
3128	Evaluation of the Conversion from Two-Way Stop Sign Control to All-Way Stop Sign Control at 53 Locations in North Carolina	Click for CMF details
3131	Evaluation of the Conversion from Two-Way Stop Sign Control to All-Way Stop Sign Control at 53 Locations in North Carolina	Click for CMF details
320	NCHRP Report 491: Crash Experience Warrant for Traffic Signals	Click for CMF details
5534	Comparison of Safety Evaluation Approaches for Intersection Signalization in Florida	Click for CMF details

1431	Evaluating the Safety Impacts of Improving Signal Visibility at Urban Signalized Intersections	Click for CMF details
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4269	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
4169	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
4165	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
4111	Investigating Effect of Collision Aggregation on Safety Evaluations Using Multivariate Linear Intervention Models: Case Study of Signal Head Upgrade Program	Click for CMF details
4201	Evaluation of Safety Strategies at Signalized Intersections	Click for CMF details
156	Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1	Click for CMF details

4574	Highway Safety Manual, 1st Edition	Click for CMF details
153	Handbook of Road Safety Measures	Click for CMF details
26	Handbook of Road Safety Measures	Click for CMF details
29	Handbook of Road Safety Measures	Click for CMF details
42	Handbook of Road Safety Measures	Click for CMF details
41	Handbook of Road Safety Measures	Click for CMF details
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1928	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details
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1929	Safety Impact of Truck Lane Restrictions on Multilane Freeways	Click for CMF details
2342	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details
2343	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details
2346	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details
584	Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads	Click for CMF details
4958	Effect of Removing Freeway Mainline Barrier Toll Plazas on Safety	Click for CMF details

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3360	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details
3358	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details
5401	Study of KDOT Policy on Lane and Shoulder Minimum Width for Application of Centerline Rumble Strips	Click for CMF details
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3362	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details
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3408	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details
5397	Study of KDOT Policy on Lane and Shoulder Minimum Width for Application of Centerline Rumble Strips	Click for CMF details
2705	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details

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2704	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details
2708	Safety Evaluation of Transverse Rumble Strips on Approaches to Stop Controlled Intersections in Rural Areas	Click for CMF details
5639	Safety Evaluation of Hybrid Mainline Toll Plazas	Click for CMF details
4083	Safety Effectiveness of Super 2 Highways in Texas	Click for CMF details
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3561	NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Click for CMF details
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4362	Safety Evaluation of the Safety Edge Treatment	Click for CMF details
4397	Safety Evaluation of the Safety Edge Treatment	Click for CMF details
4323	Safety Evaluation of the Safety Edge Treatment	Click for CMF details
4314	Safety Evaluation of the Safety Edge Treatment	Click for CMF details
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2450	Safety Effectiveness of Advance Street Name Signs	Click for CMF details
4918	Evaluation of the Safety Effectiveness of "Vehicle Entering When Flashing" Signs and Actuated Flashers at 74 Stop-Controlled Intersections in North Carolina	Click for CMF details
2438	Safety Evaluation of Improved Curve Delineation	Click for CMF details
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134	Handbook of Road Safety Measures	Click for CMF details
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129	Handbook of Road Safety Measures	Click for CMF details
131	Handbook of Road Safety Measures	Click for CMF details
406	A Review of Two Innovative Pavement Patterns that Have Been Developed to Reduce Traffic Speeds and Crashes	Click for CMF details

Countermeasure Category	Countermeasure Subcategory	Countermeasure
Access management	Other	Increase intersection median width by 3 ft increments
Access management		Convert an open median to a directional median
Access management		Convert an open median to a directional median
Access management		Convert an open median to a directional median
Access management		Decrease freeway ramp spacing from infinity to S (ft) with/without auxiliary lane
Access management		Install raised median
Access management		Provide a raised median
Advanced technology and ITS		Implement automated speed enforcement cameras
Advanced technology and ITS		Install automated section speed enforcement system
Advanced technology and ITS		Install automated speed camera at signalized intersection
Advanced technology and ITS		Install red-light camera (red light running crashes)
Advanced technology and ITS		Install red-light cameras at intersections

Delineation	Visibility of existing markings	Install wider edgelines (4 in to 6 in)
Delineation	Visibility of existing markings	Install wider edgelines (4 in to 6 in)
Delineation	Visibility of existing markings	Install wider edgelines (4 in to 6 in)
Delineation	Visibility of existing markings	Install wider edgelines (4 in to 6 in)
Delineation	Visibility of existing markings	Install wider edgelines (4 in to 6 in)
Delineation	Visibility of existing markings	Install wider markings and both edgeline and centerline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and edgeline rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing

Delineation	Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings and shoulder rumble strips with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings with resurfacing
Delineation	Visibility of existing markings	Install wider markings WITHOUT resurfacing
Highway lighting		Full to partial interchange lighting
Highway lighting		Illumination
Highway lighting		Illumination
Highway lighting		Provide intersection illumination
Intersection geometry	Intersection geometry reconfiguration	Conversion of intersection into low-speed roundabout

Intersection geometry	Intersection geometry reconfiguration	Conversion of intersection into multi-lane roundabout
Intersection geometry	Intersection geometry reconfiguration	Conversion of signalized intersection into single- or multi-lane roundabout
Intersection geometry	Intersection geometry reconfiguration	Conversion of stop-controlled intersection into single-lane roundabout
Intersection geometry	Intersection geometry reconfiguration	Conversion of stop-controlled intersection into single-lane roundabout
Intersection geometry	Intersection geometry reconfiguration	Conversion of two-way stop-controlled intersection into single- or multi-lane roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert high-speed rural intersection to roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout

Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert signalized intersection to modern roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert to roundabout
Intersection geometry	Intersection geometry reconfiguration	Convert unsignalized intersection to roundabout
Intersection geometry	Turn lanes	Painted channelization of both major and minor roads
Intersection geometry	Turn lanes	Physical channelization of both major and minor roads
Intersection geometry	Turn lanes	Provide a left-turn lane on both major-road approaches
Intersection geometry	Turn lanes	Provide a left-turn lane on both major-road approaches
Intersection geometry	Turn lanes	Provide a left-turn lane on both major-road approaches
Intersection geometry	Turn lanes	Provide a left-turn lane on both major-road approaches
Intersection geometry	Turn lanes	Provide a left-turn lane on one major-road approach
Intersection geometry	Turn lanes	Provide a left-turn lane on one major-road approach
Intersection geometry	Turn lanes	Provide a left-turn lane on one major-road approach
Intersection geometry	Turn lanes	Provide a left-turn lane on one major-road approach

Intersection geometry	Turn lanes	Provide a left-turn lane on one major-road approach
Intersection geometry	Turn lanes	Provide a right-turn lane on one major-road approach
Intersection geometry	Turn lanes	Provide a right-turn lane on one major-road approach
Intersection geometry		Convert high-speed rural intersection (4 leg) to roundabout
Intersection geometry		Convert high-speed rural intersection (4 leg) to roundabout
Intersection traffic control	Signal phasing or timing	Replace Night-Time Flash with Steady Operation
Intersection traffic control	Traffic control type	Convert minor-road stop control to all-way stop control
Intersection traffic control	Traffic control type	Convert two-way (without flashing beacons) to all-way stop control (without flashing beacons)
Intersection traffic control	Traffic control type	Install a traffic signal
Intersection traffic control	Traffic control type	Install a traffic signal

Intersection traffic control	Traffic control visibility	Improve visibility of signal heads
Intersection traffic control	Traffic control visibility	Installation of an actuated advance warning dilemma zone protection system at high-speed signalized intersections
Intersection traffic control		Change left-turn phase from permissive to protected/permissive or permissive/protected phasing on one or more approaches
Intersection traffic control		Change permissive left-turn phasing to protected/permissive
Intersection traffic control		Changing left turn phasing on more than one approach from permissive to protected-permissive
Intersection traffic control		Changing left turn phasing on one approach from permissive to protected-permissive
Intersection traffic control		Improve signal visibility, including signal lens size upgrade, installation of new back-plates, addition of reflective tapes to existing back-plates, and installation of additional signal heads
Intersection traffic control		Install dynamic signal warning flashers
On-street parking		Prohibit on-street parking

On-street parking		Prohibit on-street parking
On-street parking		Prohibit on-street parking
Roadside	Clear zone	Flatten sideslope from 1V:3H to 1V:4H
Roadside	Clear zone	Flatten sideslope from 1V:4H to 1V:6H
Roadside	Median barriers	Install any type of median barrier
Roadside	Roadside barriers	Change barrier along embankment to less rigid type
Roadside	Roadside barriers	New guardrail along embankment
Roadside	Roadside barriers	New guardrail along embankment
Roadway	Lane restrictions	Implement truck lane restrictions on multilane freeways
Roadway	Lane restrictions	Implement truck lane restrictions on multilane freeways (
Roadway	Lane restrictions	Implement truck lane restrictions on multilane freeways (
Roadway	Number of lanes	Install TWLTL (two-way left turn lane) on two lane road
Roadway	Number of lanes	Install TWLTL (two-way left turn lane) on two lane road
Roadway	Number of lanes	Install TWLTL (two-way left turn lane) on two lane road
Roadway	Number of lanes	Introduce TWLTL (two-way left turn lanes) on rural two lane roads
Roadway	Other	Removing mainline barrier toll plazas on highways

Roadway	Pavement condition and friction	Resurface pavement
Roadway	Roadway rumble strips	Install centerline and shoulder rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips
Roadway	Roadway rumble strips	Install centerline rumble strips

Roadway	Roadway rumble strips	Install centerline rumble strips on horizontal curves
Roadway	Roadway rumble strips	Install centerline rumble strips on horizontal curves
Roadway	Roadway rumble strips	Install centerline rumble strips on tangent sections
Roadway	Roadway rumble strips	Install centerline rumble strips on tangent sections
Roadway	Roadway rumble strips	Install centerline rumble strips on tangent sections
Roadway	Roadway rumble strips	Install edgeline rumble strips
Roadway	Roadway rumble strips	Install edgeline rumble strips
Roadway	Roadway rumble strips	Install edgeline rumble strips on roadways with a shoulder width of 5 feet or greater
Roadway	Roadway rumble strips	Install edgeline rumble strips on roadways with a shoulder width of 5 feet or greater
Roadway	Roadway rumble strips	Install rectangular shaped centerline rumble strips
Roadway	Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas

Roadway	Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas
Roadway	Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas
Roadway	Roadway rumble strips	Install transverse rumble strips on stop controlled approaches in rural areas
Roadway		Convert traditional mainline toll plazas to hybrid mainline toll plazas
Roadway		Install periodic passing lanes on rural two-lane highways
Roadway		Install periodic passing lanes on rural two-lane highways
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips

Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
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Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips

Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips on roadways with a shoulder width equal to 5 feet
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips with an offset of 0-8 inches relative to the edgeline
Shoulder treatments	Shoulder rumble strips	Install shoulder rumble strips with an offset of 9-20 inches relative to the edgeline
Shoulder treatments		Installation of safety edge treatment
Shoulder treatments		Installation of safety edge treatment
Shoulder treatments		Installation of safety edge treatment
Shoulder treatments		Installation of safety edge treatment
Shoulder treatments		Installation of safety edge treatment
Shoulder treatments		Installation of safety edge treatment

Signs		Advance street name signs
Signs		Install a "Vehicles Entering When Flashing" (VEWF) system (advance post mounted signs on major and loops on minor)
Signs		Install chevron signs on horizontal curves
Signs		Install new fluorescent curve signs or upgrade existing curve signs to fluorescent sheeting
Speed management		10% reduction in mean speed
Speed management		10% reduction in mean speed
Speed management		15% reduction in mean speed
Speed management		15% reduction in mean speed
Speed management		5% reduction in mean speed
Speed management		5% reduction in mean speed
Speed management		Install speed humps
Speed management		Install speed humps
Speed management		Install transverse rumble strips as traffic calming device
Speed management		Traffic calming
Speed management		Traffic calming
Speed management		Transverse bar pavement marking at roundabout approaches

CRF	CMF	Crash Type
4	0.96	Multiple vehicle
24	0.76	All
23	0.77	All
18	0.82	All
		Not specified
44	0.56	All
39	0.61	All
17	0.83	All
56	0.44	All
24	0.76	Speed related
24	0.76	All
17	0.83	All

41.5	0.585	Day time
36.8	0.632	Single vehicle
36.5	0.635	All
18.7	0.813	Nighttime,Single vehicle
12.7	0.873	Nighttime
38	0.62	All
26	0.74	All
25	0.75	All
24	0.76	All
24	0.76	All
14	0.86	All
10	0.9	All
26	0.74	All
25	0.75	All

23	0.77	All
20	0.8	All
38	0.62	All
34	0.66	All
25	0.75	All
21	0.79	All
9	0.91	All
8	0.92	All
4	0.96	All
22	0.78	All
8.7	0.913	All
32	0.69	All
27	0.73	All
59	0.41	Vehicle/pedestrian
52.73	0.473	All

63.28	0.367	All
71	0.29	All
88	0.12	All
82	0.18	All
35.03	0.65	All
87	0.13	All
74.1	0.259	All
74	0.26	All
71.2	0.288	All
66	0.34	All
66	0.34	All
65.8	0.342	All
55.5	0.445	All

55	0.45	All
32	0.68	All
39	0.61	All
44	0.56	All
57	0.43	All
27	0.73	All
58	0.42	All
50	0.5	All
48	0.52	All
17	0.83	All
55	0.45	All
35	0.65	All
29	0.71	All
28	0.72	All

9	0.91	All
23	0.77	All
9	0.91	All
89	0.11	All
88	0.12	All
53	0.47	All
77	0.23	All
72.4	0.276	All
67	0.33	Angle
31.6	0.684	All

3	0.97	All
11.3	0.887	All
16	0.84	Left turn
3.8	0.962	All
8.6	0.914	All
0.5	0.995	All
9.8	0.902	Nighttime
18	0.82	All
35	0.65	All

22	0.78	All
20	0.8	All
42	0.58	All
22	0.78	All
43	0.57	All
32	0.68	Run off road
47	0.53	Run off road
44	0.56	Run off road
1	0.99	Truck related
40	0.6	Truck related
32	0.68	All
37.1	0.629	All
27.5	0.725	All
26.1	0.739	All
35	0.65	All
40.3	0.597	All

5	0.95	All
18	0.82	All
45	0.55	Head on,Sideswipe
45	0.55	Head on,Sideswipe
44	0.56	Head on,Sideswipe
34.05	0.66	All
22	0.78	All
12	0.88	All
9	0.91	All
9	0.91	All
6	0.94	All

37	0.63	All
6	0.94	All
22	0.78	All
18	0.82	All
15	0.85	All
39	0.61	Run off road
33	0.67	Run off road
66	0.34	Run off road
43	0.57	Run off road
31.11	0.689	All
25.5	0.745	All

21.5	0.785	All
8.7	0.913	All
1.3	0.987	All
46	0.54	All
42	0.58	All
35	0.65	Non-intersection
47	0.53	Run off road
40	0.6	Run off road
37	0.63	Run off road
37	0.63	Run off road
36	0.64	Run off road
28	0.72	All

18	0.82	All
17	0.83	Run off road
16	0.84	All
16	0.84	Run off road
13	0.87	All
10	0.9	All
8	0.92	All
7	0.93	All
7	0.93	Run off road
6	0.94	All
5	0.95	All

3	0.97	Run off road
0	1	Run off road
54	0.46	Run off road
33	0.67	Run off road
38	0.62	Run off road
23.123	0.769	Run off road
21.596	0.784	Other
16.528	0.835	All
10.959	0.89	All
4.676	0.953	Other
1.667	0.983	All

1	0.99	All
27	0.73	All
16	0.84	Non-intersection
25	0.75	Non-intersection
32	0.68	All
15	0.85	All
44	0.56	All
22	0.78	All
17	0.83	All
7	0.93	All
50	0.5	All
40	0.6	All
36	0.64	All
33	0.67	All
33	0.67	All
57	0.43	Speed related

Crash Severity	Roadway Type	Area Type	Publication Year
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	1995
Fatal,Serious injury	Principal Arterial Other	Urban and suburban	2013
Fatal,Serious injury,Minor injury	Principal Arterial Other	Urban and suburban	2013
Serious injury	Principal Arterial Other	Urban and suburban	2013
Fatal,Serious injury,Minor injury	Principal Arterial Interstate	Not specified	2012
Fatal,Serious injury	Not Specified		2011
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2004
Fatal,Serious injury,Minor injury	All	All	2010
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Not specified	2012
Serious injury,Minor injury	Not specified	Not specified	2011
Fatal	Not Specified	Urban	2011
Fatal	Not Specified	Urban	2011

Fatal,Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	Not specified	Rural	2011
Fatal,Serious injury,Minor injury	Not specified	Rural	2011
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Fatal,Serious injury	Not specified	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Fatal,Serious injury,Minor injury	Not specified	Urban	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2011
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Fatal,Serious injury,Minor injury	Not specified	Rural	2011

Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2011
Fatal,Serious injury	Not specified	Urban	2011
Fatal,Serious injury	Not specified	Rural	2011
Fatal,Serious injury,Minor injury	Not specified	Rural	2011
Fatal,Serious injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Fatal,Serious injury,Minor injury	Not specified	Urban	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2011
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Suburban	2008
Serious injury,Minor injury	All	Urban	2004
Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	All	2004
Serious injury,Minor injury	Not specified	Not specified	2004
Fatal,Serious injury,Minor injury	Not specified	All	2013

Fatal,Serious injury,Minor injury	Not specified	All	2013
Serious injury,Minor injury	Not Specified	Urban and suburban	2012
Serious injury,Minor injury	Not specified	Urban	2001
Serious injury,Minor injury	Not specified	Rural	2001
Fatal,Serious injury,Minor injury	Not specified	All	2013
Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	Not specified	Suburban	2011
Serious injury,Minor injury	Not Specified	Suburban	2012
Fatal,Serious injury,Minor injury	Not specified	Urban and suburban	2011
Serious injury,Minor injury	Not Specified	Urban and suburban	2012
Serious injury,Minor injury	Not Specified	Urban and suburban	2012
Fatal,Serious injury,Minor injury	Not specified	Urban and suburban	2011
Fatal,Serious injury,Minor injury	Not specified	Urban	2011

Serious injury,Minor injury	Not Specified	Urban	2012
Serious injury,Minor injury	Not specified	Not specified	2007
Serious injury,Minor injury	Not specified	Not specified	2007
Serious injury,Minor injury	Not specified	Not specified	2007
Serious injury,Minor injury	Not specified	Rural	2004
Fatal,Serious injury,Minor injury	Not specified	Rural	2004
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Rural	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002
Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002

Fatal,Serious Injury,Minor Injury	Not Specified	Urban	2002
Fatal,Serious Injury,Minor Injury	Not Specified	All	2002
Fatal,Serious Injury,Minor Injury	Not Specified	All	2002
Serious injury,Minor injury	Not specified	Rural	2012
Serious injury,Minor injury	Not specified	Rural	2012
Fatal,Serious injury,Minor injury	All	All	2013
Fatal,Serious injury,Minor injury	All	All	2010
Fatal,Serious injury,Minor injury	All	All	2010
Fatal,Serious Injury,Minor Injury	Not specified	Urban	2003
Fatal,Serious injury,Minor injury	Not specified	Not specified	2014

Fatal,Serious injury,Minor injury	Not specified	Urban	2007
Serious injury,Minor injury	Not specified	Not specified	2011
Fatal,Serious injury,Minor injury	Not specified	Urban	2010
Fatal,Serious injury,Minor injury	Not specified	Urban	2011
Fatal,Serious injury,Minor injury	Not Specified	Urban	2011
Fatal,Serious injury,Minor injury	Not Specified	Urban	2011
Fatal,Serious injury,Minor injury	Not Specified	Urban	2012
Fatal,Serious injury,Minor injury	Not Specified	All	2011
Serious injury,Minor injury	Principal Arterial Other	Urban	1982

Fatal,Serious injury,Minor injury	Principal Arterial Other	Urban	2010
Serious injury,Minor injury	Minor Arterial	Urban	2004
Serious injury,Minor injury	Not specified	Rural	2004
Serious injury,Minor injury	Not specified	Rural	2004
Fatal	Principal Arterial Other	Rural	2004
Serious injury,Minor injury	Not specified	Not specified	2004
Serious injury,Minor injury	Not specified	Not specified	2004
Fatal	Not specified	Not specified	2004
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009
Fatal,Serious injury,Minor injury	Principal Arterial Interstate		2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways		2009
Fatal,Serious injury,Minor injury	Not Specified	All	2008
Fatal,Serious injury,Minor injury	Not Specified	All	2008
Fatal,Serious injury,Minor injury	Not Specified	All	2008
Serious injury,Minor injury	Not specified	Rural	2008
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Not specified	2013

Fatal,Serious injury	Not Specified		2009
Fatal,Serious injury	Principal Arterial Other	Rural	2010
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	All	Rural	2012
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Urban	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009

Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	All	Rural	2012
Fatal,Serious injury	Major Collector	All	2010

Fatal,Serious injury	Major Collector	Rural	2010
Fatal,Serious injury,Minor injury	Major Collector	Rural	2010
Fatal,Serious injury,Minor injury	Major Collector	Rural	2010
Fatal,Serious injury	Principal Arterial Other	All	2014
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2012
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2012
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009

Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Urban	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other Freeways and Expressways	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009

Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Not Specified	Rural	2009
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011
Fatal,Serious injury,Minor injury	Principal Arterial Other	Rural	2011

Fatal,Serious injury,Minor injury	Not Specified	All	2010
Fatal,Serious injury,Minor injury	Not specified	All	2013
Fatal,Serious injury,Minor injury	All	Rural	2009
Fatal,Serious injury,Minor injury	All	Rural	2009
Fatal	All	All	2004
Serious injury,Minor injury	All	All	2004
Fatal	All	All	2004
Serious injury,Minor injury	All	All	2004
Fatal	All	All	2004
Serious injury,Minor injury	All	All	2004
Serious injury,Minor injury	Local	Urban and Suburban	2004
Serious injury,Minor injury	Local	Urban and Suburban	2004
Serious injury,Minor injury	Local	Urban and Suburban	2004
Serious injury,Minor injury	Minor Collector	Urban	2004
Serious injury,Minor injury	Minor Collector	Urban	2004
Serious injury,Minor injury	Not specified	Not specified	1996

Star Quality Rating	Prior Condition	Adjusted Standard Error of CRF	Unadjusted Standard Error of CRF
5		2	1
4	Roadway with full median openings		5.48
4	Roadway with full median openings		6.32
4	Roadway with full median openings		6.32
4	Ramp spacing approaching infinity, which represents a basic freeway segment with no ramps.		
4	no raised median		
4		10	6
5	No automated speed enforcement		1
4	No automated section speed enforcement system		7
4	Signalized intersection with no automated speed enforcement camera.		10.59
4	Absence of red-light cameras		
4	Absence of red-light camera		

4	4 in wide edgelines		6.6
4	4 in wide edgelines		6.1
4	4 in wide edgelines		5.2
4	4 in wide edgelines		12.1
4	4 in wide edgelines		10.7
4			9.5
4			3.5
4			5.4
4			6.5
4			3.1
4			4.8
4			2.7
4			8.8
4			12.3

4			5.1
4			4.3
4			14.2
4			9.7
4			5.5
4			6
4			3.7
4			2.2
4			1.9
4			8.1
4	Full interchange lighting.	4.2	4.2
4		7	
4		12	
4		20	
4	The intersection was operating under no control, yield, TWSC, AWSC, or signal control.		11.3

4	The intersection was operating under no control, yield, TWSC, AWSC, or signal control.		12.8
4	Signalized intersection		7
4		14	8
4		16	9
4	The intersection was operating under TWSC control.		10.4
4	Stop controlled intersection (3 or 4 leg)		
4	Signalized intersection		6.6
4	Signalized intersection		7
4	Signalized intersection		6.5
4	Signalized intersection		6
4	Signalize intersection (4 leg)		6
4	Signalized intersection		5.8
4	Signalized intersection		10

4	Signalized intersection		10
4		14	6
4		8	4
4		10	5
4		12	7
4			6
5		4	3
4		6	5
4		7	6
5		2	2
4		10	8
5		4	3
5		5	4
4		6	5

5		2	1
4		8	7
5		4	3
4	4 leg intersection		
4	4 leg intersection		
4	Traffic signals were operating in the late night flash (LNF) mode from late night to early morning hours.		8
4	Two-way stop sign control with and without flashing beacons.		2.5
4	Two-way stop sign control without flashing beacons.		3.7
4		24	20
4	Stop controlled intersection		9.3

4	Improvements included one or more of the following: signal lens size upgrade, installing new backboards, adding reflective tapes to existing backboards, and installing additional signal heads.		
4	Untreated signalized intersection		10.5
5	Permitted phasing		2
4	Permissive phasting		3.5
4	Permissive only left turn phasing on all treated approaches		5.5
4	Permissive only left turn phasing on the treated approach		4.3
4	Smaller signal lens size, old back-plates, no reflective tapes on existing back-plates, and less number of signal heads		5.6
4	Signalized intersection without advance warning flashers.		8.3
4		14	6

5	Provision of on-street parking		5
5		5	3
5		4	2
5		4	2
4		10	6
4		10	6
5		5	3
4		10	6
4	No truck restrictions		5.1
4	No truck restrictions		8.2
4	No truck restrictions		4.6
4			11
4			8.7
5			6.8
4		8	7
4	11 mainline toll plazas existed on the Gardens State Parkway (GSP) in New Jersey.		3.8

4			4.6
4			
4	No centerline rumble strips		6.7
5	No centerline rumble strips		6.4
4	No centerline rumble strips		30.8
4	No centerline rumble strips		14.14
4	No centerline rumble strips		6.6
5	No centerline rumble strips		2.8
4	No centerline rumble strips		9.5
5	No centerline rumble strips		3.5
4	No centerline rumble strips		4.2

4	No centerline rumble strips		11.6
4	No centerline rumble strips		8.1
4	No centerline rumble strips		10
4	No centerline rumble strips		7.8
5	No centerline rumble strips		5.9
4			15.56
4			12.22
4	Roadway with no rumble strips and a shoulder width less than 5 feet		18.55
4	Roadway with no rumble strips and a shoulder width less than 5 feet		14.52
4	No centerline rumble strips		15.48
4			12.1

4			10.7
4			12.4
4			10.9
4	Traditional mainline toll plazas		7
4	Two-lane rural highway with no passing lane		9
4	Two-lane rural highway with no passing lane		11
4			13.78
4			12.65
4			13.35
4			10.31
5			9.71
4			8.62

4			11.59
5			7.3
4			7.25
4			8.22
4			14.62
4			10.22
4			8.04
4			5.9
4			9.93
4			6.41
4			12.31

4			13.51
4			15.84
4	Roadway with no rumble strips and a shoulder width less than 5 feet		12.55
4			12.3
4			14.9
4	Rural highways prior to resurfacing and installation of safety edge treatment		11.053
4	Rural highways prior to resurfacing and installation of safety edge treatment		11.453
4	Rural highways prior to resurfacing and installation of safety edge treatment		11.919
4	Rural highways prior to resurfacing and installation of safety edge treatment		13.779
4	Rural highways prior to resurfacing and installation of safety edge treatment		9.672
4	Rural highways prior to resurfacing and installation of safety edge treatment		9.78

4	No advance signs at a signalized intersection		3.1
4	stop-controlled		10.2
4	No sign		10.4
4	No sign or sign without fluorescent sheeting		12.7
4		9	
5		5	
4		14	
4		8	
5		5	
5		3	
4		13	
4		16	
4		12	
4		9	
4		9	
4		19	8

Adjusted Standard Error of CMF	Unadjusted Standard Error of CMF	Included in First Edition of Highway Safety Manual	Type of Study Methodology
0.02	0.01	bold caret	Regression cross-section
	0.0548	no	Before/after using empirical Bayes or full Bayes
	0.0632	no	Before/after using empirical Bayes or full Bayes
	0.0632	no	Before/after using empirical Bayes or full Bayes
		no	Regression cross-section
		no	Before/after using empirical Bayes or full Bayes
0.1	0.06	bold	Meta-analysis
	0.01	yes	Before/after using empirical Bayes or full Bayes
	0.07	no	Before/after using empirical Bayes or full Bayes
	0.1059	no	Simple before/after
		no	Regression cross-section
		no	Regression cross-section

	0.066	no	Before/after using empirical Bayes or full Bayes
	0.061	no	Before/after using empirical Bayes or full Bayes
	0.052	no	Before/after using empirical Bayes or full Bayes
	0.121	no	Before/after using empirical Bayes or full Bayes
	0.107	no	Before/after using empirical Bayes or full Bayes
	0.095	no	Before/after using empirical Bayes or full Bayes
	0.035	no	Before/after using empirical Bayes or full Bayes
	0.054	no	Before/after using empirical Bayes or full Bayes
	0.065	no	Before/after using empirical Bayes or full Bayes
	0.031	no	Before/after using empirical Bayes or full Bayes
	0.048	no	Before/after using empirical Bayes or full Bayes
	0.027	no	Before/after using empirical Bayes or full Bayes
	0.088	no	Before/after using empirical Bayes or full Bayes
	0.123	no	Before/after using empirical Bayes or full Bayes

	0.051	no	Before/after using empirical Bayes or full Bayes
	0.043	no	Before/after using empirical Bayes or full Bayes
	0.142	no	Before/after using empirical Bayes or full Bayes
	0.097	no	Before/after using empirical Bayes or full Bayes
	0.055	no	Before/after using empirical Bayes or full Bayes
	0.06	no	Before/after using empirical Bayes or full Bayes
	0.037	no	Before/after using empirical Bayes or full Bayes
	0.022	no	Before/after using empirical Bayes or full Bayes
	0.019	no	Before/after using empirical Bayes or full Bayes
	0.081	no	Before/after using empirical Bayes or full Bayes
0.042	0.042	no	Before/after using empirical Bayes or full Bayes
0.07		no	Meta-analysis
0.12		no	Meta-analysis
0.2		no	Meta-analysis
	0.113	no	Before/after using empirical Bayes or full Bayes

	0.128	no	Before/after using empirical Bayes or full Bayes
	0.07	no	Before/after using empirical Bayes or full Bayes
0.14	0.08	no	Before/after using empirical Bayes or full Bayes
0.16	0.09	no	Before/after using empirical Bayes or full Bayes
	0.104	no	Before/after using empirical Bayes or full Bayes
		no	Before/after using empirical Bayes or full Bayes
	0.066	no	Before/after using empirical Bayes or full Bayes
	0.07	no	Before/after using empirical Bayes or full Bayes
	0.065	no	Before/after using empirical Bayes or full Bayes
	0.06	no	Before/after using empirical Bayes or full Bayes
	0.06	no	Before/after using empirical Bayes or full Bayes
	0.058	no	Before/after using empirical Bayes or full Bayes
	0.1	no	Before/after using empirical Bayes or full Bayes

	0.1	no	Before/after using empirical Bayes or full Bayes
0.14	0.06	no	Before/after using empirical Bayes or full Bayes
0.08	0.04	no	Before/after using empirical Bayes or full Bayes
0.1	0.05	no	Before/after using empirical Bayes or full Bayes
0.12	0.07	no	Meta-analysis
	0.06	no	Meta-analysis
0.04	0.03	bold	Before/after using empirical Bayes or full Bayes
0.06	0.05	bold	Before/after using empirical Bayes or full Bayes
0.07	0.06	bold	Before/after using empirical Bayes or full Bayes
0.02	0.02	bold	Before/after using empirical Bayes or full Bayes
0.1	0.08	bold	Before/after using empirical Bayes or full Bayes
0.04	0.03	bold	Before/after using empirical Bayes or full Bayes
0.05	0.04	bold	Before/after using empirical Bayes or full Bayes
0.06	0.05	bold	Before/after using empirical Bayes or full Bayes

0.02	0.01	bold	Before/after using empirical Bayes or full Bayes
0.08	0.07	bold	Before/after using empirical Bayes or full Bayes
0.04	0.03	bold	Before/after using empirical Bayes or full Bayes
		no	Before/after using empirical Bayes or full Bayes
		no	Before/after using empirical Bayes or full Bayes
	0.08	no	Before/after using empirical Bayes or full Bayes
	0.025	no	Before/after using empirical Bayes or full Bayes
	0.037	no	Before/after using empirical Bayes or full Bayes
0.24	0.2	no	Before/after using empirical Bayes or full Bayes
	0.093	no	Before/after using empirical Bayes or full Bayes

		no	Before/after using empirical Bayes or full Bayes
	0.105	no	Before/after using empirical Bayes or full Bayes
	0.02	yes	Before/after using empirical Bayes or full Bayes
	0.035	no	Before/after using empirical Bayes or full Bayes
	0.055	no	Before/after using empirical Bayes or full Bayes
	0.043	no	Before/after using empirical Bayes or full Bayes
	0.056	no	Before/after using empirical Bayes or full Bayes
	0.083	no	Regression cross-section
0.14	0.06	no	Simple before/after

	0.05	yes	Before/after using empirical Bayes or full Bayes
0.05	0.03	no	Meta-analysis
0.04	0.02	no	Meta-analysis
0.04	0.02	no	Meta-analysis
0.1	0.06	bold	Meta-analysis
0.1	0.06	bold	Meta-analysis
0.05	0.03	no	Meta-analysis
0.1	0.06	no	Meta-analysis
	0.051	no	Before/after using empirical Bayes or full Bayes
	0.082	no	Before/after using empirical Bayes or full Bayes
0.046		no	Before/after using empirical Bayes or full Bayes
	0.11	no	Before/after using empirical Bayes or full Bayes
	0.087	no	Before/after using empirical Bayes or full Bayes
	0.068	no	Before/after using empirical Bayes or full Bayes
0.08	0.07	no	Before/after using empirical Bayes or full Bayes
	0.038	no	Before/after using empirical Bayes or full Bayes

	0.05	no	Before/after using empirical Bayes or full Bayes
		no	Before/after using empirical Bayes or full Bayes
	0.067	no	Before/after using empirical Bayes or full Bayes
	0.064	no	Before/after using empirical Bayes or full Bayes
	0.308	no	Before/after using empirical Bayes or full Bayes
	0.141	no	Before/after using empirical Bayes or full Bayes
	0.066	no	Before/after using empirical Bayes or full Bayes
	0.028	no	Before/after using empirical Bayes or full Bayes
	0.095	no	Before/after using empirical Bayes or full Bayes
	0.035	no	Before/after using empirical Bayes or full Bayes
	0.042	no	Before/after using empirical Bayes or full Bayes

	0.116	no	Before/after using empirical Bayes or full Bayes
	0.081	no	Before/after using empirical Bayes or full Bayes
	0.1	no	Before/after using empirical Bayes or full Bayes
	0.078	no	Before/after using empirical Bayes or full Bayes
	0.059	no	Before/after using empirical Bayes or full Bayes
	0.1556	no	Regression cross-section
	0.1222	no	Regression cross-section
	0.1855	no	Regression cross-section
	0.1452	no	Regression cross-section
	0.155	no	Before/after using empirical Bayes or full Bayes
	0.121	no	Before/after using empirical Bayes or full Bayes

	0.107	no	Before/after using empirical Bayes or full Bayes
	0.124	no	Before/after using empirical Bayes or full Bayes
	0.109	no	Before/after using empirical Bayes or full Bayes
	0.07	no	Before/after using empirical Bayes or full Bayes
	0.09	no	Before/after using empirical Bayes or full Bayes
	0.11	no	Before/after using empirical Bayes or full Bayes
	0.1378	no	Regression cross-section
	0.1265	no	Regression cross-section
	0.1335	no	Before/after using empirical Bayes or full Bayes
	0.1031	no	Regression cross-section
	0.0971	no	Before/after using empirical Bayes or full Bayes
	0.0862	no	Regression cross-section

	0.1159	no	Before/after using empirical Bayes or full Bayes
	0.073	no	Before/after using empirical Bayes or full Bayes
	0.0725	no	Before/after using empirical Bayes or full Bayes
	0.0822	no	Before/after using empirical Bayes or full Bayes
	0.1462	no	Before/after using empirical Bayes or full Bayes
	0.1022	no	Before/after using empirical Bayes or full Bayes
	0.0804	no	Before/after using empirical Bayes or full Bayes
	0.059	no	Before/after using empirical Bayes or full Bayes
	0.0993	no	Before/after using empirical Bayes or full Bayes
	0.0641	no	Before/after using empirical Bayes or full Bayes
	0.1231	no	Before/after using empirical Bayes or full Bayes

	0.1351	no	Before/after using empirical Bayes or full Bayes
	0.1584	no	Before/after using empirical Bayes or full Bayes
	0.1255	no	Regression cross-section
	0.123	no	Regression cross-section
	0.149	no	Regression cross-section
	0.111	no	Before/after using empirical Bayes or full Bayes
	0.115	no	Before/after using empirical Bayes or full Bayes
	0.119	no	Before/after using empirical Bayes or full Bayes
	0.138	no	Before/after using empirical Bayes or full Bayes
	0.097	no	Before/after using empirical Bayes or full Bayes
	0.098	no	Before/after using empirical Bayes or full Bayes

	0.031	no	Before/after using empirical Bayes or full Bayes
	0.102	no	Before/after using empirical Bayes or full Bayes
	0.104	no	Before/after using empirical Bayes or full Bayes
	0.127	no	Before/after using empirical Bayes or full Bayes
0.09		no	Meta-analysis
0.05		no	Meta-analysis
0.14		no	Meta-analysis
0.08		no	Meta-analysis
0.05		no	Meta-analysis
0.03		no	Meta-analysis
0.13		no	Meta-analysis
0.16		italics	Meta-analysis
0.12		no	Meta-analysis
0.09		no	Meta-analysis
0.09		no	Meta-analysis
0.19	0.08	no	Simple before/after

State	Municipality	Sample Size	Sample Size Unit Type	Before Sample Size
FL	Tampa		Crashes	
FL	Tampa		Crashes	
FL	Tampa		Crashes	
CA,WA		1212	Site-years	
UT			Site-years	32
notusa			Crashes	243
notusa	Winnipeg		Site-years	315
CA,MD,AZ,IL,TX,OR,NC,OH,DC,AK,VA,CO,AL,ID,MA,NY,MI,IN		1358	Crashes	
CA,MD,AZ,IL,TX,OR,NC,OH,DC,AK,VA,CO,AL,ID,MA,NY,MI,IN		3824	Crashes	

KS			Miles	1178
KS			Miles	1178
KS			Miles	1178
KS			Miles	1178
KS			Miles	1178
MO			Crashes	82
MO			Crashes	754
MO			Crashes	298
MO			Crashes	198
MO			Crashes	940
MO			Crashes	476
MO			Crashes	1422
MO			Crashes	115
MO			Crashes	46

MO			Crashes	332
MO			Crashes	502
MO			Crashes	39
MO			Crashes	90
MO			Crashes	318
MO			Crashes	258
MO			Crashes	749
MO			Crashes	2557
MO			Crashes	3332
MO			Crashes	120
OR	Portland		Crashes	
WI	Statewide		Crashes	55

WI	Statewide		Crashes	46
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	16
WI	Statewide		Crashes	48
KS,MD,MN,OR,WA,WI			Site-years	98
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	15
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	15
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	16
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	28
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	22
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	28
CO,FL,IN,MD,MI,NY,NC,SC,VT,WA			Sites	13

CO,FL,IN,MD,MI,NY,NC,SC,VT, WA			Sites	13

KS,MD,MN,OR,WA,WI			Site-years	83
KS,MD,MN,OR,WA,WI			Site-years	
NC	Statewide		Crashes	286
NC			Site-years	
NC			Site-years	
FL				214

notusa	City of Burnaby, City of Coquitlam, City of Kelowna, City of New Westminster, City of North Vancouver, City of Surrey		Sites	171
NE			Crashes	179
notusa,NC			Sites	71
notusa,NC	Toronto & North Carolina		Crashes	600
notusa,NC	Toronto & North Carolina		Crashes	1760
notusa	British Columbia		Crashes	1223
NV,VA		1450	Crashes	

VA			Sites	22
VA			Sites	11
VA			Sites	11
AR			Mile-years	139
CA			Mile-years	89
AR,CA,IL,NC			Mile-years	582
NJ			Crashes	422

FL			Crashes	1853
notusa	British Columbia		Site-years	141
MN			Crashes	66
MN,PA,WA			Crashes	300
PA			Crashes	206
KS			Crashes	129
MN			Crashes	397
CA,CO,DE,MD,MN,OR,PA,WA			Crashes	2615
PA			Crashes	239
MN,PA,WA			Crashes	1733
PA			Crashes	1114

MN			Crashes	94
MN,PA,WA			Crashes	308
PA			Crashes	137
MN			Crashes	303
MN,PA,WA			Crashes	606
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	
KS			Crashes	122
IA,MN			Crashes	1705

IA,MN			Crashes	2354
IA,MN			Crashes	2887
IA,MN			Crashes	4141
FL				30
TX			Crashes	170
TX			Crashes	148
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	
PA			Crashes	64
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	107
MN,MO,PA			Crashes	

PA			Crashes	101
MO,PA			Crashes	300
PA			Crashes	231
MO			Crashes	248
PA			Crashes	60
MN,MO,PA			Crashes	157
MN,MO,PA			Crashes	228
MO,PA			Crashes	477
PA			Crashes	131
MO			Crashes	417
MO			Crashes	108

MN,MO,PA			Crashes	103
MO			Crashes	70
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	
MN,MO,PA			Crashes	
GA,IN			Miles	430
GA,IN			Miles	430
GA,IN			Miles	430
GA			Miles	282
GA,IN			Miles	1144
GA,IN			Miles	1144

AZ,MA,WI			Crashes	
NC			Crashes	
WA			Mile-years	72
CT			Mile-years	46

After Sample Size	Required Sample Size	Required Before Sample Size	Required After Sample Size	Begin Year of Data
56				2003
121				2003
54				2003
				2006
28				1998
49				2001
233				1997
				1992
				1992

1178				2001
1178				2001
1178				2001
1178				2001
1178				2001
50				2002
505				2002
199				2002
140				2002
660				2002
400				2002
1343				2002
72				2002
41				2002

237				2002
425				2002
22				2002
48				2002
201				2002
178				2002
656				2002
2184				2002
3399				2002
98				2002
838				1995
26				1994

23				1994
16				2000
18				1994
98				
15				1999
15				2000
16				1999
28				2000
22				2000
28				1999
13				1999

13				2000

83				
39				2000
				1990
				1990
				2004

171				1999
167				1996
71				1997
695				
1063				
646				1999
				1994

22				2000
11				2000
11				2000
139				1994
89				1991
582				1990
393				2001

1244				2002
94				2000
24				1997
96				1997
68				1997
107				2003
193				1997
1456				1997
116				1997
920				1997
664				1997

34				1997
164				1997
79				1997
159				1997
291				1997
				1997
				1997
				1997
				1997
				1997
102				2003
63				1987

86				1987
126				1987
181				1987
30				2002
46				1997
40				1997
				1997
				1997
24				1997
				1997
45				1997
				1997

56				1997
143				1997
162				1997
115				1997
44				1997
84				1997
141				1997
285				1997
97				1997
241				1997
66				1997

56				1997
44				1997
				1997
				1997
				1997
430				1999
430				1999
430				1999
282				1999
1144				1999
1144				1999

3122				1994
91				1996
95				1993
22				1997

End Year of Data	Intersection Related	Traffic Volume Unit	Minimum Traffic Volume (non-intersection)
	yes	Not Specified	
2010	no	Annual Average Daily Traffic (AADT)	27000
2010	no	Annual Average Daily Traffic (AADT)	27000
2010	no	Annual Average Daily Traffic (AADT)	27000
2008	no	Average Daily Traffic (ADT)	5,134
2008	no	Average Daily Traffic (ADT)	10000
	no		
	no	Annual Average Daily Traffic (AADT)	
2009	no	Annual Average Daily Traffic (AADT)	23000
2008	yes		
2008	yes		
2008	yes		

2007	no		
2007	no		
2007	no		
2007	no		
2007	no		
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	

2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2009	no	Average Daily Traffic (ADT)	
2005	yes	Annual Average Daily Traffic (AADT)	
	no		Not specified
	no		Not specified
	yes	Not specified	
2010	yes	Annual Average Daily Traffic (AADT)	

2010	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
2010	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Average Daily Traffic (ADT)	
2009	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Annual Average Daily Traffic (AADT)	
2009	yes	Annual Average Daily Traffic (AADT)	

2009	yes	Average Daily Traffic (ADT)	
	yes	Not specified	
	yes	Not specified	
	yes	Not specified	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	

	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Average Daily Traffic (ADT)	
	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
2007	yes	Annual Average Daily Traffic (AADT)	
2009	yes		
2009	yes		
	yes	Average Daily Traffic (ADT)	
2009	yes	Annual Average Daily Traffic (AADT)	

2004	yes		
2008	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
2007	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
	yes	Annual Average Daily Traffic (AADT)	
2004	yes	Average Daily Traffic (ADT)	
2008	yes	Annual Average Daily Traffic (AADT)	
	no	Annual Average Daily Traffic (AADT)	

	no	Annual Average Daily Traffic (AADT)	30000
	no		Not specified
	no		Not specified
	no		Not specified
	no		20000
	no		Not specified
	no		Not specified
	no		Not specified
2005	no		17049
2005	no		17049
2005	no		17049
2004	no	Annual Average Daily Traffic (AADT)	8500
2004	no		
2004	no		
	no		Not specified
2010	no	Annual Average Daily Traffic (AADT)	

2007	no		
2006	no		
2006	no	Average Daily Traffic (ADT)	1336
2006	no	Average Daily Traffic (ADT)	574
2006	no	Average Daily Traffic (ADT)	574
2010	no	Annual Average Daily Traffic (AADT)	200
2006	no	Average Daily Traffic (ADT)	1336
2006	no	Average Daily Traffic (ADT)	574
2006	no	Average Daily Traffic (ADT)	2338
2006	no	Average Daily Traffic (ADT)	574
2006	no	Average Daily Traffic (ADT)	574

2006	no	Average Daily Traffic (ADT)	1336
2006	no	Average Daily Traffic (ADT)	574
2006	no	Average Daily Traffic (ADT)	574
2006	no	Average Daily Traffic (ADT)	1336
2006	no	Average Daily Traffic (ADT)	574
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	4956
2006	no	Average Daily Traffic (ADT)	180
2010	no	Annual Average Daily Traffic (AADT)	200
2006	yes	Annual Average Daily Traffic (AADT)	

2006	yes	Annual Average Daily Traffic (AADT)	
2006	yes	Annual Average Daily Traffic (AADT)	
2006	yes	Annual Average Daily Traffic (AADT)	
2012	no		
2009	no	Annual Average Daily Traffic (AADT)	1655
2009	no	Annual Average Daily Traffic (AADT)	1655
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	948
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	782
2006	no	Average Daily Traffic (ADT)	180

2006	no	Average Daily Traffic (ADT)	948
2006	no	Average Daily Traffic (ADT)	6777
2006	no	Average Daily Traffic (ADT)	11254
2006	no	Average Daily Traffic (ADT)	11539
2006	no	Average Daily Traffic (ADT)	6777
2006	no	Average Daily Traffic (ADT)	4959
2006	no	Average Daily Traffic (ADT)	782
2006	no	Average Daily Traffic (ADT)	6777
2006	no	Average Daily Traffic (ADT)	11254
2006	no	Average Daily Traffic (ADT)	11539
2006	no	Average Daily Traffic (ADT)	5326

2006	no	Average Daily Traffic (ADT)	4959
2006	no	Average Daily Traffic (ADT)	5326
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	180
2006	no	Average Daily Traffic (ADT)	180
2008	no	Annual Average Daily Traffic (AADT)	397
2008	no	Annual Average Daily Traffic (AADT)	397
2008	no	Annual Average Daily Traffic (AADT)	397
2008	no	Annual Average Daily Traffic (AADT)	397
2008	no	Annual Average Daily Traffic (AADT)	310
2008	no	Annual Average Daily Traffic (AADT)	310

2006	yes		
2010	yes	Annual Average Daily Traffic (AADT)	
2007	no	Annual Average Daily Traffic (AADT)	261
2006	no	Annual Average Daily Traffic (AADT)	895
	no		All
	no		All
	no		All
	no		All
	no		All
	no		All
	no		Not specified
	no		Not specified
	no		Not specified
	no	Average Daily Traffic (ADT)	
	no	Average Daily Traffic (ADT)	
	yes	Not specified	

Maximum Traffic Volume (non-intersection)	Minimum Major Road Traffic Volume (intersection)	Maximum Major Road Traffic Volume (intersection)
	Not Specified	Not Specified
96000		
96000		
96000		
153,500		
55000		
42000		

Not specified		
Not specified		
	Not specified	Not specified
	4100 (total entering)	48100 (total entering)

	4100 (Total)	48100 (Total)
	5300	52500
	4100 (total entering)	48100 (total entering)
	5322	43123
	5300	52500
	5322	43123
	5300	52500
	5300	52500
	5322	43123
	5322	43123

	5300	52500
	Not specified	Not specified
	Not specified	Not specified
	Not specified	Not specified
	1500	32400
	1500	40600
	4600	40300
	7200	55100
	1600	32400
	1600	32400
	1500	40600
	4600	40300

	7200	55100
	1500	40600
	7200	55100
	2550	59000
	680	15400
	680	15100
	35000	

	2420	21477
	3000	77000
	4857	74990
	4857	74990
	4857	74990
	4637	51743
	7500	99000

40000		
Not specified		
Not specified		
Not specified		
60000		
Not specified		
Not specified		
Not specified		
74079		
74079		
74079		
22500		
Not specified		

13240		
20784		
17591		
8000		
13240		
20784		
22076		
20784		
17591		

13240		
20784		
17591		
13240		
20784		
12776		
12776		
31692		
12776		
8000		

7031		
7031		
12776		
12776		
9067		
12776		
10386		
12776		

9067		
37112		
59391		
37112		
24752		
20763		
10386		
37112		
59391		
37112		
20763		

20763		
20763		
12776		
12776		
12776		
18697		
18697		
18697		
18697		
18697		
18697		

	3000	30000
14790		
20479		
All		
All		
All		
All		
All		
All		
Not specified		
Not specified		
Not specified		
	Not specified	Not specified

Minimum Minor Road Traffic Volume (intersection)	Maximum Minor Road Traffic Volume (intersection)	Number of Lanes	Intersection Type
			Roadway/roadway (not interchange related)
		4,6,8	
		4,6,8	
		4,6,8	
		Var.	
		2	
		6	
			Roadway/roadway (not interchange related)
			Not specified
			Not specified

		2	
		2	
		2	
		2	
		2	
		2	
		multi	
		multi	
		multi	
		multi	
		multi	
		multi	
		multi	
		multi	

		multi	
		multi	
		2	
		multi	
		multi	
		multi	
		multi	
		multi	
		multi	
		multi	
			Roadway/roadway (interchange ramp terminal)
			Roadway/roadway (not interchange related)
		2,4	Roadway/roadway (not interchange related)

		4	Roadway/roadway (not interchange related)
		2	Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
		2,4	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
		2	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)

		2-Jan	Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
50	11800		Roadway/roadway (not interchange related)
200	8000		Roadway/roadway (not interchange related)
100	13700		Roadway/roadway (not interchange related)
550	2600		Roadway/roadway (not interchange related)
50	11800		Roadway/roadway (not interchange related)
50	11800		Roadway/roadway (not interchange related)
200	8000		Roadway/roadway (not interchange related)
100	13700		Roadway/roadway (not interchange related)

550	2600		Roadway/roadway (not interchange related)
25	26000		Roadway/roadway (not interchange related)
550	8400		Roadway/roadway (not interchange related)
		1	Roadway/roadway (not interchange related)
		2-Jan	Roadway/roadway (not interchange related)
1000	23333		Not specified
680	15400	1	
680	15100	1	
			Roadway/roadway (not interchange related)
		4-Feb	Roadway/roadway (not interchange related)

			Roadway/roadway (not interchange related)
995	8948		Roadway/roadway (not interchange related)
1	45500		Roadway/roadway (not interchange related)
1466	42723		Roadway/roadway (not interchange related)
1466	42723		Roadway/roadway (not interchange related)
1466	42723		Roadway/roadway (not interchange related)
134	48906	4-Mar	Roadway/roadway (not interchange related)
40	20100		Roadway/roadway (not interchange related)

		2	
		2	
		Multilane	
		2	
		2	
		2	
		2	
		2	
		2	
		2	
		7-Feb	

		4-Feb	
		2	
		2	
		2	
		2	
		2	
		2	
		2	
		2	
		2	

		2	
		2	
		2	
		2	
		2	
		2	
		2	
		2	
		2	
			Roadway/roadway (not interchange related)

			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
			Roadway/roadway (not interchange related)
		2	
		2	
		2	
		2	
		2	
		2	
		2	

		2	
		2	

		2	
		2	
		2	
		2	
		2	
		2	
		2	
		2	
		2	

			Roadway/roadway (not interchange related)
		2	Roadway/roadway (not interchange related)
		2	
		2	
		2	
		2	
		2	
		2	
		2	
			Roadway/roadway (not interchange related)

Intersection Geometry	Traffic Control Type	Speed Limit (mph)	Crash Time of Day
4-leg	Stop-controlled		
		40mph to 55 mph	Not specified
		40mph to 55 mph	Not specified
		40mph to 55 mph	Not specified
		Var.	Not specified
			All
		130 km/h	All
No values chosen.	Signalized		All
Not specified	Signalized		All
Not specified	Signalized		All

			Day
			All
			All
			Night
			Night
			All
			All
			All
			All
			All
			All
			All
			All
			All

			All
			All
			All
			All
			All
			All
			All
			All
			All
			All
	Uncontrolled		Day
Not specified	Not specified		
3-leg,4-leg	Other		All

3-leg,4-leg	Other		All
3-leg,4-leg	Roundabout	15-35 mph	All
Not specified	Stop-controlled		
Not specified	Stop-controlled		
3-leg,4-leg	Stop-controlled		All
3-leg,4-leg	Roundabout	40-65 mph	
3-leg,4-leg	Roundabout		Not specified
3-leg,4-leg	Roundabout	15-35 mph	All
3-leg,4-leg	Roundabout		Not specified
3-leg,4-leg	Roundabout	15-35 mph	All
4-leg	Roundabout	15-35 mph	All
3-leg,4-leg	Roundabout		Not specified
3-leg,4-leg	Roundabout		Not specified

3-leg,4-leg	Roundabout	15-35 mph	All
Not specified	Signalized		
Not specified	Not specified		
Not specified	Signalized		
4-leg	Not specified		
4-leg	Not specified		
4-leg	Stop-controlled		
4-leg	Stop-controlled		
4-leg	Signalized		
4-leg	Signalized		
3-leg	Stop-controlled		
4-leg	Stop-controlled		
4-leg	Stop-controlled		
4-leg	Signalized		

4-leg	Signalized		
3-leg,4-leg	Stop-controlled		
3-leg,4-leg	Signalized		
4-leg	Roundabout	40-65 mph	
4-leg	Roundabout	40-65 mph	
3-leg,4-leg	Signalized		Night
4-leg	Stop-controlled	25-55	Not specified
4-leg	Stop-controlled	25-55	Not specified
4-leg	Stop-controlled		
3-leg,4-leg	Stop-controlled		Not specified

4-leg	Signalized	50 km/h (30 mph)	All
4-leg	Signalized		All
4-leg	Signalized		
4-leg	Signalized		Not specified
4-leg	Signalized		Not specified
4-leg	Signalized		Not specified
4-leg	Signalized	50 km/h	Night
3-leg,4-leg	Signalized		All

			All
			All
			All
			All
			All
			All
			Not specified

			All
			All
			All
			All
			All
			All
			All
			All
			All
			All
			All

			All
			All
			All
			All
			All
			All
			All
			All
			All
			All
4-leg	Stop-controlled		All

3-leg,4-leg	Stop-controlled		All
4-leg	Stop-controlled		All
3-leg,4-leg	Stop-controlled		All
			All
			All
			All
			All
			All
			All
			All
			All
			All

			All
			All
			All
			All
			All
			All
			All
			All
			All
			All
			All

			All
			All
			All
			All
			All
			All
			All
			All
			All
			All
			All

3-leg,4-leg	Signalized		All
4-leg	Stop-controlled	45-55 mph	
			All
			All
Not specified	Roundabout		

Roadway Division Type	Date CMF Added to Clearinghouse
Divided by Median	2/24/2014
Divided by Median	2/24/2014
Divided by Median	2/24/2014
Divided by Median	1/29/2013
Divided by Median	1/4/2012
Divided by Median	6/18/2012
	2/6/2013
	6/4/2012
	6/4/2012

	1/21/2013
	1/21/2013
	1/21/2013
	1/21/2013
	1/21/2013
Undivided	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013

Divided by Median	1/23/2013
Divided by Median	1/23/2013
Undivided	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
Undivided	1/23/2013
Divided by Median	1/23/2013
Divided by Median	1/23/2013
All	8/1/2013

All	8/1/2013
	6/5/2012
All	8/1/2013
	1/30/2013
	11/16/2012
	6/5/2012
	11/16/2012
	6/5/2012
	6/5/2012
	11/16/2012
	11/16/2012

	6/5/2012
	3/20/2013

	2/20/2013
	1/30/2013
All	8/1/2013
All	7/15/2011
Undivided	7/15/2011
	7/16/2014

	7/29/2010
	1/22/2013
	11/16/2012
	9/1/2012
	9/1/2012
	9/1/2012
	9/1/2012

Divided	
	11/18/2009
	11/18/2009
	11/18/2009
Divided by TWLTL	4/20/2010
Divided by TWLTL	4/20/2010
Divided by TWLTL	4/20/2010
Divided by Median	8/1/2013

	2/15/2010
All	8/11/2010
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	1/9/2014
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011

Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Divided by Median	3/31/2011
Undivided	3/31/2011
Undivided	1/9/2014
Undivided	8/11/2010

Undivided	8/11/2010
Undivided	8/11/2010
Undivided	8/11/2010
	7/12/2014
Undivided	9/1/2012
Undivided	9/1/2012
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Divided by Median	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011

Undivided	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011
Undivided	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011
Divided by Median	3/31/2011

Divided by Median	3/31/2011
Divided by Median	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
Undivided	3/31/2011
	11/16/2012
	11/16/2012
	11/16/2012
	11/16/2012
	11/16/2012
	11/16/2012

	8/1/2013
Undivided	8/11/2010
Undivided	8/11/2010

Id	Date	Date	Time	Onroad	CrossingFeature
2729612	4/27/2013 4:19	4/27/2013	4:19:00 AM	IRONWOOD DR	MCCORMICK RD
2793039	9/23/2013 9:52	9/23/2013	9:52:00 AM	IRONWOOD DR	GERMANN RD
2807103	11/18/2013 12:18	11/18/2013	12:18:00 PM	IRONWOOD DR	MCCORMICK RD

a. Most recent 5 years of data from the ADOT crash database.
b. Only crashes that the proposed countermeasure will correct
c. Only crashes in the countermeasure's influence area
d. Severity of each crash, Fatal and Serious Injury only
e. Manner of collision
f. Driver behavior of U1
g. Other relevant attributes
h. Do not include crashes unreported by law enforcement unless supporting documentation, i.e. crash repc

Offset	InjurySeverity	FirstHarmful	CollisionMannerDesc	LightCondition	Weather
-0.0947	INCAPACITATING INJURY	OVERTURN_ROLLOVER	SINGLE VEHICLE	DARK_NOT LIGHTED	CLEAR
1.6	FATAL	OVERTURN_ROLLOVER	SINGLE VEHICLE	DAYLIGHT	CLEAR
-0.0947	FATAL	OVERTURN_ROLLOVER	SINGLE VEHICLE	DAYLIGHT	UNKNOWN

ɔrts, is provided and attested to.

IntersectionTypeDesc	JunctionRelationDesc	TrafficWayType	UnitTravelDirectionDesc	UnitActionDesc
UNKNOWN	NOT_JUNCTION_RELATED	TWO_WAY_NOT_DIVIDED	1 - NORTH	GOING_STRAIGHT_AHEAD
NOT_AT_AN INTERSECTION	NOT_JUNCTION_RELATED	TWO_WAY_NOT_DIVIDED	1 - NORTH	GOING_STRAIGHT_AHEAD
UNKNOWN	UNKNOWN	UNKNOWN	2 - SOUTH	UNKNOWN

UnitRoadConditionDesc1	SurfaceCondition	EnvCondition	UnitDefect	UnitNumber
NO_CONTRIBUTING_CIRCUMSTANCES	DRY	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1
OTHER	DRY	OTHER	OTHER	1
UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	1

UnitEvent Sequence	UnitEvent Sequence	UnitEvent Sequence	UnitEvent Sequence
RAN_OFF_ROAD_LEFT	CROSS_MEDIAN	OVERTURN_ROLLOVER	
RAN_OFF_ROAD_RIGHT	CROSS_CENTERLINE	OVERTURN_ROLLOVER	FENCE
RAN_OFF_ROAD_RIGHT	OVERTURN_ROLLOVER		

PersonSafety Device	PersonViolation	PersonPhysical	PersonPhysical
Shoulder And Lap Belt	UNKNOWN		
None Used	SPEED_TO_FAST_FOR_CONDITIONS		4 - ALCOHOL
None Used	UNKNOWN	0 - NO_APPARENT_INFLUENCE	