Transportation Systems Management and Operations (TSM&O)

2019 HSIP Application Process

FY23 – FY24

WEBINAR

January 31, 2019

Highway Safety Improvement Program
HSIP Goal

- The goal of the HSIP is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

- It is intended to drive State HSIP investment decisions by ensuring projects correspond to the emphasis areas and strategies identified in the SHSP.

HSIP Governance

The HSIP is legislated under Section 148 of Title 23, *United States Code* (23 U.S.C. 148) and regulated under Part 924 of Title 23, Code of Federal Regulations (23 CFR Part 924). The HSIP consists of three main components, the Strategic Highway Safety Plan (SHSP), State HSIP or program of highway safety improvement projects and the Railway-Highway Crossing Program (RHCP).

FY21-FY22 Initial vs Final Applications

Initial Submittal
Local Applications, 35 which = $ 34,013,706 or 30.2%
State Applications, 35 which = $78,676,664 or 69.8%
Total Applications, 70 which = $112,690,370

After Eligibility Review
Local Applications, 34 which = $32,802,888 or 38.1%
State Applications, 29 which = $53,476,733 or 61.9%
Total Applications, 62 which = $86,279,621

All estimates do not include local/state matches or other funds.

Ranking Criteria

- Overall list based on the B/C ratio of each project
- Systemic projects limited to 20% of available HSIP funding by SFY

FY 21 - FY22 Combined Projects Funded by Number & Dollars

	Number	Dollars
Total	47	$56,810,561.00
Local	31	$24,394,086.00
State	16	$32,416,475.00

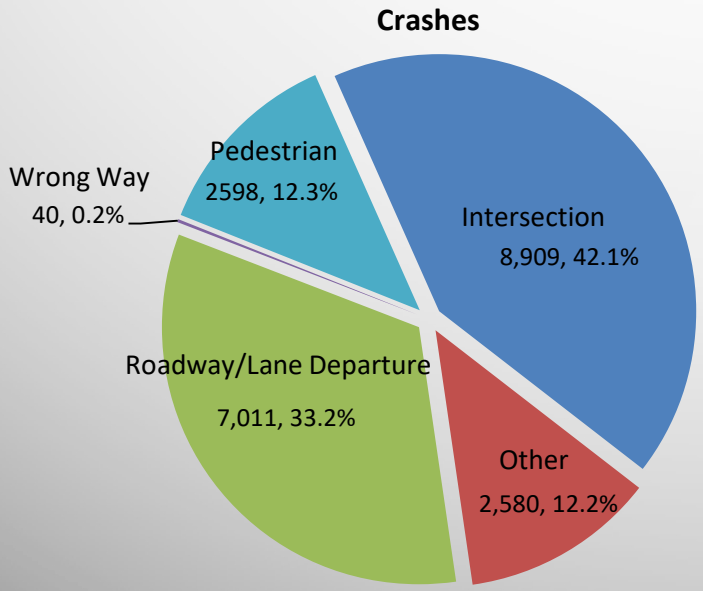
Total HSIP Funds Available = $56,520,000.00

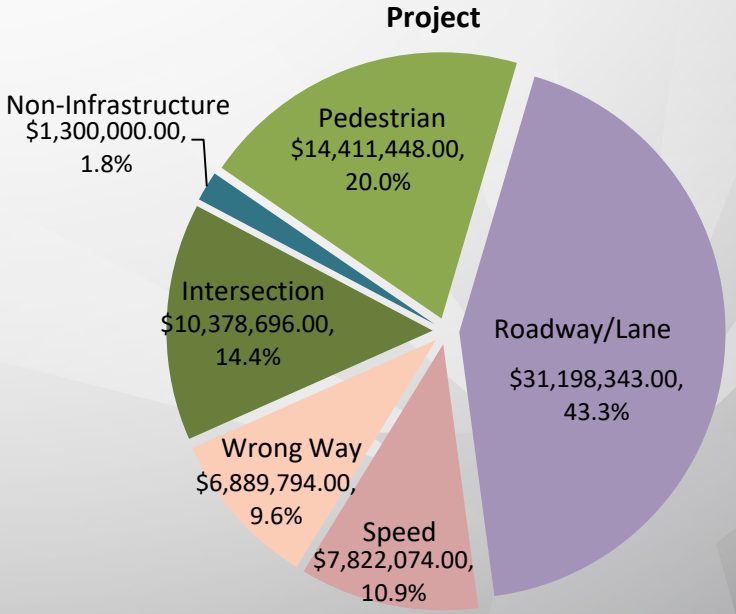
B/C Ratio Range

High was 56.6 – Project was Rumble Strips

Low was 3.9 – Install a Median Barrier

Crash History vs Project





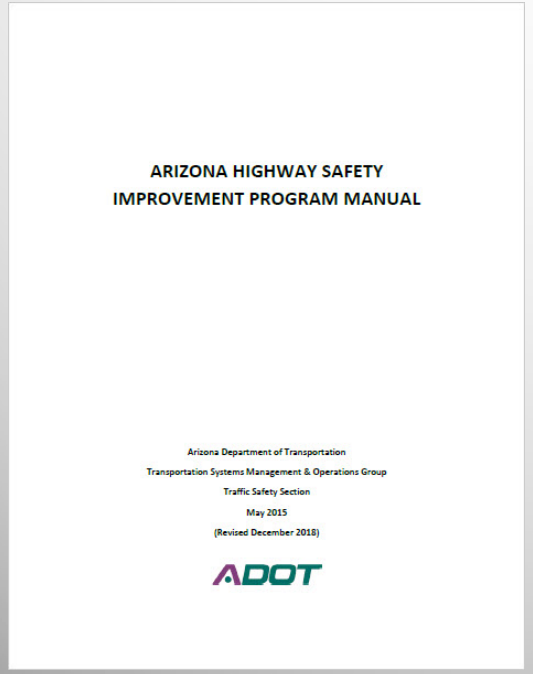
Lessons Learned

- Submitting application to TSS for review prior to final submittal pays off
- Don’t underestimate the scope or cost of a project
- Each countermeasure has to meet the B/C ratio requirement
- No lump sum cost estimates
- Make sure the existing support structure can accommodate new countermeasure

HSIP Funds Available in FY23 & FY24

$35 Million for each year

ADOT HSIP Manual



Appendix A – Project Application Process and Worksheets

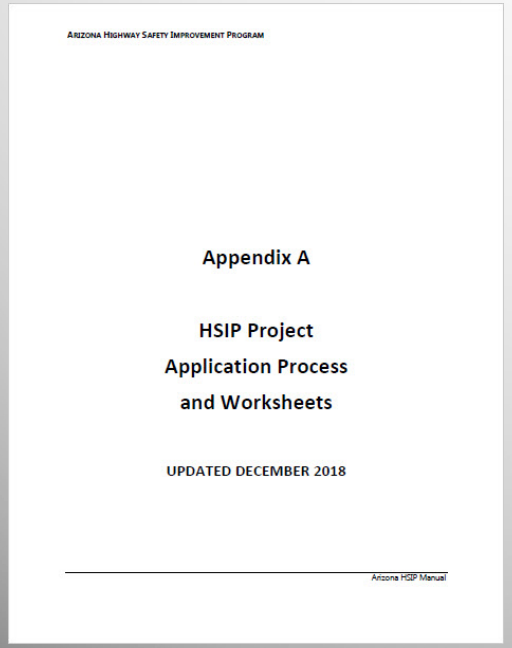
Appendix B – Crash Modification Factors

Appendix C – Project Service Life

Appendix D – Acquisition of Construction and Highway Safety Equipment (AzTraCS IT Equipment Only) (Pending Approval)

HSIP Essentials

Appendix A to HSIP Manual



ARIZONA HIGHWAY SAFETY IMPROVEMENT PROGRAM

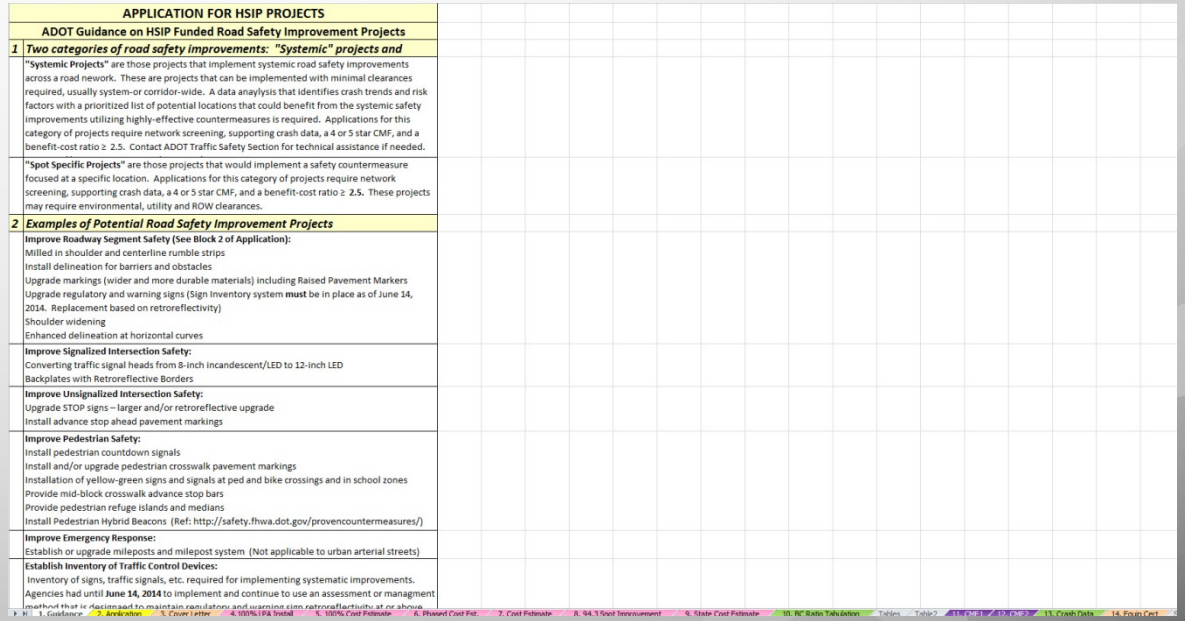
Appendix A

HSIP Project Application Process and Worksheets

UPDATED DECEMBER 2018

Arizona HSIP Manual

HSIP Excel Workbook – 14 Tabs



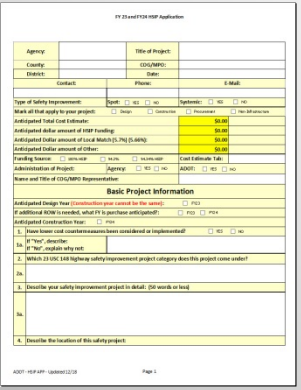
APPLICATION FOR HSIP PROJECTS	
ADOT Guidance on HSIP Funded Road Safety Improvement Projects	
1	***Two categories of road safety improvements: "Systemic" projects and***
	"Systemic Projects" are those projects that implement systemic road safety improvements across a road nework. These are projects that 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 ≥ 2.5. Contact ADOT Traffic Safety Section for technical assistance if needed.
	"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 ≥ **2.5.** These projects may require environmental, utility and ROW clearances.
2	***Examples of Potential Road Safety Improvement Projects***
	Improve Roadway Segment Safety (See Block 2 of Application): 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
	Improve Signalized Intersection Safety: Converting traffic signal heads from 8-inch incandescent/LED to 12-inch LED Backplates with Retroreflective Borders
	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

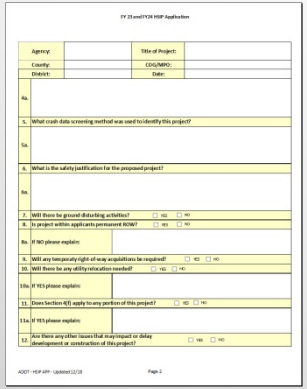
1. Guidance | 2. Application | 3. Cover Letter | 4. 100% LPA Install | 5. 100% Cost Estimate | 6. Phased Cost Est. | 7. Cost Estimate | 8. 94.3 Spot Improvement | 9. State Cost Estimate | 10. BC Ratio Tabulation | Tables | Table2 | 11. CMF | 12. CMF2 | 13. Crash Data | 14. Fcurs Cert

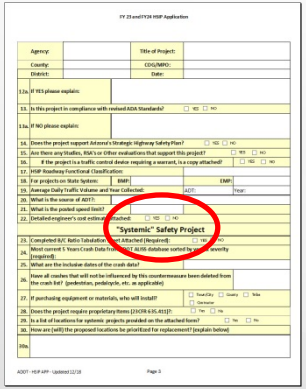
Documentation Required for HSIP Application (Appendix A)

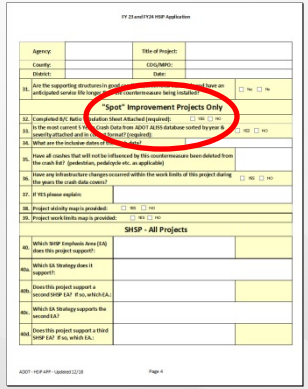
1. Transmittal Letter (Tab 3)
2. HSIP Application (Tab 2)
3. Cost Estimate (Tab 4–9)
4. B/C Ratio Analysis (Tab 10)
5. State Location Map
6. Work Limits Map
7. Copy of Warrant (If required)

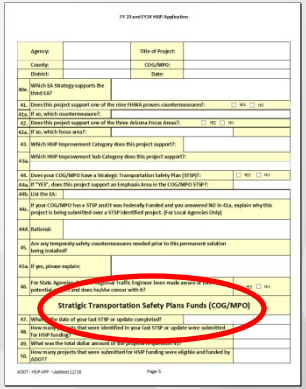
HSIP Application (Tab 2)

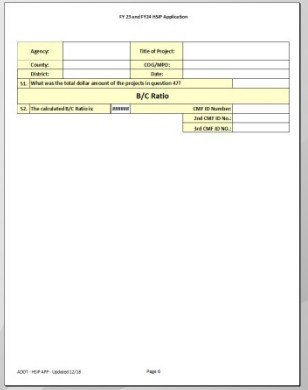












CMF vs CRF

A crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site.

A crash reduction factor (CRF) is the percentage crash reduction that might be expected after implementing a given countermeasure at a specific site.

So, what do I use in my Benefit to Cost (B/C) ratio analysis?

CRF

Where Do I Find CRFs?

Tabs 11. & 12. of the ADOT HSIP excel Application has 4 and 5 star CMFs

CMF ID	Study Title	Resource	Countermeasure Category	Countermeasure Subcategory	Countermeasure	CRF	CMF	Crash Type
2438	Safety Evaluation of Improved Curve Delineation	Click for CMF details	Signs		Install chevron signs on horizontal curves	16	0.84	Non-intersection

FHWA Crash Modification Clearing House

http://www.cmfclearinghouse.org/

Where Do I Find CRFs?
(Continued)

CMF

Appendix B – ADOT HSIP Manual

CMF ID	Countermeasure Category	Countermeasure	CMF	Crash Type	Crash Severity	Roadway Type	Area Type	Star Quality Rating	Prior Condition	Intersection Related	Traffic Volume Unit	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)	Maximum Minor Road Traffic Volume (intersection)	Number of Lanes	Intersection Type	Intersection Geometry	Traffic Control Type	Speed Limit (mph)
5452	Access management	Convert an open median to a directional median	0.76	All	Fatal,Serious injury	Principal Arterial Other	Urban and suburban	4	Roadway with full median openings	no	Annual Average Daily Traffic (AADT)	27000	96000					4,6,8				40mph to 55 mph

HSIP Cost Estimate

Agency:	ADOT	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:	Project Assessment	1	$ 15,000.00	$ 15,000.00	$ 14,145.00	$ 855.00	$ -	$ 15,000.00
Preliminary Engineering:	Design and Clearances (10% of construction costs)	1	$ 101,392.41	$ 101,392.41	$ 95,613.04	$ 5,779.37	$ -	$ 101,392.41
Non-Infastructure (NI) Elements:		0	$ -	$ -	$ -	$ -	$ -	$ -
ADOT Admin Costs:	10% of construction costs	1	$ 101,392.41	$ 101,392.41	$ 95,613.04	$ 5,779.37	$ -	$ 101,392.41
Sub-Total				$ 217,784.81	$ 205,371.08	$ 12,413.74	$ -	$ 217,784.82
ADOT ICAP:		10.14%		$ 22,083.38	$ 20,824.63	$ 1,258.75		$ 22,083.38
Design Sub-Total				$ 239,868.19	$ 226,195.71	$ 13,672.49		$ 239,868.20
Construction:		0		$ -	$ -	$ -	$ -	$ -
Saw cutting	L.Ft.	17600	$ 1.00	$ 17,600.00	$ 16,596.80	$ 1,003.20	$ -	$ 17,600.00
Removal of Pavement	Sq. Yd.	16000	$ 4.00	$ 64,000.00	$ 60,352.00	$ 3,648.00	$ -	$ 64,000.00
Aggregate base	Cu. Yd.	320	$ 40.00	$ 12,800.00	$ 12,070.40	$ 729.60	$ -	$ 12,800.00
Asphaltic Concrete (special mix)	ton	640	$ 85.00	$ 54,400.00	$ 51,299.20	$ 3,100.80	$ -	$ 54,400.00
Signs	L.Sum	1	$ 16,000.00	$ 16,000.00	$ 15,088.00	$ 912.00	$ -	$ 16,000.00
Pavement Markings	L. Sum	1	$ 9,800.00	$ 9,800.00	$ 9,241.40	$ 558.60	$ -	$ 9,800.00
Concrete Curb	L. Ft.	11500	$ 15.00	$ 172,500.00	$ 162,667.50	$ 9,832.50	$ -	$ 172,500.00
Median Paving	Sq. Yd.	1400	$ 50.00	$ 70,000.00	$ 66,010.00	$ 3,990.00	$ -	$ 70,000.00
Median landscaping	L. Sum	1	$ 90,000.00	$ 90,000.00	$ 84,870.00	$ 5,130.00	$ -	$ 90,000.00
Misc. Work	L. Sum	1	$ 90,000.00	$ 90,000.00	$ 84,870.00	$ 5,130.00	$ -	$ 90,000.00
Sub-Total		0		$ 597,100.00	$ 563,065.30	$ 34,034.70	$ -	$ 597,100.00
Construction Surveying and Layout	L. Sum	3.00%		$ 17,913.00	$ 16,891.96	$ 1,021.04	$ -	$ 17,913.00
Erosion control/water supply	L. Sum	1.00%		$ 5,971.00	$ 5,630.65	$ 340.35	$ -	$ 5,971.00
Contractor Quality Control	L. Sum	1.00%		$ 5,971.00	$ 5,630.65	$ 340.35	$ -	$ 5,971.00
Traffic Control	L. Sum	10.00%		$ 59,710.00	$ 56,306.53	$ 3,403.47	$ -	$ 59,710.00
Mobilization	L. Sum	10.00%		$ 59,710.00	$ 56,306.53	$ 3,403.47	$ -	$ 59,710.00
Sub-Total				$ 746,375.00	$ 703,831.62	$ 42,543.38	$ -	$ 746,375.00
Construction Admin :		15.00%		$ 111,956.25	$ 105,574.74	$ 6,381.51	$ -	$ 111,956.25
Contingencies :		5.00%		$ 37,318.75	$ 35,191.58	$ 2,127.17	$ -	$ 37,318.75
Post Design		2.00%		$ 14,927.50	$ 14,076.63	$ 850.87	$ -	$ 14,927.50
Public Relations	L. Sum	1		$ 10,000.00	$ 9,430.00	$ 570.00	$ -	$ 10,000.00
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
				$ -	$ -	$ -	$ -	$ -
Post Sub-Total				$ 174,202.50	$ 164,272.95	$ 9,929.55	$ -	$ 174,202.50
Construction Sub-Total				$ 920,577.50	$ 868,104.57	$ 52,472.93	$ -	$ 920,577.50
ADOT ICAP:		10.14%		$ 93,346.56	$ 88,025.80	$ 5,320.76		$ 93,346.56
Construction Sub-Total				$ 1,013,924.06	$ 956,130.37	$ 57,793.69		$ 1,013,924.06
TOTAL REQUEST				$ 1,253,792.25	$ 1,182,326.08	$ 71,466.18	$ -	$ 1,253,792.26

Required for all HSIP Applications

Agency:		Title of Project:	

Benefit / Cost Ratio Tabulation

Annual Benefit Tabulation

Severity	Annual Average	Estimated CRF* Reduction	Total Reduction	Unit Cost	Annual Benefit
Fatal	0.00	0%	0.00	$9,515,371	$0
Incapacitating Injury	0.00	0%	0.00	$550,499	$0
				Total Annual Benefits	$0

Costs

Total Project Cost	$0
Project Life (years)	10
Interest Rate (%)	8%
Capital Recovery Factor	0.1490
Annual Construction Cost	$0
Annual Maintenance Cost	$0.00
Total Annual Costs	$0

Benefit / Cost

Annual Benefit	Annual cost	Benefit / Cost Ratio
$0	$0	#DIV/0!

*REQUIRED: Use 4 and 5 star CMFs from ADOT Lists Only at Tabs 11 - 12 preferred. The CMF's CRF is used in the above calculation

Most recent 5-year average of crashes counter-measure will influence

Don't mix CMF and CRF up

Increased

From Cost Estimate Tab

From Appendix C, HSIP Manual

Best estimate

Increased to ≥ 2.5

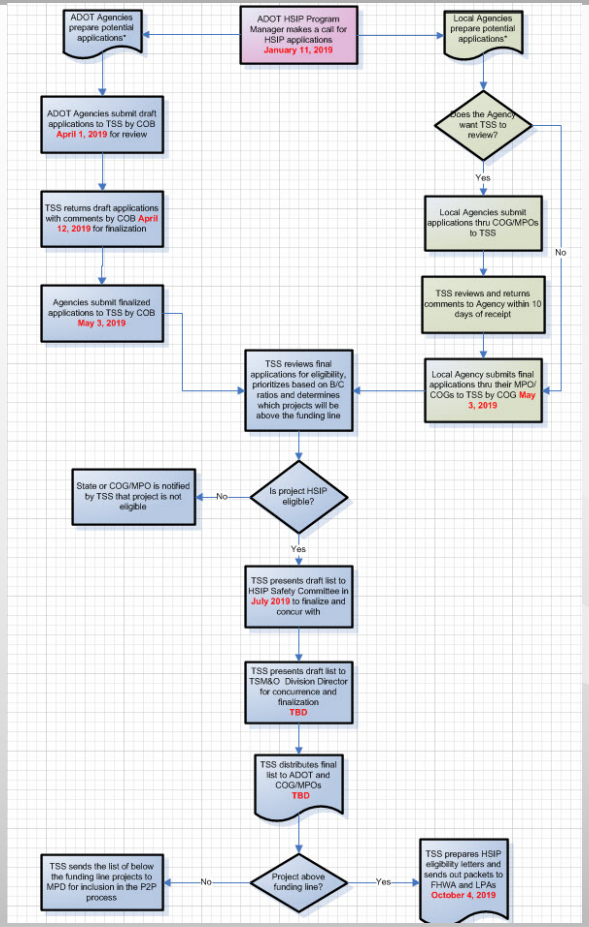
Changes to FY23 – FY24 HSIP Program

- Select information technology system equipment can be purchased for new AZTraCS implementation. The $250,000.00 minimum project cost is lowered to $5,000.00 for these projects. (Currently, this funding is on-hold until final ADOT management approval.)
- HSIP funds can be used for yearly licensing fees for statewide crash data software with ADOT approval
- The comprehensive unit costs for fatal and serious injury crashes have increased in the B/C ratio calculation sheet (Due to statewide actuarial adjustment) ($9,515,371 for fatal crashes and $550,499 for IC crashes)

Changes to FY23 – FY24 HSIP Program (Continued)

- The minimum B/C ratio increases to ≥ 2.5 (Due to increased actuarial adjustments)
- An inflation factor of 5% has been added to Cost Estimate Tabs to account for estimated inflation between project selection and 2023 (This is only an estimate and ADOT takes no responsibility for ultimate accuracy. Individual agencies may select higher inflationary estimates.)
- Total project costs for non-infrastructure projects, i.e. SHSPs, RSAs, licensing fees, etc. are capped at 5% of the yearly SFY HSIP available funds.

HSIP Flow Chart



Key Dates

- **May 3, 2019 – Final HSIP applications due to TSS**
- April 1, 2019 ADOT HSIP Applications submitted
- July 2019 - HSIP Safety Committee Meeting
- October 4, 2019 – All eligibility letters issued

Link for HSIP Manual & Application

https://www.azdot.gov/business/tsmo/operational-and-traffic-safety/arizona-highway-safety-improvement-program

Thank You!

Traffic Safety Section:

Kerry Wilcoxon, P.E., PTOE
Kwilcoxon@azdot.gov
602-712-2060

Mona Aglan-Swick, P.E.
Maglan-swick@azdot.gov
602-712-7374

Larry Talley
Ltalley@azdot.gov
602-712-7709