



July 30, 2015

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: MAG
Agency: City of Glendale
Project Name: Install FYA and Geometric Modifications to Improve Safety at Priority Intersections
Project Location: As a systemic project, the City chose all arterial to arterial intersections within the city (45). Phase 1 includes the 12 highest left-turn accident intersections based on MAG ranking.

Dear Ms. Aglan-Swick:

The City of Glendale is submitting herewith a project application for local Highway Safety Improvement Program (HSIP) funding. This road safety improvement project was identified through the state network crash data screening process and meets all requirements of Title 23. The proposed request is for systemic improvements at all arterial to arterial intersections within the City of Glendale. This includes changing the left-turn phasing from protected/permissive phasing to flashing yellow arrow (FYA), improving left-turn lane offset to create a positive offset, and adding three inch yellow retroreflective sheeting to signal backplates for twelve (12) signalized intersections in Glendale, Arizona and does not include any non-infrastructure funding request. Implementation of FYA operation, creating positive left-turn offsets, and installing three inch yellow retroreflective sheeting on the signal backplates are viable countermeasures for improving the safety of the twelve highest ranked accident locations within the City of Glendale. Each of those countermeasures are rated as four or five star. FYA operation has proven to enhance safety for left-turn operation because it is easier for drivers to understand and it is considered a safer condition than the circular green ball (i.e., FHWA suggests that if drivers are unsure, they will yield, rather than with a green ball, where drivers tend to assume the right-of-way). Creating a positive offset will give left-turning vehicles better sight distance, and retroreflective sheeting gives the signal better visibility and captures the driver's attention. This systemic project will be conducted in three phases.

Phase 1 will encompass the 12 highest priority intersections in Glendale as determined by the MAG ranking methodology (2009-2013). This methodology is accepted as a regional standard to prioritize intersections. To date, MAG has not yet ranked MAG region intersections based on the 2010 - 2014 collision data; therefore following regional standard, the 2009-2013 ranked intersections were used herein.

Phase 2 will include 11 intersections to be completed in-house by the City of Glendale forces. Costs for Phase 2 have been included in the B/C calculations.

Phase 3 includes the design and construction of the remaining 22 arterial to arterial intersections. Phase 3 preliminary engineering will be performed in FY 2019 with project construction in FY 2020.

Design for Phases 1 and 3 will be performed by a consultant and the construction will be performed by a contractor. Phase 2 (in-house) will not incur preliminary design or ADOT Administration fees.

During the most recent five year period ending in 2014, the city experienced 965 total intersection related left-turn crashes at arterial - arterial intersections, including two (2) fatal and 19 incapacitating crashes. With a Crash Reduction Factor (CRF) of 19.4% for converting left-turn signal operation from protected/permissive to flashing yellow arrow (FYA), a CRF of 38.0% for improving left-turn lane offset to create a positive offset, and a CRF of 15.0% for adding a three inch yellow retroreflective sheeting to signal backplates obtained from the Clearinghouse 4/5 Star (and pre-approved by ADOT prior to application submission) list for left-turn intersection crashes, the City could see a five year reduction of 560 left-turn crashes, including a reduction of 1.2 fatalities and 11 serious injury crashes.

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The City of Glendale has determined that, in accordance with 23 USC 148(a)(4)(A), this project is consistent with the MAG and State's 2014 SHSP. It supports ADOT's *Roadway Infrastructure and Operations* emphasis area (EA) (Intersections) and MAG's action area (AA), *Eliminate Death and Injuries Related to Intersections*.

B/C Ratio = 5.3

Weighted HSIP Score = 22.3

The City of Glendale has estimated the cost of Phase I of the Systemic improvement project to be \$887,164.66. The funding amount requested of \$877,085.08, is HSIP eligible and \$10,079.58 being local match. Phase 2 will be done in-house by the City for a cost of \$244,326.23. The estimated cost of Phase 3 is \$1,623,321.74 of which \$1,604,897.50 is HSIP eligible and 18,424.23 being local match funds to complete the systemic project. Glendale has local funds programmed for implementation of Phase II FYA implementation for an addl. 11 intersections in-house. The remaining portion of systemic improvements will be addressed in Phase 3. In accordance with Title 23, the Federal share for the requested HSIP requested safety improvement items are eligible to be funded at 100% Federal share for the traffic signal related work and 94.3% Federal share for the geometric improvements per 23 U.S.C. 120(c) as described in Code of Federal Register 23 CFR Part 924. The retroreflective sheeting is either 100% or 94.3% Federal share depending upon the backplate being new (100%) or existing to remain (94.3%).

The City of Glendale 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 be provided or secured by the City of Glendale to cover the additional costs or the project will have to be withdrawn and resubmitted in the next call-for-projects.

The City of Glendale 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 countermeasure on fatal and serious injury crashes.

The City of Glendale 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 City of Glendale will maintain the countermeasure at or above the standard to which it was installed.

If you have any questions, please contact me at 623-930-2940 or email DAIbert@glendaleaz.com.

Sincerely,



for
Debbie Albert P.E., P.T.O.E Interim Deputy Public Works Director
City of Glendale, Arizona
6210 W. Myrtle Avenue, Ste 112
Glendale, Arizona 85301

Attachments: Application (excel format) to include cost estimate, B/C ratio, vicinity map and/or list of locations

ADOT FY16 HIGHWAY SAFETY IMPROVEMENT PROGRAM APPLICATION

Agency:	City of Glendale	Title of Project:	Install FYA and Geometric Modifications to Improve Safety at Priority Intersections	
County:	Maricopa	COG/MPO:	MAG	
District:	Phoenix Maintenance	HSIP Funds:	<input type="checkbox"/> STATE	<input checked="" type="checkbox"/> LOCAL
Contact:		Phone:	E-Mail:	
Kiran Guntupalli		623-930-2951	kguntupalli@glendaleaz.com	
Type of Safety Improvement:	Spot: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Systemic: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
Mark all that apply to your project: <input checked="" type="checkbox"/> PE <input checked="" type="checkbox"/> Const. <input type="checkbox"/> Procurement <input type="checkbox"/> Planning <input type="checkbox"/> Non-Infrastructure				
Anticipated Total Cost Estimate:			\$2,754,812.63	
Anticipated dollar amount of HSIP Funding:			\$2,481,982.58	
Anticipated Dollar amount of Local Match (5.7%) (5.66%):			\$28,503.81	
Anticipated Dollar amount of Other:			\$244,326.23	
Funding Source:	<input checked="" type="checkbox"/> 100% HSIP <input checked="" type="checkbox"/> 94.3% HSIP <input type="checkbox"/> 94.34% HSIP	Cost Estimate Tab:	6. Phased Cost Est.	
Local Initiated Projects				
Anticipated Design Year (Construction/procurement year cannot be the same):		<input checked="" type="checkbox"/> FY16 <input type="checkbox"/> FY17 (State)		
If additional ROW is needed, what FY is purchase anticipated?:		<input type="checkbox"/> FY17 <input type="checkbox"/> FY18		
Anticipated Construction Year:		<input type="checkbox"/> FY16* <input type="checkbox"/> FY17 <input checked="" type="checkbox"/> FY18		
Administration of Project:	Agency: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	ADOT:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
If competing for State Funds, COG/MPO agrees to transfer TOTAL local HSIP OA to State.				<input checked="" type="checkbox"/> YES
Name and Title of COG/MPO Representative:		Margaret Boone, P.E.		
State Initiated Projects				
Anticipated Design Year (Construction/procurement year cannot be the same):		<input type="checkbox"/> FY17		
If additional ROW is needed, what FY is purchase anticipated?:		<input type="checkbox"/> FY17 <input type="checkbox"/> FY18		
Anticipated Construction Year:		<input type="checkbox"/> FY17* <input type="checkbox"/> FY18 <input checked="" type="checkbox"/> FY19 <input checked="" type="checkbox"/> FY20		
Basic Project Information				
1.	Have lower cost countermeasures been considered or implemented?			<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
1a.	If "Yes", describe: If "No", explain why not:	City of Glendale periodically reviews signal phasing and timing at all intersections.		
2.	Describe your safety improvement project in detail: (50 words or less)			

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District:	Phoenix Maintenance	HSIP Funds:	<input type="checkbox"/> STATE <input checked="" type="checkbox"/> LOCAL
2a.	The scope of work includes three elements. 1. The City intends to convert protected/permissive left-turns to Flashing Yellow Arrow (FYA) signal operation, CMF 0.806. 2. The City intends to cut back medians and install carrots to eliminate negative left-turn lane offset and create positive offset, CMF 0.620. 3. The City intends to add 3" retroreflective sheeting to all signal back plates to improve visibility, CMF 0.850.		
3.	Describe the location of this safety project:		
3a.	As a systemic project, the City chose all arterial to arterial intersections within the city (45). Phase 1 includes the 12 highest priority intersections based on MAG ranking. All 5-section protected/permissive signal heads will be removed and replaced with 4-section flashing yellow arrow signal heads. Medians will be cut back a maximum of 20 feet and striping "carrots" will be placed in order to shift vehicles to the left to eliminate negative offset and create a positive offset in left-turn lanes and improve sight distance. In addition, 3" retroreflective sheeting will be added to all signal backplates to improve visibility.		
4.	What crash data screening method was used to identify this project?		
4a.	MAG crash rankings were used to determine the locations within the city that have the highest crash rankings. Data downloaded from ADOT Safety DataMart was used in this application. The crash data is included in Tab 20 (Crash Data).		
5.	What is the safety justification for the proposed project?		
5a.	1. NCHRP/FHWA have studied the use of Flashing Yellow Arrow signal operation and determined that it is safe and more effective than the circular green ball in conveying to drivers the need to yield before turning left. In addition, FYA tends to have a safer fail condition than the circular green in that drivers will yield on the FYA rather than proceed on a circular green. 2. FHWA research has determined that a strategy of eliminating a negative left-turn lane offset has the potential to reduce total and target crashes. 3. FHWA has published reports supporting the installation of 3" retroreflective sheeting (borders) on signal backplates to increase the visibility of traffic signals, especially at night, and identified it as a countermeasure to reduce crashes by improving driver awareness of signals.		
6.	Will there be ground disturbing activities?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
7.	Is project within applicants permanent ROW?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
7a.	If NO please explain:		
8.	Will any temporary right-of-way acquisitions be required?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
9.	Will there be any utility relocation needed?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

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9a. If YES please explain:	When relocating signal poles, utility relocation may be necessary but will be determined during design process.			
10. Does Section 4(f) apply to any portion of this project?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
10a. If YES please explain:				
11. Are there any other issues that may impact or delay development or construction of this project?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
11a. If YES please explain:				
12. Is this project in compliance with revised ADA Standards?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
12a. If NO please explain:				
13. Does the project support Arizona's Strategic Highway Safety Plan?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
14. Are there any Studies, RSA's or Other evaluations that support this project?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
15. HSIP Roadway Functional Classification:	Urban Principal Arterial - Other			
16. Average Daily Traffic Volume and Year Collected:	ADT: ~25,000 vpd	2012		
17. What is the source of ADT?:	City of Glendale			
18. What is the posted speed limit?	40 mph			
19. Detailed engineer's cost estimate attached:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
"Systemic" Safety Project				
20. Completed B/C Ratio Tabulation Sheet Attached (Required):	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
21. Most current 3-5 Years Crash Data from ADOT ALISS database sorted by year & severity (required):	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
22. What are the inclusive dates of the crash data?	2010-2014			
23. If purchasing equipment or materials, who will install?	<input type="checkbox"/> Town/City <input type="checkbox"/> County <input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Tribe			

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District:	Phoenix Maintenance	HSIP Funds:	<input type="checkbox"/> STATE <input checked="" type="checkbox"/> LOCAL
24.	Does the project require proprietary Items (23CFR 635.411)?:		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
25.	Is a list of locations for systemic projects provided on the attached form?		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
26.	How are (will) the proposed locations be prioritized for replacement? (explain below)		
26a.	The locations for Phase 1 were prioritized by MAG crash rank. The locations for Phase 2 intersections to be completed in-house by the City of Glendale forces to employ the countermeasures. Phase 3 locations encompassed all of the remaining arterial to arterial intersections.		
27.	Are the supporting structures in good condition, meet local standards and have an anticipated service life longer than the countermeasure being installed?		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
"Spot" Improvement Projects Only			
28.	Completed B/C Ratio Tabulation Sheet Attached (required):		<input type="checkbox"/> YES <input type="checkbox"/> NO
29.	Most current 3-5 Years Crash Data from ADOT ALISS database sorted by year & severity (required):		<input type="checkbox"/> YES <input type="checkbox"/> 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?		<input type="checkbox"/> YES <input type="checkbox"/> NO
32.	If YES please explain:		
33.	Project vicinity map is provided:		<input type="checkbox"/> YES <input type="checkbox"/> NO
34.	Project work limits map is provided:		<input type="checkbox"/> YES <input type="checkbox"/> NO
SHSP - All Projects			
35.	Which SHSP Emphasis Area (EA) does this project support?:	Roadway_Infrastructure_and_Operations	
35a.	Which EA Strategy does it support?:	(Intersections) Reduce frequency and severity of intersection crashes through traffic-control and operational improvements.	
35b.	Does this project support a second SHSP EA? If so, which EA.:	Roadway_Infrastructure_and_Operations	

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District:	Phoenix Maintenance	HSIP Funds:	<input type="checkbox"/> STATE <input checked="" type="checkbox"/> LOCAL	
35c.	Which EA Strategy supports the second EA?	(Intersections) Reduce frequency and severity of intersection crashes through geometric improvements.		
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?:			<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
36a.	If so, which countermeasure?:	Backplates with Retroreflective Borders		
37.	Does this project support one of the three Arizona Focus Areas?:			<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
37a.	If so, which focus area?:	Intersection		
38.	Which HSIP Improvement Category does this project support?:	Intersection_Traffic_Control		
38a.	Which HSIP Improvement Sub-Category does this project support?:			
	Modify traffic signal – add flashing yellow arrow			
39.	Does your COG/MPO have a Strategic Transportation Safety Plan (STSP)?:			<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
39a.	If "YES", does this project support an Emphasis Area in the COG/MPO STSP?:			<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
39b.	List the EA:	Eliminate Death and Injuries Related to Intersections		
40.	Are any temporary safety countermeasures needed prior to this permanent solution being installed?			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
40a.	If yes, please explain:			
B/C Ratio and Weighted Score				
41.	The calculated B/C Ratio is:	5.30	The Weighted Score is:	22.30
Non-Infrastructure Project or Element				
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)	<input type="checkbox"/> YES <input type="checkbox"/> NO		
42a.	Occupant Protection	<input type="checkbox"/> YES <input type="checkbox"/> NO		

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42a.	Pedestrian and Bicycle Safety		<input type="checkbox"/> YES <input type="checkbox"/> NO
42a.	Motorcycle Safety		<input type="checkbox"/> YES <input type="checkbox"/> NO
42a.	Police Traffic Services/Speed Control		<input type="checkbox"/> YES <input type="checkbox"/> NO
42a.	Lack of accurate/complete crash data		<input type="checkbox"/> YES <input type="checkbox"/> NO
42a.	Emergency Medical Services		<input type="checkbox"/> YES <input type="checkbox"/> 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-infracture portion of this project?		<input type="checkbox"/> YES <input type="checkbox"/> NO
42b.	If "NO", then explain why other sources have not been explored.		
42b.			
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"?		<input type="checkbox"/> YES <input type="checkbox"/> NO

Agency:	City of Glendale	Name of Project:	Install FYA and Geometric Modifications to Improve Safety at Priority Intersections						
HSIP Project Cost Estimate Worksheet									
Project Cost Estimate:	Description:	Quantity:	Unit Cost:	Total Cost:	HSIP:	HSIP	Local Match	Other Funds	TOTAL COST
					100.00%	94.30%	5.70%		
Phase I									
Planning or Study:		0	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -
Phase I Preliminary Engineering:		1	\$ 117,505.35	\$ 117,505.35	\$ 94,709.31	\$ 21,496.66	\$ 1,299.37		\$ 117,505.35
Non-Infrastructure (NI) Elements:		0	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -
ADOT Admin Costs:		1	\$ 58,752.67	\$ 58,752.67	\$ 47,354.66	\$ 10,748.33	\$ 649.69		\$ 58,752.67
Phase I Design Sub-Total				\$ 176,258.02	\$ 142,063.97	\$ 32,245.00	\$ 1,949.06		\$ 176,258.02
Construction:	REMOVE CURB	392	\$ 6.50	\$ 2,548.00	\$ -	\$ 2,402.76	\$ 145.24		\$ 2,548.00
Construction:	REMOVE CONCRETE MEDIAN	728	\$ 3.90	\$ 2,839.20	\$ -	\$ 2,677.37	\$ 161.83		\$ 2,839.20
Construction:	REMOVE PAVEMENT	958	\$ 6.50	\$ 6,227.00	\$ -	\$ 5,872.06	\$ 354.94		\$ 6,227.00
Construction:	REMOVE SIGNS	4	\$ 325.00	\$ 1,300.00	\$ 1,300.00	\$ -	\$ -		\$ 1,300.00
Construction:	REMOVE PULL BOX	7	\$ 650.00	\$ 4,550.00	\$ -	\$ 4,290.65	\$ 259.35		\$ 4,550.00
Construction:	REMOVE AND REPLACE R4-7, OBJECT MARKER	8	\$ 325.00	\$ 2,600.00	\$ -	\$ 2,451.80	\$ 148.20		\$ 2,600.00
Construction:	REMOVE TRAFFIC SIGNALS	80	\$ 390.00	\$ 31,200.00	\$ 31,200.00	\$ -	\$ -		\$ 31,200.00
Construction:	REMOVAL OF SIGNAL POLES AND BASES	7	\$ 10,400.00	\$ 72,800.00	\$ 72,800.00	\$ -	\$ -		\$ 72,800.00
Construction:	REMOVAL OF POLE FOUNDATIONS	5	\$ 2,600.00	\$ 13,000.00	\$ 13,000.00	\$ -	\$ -		\$ 13,000.00
Construction:	REMOVE/RELOCATE MAST ARM	14	\$ 1,300.00	\$ 18,200.00	\$ 18,200.00	\$ -	\$ -		\$ 18,200.00
Construction:	RELOCATE EXISTING SIGNAL POLE	5	\$ 7,800.00	\$ 39,000.00	\$ 39,000.00	\$ -	\$ -		\$ 39,000.00
Construction:	RELOCATE IISNS	10	\$ 520.00	\$ 5,200.00	\$ 5,200.00	\$ -	\$ -		\$ 5,200.00
Construction:	RELOCATE PRE-EMPTION/TRAFFIC DEVICE	6	\$ 260.00	\$ 1,560.00	\$ 1,560.00	\$ -	\$ -		\$ 1,560.00
Construction:	PAVEMENT PATCH	1573	\$ 20.80	\$ 32,718.40	\$ -	\$ 30,853.45	\$ 1,864.95		\$ 32,718.40
Construction:	OBLITERATE PAVEMENT MARKING (STRIPE)	310	\$ 1.30	\$ 403.00	\$ -	\$ 380.03	\$ 22.97		\$ 403.00
Construction:	PAVEMENT MARKING (WHITE THERMOPLASTIC) (4" WIDE)	400	\$ 1.30	\$ 520.00	\$ -	\$ 490.36	\$ 29.64		\$ 520.00
Construction:	PAVEMENT MARKING (YELLOW THERMOPLASTIC) (4" WIDE)	200	\$ 1.30	\$ 260.00	\$ -	\$ 245.18	\$ 14.82		\$ 260.00
Construction:	PERMANENT PAVEMENT MARKING (PAINTED)	642	\$ 0.65	\$ 417.30	\$ -	\$ 393.51	\$ 23.79		\$ 417.30
Construction:	LEFT TURN YIELD FYA SIGN	200	\$ 26.00	\$ 5,200.00	\$ 5,200.00	\$ -	\$ -		\$ 5,200.00
Construction:	TRAFFIC SIGNAL FACE (TYPE F) (LED)	22	\$ 520.00	\$ 11,440.00	\$ 11,440.00	\$ -	\$ -		\$ 11,440.00
Construction:	TRAFFIC SIGNAL FACE (TYPE FYA) (LED)	80	\$ 780.00	\$ 62,400.00	\$ 62,400.00	\$ -	\$ -		\$ 62,400.00
Construction:	RETROFLECTIVE TAPE	95	\$ 65.00	\$ 6,175.00	\$ 6,175.00	\$ -	\$ -		\$ 6,175.00
Construction:	RETROFLECTIVE TAPE (NEW)	21	\$ 13.00	\$ 273.00	\$ 273.00	\$ -	\$ -		\$ 273.00
Construction:	TRAFFIC SIGNAL FACE (PEDESTRIAN) (MAN/HAND)(COUNTDOWN)	2	\$ 520.00	\$ 1,040.00	\$ 1,040.00	\$ -	\$ -		\$ 1,040.00
Construction:	PEDESTRIAN PUSH BUTTON	6	\$ 260.00	\$ 1,560.00	\$ 1,560.00	\$ -	\$ -		\$ 1,560.00
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE II)	13	\$ 156.00	\$ 2,028.00	\$ 2,028.00	\$ -	\$ -		\$ 2,028.00
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE V)	1	\$ 260.00	\$ 260.00	\$ 260.00	\$ -	\$ -		\$ 260.00
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VII)	12	\$ 260.00	\$ 3,120.00	\$ 3,120.00	\$ -	\$ -		\$ 3,120.00

Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE XI)	1	\$ 325.00	\$ 325.00	\$ 325.00	\$ -	\$ -	\$ 325.00
Construction:	RECONFIGURE MOUNTING ASSEMBLY	41	\$ 130.00	\$ 5,330.00	\$ 5,330.00	\$ -	\$ -	\$ 5,330.00
Construction:	RELOCATE SIGNAL HEAD	35	\$ 130.00	\$ 4,550.00	\$ 4,550.00	\$ -	\$ -	\$ 4,550.00
Construction:	LUMINAIRE	5	\$ 650.00	\$ 3,250.00	\$ 3,250.00	\$ -	\$ -	\$ 3,250.00
Construction:	RELOCATE LUMINAIRE	5	\$ 390.00	\$ 1,950.00	\$ 1,950.00	\$ -	\$ -	\$ 1,950.00
Construction:	MALFUNCTION MANAGEMENT UNIT	11	\$ 2,340.00	\$ 25,740.00	\$ 25,740.00	\$ -	\$ -	\$ 25,740.00
Construction:	POLE (TYPE R)	7	\$ 2,470.00	\$ 17,290.00	\$ 17,290.00	\$ -	\$ -	\$ 17,290.00
Construction:	POLE FOUNDATION (TYPE R)	5	\$ 1,820.00	\$ 9,100.00	\$ 9,100.00	\$ -	\$ -	\$ 9,100.00
Construction:	MAST ARM (20 FT.) (TAPERED)	5	\$ 780.00	\$ 3,900.00	\$ 3,900.00	\$ -	\$ -	\$ 3,900.00
Construction:	MAST ARM (45 FT.) (TAPERED)	1	\$ 1,560.00	\$ 1,560.00	\$ 1,560.00	\$ -	\$ -	\$ 1,560.00
Construction:	MAST ARM (50 FT.) (TAPERED)	3	\$ 1,950.00	\$ 5,850.00	\$ 5,850.00	\$ -	\$ -	\$ 5,850.00
Construction:	MAST ARM (55 FT.) (TAPERED)	8	\$ 2,340.00	\$ 18,720.00	\$ 18,720.00	\$ -	\$ -	\$ 18,720.00
Construction:	ELECTRICAL CONDUIT (2 1/2 INCH) (WITH 1/4 INCH PULL ROPE)	40	\$ 14.30	\$ 572.00	\$ 572.00	\$ -	\$ -	\$ 572.00
Construction:	CONDUCTORS	3855	\$ 4.53	\$ 17,474.72	\$ 17,474.72	\$ -	\$ -	\$ 17,474.72
Construction:	CONCRETE SINGLE CURB	61	\$ 32.50	\$ 1,982.50	\$ -	\$ 1,869.50	\$ 113.00	\$ 1,982.50
Construction:	CONCRETE MEDIAN NOSE	122	\$ 26.00	\$ 3,172.00	\$ -	\$ 2,991.20	\$ 180.80	\$ 3,172.00
Construction:	UTILITY WORK	4	\$ 10,000.00	\$ 40,000.00	\$ -	\$ 37,720.00	\$ 2,280.00	\$ 40,000.00
				\$ -	\$ -	\$ -	\$ -	\$ -
Sub-Total		10010	\$ 52,434.58	\$ 489,605.12	\$ 391,367.72	\$ 92,637.87	\$ 5,599.53	\$ 489,605.12
Traffic Control				\$ 48,960.51	\$ 39,136.77	\$ 9,263.79	\$ 559.95	\$ 48,960.51
Mobilization				\$ 48,960.51	\$ 39,136.77	\$ 9,263.79	\$ 559.95	\$ 48,960.51
Sub-Total				\$ 587,526.14	\$ 469,641.26	\$ 111,165.44	\$ 6,719.44	\$ 587,526.15
Construction Admin :		14.00%		\$ 82,253.66	\$ 65,749.78	\$ 15,563.16	\$ 940.72	\$ 82,253.66
Contingencies :		5.00%		\$ 29,376.31	\$ 23,482.06	\$ 5,558.27	\$ 335.97	\$ 29,376.31
Post Design:		1.00%		\$ 5,875.26	\$ 4,696.41	\$ 1,111.65	\$ 67.19	\$ 5,875.26
Communications:		1.00%		\$ 5,875.26	\$ 4,696.41	\$ 1,111.65	\$ 67.19	\$ 5,875.26
				\$ -	\$ -	\$ -	\$ -	\$ -
Post Sub-Total				\$ 123,380.49	\$ 98,624.67	\$ 23,344.74	\$ 1,411.08	\$ 123,380.49
Phase I Construction Sub-Total				\$ 710,906.63	\$ 568,265.93	\$ 134,510.19	\$ 8,130.52	\$ 710,906.64
Phase I Sub-Total				\$ 887,164.65	\$ 710,329.90	\$ 166,755.18	\$ 10,079.58	\$ 887,164.66
Phase II								
Planning or Study:		0						\$ -
Phase II Preliminary Engineering:		1						\$ -
Non-Infrastructure (NI) Elements:		0						\$ -
ADOT Admin Costs:		1						\$ -
Phase II Design Sub-Total				\$ -	\$ -	\$ -	\$ -	\$ -
Total	CITY OF GLENDALE IN-HOUSE PROJECT	11	\$ 22,211.48	\$ 244,326.23	\$ -	\$ -	\$ -	\$ 244,326.23
								\$ -
Phase II Sub-Total				\$ 244,326.23	\$ -	\$ -	\$ -	\$ 244,326.23
Phase III								
Planning or Study:		0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Phase III Preliminary Engineering:		1	\$ 215,009.50	\$ 215,009.50	\$ 173,297.66	\$ 39,334.27	\$ 2,377.58	\$ 215,009.50
Non-Infrastructure (NI) Elements:		0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ADOT Admin Costs:		1	\$ 107,504.75	\$ 107,504.75	\$ 86,648.83	\$ 19,667.13	\$ 1,188.79	\$ 107,504.75
Phase III Design Sub-Total				\$ 322,514.25	\$ 259,946.49	\$ 59,001.40	\$ 3,566.36	\$ 322,514.25
Construction:	REMOVE CURB	1083	\$ 6.50	\$ 7,039.50	\$ -	\$ 6,638.25	\$ 401.25	\$ 7,039.50
Construction:	REMOVE CONCRETE MEDIAN	1459	\$ 3.90	\$ 5,690.10	\$ -	\$ 5,365.76	\$ 324.34	\$ 5,690.10

Construction:	REMOVE PAVEMENT	2509	\$ 6.50	\$ 16,308.50	\$ -	\$ 15,378.92	\$ 929.58		\$ 16,308.50
Construction:	REMOVE SIGNS	31	\$ 325.00	\$ 10,075.00	\$ 10,075.00	\$ -	\$ -		\$ 10,075.00
Construction:	REMOVE PULL BOX	13	\$ 650.00	\$ 8,450.00	\$ -	\$ 7,968.35	\$ 481.65		\$ 8,450.00
Construction:	REMOVE AND REPLACE R4-7, OBJECT MARKER	12	\$ 325.00	\$ 3,900.00	\$ -	\$ 3,677.70	\$ 222.30		\$ 3,900.00
Construction:	REMOVE TRAFFIC SIGNALS	151	\$ 390.00	\$ 58,890.00	\$ 58,890.00	\$ -	\$ -		\$ 58,890.00
Construction:	REMOVAL OF SIGNAL POLES AND BASES	13	\$ 10,400.00	\$ 135,200.00	\$ 135,200.00	\$ -	\$ -		\$ 135,200.00
Construction:	REMOVAL OF POLE FOUNDATIONS	13	\$ 2,600.00	\$ 33,800.00	\$ 33,800.00	\$ -	\$ -		\$ 33,800.00
Construction:	REMOVE/RELOCATE MAST ARM	21	\$ 1,300.00	\$ 27,300.00	\$ 27,300.00	\$ -	\$ -		\$ 27,300.00
Construction:	RELOCATE EXISTING SIGNAL POLE	10	\$ 7,800.00	\$ 78,000.00	\$ 78,000.00	\$ -	\$ -		\$ 78,000.00
Construction:	RELOCATE IISNS	19	\$ 520.00	\$ 9,880.00	\$ 9,880.00	\$ -	\$ -		\$ 9,880.00
Construction:	RELOCATE PRE-EMPTION/TRAFFIC DEVICE	6	\$ 260.00	\$ 1,560.00	\$ 1,560.00	\$ -	\$ -		\$ 1,560.00
Construction:	PAVEMENT PATCH	5070	\$ 20.80	\$ 105,456.00	\$ -	\$ 99,445.01	\$ 6,010.99		\$ 105,456.00
Construction:	OBLITERATE PAVEMENT MARKING (STRIPE)	1320	\$ 1.30	\$ 1,716.00	\$ -	\$ 1,618.19	\$ 97.81		\$ 1,716.00
Construction:	PAVEMENT MARKING (WHITE THERMOPLASTIC) (4" WIDE)	3012	\$ 1.30	\$ 3,915.60	\$ -	\$ 3,692.41	\$ 223.19		\$ 3,915.60
Construction:	PAVEMENT MARKING (YELLOW THERMOPLASTIC) (4" WIDE)	464	\$ 1.30	\$ 603.20	\$ -	\$ 568.82	\$ 34.38		\$ 603.20
Construction:	PERMANENT PAVEMENT MARKING (PAINTED)	100	\$ 0.65	\$ 65.00	\$ -	\$ 61.30	\$ 3.71		\$ 65.01
Construction:	LEFT TURN YIELD FYA SIGN	335	\$ 26.00	\$ 8,710.00	\$ 8,710.00	\$ -	\$ -		\$ 8,710.00
Construction:	TRAFFIC SIGNAL FACE (TYPE F) (LED)	25	\$ 520.00	\$ 13,000.00	\$ 13,000.00	\$ -	\$ -		\$ 13,000.00
Construction:	TRAFFIC SIGNAL FACE (TYPE FYA) (LED)	156	\$ 780.00	\$ 121,680.00	\$ 121,680.00	\$ -	\$ -		\$ 121,680.00
Construction:	RETROFLECTIVE TAPE	145	\$ 65.00	\$ 9,425.00	\$ 9,425.00	\$ -	\$ -		\$ 9,425.00
Construction:	RETROFLECTIVE TAPE (NEW)		\$ 13.00	\$ -	\$ -	\$ -	\$ -		\$ -
Construction:	TRAFFIC SIGNAL FACE (PEDESTRIAN) (MAN/HAND)(COUNTDOWN)	17	\$ 520.00	\$ 8,840.00	\$ 8,840.00	\$ -	\$ -		\$ 8,840.00
Construction:	PEDESTRIAN PUSH BUTTON	16	\$ 260.00	\$ 4,160.00	\$ 4,160.00	\$ -	\$ -		\$ 4,160.00
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE II)	41	\$ 156.00	\$ 6,396.00	\$ 6,396.00	\$ -	\$ -		\$ 6,396.00
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE V)		\$ 260.00	\$ -	\$ -	\$ -	\$ -		\$ -
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VII)	6	\$ 260.00	\$ 1,560.00	\$ 1,560.00	\$ -	\$ -		\$ 1,560.00
Construction:	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE XI)	11	\$ 325.00	\$ 3,575.00	\$ 3,575.00	\$ -	\$ -		\$ 3,575.00
Construction:	RECONFIGURE MOUNTING ASSEMBLY	76	\$ 130.00	\$ 9,880.00	\$ 9,880.00	\$ -	\$ -		\$ 9,880.00
Construction:	RELOCATE SIGNAL HEAD	70	\$ 130.00	\$ 9,100.00	\$ 9,100.00	\$ -	\$ -		\$ 9,100.00
Construction:	LUMINAIRE	8	\$ 650.00	\$ 5,200.00	\$ 5,200.00	\$ -	\$ -		\$ 5,200.00
Construction:	RELOCATE LUMINAIRE	27	\$ 390.00	\$ 10,530.00	\$ 10,530.00	\$ -	\$ -		\$ 10,530.00
Construction:	MALFUNCTION MANAGEMENT UNIT	20	\$ 2,340.00	\$ 46,800.00	\$ 46,800.00	\$ -	\$ -		\$ 46,800.00
Construction:	POLE (TYPE R)	7	\$ 2,470.00	\$ 17,290.00	\$ 17,290.00	\$ -	\$ -		\$ 17,290.00
Construction:	POLE FOUNDATION (TYPE R)	5	\$ 1,820.00	\$ 9,100.00	\$ 9,100.00	\$ -	\$ -		\$ 9,100.00
Construction:	MAST ARM (20 FT.) (TAPERED)	11	\$ 780.00	\$ 8,580.00	\$ 8,580.00	\$ -	\$ -		\$ 8,580.00
Construction:	MAST ARM (45 FT.) (TAPERED)	3	\$ 1,560.00	\$ 4,680.00	\$ 4,680.00	\$ -	\$ -		\$ 4,680.00
Construction:	MAST ARM (50 FT.) (TAPERED)	4	\$ 1,950.00	\$ 7,800.00	\$ 7,800.00	\$ -	\$ -		\$ 7,800.00
Construction:	MAST ARM (55 FT.) (TAPERED)	6	\$ 2,340.00	\$ 14,040.00	\$ 14,040.00	\$ -	\$ -		\$ 14,040.00
Construction:	ELECTRICAL CONDUIT (2 1/2 INCH) (WITH 1/4 INCH PULL ROPE)	120	\$ 14.30	\$ 1,716.00	\$ 1,716.00	\$ -	\$ -		\$ 1,716.00

Construction:	CONDUCTORS	12180	\$ 3.25	\$ 39,585.00	\$ 39,585.00	\$ -	\$ -		\$ 39,585.00
Construction:	CONCRETE SINGLE CURB	534	\$ 32.50	\$ 17,355.00	\$ -	\$ 16,365.77	\$ 989.24		\$ 17,355.01
Construction:	CONCRETE MEDIAN NOSE	347	\$ 26.00	\$ 9,022.00	\$ -	\$ 8,507.75	\$ 514.25		\$ 9,022.00
Construction:	UTILITY WORK		\$ 10,000.00	\$ -	\$ -	\$ -	\$ -		\$ -
				\$ -	\$ -	\$ -	\$ -		\$ -
Sub-Total		29476	\$ 52,433.30	\$ 895,872.90	\$ 716,352.00	\$ 169,288.23	\$ 10,232.69		\$ 895,872.92
Traffic Control		10.00%		\$ 89,587.29	\$ 71,635.20	\$ 16,928.82	\$ 1,023.27		\$ 89,587.29
Mobilization		10.00%		\$ 89,587.29	\$ 71,635.20	\$ 16,928.82	\$ 1,023.27		\$ 89,587.29
Sub-Total				\$ 1,075,047.48	\$ 859,622.40	\$ 203,145.88	\$ 12,279.23		\$ 1,075,047.51
Construction Admin :		14.00%		\$ 150,506.65	\$ 120,347.14	\$ 28,440.42	\$ 1,719.09		\$ 150,506.65
Contingencies :		5.00%		\$ 53,752.37	\$ 42,981.12	\$ 10,157.29	\$ 613.96		\$ 53,752.38
Post Design:		1.00%		\$ 10,750.47	\$ 8,596.22	\$ 2,031.46	\$ 122.79		\$ 10,750.48
Communications:		1.00%		\$ 10,750.47	\$ 8,596.22	\$ 2,031.46	\$ 122.79		\$ 10,750.48
				\$ -	\$ -	\$ -	\$ -		\$ -
Post Sub-Total				\$ 225,759.97	\$ 180,520.70	\$ 42,660.63	\$ 2,578.64		\$ 225,759.98
Phase III Construction Sub-Total				\$ 1,300,807.45	\$ 1,040,143.10	\$ 245,806.51	\$ 14,857.87		\$ 1,300,807.48
Phase III Sub-Total				\$1,623,321.70	\$ 1,300,089.59	\$ 304,807.91	\$ 18,424.23		\$ 1,623,321.74
Project Grand Total				\$2,754,812.59	\$2,010,419.49	\$471,563.09	\$28,503.81	\$244,326.23	\$2,754,812.63

Required for all HSIP Applications

Agency:	City of Glendale	Title of Project:	Install FYA and Geometric Modifications to Improve Safety at Priority Intersections
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Benefit / Cost Ratio Tabulation

Annual Benefit Tabulation

Severity	Annual Average	Estimated CMF* Reduction	Total Reduction	Unit Cost	Annual Benefit
Fatal	0.40	58%	0.23	\$5,800,000	\$1,334,000
Incapacitating Injury	3.80	58%	2.19	\$400,000	\$874,000
Total Annual Benefits					\$2,208,000

Costs

Total Project Cost	2,754,812.63
Project Life (years)	10
Interest Rate (%)	8%
Capital Recovery Factor	0.1490
Annual Construction Cost	\$410,548
Annual Maintenance Cost	\$1,000.00
Total Annual Costs	\$411,548

Benefit / Cost

Annual Benefit	Annual cost	Benefit / Cost Ratio
\$2,208,000	\$411,548	5.3

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

incidentid	incidentDate	incidentTime	incidentOmroad	incidentcrossingfeature	cidentOffs	incidentInjurySeverityDesc	incidentCollisionMannerDesc	incidentIntersectionTypeDesc	incidentLightConditionDesc	incidentWeatherDesc
2930846	09-Dec-14	07:59TH AVE	07 PEORIA AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2814422	23-Nov-13	07:67TH AVE	07 CAMELBACK RD		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DARK_LIGHTED	SLEET_HAIL_FRE EZING_RAIN_OR DRIZZLE
2814404	16-Dec-13	07 PEORIA AVE	07 51ST AVE		0	FATAL	SINGLE_VEHICLE	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2808236	30-Nov-13	07:67TH AVE	07 GLENDALE AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	UNKNOWN
2782560	09-Jul-13	07 DEER VALLEY RD	07 67TH AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2781970	01-Oct-13	07 CAMELBACK RD	07 83RD AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2781959	22-Oct-13	07 BELL RD	07 59TH AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2773342	18-Sep-13	07 NORTHERN AVE	07 59TH AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2726835	01-Apr-13	07:99TH AVE	07 CAMELBACK RD		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLOUDY
2718978	07-Mar-13	07:51ST AVE	07 PEORIA AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2691504	30-Nov-12	07:59TH AVE	07 PEORIA AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DARK_LIGHTED	CLEAR
2653133	17-Aug-12	07:67TH AVE	07 GLENDALE AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLOUDY
2644278	02-Jul-12	07:51ST AVE	07 PEORIA AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLOUDY
2617141	28-Feb-12	07:59TH AVE	07 CACTUS RD		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLOUDY
2609005	12-Feb-12	07:51ST AVE	07 PEORIA AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DARK_LIGHTED	CLOUDY
2580775	05-Nov-11	07 GLENDALE AVE	07 67TH AVE		0.0057	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2580572	05-Nov-11	07:83RD AVE	07 CAMELBACK RD		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DARK_LIGHTED	CLEAR
2554188	19-Sep-10	07:59TH AVE	07 BETHANY HOME RD		0	FATAL	LEFT_TURN	FOUR_WAY_INTERSECTION	DARK_LIGHTED	CLEAR
2525656	08-May-11	07 GLENDALE AVE	07 51ST AVE		0.0064	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DARK_LIGHTED	CLEAR
2436129	14-Jul-10	07 PEORIA AVE	07 59TH AVE		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR
2419018	25-Jun-10	07:99TH AVE	07 CAMELBACK RD		0	INCAPACITATING_INJURY	LEFT_TURN	FOUR_WAY_INTERSECTION	DAYLIGHT	CLEAR

Coded incorrectly; this is a left-turn accident