ARIZONA HIGHWAY SAFETY IMPROVEMENT PROGRAM MANUAL

Arizona Department of Transportation

Transportation Systems Management & Operations Group

Traffic Safety Section

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1. INTRODUCTION

This manual documents the Arizona Highway Safety Improvement Program (HSIP) and defines Arizona Department of Transportation's (ADOT's) program for project evaluation, statewide prioritization, and development of HSIP projects based on uniform and objective criteria. The purpose of the Arizona HSIP is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads in Arizona. This manual provides guidance for planning, implementation, and evaluation of HSIP projects in Arizona to achieve this stated purpose of reducing fatalities and serious injuries. This manual supersedes previous versions of the Arizona HSIP manual and will continue to be updated as federal requirements or state procedures change.

This manual is organized in two sections, with some supporting appendices. The remainder of this first introductory section of the manual outlines legislative direction related to the Arizona HSIP, including annual reporting requirements. The second section describes components and programs relating to the Arizona HSIP and provides details on the planning, implementation, and evaluation of HSIP projects. The appendices contain detailed direction regarding the HSIP application the process including specific criteria for project eligibility and provides reference countermeasures to support the planning process. Appendix information may be updated periodically.

Web-link – Moving Ahead for Progress in the 21st Century (MAP-21)

1.1 HSIP Legislation

The Highway Safety Improvement Program (HSIP), Codified as Section 148 of Title 23, United States Code (23 U.S.C. 148) remains as one of the core federal-aid programs in the federal surface transportation act, "Moving Ahead for Progress in the 21st Century" (MAP-21), which was signed into law on July 6, 2012. The specific provisions of the HSIP are defined in Section 1112 of MAP-21 with implementing regulations 23 CFR Part 924.

Web-link – History of Federal HSIP

Web-link – Fixing America's Surface Trans. Act

Fixing America's Surface Transportation (FAST) Act (Public Law 114-94) was signed into law on December 4, 2015 and amended 23 U.S.C 148. Section 1113, Highway Safety Improvement Program, to include additional safety countermeasures and striking paragraph (10) which eliminated eligibility for non-infrastructure programs.

Web-link – Bipartisan Infrastructure Law

The Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the "Bipartisan Infrastructure Law" (BIL)) was signed into law on November 15, 2021 and again amended 23 U.S.C.148. Section 11111, Highway Safety Improvement Program, added paragraph (11), SPECIFIED SAFETY PROJECT, which added back in non-infrastructure projects which promote public awareness regarding highway safety matters, facilitates enforcement of traffic safety laws and provides infrastructure and infrastructure related equipment to support emergency services among other projects.

Web-link – Federal HSIP Policy/Guidance

Legislation requires that each state develop and implement a Strategic Highway Safety Plan (SHSP) and administer the Railway-Highway Grade Crossing Program (23 U.S.C. 130). The State HSIP should be consistent with the STSP emphasis areas and strategies. The State HSIP may be flexible to meet the needs of the State, but must include the following components:

State HSIP includes: Planning, Implementation, and Evaluation

- Planning – Collect and maintain data, identify highway safety issues, conduct engineering studies, and establish priorities.
- Implementation – Schedule and implement projects.
- Evaluation – Determine the effectiveness of safety improvements.

Findings resulting from the Evaluation process shall be incorporated as basic source data in the Planning process.

1.1.1 Strategic Traffic Safety Plan

Web-link – FHWA STSP Guidance

The STSP is a multi-year statewide-coordinated safety plan that provides a comprehensive framework for reducing fatalities and serious injuries on all public roads. It is data-driven and establishes statewide safety goals, objectives, and key emphasis areas. This plan must be developed through a multi-disciplinary approach that considers transportation safety countermeasures and strategies in all "4 E's" of

safety: engineering, enforcement, education, and emergency services. The STSP allows highway safety programs and partners in each state to work together to align goals, leverage resources and collectively address safety challenges.

Web-link – Arizona STSP

Arizona developed the most recent update to their STSP in 2019. The Arizona 2019 STSP is data-driven and was developed in collaboration with safety stakeholders throughout the state. The plan defines emphasis areas and strategies to achieve a goal to reduce fatalities and the occurrence and severity of serious injuries on all public roadways in Arizona. The vision of the STSP is "Toward Zero Deaths by Reducing Crashes for a Safer Arizona" and the goal of the STSP is to "Reduce Traffic Fatalities on Arizona's Roadways"

1.1.2 Railway-Highway Grade Crossing Program

The federal Railway-Highway Grade Crossing Program (RHGCP) reduces the number of fatalities and injuries at public railway-highway grade crossings through the elimination of hazards and/or the installation/upgrade of protective devices at crossings. Each state is required to conduct and systematically maintain a survey of all railway-highway grade crossings to identify crossings which may require separation, relocation, or protective devices, and establish and implement a schedule of projects for this purpose. At a minimum, the crossings identified through the program will have standard signing and striping following guidance from the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

Web-link – FHWA Rail Crossing Program Guidance

The Arizona RHGCP is funded through a set-aside from the HSIP apportionment (pre—apportionment). The ADOT Utility and Railroad Section administers and manages this program and maintains an inventory of public railroad crossings, a list of projects, and relevant program guidelines.

1.1.3 Special Rules and Assessments

MAP-21 established two special rules to address potential safety concerns for High Risk Rural Roads (HRRR) and Older Drivers and Pedestrians. Both involve comparisons of five-year rolling average fatality crash rates to evaluate whether

rates are increasing or decreasing. Increasing rates trigger specific actions under the federal HSIP.

IIJA added a special assessment for Vulnerable Road Users meaning a nonmotorist and the plan of the State to improve the safety of vulnerable road users.

High Risk Rural Roads Rule

Web-link –
FHWA
HRRR Guidance

MAP-21 eliminated previous HRRR annual set-aside funding. However, states are required to obligate a specified amount of HSIP funds in the next fiscal year to HRRRs if the fatality rate on rural roads in that state is increasing over the most recent two-year period. FHWA computes the annual fatality rate as a five-year rolling average for roads functionally classified as Rural Major Collector, Rural Minor Collector, or Rural Local Roads using data from the Fatality Analysis Reporting System (FARS) and Highway Performance Monitoring System (HPMS).

As required by MAP-21, Arizona has defined HRRRs in the updated STSP. Arizona HRRRs are:

> "Roadways that are functionally classified as a Rural Major Collector, Rural Minor Collector or Rural Local Road with a rate for fatalities and/or serious injuries that exceeds the statewide average for those functional classifications of roadways, or are likely to experience an increase in traffic volume that leads to rates for fatalities and/or serious injuries that exceed the statewide average for those functional classifications of roadways."

Although MAP-21 eliminates the requirement for states to set aside funds for HRRR, Arizona will continue to allocate funds for safety projects on rural roads that meet this definition.

Older Driver and Pedestrians Rule

The Older Driver and Pedestrian Rule states that if traffic fatalities and serious injuries per capita in a state, for drivers and pedestrians over age 65, increases during the most recent two-year period, that state will be required to include

strategies to address that increase in the STSP. The State also should conduct a secondary analysis to determine whether the increase is attributable to driver fatalities and injuries, pedestrian fatalities and injuries, or a combination of the two. Annual fatalities and serious injuries per capita are calculated as a five-year rolling average of older driver and pedestrian fatalities and serious injuries divided by the population per 1,000 of state residents that are 65 years of age or older from the U.S. Census Bureau.

Web-link – Guidance on Older Driver and Pedestrian Rule

Vulnerable Road User Safety Special Rule

The Vulnerable Road User Safety Rule states that if the total annual fatalities of vulnerable road users in a State represents not less than 15 percent of the total annual crash fatalities in the State, that State shall be required to obligate not less and 15 percent of the amounts apportioned to the State under section 104(b)(3) for the following fiscal year for highway safety improvement projects to address the safety of vulnerable road users and not later than 2 years after the date of enactment of the subsection, each State shall complete a vulnerable road user safety assessment with updates required to the Strategic Highway Safety plan as outlined in IIJA.

Web-link – Bipartisan Infrastructure Law

1.1.4 Funding

The HSIP federal-aid program receives a percentage of the total apportionment after allocations to CMAQ [23 U.S.C. 104(b)(4)], NHFP [23 U.S.C. 104(b)(5)], PL [23 U.S.C. 104(b)(6)]. In addition, if the High Risk Rural Roads Special Rule applies, then in the next fiscal year the State is required to obligate for high risk rural roads an amount at least equal to 200% of its FY 2009 HRRR set-aside. Also, if the Vulnerable Road User Safety Rule applies to a State, that State shall be required to obligate in the next fiscal year not less than 15 percent of the amounts apportioned to the State under 23 U.S.C.104(b)(3) for the following fiscal year for highway safety improvement projects to address the safety of vulnerable road users.

HSIP Funds

Infrastructure and select non-infrastructure related projects are eligible for HSIP funding.

A highway safety improvement project means strategies, activities, and infrastructure projects on a public road that are consistent with a state's strategic highway safety plan. As such, traditional infrastructure-related improvements are eligible for HSIP funds. Highway safety improvement projects should be identified on the basis of crash experience, crash potential, crash rate, or other safety data-supported means. The data-driven framework for funding projects allows states to administer the HSIP funds to address their specific safety needs. Each state is responsible for developing procedures to administer the HSIP in accordance with the requirements of 23 U.S.C. 148 and 23 CFR Part 924 and in consultation with the FHWA Division Offices.

This manual outlines the project selection and prioritization process to be used in administering Arizona's HSIP funds. In order to better align the state HSIP with BIL requirements and guidance, changes to HSIP funding allocations are being implemented. Appendix A contains the specific descriptions of eligibility requirements, which may change periodically to align with federal guidance and better achieve Arizona's safety goals.

Federal Share:

The federal share of HSIP projects on interstate highways is determined by a sliding scale rate for Arizona of 94.34 percent of the total project cost, with the remaining 5.66 percent funded by the project sponsor. The federal share on non-Interstate roadways is 94.3 percent, with the remaining 5.7 percent funded by the Sponsor.

23 U.S.C. 120 (c)(1) states that the federal share payable may amount to 100 percent of the construction of any project for:

- Traffic control signalization (including HAWK),
- Maintaining minimum levels of retroreflectivity of highway signs or pavement markings,
- Traffic circles/roundabouts,
- Safety rest areas,
- Pavement marking,
- Shoulder and centerline rumble strips and stripes,
- Commuter carpooling and vanpooling,
- Rail-highway crossing closure,
- Installation of traffic signs, traffic lights, guardrails, impact attenuators, concrete barrier end treatments, breakaway utility poles, or
- Priority control systems for emergency vehicles or transit vehicles at signalized intersections.
- When an eligible project uses funds from a program apportioned under 23 U.S.C. 104 and that project is located within the boundaries of an Indian reservation, national park, or national monument, the Federal share may be 100%.

The federal share of railway-highway grade crossing projects may amount up to 100 percent for projects for signing, pavement, pavement markings, active warning devices, and crossing closures. In accordance with 23 USC 120(c), some other specific types of projects may also be funded at up to a 100 percent Federal share.

1.1.5 Reporting Requirements

State DOTs are required to submit annually to FHWA a report on HSIP implementation and effectiveness. Reports are submitted as responses to a series of questions covering the below list of information and topics, as well as other specific information:

Web-link – FHWA HSIP Reporting Guidance

- Description of the state's HSIP structure, i.e., program administration and program methodology.
- Progress in implementing the HSIP projects, including HSIP funds programmed and the number and general listing of the types of projects initiated.
- Progress in achieving annual safety performance targets, including an overview of general highway safety data trends and the application of special rules for the state.
- HSIP program evaluation describing annual effectiveness of STSP emphasis areas, groups of similar types of projects, and systemic treatments.

Safety Performance Management (Safety PM) is part of the overall Transportation Performance Management (TPM) program, which FHWA defines as a strategic approach that uses system information to make investment and policy decision to achieve national performance goals. The Safety PM Final Rule supports the Highway Safety Improvement Program (HSIP), as it establishes safety performance measure requirements for the purpose of carrying out the HSIP and to assess fatalities and serious injuries on all public roads.

The Safety PM Final Rule establishes five performance measures as the five-year rolling averages to include:

- Number of Fatalities
- Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT)
- Number of Serious Injuries
- Rate of Serious Injuries per 100 million VMT
- Number of Non-motorized Fatalities and Non-motorized Serious Injuries

The Safety PM Final Rule also establishes the process for State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) to establish and report their safety targets, and the process that FHWA will use to assess whether State DOTs have met or made significant progress toward meeting their safety targets. The Safety PM Final Rule also establishes a common national definition for serious injuries.

Web-link –
Past HSIP Reports

National summary reports, along with each state's most recent approved annual reports are available through the FHWA.

1.1.6 Protection of Data from Discovery & Admission into Evidence

Title 23 U.S.C. 407 (Renumbered from 23 U.S.C. 409 in BIL) in of the United States Code (23 USC 407) establishes a policy for the discovery and admission as evidence of certain reports and surveys. This policy protects the information obtained, compiled, and maintained for the use of the HSIP. Protected information includes reports, surveys, schedules, lists, queries, or any data compiled or collected for the purpose of identifying, evaluating, or planning of safety enhancements as outlined in 23 CFR 924. Data used to develop any highway safety improvement project, which may be implemented utilizing federal aid highway funds, shall not be subject to discovery or admitted into evidence in a federal or state court proceeding, or considered for other purposes in any action for damages, arising from an occurrence at a location mentioned or addressed by such data.

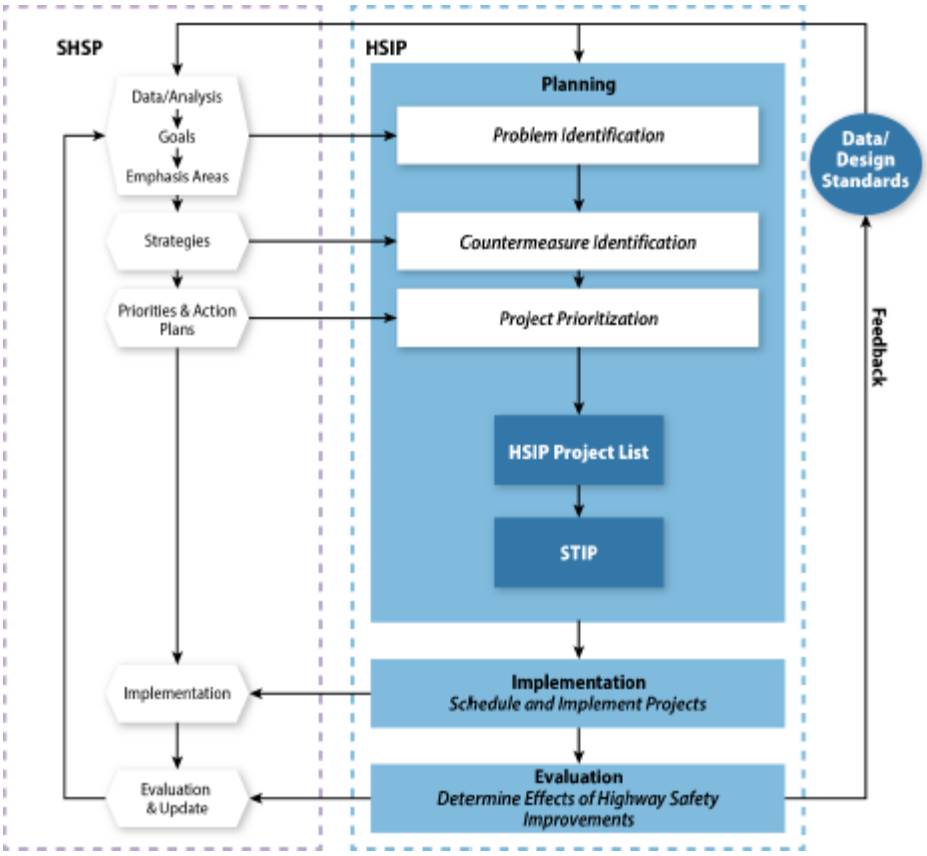
2. ARIZONA HSIP PROCESS

ADOT is responsible for administration of the Arizona HSIP.

ADOT is the state agency responsible for the adoption and administration of the HSIP in Arizona. The three components of the Arizona HSIP process are – Planning, Implementation and Evaluation, as shown in Figure 1. Planning, implementation, and evaluation are managed through ADOT's Traffic Safety Section (TSS). All HSIP programs are in alignment with the MAP-21 compliant Arizona STSP and will support the goal of reducing fatalities and serious injuries.

HSIP projects will support the goal of reducing fatalities and serious injuries.

Figure 1. HSIP Components and Relationship between SHSP and HSIP



2.1 Planning

The planning process incorporates the following components: identify locations, identify mitigation measures, prioritization, and HSIP approval.

2.1.1 Location Identification

Location identification involves collecting and maintaining the records of crash, roadway, traffic, and vehicle data on all public roads in order to conduct road safety analyses. The intent of the HSIP is to reduce the frequency and overall severity of motor vehicle crashes occurring within Arizona. Remediation efforts will focus on crashes resulting in serious injury or death and their attendant circumstances and causes.

Candidate locations, either segments or intersections, are identified for spot improvements, as well as systemic improvements, using network screening methods and available crash and exposure data. This allows the analyst to identify trends, establish expected averages, find statistically significant anomalies, and anticipate areas of interest. This data-driven process allows for rational, unbiased prioritization of projects. Specific eligibility criteria for developing projects are defined in Appendix A.

The HSIP Project Application Process is detailed in Appendix A

The Arizona STSP contains 12 safety emphasis areas, and two additional emphasis area support areas where strategies are focused on the most important safety challenges throughout the state. The HSIP is used to directly address the goal of the STSP, and all HSIP projects must align with one or more safety strategies in the STSP. ADOT addresses applicable strategies in the STSP predominately as infrastructure projects.

Each year, the ADOT TSS will identify fatal and serious injury crash locations on all public roads related to the STSP emphasis areas. Based on this crash data, the ADOT TTS will identify candidate locations for safety improvement projects on the State Highway System, and MPOs, COGs, and other public road owners will identify candidate locations for safety improvement projects on non-State Highway System roadways. Individual crashes usually fall under multiple emphasis area categories and some emphasis areas are not necessarily associated with a number of severe crash events. Emphasis area categories, defined in the Arizona STSP, are as follows:

Emphasis Areas focus on Arizona's most important transportation safety challenges.

2019 STSP Emphasis Areas

- Highway Safety (Behavior-Related)
- Intersections
- Lane Departure
- Pedestrian
- Safety –Related Data

State and local candidate locations will be considered and evaluated in a performance based manner. Funding will be allocated to projects addressing STSP Emphasis Areas and supporting the goal of reducing fatalities and serious injuries. The ADOT Local Public Agency (LPA) section will provide assistance to local agencies throughout the process of identifying and developing projects.

2.1.2 Countermeasure Identification

The process to identify effective mitigation measures for HSIP projects should consider the expected reduction in the number of fatalities and serious injuries, cost effectiveness of the projects, related emphasis area categories in the State STSP and applicable MPO/COG strategic safety plan, and integration with the Statewide Transportation Improvement Program (STIP). A holistic evaluation of all the components unique to each location should yield the most accurate assessment of the causal factors and lead to the most effective countermeasures.

2.1.3 Road Safety Assessment (RSA) Program

MAP-21 identifies "Road Safety Audits" or "Road Safety Assessments" (RSA) as an eligible HSIP activity. An RSA is a formal examination of user safety of an existing or planned road or intersection by an independent, multi-disciplinary team. ADOT has implemented a program to conduct RSAs on state, local, and tribal roadways throughout the state.

Arizona RSA program activities include conducting RSAs, providing training, program marketing and education, and evaluating the success of the program. The RSA program manager administers and conducts RSAs throughout Arizona when requested by the road owner. HSIP funds are utilized for expenses of team members conducting RSAs and consultant participation on RSA teams. HSIP funds can also be used to implement RSA recommendations when projects are submitted by the road owner and meet HSIP eligibility requirements. Additional information, and the RSA application form, can be obtained from the ADOT Road Safety website (http://azdot.gov/business/engineering-and-construction/traffic/traffic-safety/road-safety-assessments).

Web-link –
ADOT RSA Application

2.1.4 Project Prioritization

Candidate projects should be prioritized based on factors such as Benefit/Cost, potential reduction in fatal and serious injury crashes, holistic effectiveness (4 E's of Safety), STSP emphasis areas, FHWA focus areas for Arizona, and the 28 FHWA's Proven Safety Countermeasures. Arizona is currently an FHWA focus state for Intersections and Pedestrians crashes.

2.1.5 HSIP Eligibility Determination

Evaluations concluding that improvements at the identified locations may significantly reduce the occurrence of fatalities and serious injuries resulting from crashes on all public roads are submitted for eligibility determination to use HSIP funds. Only those candidate projects that receive eligibility determination are considered for development as HSIP funded projects in the five-year Program.

Current project eligibility requirements are detailed in Appendix A

2.2 Implementation Process

The Implementation component of Arizona's HSIP follows the ADOT Project Management Group Project Development process. The process for safety projects is the same as for all other federal-aid projects as defined in the ADOT Project Development Process Manual.

2.3 Evaluation

Information from project Evaluation is critical to the success of the HSIP in Arizona

Arizona's HSIP includes a process for evaluation of its program and funded projects. The intent of this process is to determine the effectiveness of the Program, adherence to federal regulations, and to utilize data obtained by evaluation in the planning process. A report is submitted annually to FHWA that evaluates ADOT's HSIP in total. Before-and-after studies of safety improvement projects compare various features and characteristics of the subject location before construction and after. Information derived from the evaluation process, such as reliable CMF's and an evaluation of the efficacy and benefits of projects, are critical to the planning process and to the success of the HSIP in Arizona.