Local Programs Procedures

LPP 01-08 Manual Update
Subject: Release of Local Assistance Program Guidelines, Chapter 9

Reference: *Local Assistance Program Guidelines* (LAPG), Chapter 9, "Hazard Elimination Safety (HES)" and LPP 97-04, "Hazard Elimination Safety (HES) Revision and Interim Deadlines.

Effective Date: October 31, 2001 Approved: **Original Signed By**

TERRY L. ABBOTT, Chief
Division of Local Assistance

User-Friendly Features:
These new procedures are incorporated in the electronic version of the *Local Assistance Program Guidelines* (LAPG). The LAPG can be found on the Division of Local Assistance Home Page on the Internet at: www.dot.ca.gov/hq/LocalPrograms/. Once there, click on "publications" and then click on "Local Assistance Program Guidelines."

PURPOSE

The purpose of this Local Programs Procedures (LPP) is to release and disseminate Chapter 9, "Hazard Elimination Safety (HES)" of the LAPG.

BACKGROUND

The LAPG is currently in the process of being updated to reflect the changes in the Federal Highway Administration (FHWA) Federal-aid program that came about with passage of Transportation Equity Act for the 21st Century (TEA-21). This LPP is the first of many that will be used to distribute new and updated LAPG chapters as they are released over the next several months. Presented herewith is Chapter 9, "Hazard Elimination Safety (HES)," which provides for safety improvements on all public roads and highways. Note: LPP 01-08 supercedes LPP 97-04.

CHAPTER 9 HAZARD ELIMINATION SAFETY (HES)

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CHAPTER 9 HAZARD ELIMINATION SAFETY (HES)

9.1 INTRODUCTION

The Hazard Elimination Safety (HES) Program provides funds for safety improvements on any public road, any public surface transportation facility, any publicly-owned bicycle or pedestrian pathway or trail, and for any traffic calming measure. These funds serve to eliminate or reduce the number and severity of traffic accidents at locations selected for improvement.

Section 152 (a), Title 23, United States Code (U.S.C.) cites the federal requirements for the HES Program.

> *"Each state shall conduct and systematically maintain an engineering survey of all public roads to identify hazardous locations, sections and elements, including roadside obstacles and unmarked or poorly marked roads, which may constitute a danger to motorists, bicyclists, and pedestrians, assign priorities for the correction of such locations, section, and elements, and establish and implement a schedule of projects for their improvement."*

The Transportation Efficiency Act for the 21st Century (TEA-21) of 1998 requires that ten percent of the apportioned Surface Transportation Program (STP) funds be made available for safety programs as defined by Section 130 - Railway-Highway Crossing Program (see Chapter 10 in this manual) and Section 152 - Hazard Elimination Program of Title 23, United States Code.

Section 2333 of the California Streets and Highways Code establishes the Legislature's intent that the total statewide federal safety funds be split equally among state highway projects, local road projects and Safe Routes to School projects. HES Program Plans are established separately for state highway projects and local road projects. This chapter describes the HES Program for local roads.

Caltrans solicits candidate HES projects from local agencies on an annual basis. The projects are normally solicited about two years in advance of the federal fiscal year (FFY) for which they will be programmed for delivery. After all of the candidate projects have been checked, reviewed and prioritized, Caltrans releases an approved list of projects that constitutes an HES Program Plan for a specific FFY. These lists may be found on the Division of Local Assistance (DLA) website at: www.dot.ca.gov/hq/LocalPrograms/.

9.2 APPLICANTS

The applicant for HES funds is the agency that assumes responsibility and accountability for the use and expenditure of federal funds. The applicant must be an incorporated city or a county within the State of California. Exceptions to this requirement will be reviewed on a case by case basis. Applicants that do not represent a city or county must provide written justification for the exception and attach it to the application.

9.3 PROJECT ELIGIBILITY

For a project to be eligible for HES funds, a specific safety problem must be identified for correction and the project must correct or substantially improve the condition.

For the purposes of these guidelines, HES funds are available for expenditure on 1) any local agency public road, 2) any local agency public surface transportation facility, 3) any local agency publicly-owned bicycle or pedestrian pathway or trail, or 4) any traffic calming measure on a local agency public road. Local agencies should not submit projects that only improve the safety of state-owned roads or facilities. Caltrans receives 33 percent of the federal safety funds apportioned to the State of California and develops its own safety improvement program for state highways and other state transportation facilities.

The installation of barrier rail and guardrail on a structure, or its approach, is ineligible for HES funding. Projects of this nature are funded from the Barrier Rail Replacement Program (see Chapter 6, "HBRR" of this manual).

9.4 PROJECT CATEGORIES

The two HES funding categories are "Safety Index" and "Work Type." Safety Index projects receive approximately 25 percent of the available HES funds. Work Type projects receive the remaining funds, approximately 75 percent.

SAFETY INDEX PROJECTS

Projects may qualify for HES funding based on a calculated Safety Index (SI). If the applicant chooses to compete for funds under the SI category, Exhibit 9-B, a "Safety Index Calculation Form" must be completed in addition to Exhibit 9-A "Application Form for HES Program Funds." Instructions for completing the Safety Index Calculation Form are included in Exhibit 9-C.

The applicant must use all of the recorded accidents at the location and apply the appropriate Reduction Factor from Exhibit 9-D, "Calculation Factors for Highway Safety Projects."

The following types of improvements are not eligible for SI funding:

- Emergency vehicle priority systems
- Bicycle and pedestrian improvements
- Public transportation facilities
- Traffic calming
- Red light running detection systems
- In-pavement lighted crosswalks

Projects are prioritized, statewide, by descending SIs. If a SI project fails to get funded under the SI category, it will automatically be moved into the Work Type category and re-compete for funding against other Work Type projects.

WORK TYPE IMPROVEMENT PROJECTS

The Work Type category is used to fund projects that cannot be quantified by a SI due to the lack of sufficient or documented accident data. Applicants must complete Exhibit 9-A, "Application Form for HES Program Funds." Projects providing evidence of some accident history or accident potential will compete better than projects that do not.

Work Type improvements have been categorized by the Federal Highway Administration (FHWA). The following are the current eligible work type categories:

1. Roadway illumination
2. Relocated or breakaway utility poles
3. Traffic signs
4. Upgrade median barrier
5. Remove obstacles
6. New traffic signals
7. New median barrier
8. New or upgraded guardrail
9. Impact attenuators
10. Upgrade traffic signals
11. Sight distance improvement
12. Median for traffic separation
13. Groove pavement for skid treatment
14. Traffic channelization
15. Pavement markings and delineation
16. Widen or improve shoulder
17. Flatten side slopes
18. Realign roadway
19. Overlay for skid treatment
20. Emergency vehicle priority systems
21. Bicycle/Pedestrian improvements
22. Public transportation facility
23. Traffic calming
24. Red light running detection system
25. In-pavement crosswalk lights

Some of the Work Type categories are broad in nature. Consult with the District Local Assistance Engineer (DLAE) for clarification or questions on project categories and/or eligibility.

9.5 RATING FACTORS AND CRITERIA

The "Application Form for HES Program Funds," Exhibit 9-A, requires applicants to provide specific information related to the proposed improvements. This requirement applies to both SI projects and Work Type projects. All projects competing for funding under the Work Type category will be rated on the following list of factors:

- Identification and demonstration of needs
- Potential for proposed improvements to correct or improve the problem
- Potential for timely implementation of the project

As stated above, projects competing for funding under the SI category will be prioritized in descending order, statewide, by the calculated SI.

9.6 FUNDING CONSIDERATIONS

The amount of federal funds allocated to the local HES Program has varied in recent years due to the Safe Routes to School (SR2S) program. Current and future legislative actions will determine each program's annual allocation. The amount of funds allocated to the local HES Program each FFY may range from $10 million to $16 million.

Eligible project costs that the local agency is entitled to federal reimbursement include:

- Preliminary engineering
  Environmental studies
  Preparation of Plans, Specifications and Estimates (PS&E)

- Right of Way
  Right of way engineering
  Right of way acquisition

- Construction
  Construction costs
  Construction engineering

Beginning with the 2003/2004 FFY HES Program Plan, the maximum federal reimbursement ratio for any HES project will be 90 percent and the maximum federal reimbursement amount for any project will be $360,000. Projects that exceed $400,000 in total costs will be eligible for funding, but the maximum federal reimbursement will be $360,000. The actual project reimbursement ratio will be determined when the "Authorization to Proceed" is approved. Requests for additional federal funds that exceed the original amount shown in the application will not be granted except in unusual circumstances and subject to the availability of funds.

Federal funds are considered obligated to each project phase when the Caltrans Headquarters (HQ) DLA Area Engineer authorizes the work through the FHWA delegated authorization process. See Chapter 3, "Project Authorization," of the *Local Assistance Procedures Manual* (LAPM). These funds are reserved for the project, but the local agency will not be reimbursed for any phase until after the construction contract has been awarded.

All projects that have been approved for funding will be funded on a first-come/first-serve basis in the year they are programmed. Some projects may be advanced if other projects have been delayed.

Caltrans-initiated safety projects on a state highway that require financial participation by a local agency will be given a high priority for funding. Typically, these types of projects involve new or upgraded traffic signals at an intersection. The number of legs of the intersection owned by each agency determines the cost-sharing ratio. For example, if a traffic signal is proposed at the intersection of a state highway and a local road and the intersection has four legs, then the cost-sharing ratio for each agency is typically 50 percent of the total project cost. Federal funds for the local agency share of the project cost can be obligated only if the project was approved for funding and is included in an approved HES Program Plan. For a listing of approved plans, visit www.dot.ca.gov/hq/LocalPrograms/.

HES candidate projects submitted by a local agency that identifies financial participation by Caltrans must include a letter of support from Caltrans indicating that both agencies have identified a safety need and both agencies agree to share in the costs of the project. The financial and project administration responsibilities of each agency will be detailed in a future cooperative agreement. The HES Application Form should contain a reasonable estimate of all cost-sharing ratios and amounts.

9.7 SCHEDULE AND MILESTONES

Approximately 24 months prior to the beginning of each, new FFY, Caltrans district staff will solicit candidate HES projects from local agencies within their district boundaries. Caltrans will issue a list of approved projects within seven months after the solicitation. This schedule allows local agencies ample time to award a construction contract for the project within the FFY it is programmed. The typical annual schedule and milestones for the program, from solicitation of projects to the issuance of an approved list of projects, is as follows:

July	Districts solicit candidate HES projects from local agencies
November	Local agencies submit candidate projects to DLAE
December	DLAE submits prioritized list of projects to HQ DLA
February	HQ DLA issues list of projects approved for funding

This schedule may change when modifications are made to federal, state and local laws that directly impact the HES program.

9.8 LOCAL AGENCY APPLICATION

The "Application Form for HES Program Funds," Exhibit 9-A, must be completed in its entirety and accompany all application submittals.

A local agency should consult with the DLAE on planned and/or programmed state highway safety projects that will require financial participation by a local agency. If Caltrans will be delivering a safety project during the FFY for which an HES Program Plan is being developed and the state project requires financial participation by a local agency, then the local agency must submit an HES application for the project in order for it to be eligible for federal reimbursement of its share of project costs. Submittal of a project application does not guarantee that the project will be approved for funding; however, Caltrans will make every effort to fund these types of cooperative projects. In the HES application, the local agency must only include cost estimates for the local agency's share.

A local agency must submit candidate projects to its respective Caltrans District Office, directed to the attention of the DLAE, by the designated deadline. An original application, plus two copies, is required. Any maps, schematics, drawings, figures, or photographs that are attached to the application should be made on 8-1/2 x 11-inch paper.

Candidate projects must include cost estimates for all phases of the project.

Candidate projects must include estimated dates when various project milestones will be completed.

SI projects must contain supportive documentation on accident histories. Work Type projects should contain some information on accident histories or a description of the potential for accidents. Collision diagrams should be submitted when available. Photographs to better illustrate the problem are encouraged.

Schematic drawings or plans showing the general nature and location of the proposed improvements should be submitted for all projects.

A local agency submitting two or more candidate projects must prioritize them without regard to their SI or Work Type categorization.

9.9 CALTRANS REVIEW AND SELECTION PROCESS

DISTRICT REVIEW

The DLAE (or designated staff) will check all SI submittals to ensure that the data, factors and calculations are consistent, appropriate and accurate.

Each district may establish a District Review Committee to prioritize and rank all projects. The composition of this committee may vary from district to district. It may be comprised, in various combinations, of representatives from Caltrans, FHWA, local governmental agencies, state or local law enforcement officials, and community based organizations. The committee will rank all candidate projects, Work Type and SI combined, using the factors identified in Section 9.5, "Rating Factors and Criteria."

The DLAE will submit a prioritized list of all projects to HQ DLA.

HEADQUARTERS REVIEW AND APPROVAL

HQ DLA staff will review and check all SI submittals to ensure that the factors and calculations are consistent on a statewide basis.

Based upon the total available HES funding for a given FFY, HQ will determine the amount of funds that will be appropriated to the SI category and the Work Type category. The funding split between these two categories will be 25 percent and 75 percent, respectively.

After reviewing and ranking all of the projects on a statewide basis, HQ will release an approved list of projects. The list will be posted on the DLA website at: www.dot.ca.gov/hq/LocalPrograms/.

9.10 PROJECT IMPLEMENTATION PROCEDURES

Projects are processed in accordance with project implementation procedures outlined in the LAPM. The LAPM describes the various procedures required to process federal and state funded local transportation projects. The chapters and sections in the LAPM that are applicable to the implementation of HES projects are those that involve the processing of federal funds. The local agency will certify that they have complied with all state and federal procedures consistent with the project implementation procedures, including these HES program guidelines.

The HQ DLA Area Engineer will work with the FHWA to process the obligation of federal funds for the project. The DLAEs will provide the local agency with the written "authorization to proceed" with each project phase.

9.11 DESIGN STANDARDS

Chapter 11, "Design Standards" of the LAPM describes statewide design standards, specifications, procedures, guides, and references that are acceptable in the geometric, drainage, and structural design of local assistance projects. The chapter also describes design exception approval procedures. These standards and procedures shall be used for all HES projects.

If a project contains a bikeway component, it shall be designed in accordance with the Caltrans *Highway Design Manual* and the Caltrans *Traffic Manual*. Exceptions to using these standards will be handled in accordance with the exception approval process described in each manual.

All projects will be subject to meeting the requirements of the Americans with Disabilities Act (ADA).

All projects must upgrade non-standard safety features to the appropriate standard when those features are within the scope and work area of the project. Requests for exceptions to this requirement will follow appropriate procedures.

A local agency which proposes to install an experimental Traffic Control Device (TCD) on a public roadway should follow the process prescribed in Section 1A.10 of the *MUTCD 2000, Manual on Uniform Traffic Control Devices, millennium edition, December 2000*, published by the FHWA. A direct link to the *MUTCD 2000* can be found at http://mutcd.fhwa.dot.gov/. The local agency should also comply with the experimental process of the California Traffic Control Devices Committee (CTCDC). Go to www.dot.ca.gov/hq/traffops/signtech/newtech/ for more information on that process.

9.12 DEADLINES

It is the intent of the HES Program that federal funds be expended on safety projects that can be designed and constructed within two years. Projects should not require the acquisition of significant rights of way, nor should they require extensive environmental review and mitigation. Federal funds should be obligated by September 30th of the year in which the project was originally programmed for delivery. A local agency that fails to get federal funds obligated for the construction of a project within the FFY for which it is programmed must request a time extension from the DLAE prior to September 1st of that year. If the DLAE does not approve the time extension, the project will be dropped from the program. If the DLAE approves the time extension, the local agency must get federal funds obligated for the construction of the project during the subsequent FFY, or risk having the project dropped from the program. In rare cases, a project may be given a second time extension with the approval from HQ DLA. Extension requests will not be granted for delays attributed to staffing issues.

9.13 STATUS REPORTS

Local agencies are required to provide an update of project schedules and costs on July 1 of each year for all projects that have been approved for funding and have not received "authorization to proceed" with the construction phase of the project. A local agency that fails to provide this annual update may have their project dropped from the program. The

report should be mailed to the appropriate DLAE. A sample "Project Status Report" is included as Exhibit 9-E.

9.14 PROJECT EVALUATIONS

Federal directives require that improvements constructed with federal safety funds be evaluated after the project is completed. Applicants that receive funding for a project must conduct a before-and-after evaluation and report its findings to Caltrans. Typically, two years of "before" data and two years of "after" data are sufficient to calculate a credible benefit-to-cost ratio. Safety deficiencies corrected by this program largely justify future funding priorities and levels.

9.15 APPROPRIATION CODES

For projects programmed up to and including the 2002/2003 FFY, there are four federal appropriation codes available for HES projects:

• STPLH*	Hazard Elimination	Q28	90% Federal reimbursement
• STPLHG*	Hazard Elimination	Q43	100% Federal reimbursement
• STPLH	Safety (Optional)	Q21	90% Federal reimbursement
• STPLHG	Safety (Optional)	Q33	100% Federal reimbursement

Projects programmed for the 2003/2004 FFY and beyond have only two federal appropriation codes available:

• STPLH*	Hazard Elimination	Q28	90% Federal reimbursement
• STPLH	Safety (Optional)	Q21	90% Federal reimbursement

*Use these codes unless otherwise instructed by the HQ DLA Area Engineer.

9.16 REFERENCES

Title 23, United States Code, Sections 120 and 152
California Streets and Highways Code, Sections 2330-2334.5
Caltrans *Local Assistance Program Guidelines*
Caltrans *Local Assistance Procedures Manual*
Caltrans *Highway Design Manual*
Caltrans *Traffic Manual*
FHWA *Manual on Uniform Traffic Control Devices – The Millennium Edition*
AASHTO: *A Policy on Geometric Design of Highways and Streets* - 1994

APPLICATION FORM

FOR

HES PROGRAM FUNDS

Applicants seeking HES funds must use this form. Failure to provide information that is required or to prepare the application in accordance with general formatting instructions will result in your application being disqualified.

This entire Application Form must be submitted, including this introductory page. Applicants should download the Application Form from the Internet. It can be found on the Local Assistance Home Page at www.dot.ca.gov/hq/LocalPrograms/. The *italicized* text shown on various lines throughout the application should be removed and replaced with the appropriate information.

Limit the application to eight (8) pages plus attachments. Attachments should be grouped and numbered to correspond with the section number in the application. Do not provide brochures and samples of materials unless they are directly related to a response.

APPLICANT: *Local Agency*

CALTRANS DISTRICT: *1, 2, 3,…,12*

WAS A "SAFETY INDEX" CALCULATION PERFORMED FOR THIS PROJECT? Yes or No

IF YES, SAFETY INDEX = _____

TYPE OF WORK: *Required - Indicate the type of work being proposed. Select one, or more, of the twenty-five Work Type Categories identified in Section 9.4 of the Guidelines.*

WORK DESCRIPTION: *Required - Provide a "short" description – 50 words or less – of the proposed improvements.*

PROJECT LOCATION: *Required - Provide a brief description of the project location using street names or geographical references to project location(s). Attach map showing general location of improvements.*

AGENCY PRIORITY: _____ If submitting 2 or more applications, agency must prioritize their applications. Example: An agency submitting 4 applications must indicate their 1st, 2nd, 3rd, and 4th priority projects.

Complete the following "Project Costs" section. Include only those costs that are being requested for this project.

PROJECT COST ESTIMATE: ***(Required)***

Preliminary Engineering
Environmental…… $ _____
PS&E…….. $ _____

Right of Way
Engineering…..…… $ _____
Acquisition…...…… $ _____

Construction
Construction…….…….…… $ _____
Construction Engineering……. $ _____

Subtotal…… $ _____

Contingency..…….. $ *(10% of Subtotal; max)*

Total Project Cost……. $ _____

Federal Funds Requested…….. $ *(90% of Total Project Cost or $360,000 max)*

The following parts of this Application Form request specific project related information. Most of the sections request the applicant to provide narration related to a specific topic. Other sections contain questions that the applicant can simply answer in the space provided. If pictures, maps, exhibits, data, diagrams, survey summaries, petitions, etc. are submitted in response to questions or statements in the application, they must be attached to the application.

1. IDENTIFICATION AND DEMONSTRATION OF NEEDS

This section requires the applicant to demonstrate the need for the project. Using the following questions and statements as a guide, provide a detailed narrative description of the problem:

Provide some background information about the problem. How was the problem identified? How long has the problem existed? Describe the primary cause(s) of the accidents that have occurred at the location. Given that other problems may exist within the applicant's jurisdiction, explain why this problem was chosen for improvement. Use whatever accident data, traffic data, community surveys, reports, plans, and other environmental conditions that may apply.

If available, provide photographs to illustrate the problem or hazard. Include these photographs as attachments. Maximum of six (6) photos and no video tapes, please.

2. POTENTIAL FOR PROPOSED IMPROVEMENT TO CORRECT OR IMPROVE THE PROBLEM

This section requires the applicant to describe how the proposed solution will improve the safety of the public. The improvement may improve the safety of the motoring public, bicyclists, pedestrians, any person with an impairment, etc., and any combination thereof. The applicant must clearly demonstrate the connection between the problem and the proposed solution. Using the following questions and statements as a guide, provide a detailed narrative description of the proposed improvement:

Describe how the proposed project corrects or improves the traffic safety at or near the project site? Justify your response.

Discuss how the proposed improvement is the best, most cost effective solution to the problem.

Describe options or alternatives that were considered.

If applicable, describe how the proposed solution improves traffic safety for other users of the facility or system.

3. POTENTIAL FOR TIMELY IMPLEMENTATION

This section requires the applicant to provide information on project implementation schedules.

Applicants must estimate dates for the following milestones. The estimated date to "Advertise Project" must be within the FFY for which this project is being submitted for consideration. Note: Any work performed prior to receiving written authorization to proceed from Caltrans will not be eligible for reimbursement.

Obtain Environmental Clearance _____ *(required)*

Obtain Right of Way Clearance _____ *(required)*

Advertise Project _____ *(required)*

Award Project _____ *(required)*

Complete Construction of Project _____ *(required)*

4. APPLICATION SIGNATURES

An agency official representing the applicant must sign the application. The undersigned affirms that the statements contained in the application package are true and complete to the best of the applicant's knowledge. If portions of the improvements extend into areas where the applicant has no jurisdictional authority, a notation must be made that officials representing the affected local agencies support the project. In the notation, provide names and telephone numbers of whom to contact for corroboration. Only one agency official needs to sign the application. "Agency Official" means Director, Assistant Director, Executive Director, Assistant Executive Director, or their respective designated administrators, engineers, or planners.

Agency Official: _____ *(required)*
Name
_____ *(required)*
Signature
Title: _____ *(required)*

Phone Number: _____ *(required)*

Email: _____ *(if available)*

Notation: *(If applicable)*

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SAFETY INDEX CALCULATION FORM

LOCAL AGENCY _____ DATE _____
CALCULATED BY _____
CHECKED BY _____

PROJECT LOCATION_____

PROPOSED IMPROVEMENT_____
_____
_____

TOTAL COST (in $1000s) _____ ADT (existing, all directions, in 1000s) _____

NUMBER OF LOCATIONS, OR LENGTH IN MILES _____ Note: This value is represented by "N" in the formulas below.

SEVERITY OF ACCIDENTS	COLUMN							
	A	**B**	**C**	**D**	**E**		**F**	**G**
	TOTAL ACCIDENTS LAST THREE (3) YEARS	AVERAGE NO. OF ACCIDENTS PER YEAR	REDUCTION FACTOR (See Exhibit 9-D)	ACCIDENTS REDUCED	ACCIDENT COSTS ($1,000's)		LIFE OF IMPROVE-MENT (See Exhibit 9-D)	SAVINGS IN ACCIDENT COSTS ($1,000's)
		A ÷ 3	**RF****	**B x C**	**urban**	**rural**	**LOI****	**D x E x F**
FATAL + INJURY					**24.0**	**61.0**		
PDO					**3.2**			
	TOTALS							

INITIAL ACCIDENT RATE

IAR = $\frac{\text{"B" Total)}}{\text{ADT(in 1000s) x 0.365 x N}}$ =_____

EXPECTED ACCIDENT RATE

EAR = $\frac{\text{"B"(Total) - "D"(Total)}}{\text{ADT(in 1000s) x 0.365 x N}}$ =_____

SAFETY INDEX

From Exhibit 9-D, find the Accident Base Rate (ABR) for the Project:
ABR = _____

If EAR ≥ ABR, use the Safety Index formula below:

SI = $\frac{\text{"G"(Total) x 100}}{\text{Total Cost (in \$1000s)}}$

SI = _____

If EAR < ABR, use the Safety Index formula below:

SI = $(\text{EAR/ABR})^3$ x $\frac{\text{"G"(Total) x 100}}{\text{Total Cost (\$1000s)}}$

SI = _____

District Check by: _____ Date: _____

** From Exhibit 9-D

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INSTRUCTIONS
SAFETY INDEX CALCULATIONS

Local Agency: Write the name of your agency.

Project Location: Provide street name or geographical references to project location(s).

Proposed Improvement: List type(s) of improvement(s) proposed.

Total Cost: Divide the "Total Project Cost" amount from Page 2 of the Application Form by 1,000.

ADT: Use the existing (or most current) Average Daily Traffic volumes in all directions and divide by 1,000. For example, if the proposed improvement is at an intersection, the ADT is the combined traffic volume of all approaches to the intersection on an average day. If the proposed improvement is not at an intersection, the ADT is the number of vehicles that use the section of roadway proposed for improvement in both directions on an average day. For projects that involve multiple locations and varying ADTs, a separate SI must be calculated for each spot location and/or for each 1-mile segment of road. The SI for the entire project will be the average of the SIs calculated for each spot and/or segment.

Number of Locations or Length in Miles: Indicate the number of locations where improvements are proposed, or, if other than spot locations, use the length of the project (in miles) with the minimum length being one mile.

Column A: Fill in the "Fatal + Injury" and "Property Damage Only" (PDO) boxes using only the accidents that have been reported during the last three (3) years. Do not include unreported accidents since the Safety Index formula has already been adjusted to account for this anomaly. Accident summary reports that corroborate the values must be attached to the application. Do not attach the law enforcement field reports.

- For spot improvements, accidents that occurred within 1/10 mile may be included.
- For corridor or linear improvements, accidents that occurred within the corridor plus accidents that occurred within 1/10 mile of the ends of the project limits may be included.
- For intersection improvements, accidents that occurred within 300 feet of the intersection in all directions may be used. If the distance to the nearest intersection is less than 600 feet, only those accidents that occurred from midblock may be used.

Column B: Divide the number in Column A by three (3). Add the two rows together to obtain a "Total."

Column C: A reduction factor (RF) must be applied to all Safety Index calculations. Exhibit 9-D shows the reduction factors to be applied for various categories of work. Identify the category of work being proposed; find the respective reduction factor and transpose that number to both rows in Column C.

If the project includes more than one type of improvement, select one of the following options:

a) Apply the reduction factor for the work category that represents the majority of work to be done
b) Adjust the reduction factor in accordance with the relative percentages of the work category (see example below)

Example: A project consists of constructing a left-turn pocket at an unsignalized intersection and installing new safety lighting. From Exhibit 9-D, a 35 percent reduction can be applied to the left-turn pocket improvement and a 15 percent reduction of night accidents can be applied to the safety lighting. If there was an average of 20 accidents/year at this location with an average of 12 night-time accidents/year, then the combined reduction factor is calculated as follows:

Lighting:	(12 night accidents) x 15% = 1.8 accidents reduced
Channelization:	[(20 total accidents) - 1.8 accidents] x 35% = 18.2 x 35% = 6.4 accidents reduced
Combined:	1.8 + 6.4 = 8.2 total accidents reduced
Combined RF:	8.2 ÷ 20 = 0.41 or 41%

Enter the combined Reduction Factor on both rows in Column C.

Column D: Multiply the values in Column B and Column C. Add the two rows together to obtain a "Total."

Column E: To determine if a project should be classified as "rural" or "urban," the applicant must locate the proposed project on the most recent "County Road System" (CRS) map. These maps are prepared by Caltrans and can be obtained by contacting your District Local Assistance Engineer. This map identifies boundaries between rural and urban environments.

If the entire project is located within a "rural" area on the CRS map, it will be considered "rural."

If a project is partially or wholly located within an "urban" area, it will be considered "urban" unless all of the urban locations of improvement exhibit rural characteristics. To determine if the location(s) exhibits rural characteristics, the following three conditions must be met:

1. The posted speed limit must be 45 MPH or greater.
2. The Average Annual Daily Traffic volume must be 10,000 vehicles/day or less.

It must be a 2-lane roadway section (one lane of travel in each direction). A 2-lane roadway section may include passing lanes, 2-way left-turn lanes, and short 4-lane sections.

After determining the rural or urban classification, circle either "24" or "61" in Column E.

Column F: Exhibit 9-D shows the Improvement Life for the various categories of work. Identify the category of work being proposed; find the respective Improvement Life and transpose that number to both rows in Column F.

If the project includes more than one type of improvement, select one of the following options:

a) Apply the Improvement Life for the work category that represents the majority of work to be done
b) Adjust the Improvement Life in accordance with the relative percentages of the work category (see example below)

Note: The option selected for Column C and Column F must be the same.

Example: The life of a combined project is computed by the weighted average (using construction costs) of the different improvements. From the example above, after assigning construction costs of $60,000 for safety lighting and $100,000 for channelization, the combined Improvement Life is calculated as follows:

Cost and expected life of lighting	$60,000	15 years
Cost and expected life of channelization	$100,000	10 years
Total Cost:	$160,000	

$$\frac{\$60{,}000 \text{ (lighting)}}{\$160{,}000 \text{ (total)}} = 0.375 \times 15 \text{ years} = 5.625 \text{ years}$$

$$\frac{\$100{,}000 \text{ (channel)}}{\$160{,}000 \text{ (total)}} = 0.625 \times 10 \text{ years} = 6.25 \text{ years}$$

Combined Improvement Life = 5.625 + 6.25 = 11.875 years

Enter the combined Improvement Life number on both rows in Column F.

Column G: Multiply the values in Columns D, E and F. Add the two rows together to obtain the "Total Savings in Accidents Costs" for the project.

Calculations:

Calculate the Initial Accident Rate (IAR) using the formula shown.

Calculate the Expected Accident Rate (EAR) using the formula shown.

Find the Accident Base Rate for the project from Exhibit 9-D. If the project includes more than one type of improvement, use an ABR of 1.0. Compare the ABR to the Expected Accident Rate (EAR). Apply the correct Safety Index formula and calculate the SI for the project. Transpose this number to the SAFETY INDEX line on Page 1 of the application.

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CALCULATION FACTORS FOR HIGHWAY SAFETY PROJECTS

TYPE OF IMPROVEMENT	REDUCTION FACTOR (RF)	ACCIDENT BASE RATE (ABR)	IMPROVEMENT LIFE (In years)
Roadway Illumination (where no lighting exists)	.15*	0.80	15
Relocated or Breakaway Utility Poles	.20	1.00	10
Traffic Signs (general)	.05	1.00	6
Curve warning arrows	.20	0.50	6
Advance curve warning with advisory speed	.20	0.50	6
4-way stop	.50	0.50	6
Upgrade with breakaway supports	.20	1.00	10
Upgrade Median Barrier (includes new median barrier)	.20	1.00	15
Remove Obstacles	.20	1.00	20
New Traffic Signals	.15	1.20	10
Upgrade Guardrail (includes new guardrail)	.20	1.00	10
Impact Attenuators	.20	1.00	10
Upgrade Traffic Signals (includes interconnection)	.15	1.20	10
Sight Distance Improvement	.20	1.00	10
Construct Raised Median for Traffic Separation	.20	1.00	20
Groove Pavement for Skid Treatment	.10	1.00	10
Turning Lanes and Traffic Channelization	.15	1.00	10
New left-turn lane at signalized intersection			
- With no left-turn phase	.15	1.00	10
- With left-turn phase	.35	1.00	10
New left-turn lane at non-signalized intersection	.35	0.80	10
Two-way left-turn lane	.25	1.00	10
Pavement Markings and Delineation	.05	1.00	2
Widen or Improve Shoulder	.20	1.00	20
Flatten Side Slopes	.20	1.00	20
Realign Roadway	.50	1.00	10
Overlay for Skid Treatment	.10	1.00	10
Reconstruction (combinations & miscellaneous)	.20	1.00	10

* Applies to night accidents only

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PROJECT STATUS REPORT

Due July 1 each year

(Required only if a construction contract has not be awarded by July 1)

Agency: _____ Date: _____

Project Number: *(to be completed by Caltrans District)*

Project Location: _____

Work Description: _____

Original Projected Award Date: _____

Current Projected Award Date: _____

If "current projected award date" is not within the same federal fiscal year as the "original projected award date," attach letter requesting time extension.

Original Cost Estimate: _____

Current Cost Estimate: _____

Reason for difference (increase or decrease): _____

Other comments: _____

Prepared by: _____
Email: _____
Telephone: _____

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