OFFICE OF SPECIAL FUNDED PROJECTS

INFORMATION AND PROCEDURES GUIDE

CHAPTER 1: GENERAL INFORMATION

STRUCTURES & ENGINEERING SERVICES
DIVISION OF ENGINEERING SERVICES
DEPARTMENT OF TRANSPORTATION
STATE OF CALIFORNIA

2024

Updates and information concerning the contents of this guide may be obtained from:

Office of Special Funded Projects and Structure Local Assistance (OSFP/SLA) page
or
Contact the Caltrans, Office of Special Funded Projects, American Council of Engineering Companies (ACEC) representative.

The Office of Special Funded Projects has prepared the contents of this guide. When necessary, revisions are made and posted on the web site listed above. It is the responsibility of all that use this guide to verify it is current and appropriateness for the use intended, to obtain the revisions, and to disregard obsolete or inapplicable information.

TABLE OF CONTENTS

1 GENERAL INFORMATION
- 1.1 INTRODUCTION………………………………………………………..…......... 4
- 1.2 ROLES AND RESPONSIBILITIES……………………………………….…..... 5
- 1.3 PROJECT LIAISON AND OVERSIGHT…………………………………….... 8
- 1.4 PUBLISHED DESIGN AND PROCEDURAL DOCUMENTS……….…........11
- 1.5 STATEMENT OF WORK FOR STRUCTURES……………………….……......12
- 1.6 QUALITY CONTROL PLAN………………………………...……………..…...13
- 1.7 DELIVERABLES…………………………………….....………..……………..….14
- 1.8 UPDATING PROJECTS FOR ADVERTISEMENT …………….…......……28
- 1.9 PROJECT RECORDS……….……………………………………..…...………...29

Editable forms and bridge design information noted in the OSFP Information and Procedures Guide are available upon request from the SFP Liaison:

1.5.1	Statement of Work for Structures
1.6.1	Quality Control Plan Checklist
3.2.1	Advance Planning Study Checklist
3.2.2	Bridge Life-Cycle Cost Analysis (BLCCA) Documents
4.1.1a	BD-0500 Bridge Site Data Submittal
4.1.1b	BD-0502 Bridge Site Data Submittal-Minor
4.1.1c	BD-0503 Bridge Site Data Submittal Non-Standard RW/SW
4.1.2	Bridge or Structure Field Site Investigation Checklist
4.1.3	Railroad Separation Field Site Investigation Checklist
4.1.4	Bridge or Structure Hydraulic Site Survey Checklist
4.1.5	Foundation Plan Preparation Checklist
4.6.1	BD 0361 Structure P&Q Submittal Checklist
4.6.2	BD 0354 Structure Standard Plan Transmittal
4.7.1	Estimating Quantities
4.7.2	BD-0362 Structure Quantity Summary
4.7.3	BD-0363 Structure Quantity Summary-Other
4.9.1	BD-0307 Joint Movement Calculations LRFD
4.9.2	MTD 3.7 Shaft Design Information Sheet
4.10.1	Pumping Plant Design Manual 2019

Other documents referenced in this Guide are available at the Caltrans internet website: https://dot.ca.gov/ or https://dot.ca.gov/manuals/

INDEX TO ABBREVIATIONS:

AAA	Advertise, Award and Administer
AASHTO	AASHTO LRFD Bridge Design Specifications
ACEC	American Council of Engineering Companies
A&E	Architectural and Engineering Contract
APS	Advance Planning Study
BLCCA	Bridge Life-Cycle Cost Analysis
BD	Bridge Design
BDD	Bridge Design Detail
BDM	Bridge Design Memo
BDP	Bridge Design Practice
CA	California Amendments to AASHTO LRFD Bridge Design Specifications
CMGC	Construction Manager/General Contractor
DB	Design Build
DES	Division of Engineering Services
DRP	Draft Project Report
EE	Earthquake Engineering
GS	Geotechnical Services
MTD	Bridge Memos to Designers
OC	Overcrossing
OH	Overhead (railroad)
OSFP	Office of Special Funded Projects
PDPM	Project Development Procedures Manual
PDT	Project Development Team
PID	Project Initiation Document
POC	Pedestrian Overcrossing
PM	Project Manager
RP	Project Report
PS&E	Plans, Specifications and Estimate
PUC	Pedestrian Undercrossing
QC	Quality Control
SC	Structures Construction
SDC	Caltrans Seismic Design Criteria
SM&I	Structures Maintenance and Investigations
SOE	Structure Office Engineer
SFP	Special Funded Projects
STP	Structure Technical Policies
UC	Undercrossing
UP	Underpass (railroad)
VECP	Value Engineering Change Proposal

1.1 INTRODUCTION

Caltrans is responsible for operations, maintenance, and tort liability after State Highway projects are constructed. Caltrans is also responsible for providing for the authorized expansion of the system and for assessing the impact of improvements proposed by others to the existing system.

To ensure that projects on the State Highway system are well designed, safe, and properly constructed, all project planning, design, and construction should be performed in accordance with Caltrans standards, policies, and practices and according to the Caltrans project development process.

Caltrans assures that special funded projects (i.e. projects to be built on State Right of Way which are sponsored and developed by others) conform to the appropriate standards, policies and procedures by providing oversight through all project phases from inception through construction completion. The Office of Special Funded Projects and Structure Local Assistance of the Division of Engineering Services has oversight responsibility for structure portions of special funded projects that involve transportation related structures.

For the purposes of this Guide, oversight is defined as the effort necessary to assure conformance to Caltrans standards, policies, and practices. Within OSFP, oversight generally consists of project liaison, coordination, and technical reviews at various project milestones. While there are certain variations between project categories and general responsibilities, depending on project funding or the lead agency, the requirements for oversight, and the resulting quality of the final product, remains the same.

This Guide is intended for use by OSFP, other DES and Caltrans personnel, local entities, design consultants and other authorities, agencies or disciplines involved in the preparation of projects that require OSFP oversight. The purpose of this Guide is to establish general, uniform levels of project development and oversight and should not be substituted for the good judgement of the user.

This Guide supplements the following Caltrans document, which can be obtained from the website listed below.

- *Project Development Procedures Manual* (PDPM) at:
  Project Development Procedures Manual (PDPM)

1.2 ROLES AND RESPONSIBILITIES

All project stakeholders must work as a team to successfully develop and construct complex transportation projects. To achieve this goal, stakeholders must understand their own role and responsibility in state highway projects as well as those of the others. Roles and responsibilities of the main project stakeholders, particularly as they apply towards projects that involve oversight the Office of Special Funded projects, are discussed below.

1.2.1 GENERAL ROLES AND RESPONSIBILITIES

One primary role and responsibility all project stakeholders share is to develop projects in accordance to Caltrans procedures, standards and policies. This is a legislative borne requirement which enables Caltrans to provisionally allow others to perform work on the State Highway System while at the same time ensuring quality projects and maintaining protection from tort liability.

All improvements to State highways are Caltrans projects. This applies even if the project will be financed by others. As owner-operator of these transportation facilities, Caltrans is responsible for operation, maintenance, and tort liability after construction. Some structures, such as rails and pedestrian structures, the operation, maintenance and tort liability may be transferred to other agencies per cooperative agreements. Caltrans is also responsible for providing for the authorized expansion of the system and for assessing the impact of improvements proposed by others to the existing system.

To ensure that transportation facilities are well designed, safe, and properly constructed, all project planning, design, right-of-way acquisition, and construction should be performed in accordance with Caltrans standards and practices and according to Caltrans project development process.

The above statement is rooted in law through various codes and statutes--some of which are paraphrased below. These are shown to help illustrate the legal authority for Caltrans to allow others to perform work on state highways and still maintain the level of quality and legal position as if it were a Caltrans project:

- Streets & Highway Code Section 116: Allows Caltrans to delegate any powers and jurisdiction vested by law, however, the power of approval remains with the Caltrans.

- Streets & Highway Code Section 137: Provides Caltrans with the sole responsibility to determine the kind, quality, and extent of all highway work under its control and approval authority.

- Government Code Section 830.6: Provides relief from liability to public entities for those projects that have been approved as conforming to the standards established by the Caltrans.

An understanding of the need to comply with Caltrans standards gives project stakeholders a context for how State Highway Projects must be developed and constructed and points the project team in a clearly defined direction toward solving the transportation need.

1.2.2 SPECIFIC ROLES AND RESPONSIBILITIES

For quality projects to be developed efficiently, project stakeholders must understand their own roles and responsibilities and that of the other stakeholders, so everyone's expectations, accountabilities, and probable courses of action are predictable and can be relied upon as much as possible.
Following is a general list of roles and responsibilities associated with the main project stakeholders. The list is not all-inclusive and is meant to briefly capture roles and responsibilities as they relate to projects that involve OSFP oversight.

1.2.2.1 SPONSORING AGENCIES:

- Propose projects to the appropriate District Project Manager, Encroachment Permit Office, and District staff.
- Ensure that Caltrans participates in the develop of the "Statement of Work."
- Ensure that Caltrans participates in the Consultant Selection process if needed.
- Provide enough resources to ensure that projects can be developed to meet Caltrans standards.
- Work with Districts to determine Advertise, Award, and Administer (AAA) responsibility early in the design phase.
- Designate a person as a focal point for the project.
- Work with Consultants, Districts, and OSFP to develop schedules that provide the appropriate duration for review, and approval.
- Ensure consultant availability through construction completion, including construction support and completion of project as-builts.

1.2.2.2 CALTRANS DISTRICTS:

- Provide the OSFP Liaison Engineer with early notification that sponsored projects involving structures are under consideration.
- Designate District focal points and contacts for each project.
- Work with the Sponsoring Agency and the OSFP Liaison Engineer to develop the “Statement of Work.”
- Ensure that OSFP Liaison Engineer is available to participates in Consultant selection for projects involving structures.
- Work with Sponsoring Agencies to determine AAA responsibility early in the design stage.
- Ensure that the project schedules appropriately reflect achievable milestones and the review duration for Division of Engineering Services portions of the work are properly incorporated.
- Provide the OSFP Liaison Engineer with the current project schedule and with any proposed schedule revisions.
- Ensure that the structures oversight portion of the projects have the proper resources.
- Provide project oversight from project inception to construction completion.

1.2.2.3 CONSULTANTS:

- Designate focal points and project contacts for the project.
- Must have knowledge of and comply with Caltrans project development procedures.
- Provide staff that has the knowledge, training, and experience to meet the needs of the project.
- Provide cost effective solutions that meet the needs and purpose of the project.
- Establish, maintain, and adhere to an effective Quality Control Plan.
- Provide A&E services and products that are complete, accurate, and meet current Caltrans Standards.
- **Provide high quality and complete deliverables/submittals**.
- Meet scheduled delivery dates for all deliverables and provide regular schedule updates.
- Provide support services for the construction phase of the projects, including completion of the as-built plans.

1.2.2.4 OFFICE OF SPECIAL FUNDED PROJECTS:

- Provide Liaison & Oversight to each District and local agencies for Special Funded Projects from project inception until construction completion.
- Provide single point of contact for all of Division of Engineering Services.
- Be available to work with Districts and sponsoring agencies to pre-scope projects.
- Provide District Project Manager with a resource estimate for structure oversight efforts for OSFP.
- Participate in Consultant Selection if requested.
- Provide reviews at all stages of the project to ensure that Caltrans policies and standards are met.
- Approve structure portion of APS, Type Selection, and final PS&E.
- Establish and maintain a liaison relationship with the construction stakeholders.
- Review and approve Value Engineering Change Proposal involving the structure portion of the work.
- Review and approve Contract Change Orders involving the structure portions of work.
- Ensure As-built plans have been completed by the Consultant and submitted to Structures Maintenance and Investigations (SM&I).

An understanding of roles and responsibilities with regular interaction among the project stakeholders will help ensure that quality projects are developed efficiently with a minimum number of setbacks.

1.3 PROJECT LIAISON AND OVERSIGHT

The OSFP Liaison Engineer will maintain liaison and provide project oversight to assure that transportation related structures in State Right of Way, designed by others, conform to Caltrans policies, standards, and practices. The Liaison Engineer participates in various project activities from inception through construction completion. Generally, the OSFP Liaison Engineer has the final authority on structure related technical issues relative to conformance with Caltrans standards and practices. The liaison and oversight duties of the Liaison Engineer are briefly described below.

1.3.1 LIAISON AND OVERSIGHT DUTIES

- Provide liaison and structural consultation, support, and oversight to project development staff.
- Coordinate procedural and technical issues.
- Negotiate and coordinate project schedules with sponsoring agencies, consultants, and Districts.
- Track and report on the status of projects.
- Communicate and coordinate project specific issues, through the District, to consultants and sponsoring agencies. This will not preclude day-to-day working contacts between consultants and other DES units.
- Work closely with the consultant and sponsoring agency early in the project to minimize conflicts and to assure that they:
  - Fully understand Caltrans requirements
  - Have current manuals and project data
- Identify problems early and act as necessary.
- Participate in Consultant Selection procedures, if requested.
- Review Contract Statement of Work.
- Provide District Project Manager with the resources needed by OSFP to provide oversight activities.
- Participate in discussions and/or analyses of preliminary concepts.
- Review Project Initiation Documents / Draft Project Reports / Project Reports.
- Review and approve Advance Planning Studies.
- Participate in Field Assessments.
- Participate in Value Analysis studies.
- Participate in Project Development Team meetings.
- Attend and participate in Public Hearings/Meetings.
- Provide structural and technical consultations.
- Review and approve Structure Type Selections.
- Provide technical oversight during the development of the structure PS&E.
- Review and approve Structure Projects (Structures PS&E).
- Coordinate and assist in resolving structure related issues during construction.
- Review and approve Contract Addenda and Contract Change Orders for all structures work
- Participate in the evaluation and review of Value Engineering Change Proposal (VECP)
- Provide technical oversight of Shop Plans and As-Builts.

1.3.2 SUMMARY

The goal of the OSFP Liaison Engineer is to provide effective project oversight by maintaining close communication with relevant members of the Project Development Team and by reviewing and approving the various documents that are prepared through the different project phases.

While this Guide encourages cooperation, assistance, and proper oversight from the OSFP Liaison Engineer throughout the planning, design and construction phases, **the consultant is fully responsible for the final quality and the integrity of their design including the correction of all errors and omissions.**

1.4 PUBLISHED DESIGN AND PROCEDURAL DOCUMENTS

Design consultants and sponsoring agencies that produce designs for structures on the State Highway System are expected to obtain the *most current* versions of manuals, guidelines, specifications, and other publications to assure that the development of work conforms to Caltrans most current standards.

A list of Caltrans Publications that are currently available at the Caltrans website https://dot.ca.gov/ or https://dot.ca.gov/programs/engineering-services/manuals

Some of the more critical publications that provide planning, design, and detailing information for transportation structures are as follows:

- OSFP Information and Procedures Guide
- AASHTO LRFD Bridge Design Specifications
- CA Amendments to AASHTO LRFD Bridge Design Specifications
- Caltrans Seismic Design Criteria (SDC)
- Caltrans Seismic Design Specifications for Steel Bridges
- Structure Technical Policies (STP)
- Bridge Design Memos (BDM)
- Accelerated Bridge Construction Manual
- Bridge Memos to Designers (MTD)
- Bridge Design Details (BDD)
- Geotechnical Manual
- Geotechnical Specifications
- Soil and Rock Logging Manual
- Bridge Design Practice (BDP)
- Bridge Standard Details and User Guides
- Highway Design Manual
- Plans Preparation Manual
- Project Development Procedures Manual
- CADD User's Manual
- Standard Plans and Revised Standard Plans
- Standard Specifications and Revised Standard Specifications
- Structure Construction Manual
- Workplan Standards Guide

The below information may be obtained from the OSFP Liaison Engineer:

1.5.1 Statement of Work for Structures
1.6.1 Quality Control Plan Checklist
3.2.1 Advance Planning Study Checklist
3.2.2 Bridge Life-Cycle Cost Analysis (BLCCA) Documents
4.1.1a BD-0500 Bridge Site Data Submittal
4.1.1b BD-0502 Bridge Site Data Submittal-Minor
4.1.1c BD-0503 Bridge Site Data Submittal Non-Standard RW/SW
4.1.2 Bridge or Structure Field Site Investigation Checklist
4.1.3 Railroad Separation Field Site Investigation Checklist
4.1.4 Bridge or Structure Hydraulic Site Survey Checklist
4.1.5 Foundation Plan Preparation Checklist
4.6.1 BD 0361 Structure P&Q Submittal Checklist
4.6.2 BD 0354 Structure Standard Plan Transmittal
4.7.1 Estimating Quantities
4.7.2 BD-0362 Structure Quantity Summary
4.7.3 BD-0363 Structure Quantity Summary-Other
4.9.1 BD-0307 Joint Movement Calculations LRFD
4.9.2 MTD 3.7 Shaft Design Information Sheet
4.10.1 Pumping Plant Design Manual 2019

1.5 STATEMENT OF WORK FOR STRUCTURES

The Statement of Work for Structures is an editable form that is available upon request from the SFP Liaison.

The Statement of Work for Structures describes the procedures, deliverables, and other requirements for consultant designed structure work on state right of way that OSFP will review. To help ensure the consultant's work is adequately scoped, sponsoring agencies should include requirements to the same effect in their consultant contracts. The Statement of Work for Structures shall be completed as early as possible in the K phase (PID) or the 0 phase (PA&ED). As the scope of the structure work change, the Statement of Work for Structures shall be updated.

The Statement of Work for Structures applies to traditional design-bid-build projects regardless of funding sources or construction contract administration responsibilities. For projects that are developed and delivered by alternate methods, such as design-build, the basic requirements in the Statement of Work for Structures still apply, but the unique submittal and review processes these projects require are outside the scope of the document.

The Statement of Work for Structures is for typical projects and but may not fully address any specific project. For example, projects that include pumping plants, buildings, steel structures, railroad structures, or tunnels with ventilation systems may require additional lead time and additional copies of documents. Alternatively, some simpler projects may require less lead time. All submittals must be in electronic file format. Because of these variations, sponsoring agencies and consultants should always request the OSFP Liaison Engineer to review the scope of structure work in consultant contracts to help ensure the schedule, submittal, and other requirements are appropriate for the specific project.

1.6 QUALITY CONTROL PLAN

The Quality Control Plan Checklist is an editable form that is available upon request from the SFP Liaison.

The checklist is used to establish a minimum level of quality control during the PS&E phase and shall be used as a basis for the development of the project checklist. Quality control for the design integrity and the completeness of project documents are the responsibility of the consultant.

The consultant shall have a quality control plan in effect during all project phases. Plans, specifications, calculations, reports, and other items or documents delivered to OSFP for review shall be clearly addressed in the quality control plan established for the work. The Quality Control Plan shall contain appropriate checklists to assure product quality and control.

The consultant shall complete and deliver to OSFP a project specific Quality Control Plan Checklist with the Initial PS&E submittal. The consultant project manager must sign the checklist to certify completeness and accuracy of the submittal.

Incomplete submittals will not be accepted by OSFP for review. Review will not commence until all the required documents have been received and verified complete by OSFP.

1.7 DELIVERABLES

Summarized in this section are general deliverable requirements and information for documents to be submitted for projects with bridges or other transportation-related structures.

Registered Professional Engineer registration seals and signatures required on deliverables shall be in accordance with the requirements of the State of California Business and Professions Code and Caltrans policy as stated elsewhere in this Guide.

All submitted documents shall be neat and legible. Each electronic file must be no larger than 70 MB if possible. Any files over 70 MB must be broken down into smaller files and named accordingly (i.e., Part I, Part II...) Project identification and document identifications shall be part of the electronic file name. The contents of all documents should be indexed, and all pages numbered.

Deliverable Distribution List indicates the required electronic documents that are to be submitted to District Project Manager and OSFP by the Consultant for the various phases of the project. The deliverable electronic documents are to be submitted to the District Project Manager and OSFP Liaison Engineer by e-mail or file transfer protocol (FTP).

1.7.1 DELIVERABLE DISTRIBUTION LIST

The Deliverable Distribution List is used for project development from inception to PS&E completion to construction phase. It is intended for use by Districts, sponsoring agencies, and consultants to convey the deliverable requirements for each element of the project for which OSFP provides oversight. Following is a description of the information each column in the list contains.

1.7.2 SECTION REFERENCE

Provides a cross-reference to the pertinent sections elsewhere in this manual.

1.7.3 DELIVERABLE REVIEW DURATION

Provides the review duration OSFP requires to review the different deliverables for typical projects. **For non-typical projects (such as long/complex structures, large number of structures, complex seismic, complex geology, etc) an increase duration will be required. Please consult with the SFP Liaison at**

initiation of the project and agree on an increase review duration. The durations consider the time needed for OSFP to coordinate reviews through the various functional units within the Division of Engineering Services. Sponsoring agencies and their consultants must include the appropriate review duration into the project schedules. The Liaison Engineer should be consulted early in the project to assist with schedule development to ensure that all necessary reviews are properly considered. This particularly applies to projects that contain non-typical elements.

During the development of the project, the schedule should be reviewed with the Liaison Engineer to ensure that the elements of the project can be reviewed as originally planned.

1.7.4 DOCUMENTS PER STRUCTURE (S) OR PROJECT (P)

Indicates whether the electronic documents are per structure (S) basis or on a per project (P) basis.

In certain cases, the designation (S/P) is used. If there are many structures on a project the deliverables should be on a per structure basis. If there are a small number of structures on the project, deliverables can be based on a per project basis with the approval of the Liaison Engineer.

1.7.5 REMAINING COLUMNS

Shows the potential involvement of other units that participate in project reviews. These columns are primarily for use by OSFP.

In addition to design reviews performed by OSFP, other offices within the Division of Engineering Services provide reviews in specialized areas. Listed below, in the same order as shown on the list to provide clarity, are the functional areas that most often perform reviews:

- Geotechnical Services
- Structure Hydraulics and Hydrology
- Structure Design
- Structure Construction
- Structures Maintenance and Investigation
- Earthquake Engineering
- SOE Structures Specifications

- SOE Structures Estimating
- Bridge Architecture & Aesthetics
- Various Technical Specialists or Committees, such as, Bridge Barriers, Retaining Walls, Signs, Underground Structures, Concrete, Structural Steel, etc.

The following tables show the required document distributions at the various stages of the project. The Liaison Engineer will determine the involvement of the specific units and will distribute the documents as necessary. Consultants shall only submit deliverables to the District Project Manager or OSFP Liaison Engineer and not directly to the units shown.

Unless otherwise noted, all plans are to be on reduced size 11 inches x 17 inches. Electronic files shall be submitted by e-mail of file transfer protocol (FTP) unless otherwise requested by the Liaison Engineer. Files shall in MicroStation format (DGN) for drawings, and Portable Document Format (PDF) for all others.

Project initiation Documents (PID) (WBS 0.150)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM&I	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Advance Planning Study Submittal	3-2	4	E	S	E	E		E		E	E		E		E		E	
Structure Preliminary Geotechnical Report or Preliminary Foundation Report	2-3	4	E	S	E	E		E					E					
Preliminary Hydraulics Report and HEC-RAS model	2-4	4	E	S	E	E							E					
Structure Advance Planning Study Checklist	3-2	4	E	S	E	E		E		E	E		E				E	
Design Memo	3-2	4	E	S	E	E		E		E	E		E				E	
Cost Estimate	3-2	4	E	S	E	E				E							E	
Draft Final PID or Final Approved PID	3-2	4	E	P	E													
Accelerated Bridge Construction (ABC) Evaluation	3-2	4	E	S	E	E				E							E	E
Bridge Life-Cycle Cost Analysis (BLCCA) (if requested by the OSFP Liaison)	3-2	4	E	S	E	E				E							E	E
Responses to previous comments (for resubmittals only)	3-2	4	E	S	E	E		E		E	E		E		E		E	

Draft Project Reports/Project Reports (WBS 0.160)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM&I	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Advance Planning Study	3-2	4	E	S	E	E		E		E	E		E		E		E	
Structure Preliminary Geotechnical Report or Preliminary Foundation Report	2-3	4	E	S	E	E		E					E					
Preliminary Hydraulics Report and HEC-RAS model	2-4	4	E	S	E	E							E					
Structure Advance Planning Study Checklist	3-2	4	E	S	E	E		E		E	E		E				E	
Design Memo	3-2	4	E	S	E	E		E		E	E		E				E	
Cost Estimate	3-2	4	E	S	E	E				E							E	
Draft Project Report with Structures Planning Studies or PSR PDS	3-2	4	E	P	E													
Final Signed Project Report (after APS Approval)	3-2	4	E	P	E													
Accelerated Bridge Construction (ABC) Evaluation	3-2	4	E	S	E	E				E							E	E
Bridge Life-Cycle Cost Analysis (BLCCA) (if requested by the OSFP Liaison)	3-2	4	E	S	E	E				E							E	E
Responses to previous comments (for resubmittals only)	3-2	4	E	S	E	E		E		E	E		E		E		E	

Preliminary Design - Pre-Type Selection (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Draft Bridge Site Data Submittal (to District). Contact District Project Manager and the Liaison Engineer to determine necessary number of copies and formats required.	4-1	4	E	S	E													E
Foundation Boring Plan	2-3	4	E	S	E			E										
Draft Final Hydraulics Report Submit a minimum of 4 weeks prior to Type Selection Submittal	2-4	4	E	S	E								E					

Preliminary Design - Type Selection-35% (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Type Selection Report	4-2	2 - 4 *	E	S	E	E		E	E	E	E	E	E	E	E	E		E
GAD approval memo from District Design oversight. GAD must be approved before scheduling Type Selection Meeting. or Approved Bridge Site Data Submittal with attachments.	4-1	2 - 4 *	E	S	E													
General Plan	2-2	2 - 4 *	E	S	E	E		E	E	E	E	E	E	E	E	E		E
Draft Foundation Plan	4-2	2 - 4 *	E	S	E	E												
Draft Final Hydraulics Report and HEC-RAS model	2-4	2 - 4 *	E	S	E	E							E					
Preliminary Foundation Report	2-3	2 - 4 *	E	S	E	E		E					E					
Responses to any outstanding APS comments		2 - 4 *	E															

* Duration between complete Type Selection Submittal and the Type Selection Meeting.

Preliminary Design - Post-Type Selection (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Updated Type Selection Report	4-2	2 - 4	E	S	E	E		E	E	E	E	E	E	E	E	E		E
Type Selection Review Meeting Summary.	4-2	2 - 4	E	P	E	E		E	E	E	E	E	E	E	E	E		E
Updated General Plan Estimate	4-2	2 - 4	E	S	E												E	E
Updated General Plans	4-2	2 - 4	E	S	E	E	E											
Responses to Type Selection comments		2 - 4	E	S	E	E	E	E	E	E	E	E	E	E	E	E	E	E

Unchecked Details 65% (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Unchecked Structure Plans	4-3	4	E	S	E	E		E		E	E		E		E			E
Draft Road Plans	4-3	4	E	P	E	E				E								
Draft Foundation Report	4-3	4	E	S	E	E		E		E			E					
Draft Final Hydraulics Report and HEC-RAS model	4-3	4	E	S	E	E				E			E					
Responses to any outstanding Type Selection comments		4	E	S														

Initial PS&E 90%- Structure Plans and Calculations (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Structure Plans	2-2	6	E	S	E	E	E	E		E	E		E	E	E	E	E	E
Structure Plans Electronic File (DGN)	2-2	6	E	S			E											
Structure Plans Electronic File (PDF-one file per structure)	2-2	6	E	S	E	E		E		E	E		E	E	E	E	E	
Design Calculations	4-5	6	E	S	E	E												
Check Calculations	4-5	6	E	S	E	E												
Design-Check Discrepancies Comparison Log	4-5	6	E	S	E	E												
Responses to 65% comments		6	E	S	E	E												

Initial PS&E 90%- Specifications and Estimate (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Special Provisions (with edits shown) (Word File)	4-6	6	E	P		E		E		E				E			E	
Structure P&Q Submittal Checklist	4-6	6	E	P	E									E			E	
Structure Standard Plan List Transmittal	4-6	6	E	P	E									E			E	
Cost Estimate	4-7	6	E	S		E											E	
Design and Check Quantity Calculations Caltrans advertised projects	4-7	6	E	S		E											E	
Quantity Summary Sheets Caltrans advertised projects	4-7	6	E	S		E											E	
Working Day Schedule Caltrans advertised projects	4-7	6	E	P		E											E	

Initial PS&E 90%- Hydraulics and Foundations (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Final Hydraulics Report [1]	2-4	6	E	S	E	E				E			E	E		E		
HEC-RAS model	2-4	6	E	S	E								E					
Final Foundation Report	2-3	6	E	S	E	E		E		E				E		E		

Initial PS&E 90%- Roadway (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Road Plans	4-8	6	E	P	E	E				E								
Road Special Provisions	4-8	6	E	P	E	E				E				E			E	

Initial PS&E - Consultant Quality Control Statement (WBS 1.240)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copy	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Consultant Quality Control Statement	1-6	6	E	P	E													

Intermediate PS&E 91%, 92%, 93%, ….. (WBS 1.240)

Re-submit all items required by Initial PSE above and responses to previous initial PS&E comments. Review duration is 4 weeks.

Final PS&E 100% (WBS 1.240 thru 1.250)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copies	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Final Signed Structure Plans Caltrans advertised projects (PDF & DGN)	2-2	4	E	S	E	E	E							E			E	
Final Signed Structure Plans Local advertised projects (PDF)	2-2	4	E	S	E	E	E							E				
Road Plans	4-8	4	E	P														
Road Special Provisions	4-8	4	E	P										E				
Resident Engineers Pending File Caltrans advertised projects	4-8	4	E	P						E								
Four Scale Deck Contour Plot Full scale prints Caltrans advertised projects	4-9	4	E	P						E								
Responses to previous comments (for resubmittals only)		4	E	S														

Contract Advertisement (WBS 1.265)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copies	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
As-Advertised Plans Locally advertised projects	4-12	4	E	P	E					E	E							
As-Advertised Special Provisions Locally advertised projects	4-12	4	E	P	E					E	E							
Documentation of Bidder's Inquiries	4-14	4	E	P	E					E				E				

Addenda (WBS 1.265)

Section Reference: 4-13. Submit copies of the following as required by the Liaison Engineer:

Local Advertisement Only:

- Plan Details (PDF)
- Design Calculations
- Check Calculations
- Design-Check Discrepancies Comparison Log
- Addenda Memorandum
- Addenda

Caltrans Advertisement Only:

- Plan Details (PDF & DGN)
- Design Calculations
- Check Calculations
- Design-Check Discrepancies Comparison Log
- Quantities
- Check Quantities
- Cost Estimates
- Special Provisions

Contract Change Orders - Initial and Intermediate Submittals (WBS 3.285)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copies	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Structure Plans (PDF & DGN) Caltrans advertised projects	5-2	TBD	E	S	E	E	E	E		E			E	E			E	
Structure Plans (PDF) Locally advertised projects	5-2	TBD	E	S	E	E		E		E			E	E				
Special Provisions Caltrans advertised projects	5-2	TBD	E	P	E	E				E				E			E	
Special Provisions Locally advertised projects	5-2	TBD	E	P	E	E				E				E				
Quantities Caltrans advertised projects	5-2	TBD	E	S	E												E	
Check Quantities Caltrans advertised projects	5-2	TBD	E	S	E												E	
Cost Estimates Caltrans advertised projects	5-2	TBD	E		E												E	
Cost Estimates Locally advertised projects	5-2	TBD	E		E													
Design Calculations	5-2	TBD	E	S		E												
Check Calculations	5-2	TBD	E	S		E												
Design-Check Discrepancies Comparison Log	5-2	TBD	E	S	E	E												
Foundation Report	5-2	TBD	2	S	E	E		E										
Hydraulics Report	5-2	TBD	2	S	E	E							E					

Contract Change Orders - Final Submittal (WBS 3.285)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copies	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Structure Plans (PDF & DGN) Caltrans advertised projects	5-2	TBD	E	S	E		E							E			E	
Structure Plans (PDF) Locally advertised projects	5-2	TBD	E	S	E									E				
Responses to previous comments (for resubmittals only)		TBD	E	S	E		E							E			E	

Value Engineering Change Proposal (VECP) (WBS 3.285)

Same as for Contract Change Orders.

As-Builts (WBS 3.295)

Name of Report	Section Reference	Review Duration (weeks)	Electronic Copies	Document per Structure (S) or Project (P)	OSFP Liaison Engineer	OSFP Reviewer	OSFP Detailer	GS	BD	SC	SM	EE	Hydraulics	Specifications	Aesthetics	Specialists	Estimating	District
Final As-Built Plans (DGN & PDF for Caltrans advertised projects) PDF for Locally advertised projects)	5-5		E		E													
Red-marked As-Built Plans From Field Office	5-5		E		E													

1.8 UPDATING PROJECTS FOR ADVERTISEMENT

Caltrans updates project development standards and procedures on a continual basis which results in the need to routinely evaluate projects for conformance with the latest requirements. This is especially true when the construction phase of the project does not commence soon after PS&E approval. Projects that do not advertise in a timely manner after the PS&E phase are considered shelf projects.

Shelf projects that are re-activated must be evaluated for conformance with the most current requirements prior to advertisement. The consultant, in close coordination with the OSFP Liaison Engineer, must perform this evaluation. The Liaison Engineer and the District Design Oversight will make the final determination of the extent of revisions required by reviewing the Implementation Memos for newly adapted requirements. All elements of the PS&E package are subject to updating to current requirements including plans, Special Provisions, Foundation Reports, structural calculations, etc.

The extent of the evaluation for conformance will depend on the length of time the project was shelved and on the significance of the change in requirements. Generally, projects where the construction phase begins within six months after PS&E approval will not require this evaluation unless necessitated by a significant requirement change (typically new design criteria or special provisions/Standards). Projects on the shelf for more than six months will require an evaluation. The longer the project is shelved, the more extensive the revisions are likely to be. In some cases, redesign and review cycles will be required.

Sponsoring agencies and consultants must make allowances in project schedules and budgets to account for evaluating and updating shelf projects. Timely contact with the OSFP liaison engineer and District Design Oversight is strongly encouraged when shelf projects are re-activated. This is so that the extent of updates can be determined, developed, and incorporated in a timely manner before the construction contract is advertised.

Necessary updates that are not made before advertisement must be incorporated into construction contracts by addendum or contract change order.

1.9 PROJECT RECORDS

A project file shall be kept and maintained by the consultant. The file shall include all correspondence, records of meetings and phone conversations, a history of project cost estimates, and all project memoranda and information. As correspondence is received during the project, it shall be dated and filed. Copies shall be distributed to appropriate project personnel and a record of required actions shall be documented.

In addition, pertinent project development information shall be included in the Resident Engineers Pending File for construction.

Complete project records are the responsibility of the consultant and will not be kept or maintained by OSFP. Project records shall be made available to the OSFP Liaison Engineer upon request.

OFFICE OF SPECIAL FUNDED PROJECTS

INFORMATION AND PROCEDURES GUIDE

CHAPTER 2: TYPICAL PROJECT INFORMATION

STRUCTURES & ENGINEERING SERVICES
DIVISION OF ENGINEERING SERVICES
DEPARTMENT OF TRANSPORTATION
STATE OF CALIFORNIA

2024

Updates and information concerning the contents of this guide may be obtained from:

Office of Special Funded Projects and Structure Local Assistance (OSFP/SLA) page
or
Contact the Caltrans, Office of Special Funded Projects, American Council of Engineering Companies (ACEC) representative.

The Office of Special Funded Projects has prepared the contents of this guide. When necessary, revisions are made and posted on the web site listed above. It is the responsibility of all that use this guide to verify it is current and appropriateness for the use intended, to obtain the revisions, and to disregard obsolete or inapplicable information.

TABLE OF CONTENTS

2 TYPICAL PROJECT INFORMATION
- 2.1 BRIDGE NAMES AND NUMBERS……5
- 2.2 PLANS……6
- 2.3 FOUNDATION REPORT ……8
- 2.4 HYDRAULICS REPORT……10
- 2.5 FIELD ASSESSMENTS……11
- 2.6 MISCELLANEOUS STRUCTURES……12
- 2.7 COMPLEX BRIDGES……15
- 2.8 LIGHTWEIGHT CONCRETE……18
- 2.9 OTHER COMPLEX STRUCTURE: TUNNELS……21
- 2.10 DESIGN BUILD PROJECTS……21
- 2.11 CONSTRUCTION MANAGER/GENERAL CONTRACTOR (CMGC) PROJECTS ……21
- 2.12 SHARED FILE SUBMITTALS AND REVIEW……21

Editable forms and bridge design information noted in the OSFP Information and Procedures Guide are available upon request from the SFP Liaison:

1.5.1	Statement of Work for Structures
1.6.1	Quality Control Plan Checklist
3.2.1	Advance Planning Study Checklist
3.2.2	Bridge Life-Cycle Cost Analysis (BLCCA) Documents
4.1.1a	BD-0500 Bridge Site Data Submittal
4.1.1b	BD-0502 Bridge Site Data Submittal-Minor
4.1.1c	BD-0503 Bridge Site Data Submittal Non-Standard RW/SW
4.1.2	Bridge or Structure Field Site Investigation Checklist
4.1.3	Railroad Separation Field Site Investigation Checklist
4.1.4	Bridge or Structure Hydraulic Site Survey Checklist
4.1.5	Foundation Plan Preparation Checklist
4.6.1	BD 0361 Structure P&Q Submittal Checklist
4.6.2	BD 0354 Structure Standard Plan Transmittal
4.7.1	Estimating Quantities
4.7.2	BD-0362 Structure Quantity Summary
4.7.3	BD-0363 Structure Quantity Summary-Other
4.9.1	BD-0307 Joint Movement Calculations LRFD
4.9.2	MTD 3.7 Shaft Design Information Sheet
4.10.1	Pumping Plant Design Manual 2019

Other documents referenced in this Guide are available at the Caltrans internet website: https://dot.ca.gov/ or https://dot.ca.gov/manuals/

INDEX TO ABBREVIATIONS:

AAA	Advertise, Award and Administer
AASHTO	AASHTO LRFD Bridge Design Specifications
ACEC	American Council of Engineering Companies
A&E	Architectural and Engineering Contract
APS	Advance Planning Study
BLCCA	Bridge Life-Cycle Cost Analysis
BD	Bridge Design
BDD	Bridge Design Detail
BDM	Bridge Design Memo
BDP	Bridge Design Practice
CA	California Amendments to AASHTO LRFD Bridge Design Specifications
CMGC	Construction Manager/General Contractor
DB	Design Build
DES	Division of Engineering Services
DRP	Draft Project Report
EE	Earthquake Engineering
GS	Geotechnical Services
MTD	Bridge Memos to Designers
OC	Overcrossing
OH	Overhead (railroad)
OSFP	Office of Special Funded Projects
PDPM	Project Development Procedures Manual
PDT	Project Development Team
PID	Project Initiation Document
POC	Pedestrian Overcrossing
PM	Project Manager
RP	Project Report
PS&E	Plans, Specifications and Estimate
PUC	Pedestrian Undercrossing
QC	Quality Control
SC	Structures Construction
SDC	Caltrans Seismic Design Criteria
SM&I	Structures Maintenance and Investigations
SOE	Structure Office Engineer
SFP	Special Funded Projects
STP	Structure Technical Policies
UC	Undercrossing
UP	Underpass (railroad)
VECP	Value Engineering Change Proposal

2 TYPICAL PROJECT INFORMATION

2.1 BRIDGE, EARTH RETAINING SYSTEM (ERS), PUMP PLANT NAMES AND NUMBERS

The Bridge, ERS, and pump plant Numbering System is used for the identification of bridges/ERS/pump plants and other structures under the jurisdiction of Caltrans. This includes structures Caltrans owns, performs maintenance reviews, or has other record responsibilities. Bridge and pump plant names and numbers are determined and assigned by the Structure Maintenance and Investigations unit. ERS names and numbers are determined and assigned by the Earth Retaining Systems Committee.

Typical structures that are routinely assigned bridge numbers consist of state highway bridges, pumping plants, MSE walls, and buildings. Other types of walls and structures are occasionally assigned bridge numbers on a case-by-case basis.

Requests for bridge/ERS/pump plant numbers and bridge/ERS/pump plants names for structures shall be made through OSFP Liaison Engineer and shall include:

- Request for Structure Asset Name and Number form (MTCE-0101) or Request for ERS Structure Asset Number form (ERS SAN Request Form)
- General Plan of the bridge/ERS/pump plant.
- County and State Route Identification Number
- Post Mile at Beginning of Bridge (to the nearest .01 PM)
- Site Map or Strip Map of enough detail to clearly indicate the relationship of the street names and names of the pertinent features near the bridge site.

The assigned bridge/ERS/pump plant name, number, and year constructed shall be painted on all structures. Locations indicating where to paint the bridge number, name, and year constructed on a structure shall be shown on the General Plan in accordance with *Bridge Design Details*.

The bridge/ERS/pump plant name and number shall be requested and assigned in the preliminary design phase (Type Selection or 35% design level).

2.2 PLANS

The submittal of plans is required at various milestones through the project development process. The plans must conform to the preparation and submittal requirements that are outlined below. The electronic plans shall be submitted in PDF format and DGN format for State AAA projects at PS&E submittal. Structure plans must be one structure per PDF file.

2.2.1 PREPARATION OF STRUCTURE PLANS

The preparation of structure plans shall conform to the detailing and formatting standards contained in the *Plans Preparation Manual* and the *Bridge Design Details* manual. The plans shall be prepared using the most current standards--this includes the most current Caltrans formatted border sheets, Standard Detail Sheets (XS sheets), and Standard Plans.

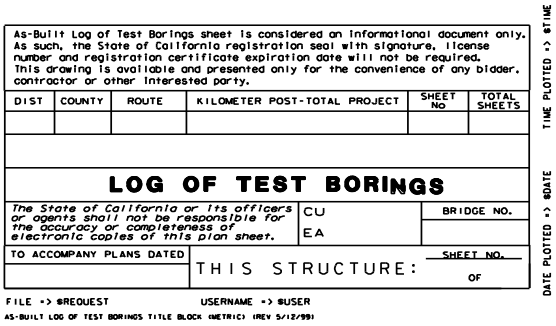
The Caltrans formatted border sheets that must be used for structure plans are those that contain “Prepared for the State of California” in the lower title blocks. Examples of the following formatted sheets can be found at Structure Borders.

- Advance Planning Study
- General Plan
- Foundation Plan
- General Detail
- Log of Test Borings
- Log of Test Borings Title Block (to be affixed to As-Built LOTB)

In addition to the requirements above, electronic plans shall conform to the *CADD User’s Manual* and the most current detailing guidelines, seed files, bridge detail cells, and cell libraries which are all available at: Structure Borders.

2.2.2 AS-BUILT LOG OF TEST BORINGS TITLE BLOCK

The title blocks below shall be attached to as-built log of test boring sheets that are included in the structure plans.



As-Built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date will not be required. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST	COUNTY	ROUTE	KILOMETER POST-TOTAL PROJECT	SHEET NO	TOTAL SHEETS

LOG OF TEST BORINGS

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

CU
EA

BRIDGE NO.

TO ACCOMPANY PLANS DATED

THIS STRUCTURE:

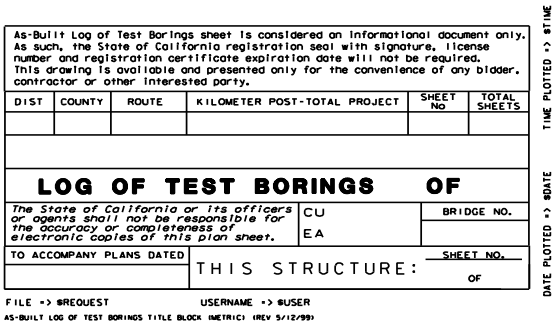
SHEET NO.
OF

FILE => $REQUEST USERNAME => $USER

AS-BUILT LOG OF TEST BORINGS TITLE BLOCK (METRIC) (REV 5/12/99)

TIME PLOTTED => $TIME

DATE PLOTTED => $DATE



As-Built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date will not be required. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST	COUNTY	ROUTE	KILOMETER POST-TOTAL PROJECT	SHEET NO	TOTAL SHEETS

LOG OF TEST BORINGS OF

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

CU
EA

BRIDGE NO.

TO ACCOMPANY PLANS DATED

THIS STRUCTURE:

SHEET NO.
OF

FILE => $REQUEST USERNAME => $USER

AS-BUILT LOG OF TEST BORINGS TITLE BLOCK (METRIC) (REV 5/12/99)

TIME PLOTTED => $TIME

DATE PLOTTED => $DATE

2.2.3 STRUCTURE PLANS ON NON-CALTRANS BORDERS.

For some locally advertised projects it may be acceptable to use non-Caltrans borders for the structure sheets. Typically, large projects that are mostly outside Caltrans right-of-way and maintained by others may use non-Caltrans borders for the structure sheets. The OSFP Liaison, design consultant, and local entities must agree to the use of non-Caltrans borders for the structure sheets in the PA&ED or early in the PS&E phase.
In lieu of using Caltrans Structure Plan Sheet Borders, provide Caltrans information block on the lower left corner of all bridge structure sheets.

Dist	**Co**	**Rte**	**PM**
xx	Xxx	Xxx	Ww – ww
EA: xx-xxxxxx			
PID: xx xxxx xxxx			
Bridge Name: xxxxx			
Br. No.: xx-xxxx			
Structure Sheet Name: xxxxxxxx			
Structure Sheet Number: xx **of** xx			
To be signed upon approval by Str oversight liaison		Date of approval	
Design Oversight		**Date**	

2.3 FOUNDATION REPORT

A Foundation Investigation is required for all structures (bridges, tunnels, retaining walls, sound walls, tie-back walls, overhead signs, maintenance stations, culverts, pumping plants/stations, toll plazas, etc.) when new, widening, retrofit, or modifications to existing structures are proposed. A Foundation Report is required to summarize the findings of the investigation and to provide foundation recommendations for the structure design and construction.

A separate Foundation Report for each structure shall be developed in accordance with Caltrans requirements including the two following publications and webtool:

- *Geotechnical Manual*
- *Soil and Rock Logging Manual, Classification, and Presentation Manual*
- Caltrans ARS Online

Foundation reports shall conform to generally accepted standards of professional practice and all applicable rules and regulations of the California Board of Registration for Professional Engineers and Land Surveyors and the California Board of Registration for Geologists and Geophysicists.

The (preliminary/final) Foundation Report, LOTB, responses to comments, design and check calculation, etc shall be separate parts of a submittal. These documents shall be separate PDF or doc files.

The Foundation Investigation shall be conducted under the supervision of, and the Foundation Report signed by, a Registered Civil Engineer or Certified Engineering Geologist who specializes in foundation engineering for bridge structures. The geotechnical professional of record shall include his/her State of California registration seal, license number, expiration date and signature on all submittals of Foundation Reports, addenda and/or amendments to the Foundation Report, and Log of Test Boring (LOTB) sheets.

Structure Preliminary Geotechnical Report (SPGR) and/or Preliminary Foundation Report (PFR) are used during the early stages of a structure project and shall be included as part of an Advance Planning Study (APS). PFR is used for Type Selection submittal. The SPGR and PFR are used to document existing foundation conditions, make preliminary foundation recommendations, and identify the need for additional investigations and studies.

Prior to conducting boring explorations in the field, consultants are encouraged to submit a boring plan for comment. This submittal is not mandatory but is recommended as an attempt to ensure the planned number, location, depths of borings, types of borings, soil tests, testing frequency, etc. appear enough. The review time for the boring plan will normally be less than four weeks.

The Final Foundation Report shall contain foundation recommendations that are complete, concise and definite. The recommended foundation systems shall be cost-effective, performance-proven, and constructible. However, alternative foundation types shall be briefly discussed and the reasons for those being excluded clearly stated. When construction problems for the recommended foundation types are anticipated, solutions to these problems shall be discussed.

It is imperative that the structure Project Engineer, geotechnical professional, engineering seismologist, corrosion engineer, hydrology and hydraulics engineer, and specification engineer maintain close communication during the development of the Foundation Report, Contract Plans, and Special Provisions. Foundation recommendations as shown in the Foundation Report, Contract Plans, and Special Provisions must be adequate, consistent, complete, and made with the Design Engineer's concurrence.

LOTB sheets shall be drafted and submitted alongside of the Foundation Report and included in the Contract Plans. As-Built LOTB sheets shall also be included as part of the Foundation Report and Contract Plans.

Draft foundation reports are required as part of the Unchecked Details (65%) submittal and through the subsequent PS&E submittals until review comments are resolved. Once resolved, the consultant shall submit a Final Foundation Report.

Construction contract change orders that revise, modify, or affect original foundation recommendations shall be submitted to Caltrans for review and approval prior to any action taken by the contractor. Additional foundation investigations and reports shall be prepared and submitted as necessary to support the change. The final version of the report shall be submitted once all the comments have been addressed satisfactorily.

Upon completion of construction, As-Built structure foundation documentation, including pile driving logs and construction notes, shall be submitted to Caltrans for record keeping.

2.4 HYDRAULICS REPORT

Thorough hydrologic investigations and hydraulics reports are required for structures in, over, or adjacent to streams and waterways which may affect the design or construction of the structure.

The investigations and preparation of reports shall be performed by a Registered Civil Engineer who is competent in hydrologic investigations and studies, and shall conform to the *AASHTO LRFD Bridge Design Specifications,* current *California Amendments, Highway Design Manual, Structure Technical Policies, Bridge Design Memo, Bridge Memo to Designers,* and other applicable Caltrans policies and procedures.

A separate Hydraulic Report shall be prepared for each structure and shall bear the State of California registration seal, license number, expiration date and signature of the Engineer responsible for its preparation. In addition, the report shall include the following basic information:

- District, County, Route, Post-Mile (PM) and Kilometer-Post (KP), and Expenditure Authorization (EA)
- State assigned Bridge Name, Bridge Number, and other pertinent information for the applicable structure
- A brief description of the hydrology, Hydrologic Summery Table
- Scour Summary and Data Table,
- Constraints or requirements which influence the selection of available alternatives, e.g. roadway geometric needs or drift way requirements
- Location of property at risk and a description of the potential damage
- Calculations to determine velocities, water surface elevations, backwater, and scour depth. HES-RAS computer model must be provided as well as contour mapping depicting cross section locations utilized for the computer model. An executable copy of the software used (with documentation) must be submitted if requested by the OSFP Liaison Engineer.

Generally, two types of hydraulics reports are required during the development of a structure project--a Preliminary Hydraulics Report (PHR) and a Final Hydraulics Report (FHR).

A PHR is required for the development of Advance Planning Studies (APS) at the Project Study Report (PSR) stage or at the Project Report (PR) stage. The PHR shall identify hydrologic factors and parameters that will affect the selection of the

structure. The PHR does not necessarily have to be based on a thorough hydrologic study, but the study must be detailed enough so the proper structure layout and type can be identified. The PHR must be submitted for review as part of the APS submittal.
A draft FHR and the HEC-RAS model are required for the Structure Type Selection process and the development of the structure General Plan.

As structure project documents are developed (Contract Plans, Special Provisions, Foundation Report, and Hydraulics Report), it is imperative that the structure Project Engineer, specification engineer, geotechnical professional, hydrology engineer, and hydraulics engineer maintain close communication so that these documents address all pertinent factors completely, consistently, and with the Project Engineer's concurrence.

The Project Engineer shall have the responsibility for obtaining relevant hydrologic information required for the Hydrologic Summary Table and the Scour Data Table to be placed on the Foundation Plan sheet of the contract plans.

2.5 FIELD ASSESSMENTS

Properly conducted Field Assessments are a technique that has proven successful in establishing the project scope while reducing potential design issues, construction issues and cost escalation. For this reason, sponsoring agencies and consultants should use Field Assessments to help ensure successful projects.

Field Assessments should occur at several critical stages of project development and should be attended by representatives of the key engineering disciplines involved in the project whose input may be critical in decisions made. This includes representatives from the sponsoring agency consultants, the District, and the OSFP Liaison Engineer. It is incumbent on the representatives to collectively use their knowledge and experience to ensure the project is properly scoped, to look for potential problems, to determine potential courses of action, and to review proposed solutions.

Following are the different project stages where Field Assessments are recommended. The Liaison Engineer is available to assist with the planning and to participate in these Assessments.

2.5.1 PROJECT INITIATION OR PROJECT APPROVAL AND ENVIRONMENTAL DOCUMENT PHASE

Early in the Project Initiation (PID) or Project Approval/Environmental Document (PA/ED) phase, Field Assessments allow for the identification of the project constraints and development of a variety of potential solutions. Constructability, utilities, traffic and other constraints should be examined and documented for use in developing suitable alternatives for structure Advance Planning Studies (APS).

2.5.2 PRELIMINARY DESIGN PHASE (TYPE SELECTION)

The project site should be assessed for changes that have occurred since the development of the previous planning study. This is especially important when considerable time has passed since the approval of the APS, PSR, or PR.

2.5.3 PS&E PHASE

This Field Assessment allows for a comprehensive review of the final plans and specifications against the latest field conditions. It is especially important that Highway and Structure Construction staff attend this assessment, so their input can be incorporated prior to the completion of the contract documents.

2.6 MISCELLANEOUS STRUCTURES

In addition to bridge structures, OSFP has oversight responsibilities for miscellaneous transportation-related structures within the State right-of-way that are designed by others. These miscellaneous structures include, but are not limited to, the following structure types:

- Earth Retaining Systems (Retaining Walls)
- Soundwalls
- Bridge mounted signs
- Barrier Mounted Signs on Structures
- Overhead Sign Structures
- Culverts and Drainage Structures
- Pumping Plants
- Vehicular, pedestrian, rail, and other tunnel types
- Buildings (toll plazas, maintenance stations, etc.)

2.6.1 OVERSIGHT RESPONSIBILITY

Design responsibilities for miscellaneous structures are delineated in the *Highway Design Manual.* For some miscellaneous structures, the design responsibility is assigned to the District and for others to DES. When the responsibility for a miscellaneous structure is assigned to DES, OSFP has the corresponding oversight responsibility.

For certain miscellaneous structures (e.g. retaining walls, soundwalls, culverts) where Caltrans Standard Plans are available and appropriate for use at the planned site, the District will normally have the oversight responsibility.

For miscellaneous structures where the Standard Plans are not available or are available but not totally applicable are considered "**special designs**" and OSFP will have the oversight responsibility.

Districts, Sponsoring Agencies, and consultants are encouraged to coordinate with OSFP early in the project to identify special designs, to determine where the oversight responsibility will reside, and to avoid any duplication of project development and review effort.

2.6.2 PS&E DEVELOPMENT AND SUBMITTALS

Miscellaneous structures shall be designed in accordance to the *Highway Design Manual*, *AASHTO LRFD Bridge Design Specifications with California Amendments*, *Structure Technical Polices, Bridge Design Manual, Bridge Memo to Designers*, and other applicable Caltrans policies and procedures.

Refer to Structure Technical Polices 1.4 and Memo to Designer 1-29 for the Type Selection review meeting required of the miscellaneous structures.

Project development procedural requirements are generally the same as for bridge structures and shall meet the requirements in this Guide. Variation from these requirements (such as submittal requirements, review duration, etc.) are on a case-by-case basis and will be determined by the OSFP Liaison Engineer.

Pumping plants, tunnels, movable bridges, and mass transit or other types of building facilities are always considered on a case by case basis because these types of miscellaneous structures will require project specific design criteria, submittal requirements, and review timeframes.

The consultant or Sponsoring Agency should contact the Liaison Engineer, District Project Manager, and District Design Oversight Engineer in the early stages of the project to discuss miscellaneous structures so that the necessary requirements can be determined and considered in the project schedule.

2.7 COMPLEX BRIDGES

OSFP has oversight responsibilities for Complex Bridges within the State right-of-way that are designed by others. For Complex Bridge definition, see STP 1.3 titled Complex Bridges.

Typical bridge project delivery policies, procedures and requirements do not explicitly address added risk and technical challenges associated with Complex Bridges. Recent projects, both statewide and nationwide, have demonstrated the need for special technical and quality control and assurance policies to mitigate the risks and to ensure bridge and public safety. To ensure that Complex Bridges receive broad-based input and an appropriate level of quality assurance during delivery of the project, they are required to have the following:

- Project Specific Design Criteria
- Peer Review Panel
- Independent Check Free of Conflict of Interest

2.7.1 PROJECT SPECIFIC DESIGN CRITERIA

Projects involving Complex Bridges will require a Project Specific Design Criteria (PSDC). The Draft PSDC shall be included for review as part of the Type Selection Package. Approval of the final PSDC, by OSFP and the Peer Review Panel is required before 100% PS&E.

2.7.2 PEER REVIEW PANEL

The sponsoring agency will be required to retain a Peer Review Panel (PRP) comprising of 3 – 6 members (determined by the bridge complexity) for all Complex Bridge Projects. The PRP shall:

- Not be part of the design or independent check teams.
- At a minimum, be comprised of members that are experts with relevant and extensive design, construction and operations experience of the subject bridge type and be approved by OSFP.
  - ❖ The panel member/members representing construction of the subject bridge type shall be an expert with relevant and extensive construction experiences in fields of specifications, contract administration, and means and methods for the subject bridge type.
- Review the PSDC, Type Selection Package and PS&E.
- Provide assistance to the design team addressing complex technical issues and provide advice on analytical methodology.

- Provide their comments and recommendations on the Type Selection Report and the Initial PS&E.
- Develop a draft and final report noting the PRP comments and recommendations for review by OSFP and the sponsoring agency.
  - ❖ Draft Report at 95% PS&E
  - ❖ Final Report at 100% PS&E

2.7.3 INDEPENDENT CHECK

Due to the complexity of the structure, it is imperative that the independent check be free from any conflict of interest or appearance of conflict of interest. Therefore, the independent check shall:

- Be performed by engineers not familiar with the project and working out of a different office from that of the design team.
  - ❖ If this is not possible, a separate consulting firm shall perform the independent check.
  - ❖ The OSFP Liaison Engineer may require the independent check to be performed by another staff if a conflict of interest or lack of independence is identified.
- Be performed by engineers familiar with the selected structure type.
- Utilize different software than that used by the design team for the superstructure and substructure design.

2.7.4 ADDITIONAL REQUIREMENTS

This Guide (California Department of Transportation's Office of Special Funded Projects Information and Procedures Guide) is to be followed including items noted above and the following:

- Designer and Independent Checker experience with similar type structures should be provided in the Type Selection Report subject to Caltrans approval.
- Electronic copies of the design calculations, independent check calculations, design and check computer files, contract plans and special provisions shall be provided to the OSFP Liaison Engineer.
- Review times noted in this manual will be increased for Complex Bridge Projects.

The Sponsoring Agency and/or Consultant shall contact the OSFP Liaison Engineer in the early stages of the project to discuss the Complex Bridge

Structure so that the necessary project delivery arrangements and requirements can be determined and considered in the project schedule.

2-8 LIGHTWEIGHT CONCRETE

Use of lightweight concrete (LWC) in lieu of normal weight concrete shall be justified and defined in a Project Specific Design Criteria (PSDC). Utilization of LWC in bridge superstructures provides a reduction in dead load and the potential to reduce seismic demands. In General, Caltrans seismic design philosophy promotes plastic hinging in columns with normal weight concrete for Ordinary Standard bridges. High seismicity sites and/or large axial load in columns pose challenges in the seismic design of bridges creating Ordinary Non-Standard bridge conditions. In such cases, Caltrans prioritizes response modification systems, such as base isolation, as the preferred choice of seismic design solution before the consideration of LWC. Bridges designed within state right of way proposing to utilize LWC in the superstructure must be approved by the Liaison Engineer and meet the following requirements:

Type Selection:

The Type Selection Report must include the design team's intention to utilize LWC as well as justification for using LWC, to be approved by the OSFP Liaison Engineer. Justification shall include the rationale for using LWC as well as calculations comparing LWC to other viable alternatives using normal weight concrete. The Type Selection Report needs to include a PSDC, which at a minimum should include the following items:

- Concrete weight (dry unit weight and design weight)
- Aggregate (source, size, saturation amount and breakdown)
- Cement content
- Amount of polymer fibers and shrinkage reducing admixture
- Coefficient of thermal expansion
- Creep and shrinkage components (such as relative humidity, ambient temperature, age of concrete at loading…)
- Locations where LWC is to be utilized (including limits near the bent cap as shown in Figure 1 below)
- Modulus of elasticity (MOE) assumptions
- Modulus of rupture assumptions
- Reinforcement development length
- Proposed lightweight concrete special provisions
- A cost comparison between the normal weight concrete, LWC and base isolation alternatives (if appropriate).

Seismic Design:
LWC shall not be used in Seismic Critical Members (SCM) and joints subjected to joint shear design requirements. Furthermore, since the seismic response of bridges with lightweight concrete SCMs and bent caps subjected to joint shear has not been thoroughly investigated, LWC shall not be placed within bent caps subjected to joint shear unless an alternative proposed solution is accepted. Figure 1 below shows limits of the different concrete types.

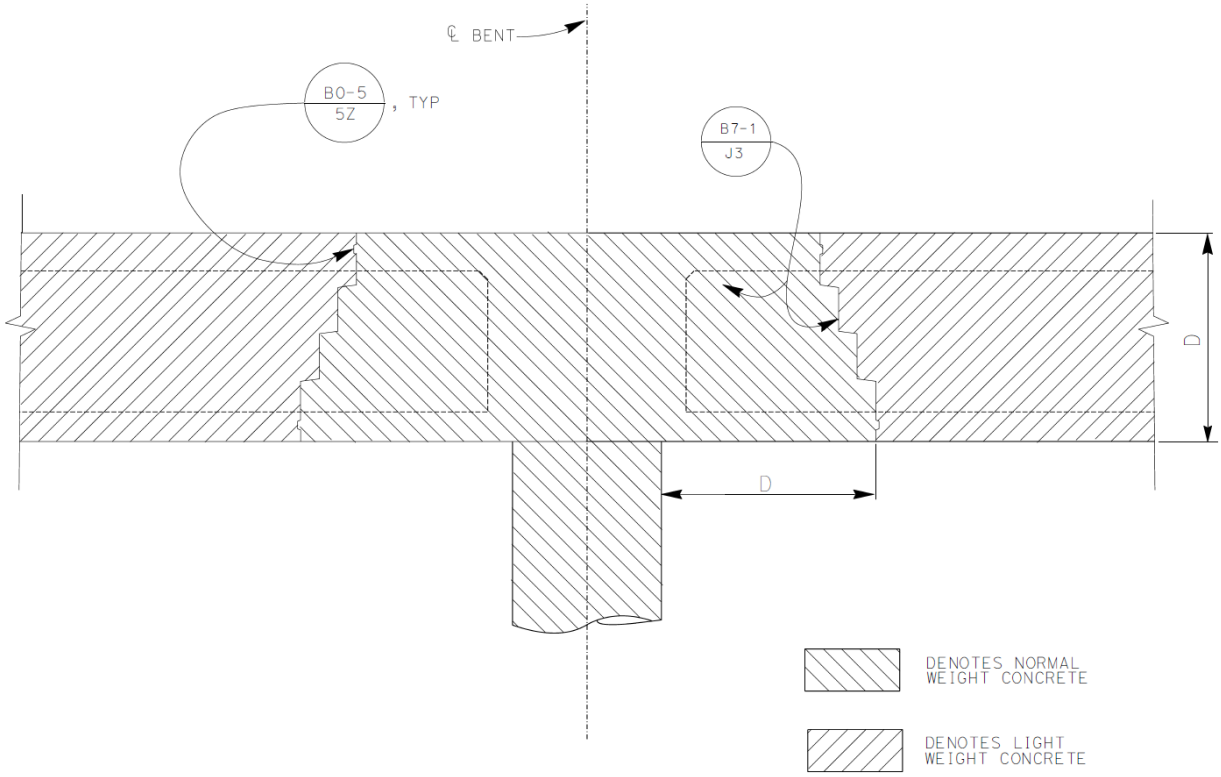


Figure 1

Durability:
Due to reduced durability, LWC shall not be used in a freeze thaw or a corrosive environment.

For bridges carrying vehicular traffic, a one-inch-thick polyester concrete overlay shall be placed in areas receiving vehicular traffic.

Constructability:
Constructability shall be addressed in the Type Selection Report. This shall include bridge schematic limits of concrete strengths and concrete types. Provide practical means & method of construction when normal weight concrete and LWC are both utilized in the same or adjacent structural elements along with proposed timing of concrete placement.

Project Special Provisions:
Past construction projects utilizing LWC have experienced challenges in meeting specified design parameters during construction. Therefore, project special provisions must be submitted in the Type Selection Report to address the following:

- Mix Prequalification
  - Shall be comprised of submitting certified test data or trial batch test reports that includes unit weight, air entrainment, temperature, impurities, slump, as well as Modulus of Elasticity (MOE) and Creep tests as noted under Section 90-1.01D(5)(b).
  - Soundness of aggregate: AASHTO T104. Light weight aggregates must have no more than 10% loss when tested for soundness under California Test 214.
  - Coarse Aggregate: The loss in Los Angeles rattler after 500 revolutions shall not exceed 55% per California Test 211.
  - Demonstrate that the LWC mix can be pumped to the maximum height and distance required for construction of the bridge.
- Frequency of Concrete Testing and Verification
  - Aggregate QC Tests
    - Moisture content of fine aggregate: ASTM C566 or electronically actuated moisture meter, a minimum of 1-2 times per each day of pour, depending on conditions.
  - Concrete QC Tests
    - Slump: ASTM C143/C143M, a minimum of once per 100 cubic yards or each day of pour, whichever is more frequent.
    - Density: ASTM C138, a minimum of every time slump is taken.
- Field Tests: Any deviation from the Standard Specifications should be noted.
- Lightweight concrete flexural testing based on California Test 523
- Lightweight aggregate shall be saturated at the manufacturing plant and saturation shall be maintained during shipping, trucking and storage until added to the approved concrete mix.
- Pre-wet or pre-saturated aggregates absorption is equal to or greater than the immersed 24-hour value under ASTM C127.
- Address required Development Length of Reinforcement.

2.9 OTHER COMPLEX STRUCTURES: TUNNELS, ….

Pending development

2.10 DESIGN BUILD (DB)

Pending development

2.11 CONSTRUCTION MANAGER/GENERAL CONTRACTOR (CMGC)

Pending development

2.12 SHARED FILE SUBMITTALS AND REVIEW

Pending development

OFFICE OF SPECIAL FUNDED PROJECTS

INFORMATION AND PROCEDURES GUIDE

CHAPTER 3: PROJECT INITIATION AND PRELIMINARY ENGINEERING

STRUCTURES & ENGINEERING SERVICES
DIVISION OF ENGINEERING SERVICES
DEPARTMENT OF TRANSPORTATION
STATE OF CALIFORNIA

2024

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TABLE OF CONTENTS

3 PROJECT INITIATION AND PRELIMINARY ENGINEERING
3.1 PROJECT INITIATION..... 5
3.2 ADVANCE PLANNING STUDIES..... 7
3.3 VALUE ANALYSIS STUDIES..... 10

Editable forms and bridge design information noted in the OSFP Information and Procedures Guide are available upon request from the SFP Liaison:

1.5.1	Statement of Work for Structures
1.6.1	Quality Control Plan Checklist
3.2.1	Advance Planning Study Checklist
3.2.2	Bridge Life-Cycle Cost Analysis (BLCCA) Documents
4.1.1a	BD-0500 Bridge Site Data Submittal
4.1.1b	BD-0502 Bridge Site Data Submittal-Minor
4.1.1c	BD-0503 Bridge Site Data Submittal Non-Standard RW/SW
4.1.2	Bridge or Structure Field Site Investigation Checklist
4.1.3	Railroad Separation Field Site Investigation Checklist
4.1.4	Bridge or Structure Hydraulic Site Survey Checklist
4.1.5	Foundation Plan Preparation Checklist
4.6.1	BD 0361 Structure P&Q Submittal Checklist
4.6.2	BD 0354 Structure Standard Plan Transmittal
4.7.1	Estimating Quantities
4.7.2	BD-0362 Structure Quantity Summary
4.7.3	BD-0363 Structure Quantity Summary-Other
4.9.1	BD-0307 Joint Movement Calculations LRFD
4.9.2	MTD 3.7 Shaft Design Information Sheet
4.10.1	Pumping Plant Design Manual 2019

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INDEX TO ABBREVIATIONS:

AAA	Advertise, Award and Administer
AASHTO	AASHTO LRFD Bridge Design Specifications
ACEC	American Council of Engineering Companies
A&E	Architectural and Engineering Contract
APS	Advance Planning Study
BLCCA	Bridge Life-Cycle Cost Analysis
BD	Bridge Design
BDD	Bridge Design Detail
BDM	Bridge Design Memo
BDP	Bridge Design Practice
CA	California Amendments to AASHTO LRFD Bridge Design Specifications
CMGC	Construction Manager/General Contractor
DB	Design Build
DES	Division of Engineering Services
DRP	Draft Project Report
EE	Earthquake Engineering
GS	Geotechnical Services
MTD	Bridge Memos to Designers
OC	Overcrossing
OH	Overhead (railroad)
OSFP	Office of Special Funded Projects
PDPM	Project Development Procedures Manual
PDT	Project Development Team
PID	Project Initiation Document
POC	Pedestrian Overcrossing
PM	Project Manager
RP	Project Report
PS&E	Plans, Specifications and Estimate
PUC	Pedestrian Undercrossing
QC	Quality Control
SC	Structures Construction
SDC	Caltrans Seismic Design Criteria
SM&I	Structures Maintenance and Investigations
SOE	Structure Office Engineer
SFP	Special Funded Projects
STP	Structure Technical Policies
UC	Undercrossing
UP	Underpass (railroad)
VECP	Value Engineering Change Proposal

3.1 PROJECT INITIATION

3.1.1 INTRODUCTION

The OSFP Liaison Engineer strives to assist in the delivery of quality projects at all phases of project development. This is particularly the case in the project initiation stage when the sponsoring agency decides to go forward with a project and will proceed through the consultant selection process to begin project development. Because these initial activities are critical to promote success in future project stages, it is important at the project initiation stage for Districts and sponsoring agencies to engage the OSFP Liaison Engineer.

Districts and sponsoring agencies are strongly encouraged to take advantage of the Liaison Engineer's services when initiating special funded projects involving structures. The services provided by the Liaison Engineer at this time include assistance and expertise, especially in the following areas:

- Request for Proposals or Qualifications
- A&E Contract Statement of Work
- Consultant Selection
- Project Kickoff Meetings

These areas are further discussed below.

3.1.2 REQUEST FOR PROPOSAL OR QUALIFICATIONS

The Liaison Engineer will assist in the development of the scope of consultant services associated with the structure work.

The Liaison Engineer will meet with the sponsoring agencies to review and discuss site conditions, constraints, available project information, and details existing structures, and will provide recommendations accordingly.

In addition to bridges, the Liaison Engineer will assist districts and sponsoring agencies with the development of the scope of consultant services for special earth retaining systems, pump plants, buildings, moveable bridges, and other special structures.

3.1.3 A&E CONTRACT STATEMENT OF WORK

The Liaison Engineer will assist Districts and sponsoring agencies with the development of the structure portion of the Statement of Work for the Architectural and Engineering Contract (A&E). This ensures that the structure's project development phases, milestones, and related deliverables are clearly identified.

3.1.4 Consultant Selection

The selection of consultants who possess the knowledge, and experience, and that have successfully demonstrated these qualities and capabilities on other projects will offer the greatest opportunity to achieve a successful project. The Liaison Engineers reviews projects prepared by many consultants statewide and will offer useful insight on their capabilities.

The Liaison Engineer will assist with the review of proposals or qualifications, ranking of consultants for interview purposes, and final selection of the most qualified firm.

3.1.5 PROJECT KICKOFF MEETINGS

The Liaison Engineer will participate in project kickoff meeting. Once the consultant selection and contractual process are complete, a project kickoff meeting should be held with the project personnel who will be involved in the project. This should include key representatives from the sponsoring agency, the consultants, District functional units, as well as the Liaison Engineer.

The Liaison Engineer will share vital information necessary for project development, make all parties aware of Caltrans requirements for structure work, will provide input for determining the project schedule, and will establish vital communication links.

3.1.6 SUMMARY

The goal of the project initiation effort is to identify the main project features early on; establish vital communication links with the project sponsors, District staff, Liaison Engineer, and consultant staff; develop accurate project schedules; and convey the project requirements for structures to the project team.

Early participation by the OSFP provides Districts and sponsoring agencies the opportunity to improve the quality and delivery of projects and while ensuring projects conform to Caltrans policies, standards and practices.

3.2 ADVANCE PLANNING STUDY SUBMITTAL

The Consultant Prepared Advance Planning Study (APS) Checklist is an editable form that is available upon request from the OSFP Liaison.

APS plan sheets are required in Project Study Reports (PSR) and Project Reports (PR) to document the scope, cost of structure work, working days, feasibility, traffic handling, other impacts in projects. An APS consists of one (or more) APS plan sheet(s) for each structure showing the basic structure layout details, traffic handling/openings and cost estimate. Unless otherwise determined by the OSFP Liaison Engineer, APS must be prepared for all structure work including bridges, culverts, tunnels, retaining walls, pumping plants, structure modifications, and any non-standard or special design structures.

The APS shall be prepared in accordance with guidelines set forth in Memo to Designers, Structure Technical Policies, Bridge Design Memos, etc. Consultants shall be responsible for developing feasible structure alternatives, costs, and controls appropriate for the specific location. The structure consultant and the roadway consultant must coordinate project and structure alternatives and associated estimates to arrive at the best project solution. The lowest structure cost does not always translate to the lowest project cost or the optimal project solution. For example, a higher-cost precast structure will eliminate the need for falsework potentially reduce other project costs enough to result in the lowest over-all project cost and meet other project objectives.

Seismic evaluation of existing structures is required to ensure conformance with current standards or to determine the extent of retrofit required. Evaluation and analysis shall be done as specified in the Memo to Designers, Structure Technical Policies, Bridge Design Memos, etc. Early consultation and coordination between OSFP, the District, consultants, and the sponsoring agency is necessary to achieve early convergence on the scope of design effort required and eliminate wasted effort on unnecessary analysis.

For widenings and modifications of existing structures, the Structures Maintenance records shall be reviewed for deficiencies and any recommended work that should be included with the project. This work shall be documented in a design memo by the consultant.

Accelerated Bridge Construction (ABC) evaluation must be performed as part of the APS. The structure design consultant can contact the OSFP Liaison for ABC evaluation documents.

Bridge Life-Cycle Cost Analysis (BLCCA) may be required as part of the APS. The OSFP Liaison will determine if BLCCA shall be performed. The OSFP Liaison will provide the BLCCA documents.

3.2.1 DELIVERABLES

The following deliverables are required for review at the Advance Planning Study Submittal stage:

1. The APS plan sheet(s)
2. Preliminary Foundation Report
3. Preliminary Hydraulic Reports
4. APS Checklist
5. Design Memo
6. Itemized Cost Estimate.
7. ABC evaluation
8. BLCCA (if requested)
9. Draft Project Report
10. Responses to comments (for resubmittals)

The deliverables are required to identify site parameters that could have a significant impact on the scope or cost of the structure proposed by the APS. Additional information on the deliverables is discussed below.

3.2.2 ADVANCE PLANNING STUDY

The Advance Planning Study delineates a feasible structure type, requirements, constraints, and associated cost estimate summary for the structure work involved. The APS need only use the minimum detailing necessary and basic dimensions to clearly define the scope the structure work and to develop a reasonable cost estimate. As a minimum, the APS plan sheets should use Plan, Elevation, and Typical Section views and make note of all critical assumptions. Additional APS plan sheets must be prepared as appropriate to consider alternative structure types.

The APS plans sheets shall be prepared on the most current APS formatted plan sheet.

3.2.3 PRELIMINARY FOUNDATION AND PRELIMINARY HYDRAULICS REPORTS

Preliminary Foundation and Hydraulic Reports are required for an APS to identify basic site parameters which may have a significant impact on the structure scope and cost. For more information on these reports, refer to the foundation and hydraulics sections elsewhere in this Guide.

3.2.4 APS CHECKLIST

As an aid in the collection of the information needed to prepare the APS and estimate the cost, a checklist entitled “Consultant Prepared Structures Advance Planning Study (APS) Checklist” is available upon request from the SFP Liaison. This checklist should be utilized and submitted with the APS to document pertinent project information. One checklist may be used for all bridges on the project.

3.2.5 DESIGN MEMO

The consultant must prepare a Design Memo to summarize and document the following items:

- Important or unusual design assumptions or structure features
- Discussions with Caltrans personnel concerning any key assumptions
- Modifications from Structure Maintenance Records recommendations
- Seismic retrofit modifications
- Local agency requirements such as aesthetics, improvements in vicinity of the structure, airspace usage, or other obstructions
- Special Railroad requirements, including shoofly provisions and cost
- Special foundation requirements, including scour critical work, special excavation such as Type A, Type D, and/or hazardous or contaminated material
- Special construction requirements, including limited site accessibility or seasonal work.
- Identify complex bridge and future requirements per Section 2-7.
- ABC evaluation and incorporated ABC features.
- BLCCA in the evaluation and selection of alternatives.

One Design Memo per project is acceptable provided the memo cites the individual structures appropriately.

3.2.6 ITEMIZED COST ESTIMATE

The APS structure cost estimate must be supported by an itemized cost estimate which must show estimated quantities or square feet factors for major items of work, associated unit prices, extended item totals, and a subtotal of all item costs. The itemized cost estimate must also show a grand total for the structure work by the addition of a 25% contingency factor and 10% mobilization factor to the subtotal of all item costs.

3.2.7 REVIEW AND APPROVAL

Within four (4) weeks after receiving the APS submittal, OSFP will return comments to the District Project Manager.

Resubmittal may be required if extensive revisions or alternatives are necessary. When the APS is acceptable, the OSFP Liaison Engineer will sign the Oversight Approval block on the APS and transmit it by memo to the District Project Manager.

3.3 VALUE ANALYSIS STUDIES

Value Analysis (VA) studies are undertaken early in the project life typically during the development of the Project Initiation Document or Project Report. Although VA studies can be done at any time during the life of the project, studies performed after significant design effort is complete may result in project delays and project development cost overruns.

Districts and sponsoring agencies should include the OSFP Liaison Engineer in planning of the VA studies that may involve transportation structures on the State Highway. The OSFP Liaison will provide an experienced structure engineer to participate in the VA study. The involvement of the experienced structures engineer improves the quality of VA studies by ensuring that project alternatives receive appropriate consideration about feasible structural systems.

Typically, VA studies consist of three primary phases which include:

1. Pre-Study Preparation
2. Study Performance
3. Post-Study Implementation.

The Liaison Engineer and the experienced structures engineer's potential involvement in each stage is briefly described as follows:

Pre-Study Preparation--Assist with the selection of the VA Team members, collect and interpret available information, and evaluate study goals. Early contact with the Liaison Engineer is necessary at this stage to allow enough time for team selection and gathering of supporting information.

VA Study Performance--Provide trained and experienced VA Team members to participate in VA studies. The Liaison Engineer should be allowed enough lead-time in advance of the study to make the necessary arrangements.

Post-Study Implementation--Participate in the evaluation and implementation of recommended alternatives.

OFFICE OF SPECIAL FUNDED PROJECTS

INFORMATION AND PROCEDURES GUIDE

CHAPTER 4: DESIGN AND AWARD

STRUCTURES & ENGINEERING SERVICES
DIVISION OF ENGINEERING SERVICES
DEPARTMENT OF TRANSPORTATION
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TABLE OF CONTENTS

4 DESIGN AND AWARD
- 4.1 PRELIMINARY DATA..... 5
- 4.2 STRUCTURE TYPE SELECTION..... 7
- 4.3 UNCHECKED DETAILS SUBMITTAL..... 9
- 4.4 PS&E DELIVERABLES, REVIEW, & APPROVAL.....10
- 4.5 STRUCTURE CALCULATIONS..... 11
- 4.6 CONTRACT SPECIAL PROVISIONS.....13
- 4.7 PS&E ESTIMATES 14
- 4.8 ROAD PLANS AND SPECIAL PROVISIONS.....15
- 4.9 AS-ADVERTISED CONTRACT PLANS AND SPECIAL PROVISIONS (LOCALLY ADVERTISED PROJECT ONLY).....16
- 4.10 RESIDENT ENGINEER'S PENDING FILE.....16
- 4.11 PUMPING PLANTS.....17
- 4.12 BUILDINGS.....23
- 4.13 CONTRACT DOCUMENTS..... 24
- 4.14 ADDENDA.....24
- 4.15 BIDDER'S INQUIRIES..... 25

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BDD	Bridge Design Detail
BDM	Bridge Design Memo
BDP	Bridge Design Practice
CA	California Amendments to AASHTO LRFD Bridge Design Specifications
CMGC	Construction Manager/General Contractor
DB	Design Build
DES	Division of Engineering Services
DRP	Draft Project Report
EE	Earthquake Engineering
GS	Geotechnical Services
MTD	Bridge Memos to Designers
OC	Overcrossing
OH	Overhead (railroad)
OSFP	Office of Special Funded Projects
PDPM	Project Development Procedures Manual
PDT	Project Development Team
PID	Project Initiation Document
POC	Pedestrian Overcrossing
PM	Project Manager
RP	Project Report
PS&E	Plans, Specifications and Estimate
PUC	Pedestrian Undercrossing
QC	Quality Control
SC	Structures Construction
SDC	Caltrans Seismic Design Criteria
SM&I	Structures Maintenance and Investigations
SOE	Structure Office Engineer
SFP	Special Funded Projects
STP	Structure Technical Policies
UC	Undercrossing
UP	Underpass (railroad)
VECP	Value Engineering Change Proposal

4 DESIGN AND AWARD

4.1 PRELIMINARY DATA

The following editable forms are available upon request from the SFP Liaison:

- 4.1.1a Bridge Site Data Submittal
- 4.1.1b Bridge Site Data Submittal-Minor Bridge Modifications
- 4.1.1c Bridge Site Data Submittal Non-Standard RW/SW
- 4.1.2 Bridge or Structure Field Site Investigation Checklist
- 4.1.3 Railroad Separation Field Site Investigation Checklist
- 4.1.4 Bridge or Structure Hydraulic Site Survey Checklist
- 4.1.5 Foundation Plan Preparation Checklist

The forms should be submitted as required by the Liaison Engineer.

Preliminary Data is the essential information fundamental to the design of structures. Preliminary Data includes information about existing site conditions, planned geometrics, scope of structure work, design and construction constraints, and other factors on which structure designs are based.

This section highlights the Bridge Site Data Submittal Package and other checklists available for consultants to use to compile pertinent preliminary information. Consultants may utilize their own forms in addition to the forms and checklists described.

As the minimum preliminary information for projects that involve state highway structures, consultants must prepare a Bridge Site Data Submittal (BSDS) package for each structure in the project. Ordinarily, the roadway designers should prepare BSDS package(s) for the structure designers' use and consultant contracts should account for this task accordingly.

4.1.1 BRIDGE SITE DATA SUBMITTAL PACKAGE

The BSDS package consists of completed BSDS forms and associated attachments. The BSDS forms are essentially checklists of pertinent layout, environmental, site information and other constraints needed to design structures. The checklist requires the attachment of various site drawings, layouts, and other information to make the BSDS package complete.

There are different forms for bridges, minor bridge modifications, and non-standard retaining walls/soundwalls. When a project involves any of these features, the appropriate forms shall be used. Each structure within the project requires a separate BSDS package. Before preparing BSDS packages, the most current forms should be obtained from the SFP Liaison engineer.

The BSDS shall be prepared in accordance with the instructions on the forms. Though the forms were developed for Caltrans in-house use, consultants must use the forms in a similar fashion. Generally, references in the forms to the District and Structures correspond to the Roadway Design and Structure Design Consultants, respectively. The forms should be filled in electronically to utilize the standardized entries via dropdown menus many fields contain.

On the first page of the BSDS forms, in the table that shows the information/documents provided, instead of writing the name of the file in the “File Name” column, the consultant may write “Provided to Structure Designer” or “Not Provided to Structure Designer”.

BSDS packages should be completed with enough lead time to allow for Caltrans review and approval before the structure designer develops General Plans for the structures.

Once prepared, the BSDS packages must be submitted to the District and the OSFP Liaison Engineer for review. Unless otherwise requested, the following attachments need to be submitted with the BSDS checklist for review:

- APS and Feasibility study
- Strip Map
- Aerial photo of site
- Bridge Site Plan
- Profile Grade
- Superelevations
- Typical Sections
- Detour or stage construction plans
- Utility map & Utility information sheets
- Lane Closure Charts
- Survey Information Sheet
- Supplemental Structure Clearance Calculations

The District has the primary approval responsibility for BSDS checklists and attachments. The Liaison Engineer will provide support as necessary.

Approved BDSD packages must be submitted to the Liaison Engineer with the Type Selection Report.

GAD approval memo from District design oversight must be received by the OSFP Liaison before scheduling Type Selection Meeting.

4.2 STRUCTURE TYPE SELECTION – 35%

The Structure Type Selection process is a fundamental step in the design of structures on State Right-of-Way. This step must be completed before extensive structure design work is performed. The Type Selection process involves the following primary elements: 1) Preparation and Submittal of Type Selection Documents, 2) Type Selection Meeting and Approval, and 3) Updated Type Selection Documents and General Plan Submittal and Distribution. These elements are further described below.

4.2.1 PREPARATION AND SUBMITTAL OF TYPE SELECTION DOCUMENTS

The initial stage of the Type Selection Process involves discerning all parameters that govern the design of a bridge. These parameters are contained in the following which must be submitted before a Type Selection Meeting is scheduled:

- Bridge Site Data Submittal Package (BSDS)
- Preliminary Hydrology/Hydraulics Report
- Preliminary Foundation Report (with optional Boring Plan)
- Draft Foundation Plan
- Type Selection Report
- GAD approval memo from District design oversight

The BSDS must be prepared and submitted sufficiently in advance of the other documents so that the BSDS and the GAD are approved by the District resolving issues prior to the Type Selection Meeting. The remaining documents may be submitted with the Type Selection Report.

Information relative to the Preliminary Hydrology/Hydraulics Report; BSDS; Preliminary Foundation Report and Boring Plan, which may be submitted for comments at the consultant's option, can be found in the appropriate sections elsewhere in this Guide.

The Draft Foundation Plan only need be a working draft of the most current foundation plan the consultant has available. As a minimum, the draft plan should show the site's topography, existing utilities, centerlines of the proposed supports, and other features that may create potential issues or may need to be discussed at the Type Selection Meeting.

The Type Selection report should follow the format described in the *Memo to Designers.* The report must include a discussion of the structure types considered and reasons for selection of the proposed structure and the following:

- Type Selection Memo
- Vicinity Map
- General Plan
- General Plan Estimate
- Project Seismic Design Criteria
- Preliminary Foundation Recommendations
- A statement that indicates which Agency will advertise, award, and administer (AAA) the construction contract.

In the case of modifying or widening existing structures, the Type Selection Report shall also include a summary of the seismic evaluation of the existing bridge, the potential retrofit strategies with supporting documentation, and associated costs.

4.2.2 TYPE SELECTION MEETING AND APPROVAL

The Type Selection Meeting will be scheduled after the District has approved the project geometrics (GAD) and a minimum of 2 to 4 weeks following receipt of an acceptable Type Selection Report and related documents. The meeting will be held online or in Sacramento. At the meeting, the consultant shall present the proposed structure and shall briefly discuss issues pertinent to the selection of the structure type, particularly requirements for foundations, hydraulics, construction (including falsework), seismic design, retrofit strategy, aesthetics, traffic handling, and other information needed to support the structure type.

After the meeting, the Consultant shall prepare a meeting summary and provide a copy to the Liaison Engineer within one week. The meeting summary may be used to update or supplement the information in the Type Selection Report to address comments raised at the meeting. Provided all issues raised at the Type Selection Meeting are satisfactorily addressed, the Liaison Engineer will provide written approval of the proposed structure type within two weeks of receiving the meeting

summary. No further design work should be performed until written approval of the structure type is issued by OSFP.

4.2.3 UPDATED GENERAL PLAN SUBMITTAL AND DISTRIBUTION

The consultant shall submit the updated the General Plans and General Plan Estimates for distribution to other Caltrans functional units. Comments resulting from this distribution will be returned to the consultant to incorporate in final design.

If the issues raised at the Type Selection meeting are not resolved, the Type Selection documents must be revised and submitted for review to the OSFP Liaison. The OSFP Liaison will determine if another Type Selection meeting is needed.

4.3 UNCHECKED DETAILS SUBMITTAL – 65%

The Unchecked Details Submittal is also known as the 65% submittal where the consultant submits unchecked plan details and draft foundation and draft hydraulics reports for review.

Unchecked details are structure plans with construction details that are generally complete but not yet independently checked. OSFP performs a cursory review of these details to identify and raise potential issues that the consultant should consider in preparing subsequent PS&E submittals. OSFP will normally return review comments within four weeks. Occasionally, a longer review period is necessary due to staff availability, workload priorities, and project complexities.

Contract special provisions are not reviewed at this time and therefore are not submitted.

Sponsoring agencies and consultants should contact the OSFP Liaison Engineer well in advance of the submittal to coordinate the review schedule and to discuss the exact documents to submit.

Responses to any outstanding Type Selection comments must be submitted with the Unchecked Details Submittal.

4.4 PS&E DELIVERABLES, REVIEW & APPROVAL – 90% to 100%

The intent of the PS&E review is to assure that projects meet applicable Caltrans standards, policies and procedures. The OSFP Liaison Engineers perform the reviews with support from OSFP staff, DES functional units and Technical Specialists, and other departmental functional units.

When the various units issue their review comments, the Liaison Engineer reviews and consolidates the comments and sends to the District Project Manager (PM) and the consultant. The final comments that must be addressed. The final comments are ordinarily noted on a set of red-marked plans, comments and responses forms, and in various review memos/letters.

For typical projects, the review duration is six weeks for the Initial PS&E Submittal and four weeks for each subsequent submittal. Longer review durations may be required for projects with numerous, large, or complex structures. The Liaison Engineer will determine the exact review duration, as early in the project development stage as possible, in partnership with the District, consultant, sponsoring agency, and other Caltrans functional units that may be involved.

Deliverables required for the different PS&E reviews are shown below. The documents must be prepared in accordance to Caltrans standards, guidelines, and practices. **The PS&E review process will not formally begin until all required PS&E documents are received.** When submitted documents are unsatisfactorily prepared, the entire PS&E package may be returned for revision and the review terminated. The review period, with the full review duration, will restart once the appropriate documents are received.

Responses to Unchecked Details Submittal comments must be submitted with the Initial PS&E Submittal.

Approval of a PS&E package will be dependent on all outstanding review comments being resolved for all documents in the package.

4.4.1 OSFP OVERSIGHT SIGNATURES

Once the PS&E package is approved, the OSFP Liaison Engineer will sign and date the plans if advertisement is imminent.

For projects that will not advertise within approximately six months of approval, oversight signatures will be withheld from the plans and the Liaison Engineer will

write a memo documenting the PS&E approval. When advertisement for these projects will finally occur, the consultant must update the project documents in accordance to “Updating Projects for Advertisement” elsewhere in this guide. Once the structure portion of the project is updated and found acceptable, the Liaison Engineer will sign and date the plans.

For locally advertised projects, the Liaison Engineer will send electronically signed structures plans to District PM and the design consultant for final processing**. The signed structure plans and the approved structure special provisions must be used in the advertise and award contract documents. This will be verified by the OSFP Liaison during the Contract Advertisement submittal, see Section 1-7.**

For State advertised projects, contract plans are produced for advertisement from electronic files and OSFP will electronically place oversight signatures on the plans. Electronic plans and special provisions can be obtained by the consultant from HQ OE once these documents are posted for advertisement.

4.5 STRUCTURE CALCULATIONS

Structure design calculations, independent design check calculations, and design-check comparison log must be submitted as part of PS&E submittals.

Design calculations shall include all analysis and computations that were necessary in designing the bridge including the bridge layout, structural elements, and operational features such as deck drains. Check calculations shall include all analysis and computations that are necessary to independently check all aspects of the design shown on the unchecked details. Results from the check calculations shall be compared with the design. Discrepancies shall be resolved between the designer and checker and the resolutions documented in the calculations. Also all discrepancies between the design / check calculations, plan details and corresponding resolutions must be recorded in a Design-Check Discrepancies Comparison Log.

For Initial PS&E submittals, full sets of design and check calculations, design-check comparison log are required. For Intermediate and Final PS&E submittals, only supplemental design and check calculations, and Design-Check Discrepancies Comparison Log need to be submitted for re-designs and any other changes made to the structure since the initial submittal. Supplemental design and check calculations must be signed, sealed and meet all the requirements of the initial submittal.

The consultant must retain the design and check calculations, and Design-Check Comparison Log at least one year after the project has reached Contract Acceptance (project Milestone 600), which indicates any disputes or legal issues have been resolved. OSFP will not retain submitted copies of the calculations once the PS&E is approved.

Design and check calculations shall conform to the following additional requirements:

- Must be separate from each other for each bridge.
- Must be labeled with whether they are design or check calculations they are and with the District, EA, Project ID, Bridge Name, and Bridge Number.
- Must bear the State of California Registered Professional Engineer Registration seal with the signature, license number, and registration certificate expiration date of the design engineer and independent check engineer.
- Must contain a table of contents that refers to page numbers--all pages must be numbered.
- Must be legible and organized so that the design logic can be easily followed.
- Must contain only final computer runs including input and output sheets.
- Must contain enough notes on calculation sheets, computer input/output, and on other documentation to clearly show the design logic.
- Must contain copies of design charts with the specific entries highlighted that were used in the design.
- Must document all assumptions and conclusions.
- Maximum file size is 20 MBs. Large documents shall be submitted using multiple electronic files.

Design-Check Discrepancies Comparison Log shall conform to the follow requirements:

For each discrepancy in design/check calculations and plan details:

- Initial design results
- Initial check results
- Discrepancy comparison of initial design results and initial check results.
- Resolution of discrepancy with justification.

4.6 CONTRACT SPECIAL PROVISIONS

Contract Special Provisions shall be prepared in accordance with the Construction Contract Development Guide and Project Development Procedures Manual. The Special Provisions shall consist of the most current versions of Caltrans Standard Special Provisions (SSPs) edited to suit the specific project. The most current versions of the SSPs can be accessed through Caltrans Standards .

Special Provisions submitted for review, shall show all edits and hidden text. Special Provisions that do not show these items will not be accepted for review.

Special Provisions shall have a title sheet that shows the District, EA, Project ID, the date prepared, and the Professional Engineer registration seal with the signature, license number and expiration date of the Engineer who prepared the provisions. The Special Provisions files must descript the contents (i.e., Structure Specifications, Roadway Specifications, or both).

A Bid Item List shall be included in front of the structure Special Provisions. The list shall show the item number, item code number, unit of measure, and Estimated Quantity. For example, a portion of such an item list is as follows:

Item No.	Item Code	Item Description	Unit of Measure	Unit of Measure
0001	157561	Bridge Removal (Portion), Location A	LS	1
0002	192003	Structure Excavation (Bridge)	CY	150
0003	490753	Furnish Piling (Class 90)	LF	560
0004	510053	Structural Concrete, Bridge	CY	88

Standard contract items should be used whenever possible and especially for contracts to be advertised by Caltrans.

Also submitted with the special provisions shall be a completed Structure P&Q Submittal Checklist and the Structure Standard Plan List Transmittal. The purpose of this form is to identify the crucial aspects of projects that writers and reviewers of the special provision must consider.

4.7 PS&E ESTIMATES

Once a structure design is complete and checked, PS&E estimates must be prepared and submitted as part of the PS&E package. PS&E estimates are comprised of quantity calculations, quantity check calculations, cost estimates, and estimates of working days. Preparation of these documents shall conform to the requirements Estimating Quantities guide. Consultant designer can contact the OSFP Liaison for the Estimating Quantities guide.

Quantity calculations, and check quantities calculations calculated by an independent checker, shall be based on the design shown on the checked structure plans. The quantities and check quantities shall be compared and the differences more than those allowed in the Estimating Quantities guide.

Quantities and check quantities shall be separate from each other. A set of quantities and check quantities shall be prepared for each structure when a project involves multiple structures.

For each structure in a project, the following State forms shall be prepared for quantity summaries and cost estimates:

- BD-0362 Structure Quantity Summary
  - Earthwork
  - Pile Summary
  - Precast
  - Concrete
  - Rebar by component
  - Rebar Summary
  - Rebar Quantity
  - Misc. Metal
  - Br. Removal (Portion)
  - RW Area
- BD-0363 Structure Quantity Summary – Structure Work Other than Replace/Widen Bridge

These forms are available through the OSFP Liaison.

In addition to completing the forms above, the following documents must also be prepared:

- Working Days Schedule prepared to show the estimated working days to construct the structure work. Only one form per project is required. For projects involving multiple structures, the schedule will show all the structures. Separate schedules for each structure will be required only in exceptional cases.

- An additional BD-0362 Structure Quantity Summary prepared to show combined structure quantities and the total structure cost on projects with multiple structures.

For projects advertised by those other than Caltrans, the quantity calculations, summary forms and working day schedules will not be reviewed and are not a required submittal. The exception is that the BD-0362 Structure Quantity Summary showing the quantities and cost estimate for each structure must be submitted for informational purposes.

4.8 ROAD PLANS AND SPECIAL PROVISIONS

Consultant structure and roadway designers must review each other's plans and specifications to ensure consistency between plan details and specifications, to identify points of conflict, and to identify features on the road plans that require a special structure design and OSFP oversight. The reviews must cover all aspects of the project with special attention to the following items that frequently have conflicts or are overlooked:

- Falsework openings
- Utilities
- Contractor staging areas
- Bridge/roadway drainage
- Layout lines, profiles, typical sections
- Construction staging/traffic handling
- Right of Way conflicts
- Special designed retaining walls or soundwalls and elements thereof
- Special designed sign structures (bridge mounted, and non-bridge mounted)
- Late plan changes

The submittal of road plans and road special provisions are required at the Initial, Intermediate and Final PS&E submittals unless otherwise requested by OSFP.

4.9 AS-ADVERTISED CONTRACT PLANS AND SPECIAL PROVISIONS (LOCALLY ADVERTISED PROJECT ONLY)

For all locally advertised projects, the design consultant or the local agency shall submit the as-advertised contract plans and as-advertise special provision to the OSFP**. The OSFP Liaison will review the as-advertised contract plans and as-advertise special provision to ensure the approved structure PS&E plans and special provisions are incorporated in the as-advertised contact documents**. If the as-advertised documents deviate from the approved structure plans and special provisions, the as-advertised documents may need to be corrected by addendum or change order.

4.10 RESIDENT ENGINEER'S PENDING FILE

The Resident Engineer's (RE) Pending File contains construction related documents and information assembled by the consultant through the various project development phases for structure work. For Caltrans advertised projects, the RE Pending File shall be submitted to OSFP with the Final PS&E Package. For a project advertised by locals, the RE Pending File must be transmitted to the representative who will administer and inspect the structure construction.

The RE Pending File shall typically contain the following consultant provided documents and information:

- Notes from Designer/Project Engineer
- Joint Movement Rating Calculations for bridge expansion joints (using Caltrans Form DSD -D-0129) prepared in accordance with *Bridge Memo to Designers*.
- Shaft Design Information sheet, per Memo to Designer 3-7 Attachment 1
- Final Foundation Report
- Final Hydrology/Hydraulics Report
- Special instructions or information from the Designer to the Resident Engineer/Structure Representative. As a minimum, this should include the following:

1) The intent of the designer where misinterpretation of contract documents is possible
2) Alerts to details or sequences.
3) A description of construction methods anticipated for unique or unusual designs.

- Special falsework or shoring concepts and requirements.
- As-Built plans for existing structures.
- 1" = 4'–Deck Contour Plots (4-Scales) prepared in accordance with *Bridge Memo to Designers.*

The Joint Movement Rating Calculations and Shaft Design Information sheets are available from the OSFP Liaison.

4.11 PUMPING PLANTS

Pumping plants involved in Special Funded Projects require essentially the same procedural steps and documents as for any other Special Funded structure on State right of way. The purpose of this section is to outline the differences in all project phases from project development through construction support.

4.11.1 GENERAL PUMPING PLANT SCOPING AND DESIGN CONSIDERATIONS

Pumping plants have high initial cost, operational liability, maintenance expense, power cost, and are susceptible to untimely power outages and therefore should be used only when gravity flow systems are too costly or are otherwise not feasible.

Caltrans pumping plants are custom designed based on site specific criteria formed around Caltrans design philosophies for protecting the roadway from storm water flooding. In addition to site specific criteria, pumping plant designs are based on standard engineering principals for industry stormwater lift station facilities and Caltrans Pumping Plant Design manual 4th edition (July 2019).
Some general but significant Caltrans pumping plant design philosophies include the following:

- Storage is designed to store significant runoff before pumps switch on. This makes the storage need significantly larger than for usual industry pumping plants.
- Pump sizes are limited so that standardized trailer mounted generators, owned by Caltrans, can power them. Compared to industry pumps, pump sizes are smaller and cycle on less frequently.

- Pumps and outflow pipes are orientated to allow ease of inspection and maintenance.
- Pumping plants are dedicated specifically to the roadway drainage area contained within State right of way.
- Storm water runoff originating from outside Caltrans right of way must not enter the pumping plant drainage area.
- Pumps start/stop control system is designed to have a main level monitoring control system with back-up controls to provide system operational redundancy. This control system also provides the option for remote monitoring and integration with department enterprise SCADA system.
- Groundwater pumping requirements must be handled by a separate system.

The design philosophies add cost as compared to typical industrial pumping plants (e.g. utility companies) but are essential to meet Caltrans operational requirements. Consultants must be aware of the philosophies in the early stages of projects when pumping plants are scoped and later when designed. As projects are developed, the design philosophies and site-specific design criteria are discussed in detail with consultants at the pre-Type Selection Meeting discussed later in this section.

Caltrans pumping plants must be designed to meet the pumping plant philosophies; the California Building Code; the regulations and codes listed in Section 7-1.02, “Regulations and Codes” of the Standard Specifications; Section 74, Pumping Equipment and Controls of the Standard Specification and the industry standards that are applicable.

The Caltrans Pumping Plant Design manual 4th edition (July 2019) is available from the SFP Liaison.

4.11.2 PROJECT DEVELOPMENT

The project development steps, processes and documents required for pumping plants are the same as for other structures on Caltrans right of way as described in sections elsewhere in this Guide. The basic project development steps as they pertain to pumping plants are described below.

4.11.3 ADVANCED PLANNING STUDY

For new pumping plants, the APS must show the anticipated layout, estimated cost and other information customarily shown on APS’s. In addition, the APS must note

the approximate area to be drained, the assumed rainfall intensity, the estimated storage capacity, and an estimate of the pump horsepower required.

The consultant may base the costs of new pumping plants on the amount of runoff that will be pumped or by other means that will produce a viable estimate.

For pumping plant modifications, the same information must be shown as appropriate and estimates must be based primarily on the items of work involved.

4.11.4 TYPE SELECTION

The Type Selection process requires significant preparatory work and analysis beyond that required for usual bridge structures. Consultants and sponsoring agencies must factor this lead-time into their project schedules. A lead time of no less than one month should assumed.

The Type Selection Process for pumping plants consists of the following steps:

- The preparation of a pumping plant data submittal (PPDS)
- District approval of the PPDS
- Pre-Type Selection Meeting
- Preparation of the General Plan
- Type Selection Meeting

The pumping plant data submittal (PPDS) must contain the preliminary information that Districts normally furnish DES for pumping plants designed by Caltrans. The information required is published in the *Highway Design Manual* and in Chapter 3 of the *Drafting and Plans Manual of Instructions.*

The PPDS must be prepared by the consultant and approved by the District as a first step in the Type Selection process and before submitting it to the Liaison Engineer.

Once the PPDS is submitted to the Liaison Engineer and is reviewed, the consultant must attend a Pre-Type Selection meeting at which the Caltrans pumping plant design philosophy will be discussed in detail and site-specific parameters for the design will be established. The meeting will be held with PDT in Sacramento or on-line.

Based on the requirements discussed at the meeting, the consultant must prepare a General Plan that will be used for Type Selection. As a step in determining the structure layout and layout of pump equipment on the General Plan, the consultant must perform the necessary iterative head calculations to determine the storage box volume and the number and horsepower of the pumps.

Other documents the consultant must prepare and submit for the pumping plant Type Selection meeting are the same as for other structures discussed in sections elsewhere in this Guide.

Pumping plant Type Selection Meetings are typically held separate from the other structures on a project because of the preliminary work required and the fact that pumping plant Type Selection issues generate significant and detailed discussions.

4.11.5 UNCHECKED DETAILS AND PS&E SUBMITTALS

The unchecked details and PS&E submittals should coincide with the same submittals for the other structures on the project whether or not the pumping plant Type Selection meeting was held separately.

Review durations for the pumping plant submittals may extend up to two weeks beyond the durations for other structures. The Liaison Engineer should be contacted to determine the durations to be anticipated.

4.11.6 PROJECT DEVELOPMENT DELIVERABLES

Other than for the PPDS discussed under “Type Selection” above, the types of documents, their content, and formatting is the same as for other structures. This includes plans, special provisions, foundation reports, design calculations, independent check calculations, quantity calculations, etc. Significant differences are outlined below.

4.11.7 PLAN SHEETS

Pumping plant plans must consist of the following sheets assembled in the order shown:

- General Plan
- Structural drawings

- Mechanical drawings
- Electrical drawings

Plan sheet numbers in the lower right corner of the drawings are preceded by “GP”, “ST”, “M”, and “EE” respectively. Numbering restarts with each type of drawing.

4.11.8 SPECIAL PROVISIONS

Standard Special Provisions (SSPs) for the structural work are available from the internet for consultants to download and use. For mechanical and electrical work, standard specifications are modified by NSSPs (non-standard specifications) specific to each design criteria which are not available from the internet and must be requested from the Liaison Engineer.

Sections in the Special Provisions must include the following:

Section 10:

- Contractual requirements in “Order of Work” that specify how the contractor must maintain pumping capacity within the drainage area during construction.
- Special provisions throughout for the structural work.

Section 74:

- Special provisions for Pumping Equipment and Controls.

4.11.9 CONSTRUCTION SUPPORT

Construction support of pumping plants involves the same duties as for other structures where the consultant must perform the following:

- Answer questions and address issues that arise as the pumping plant is constructed.
- Prepare change order revisions.
- Review shop drawings and submittals*
- Make on-site visits when necessary*
- Prepare and submit as-built drawings

Of the above, the two items marked with an asterisk require further elaboration.

4.11.10 REVIEW SHOP DRAWINGS AND SUBMITTALS

Review of shop drawings and submittals requires more intensive effort than for usual bridge designs because of the number of submittals that are required.

The construction contractor must submit schedules of components to be installed in pumping plants to the Caltrans Structure Rep. The schedules must be submitted to the Caltrans Structure Rep regardless of whether the project is advertised by Caltrans or by others. The consultant must ensure the contract documents require this. Caltrans Structure Rep distributes the submittals to the Liaison Engineer, other DES functional units, and the consultant for review.

Once DES reviews are complete, the comments and recommendations will be transmitted to the consultant. The consultant must notify the Liaison Engineer immediately should there be an issue with the comments or recommendations provided. Otherwise, the consultant must incorporate the comments and recommendations into their own comments.

The submittals must be reviewed by the Engineer of Record, and if the Engineer of Record is not available, by another registered employee of the firm.

After review, the consultant must stamp each item of the submittal with a review stamp and return the submittal to the Caltrans Structure Rep and the Liaison within 5 working days. The review stamp used by consultant must be similar to the one shown at the end of this section.

4.11.11 VISITS TO THE CONSTRUCTION SITE

When requested by the Liaison Engineer, the consultant must visit the construction site to address design issues that arise during construction. When requested consultant must also visit the electrical equipment supplier facility for pump controls testing and verifying its conformity with the approved submittals before shipping the equipment to the job site.
When the construction contractor tests pumping plants, Structure Representatives and consultants must inform the Liaison Engineer of the upcoming tests.

The Liaison Engineer will arrange for Caltrans representatives from the appropriate disciplines to attend the testing and make the final inspections and the final determination as to whether the test results are acceptable and in accordance with the contract documents. The Liaison Engineer will ensure the consultant is informed of the test should the consultant wish to attend.

4.11.12 SAMPLE REVIEW STAMP FOR SUBMITTALS

As discussed previously in this section, the consultant must stamp the construction contractor's submittals after review. The stamp must be similar to the one shown below.

REVIEWED FOR THE STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURE DESIGN
by (consultant's name here)

☐ APPROVED: NO EXCEPTIONS TAKEN

☐ APPROVED: AS NOTED—SUBJECT TO NOTATIONS INDICATED IN RED

☐ NOT APPROVED: RESUBMIT

BY:_____DATE:_____

4.12 BUILDINGS

Pending development

4.13 CONTRACT DOCUMENTS

Contract Documents consist of complete sets of project plans and special provisions as printed to advertise and construct a project.

For projects advertised by Caltrans, the Structures Specifications unit will distribute Contract Documents to Caltrans functional units as necessary.

Contract Documents for projects not advertised by Caltrans shall be submitted to the OSFP Liaison Engineer by the consultant.

4.14 ADDENDA

Addenda are issued at the advertising agency's discretion to effect changes in contract documents during a project's advertisement period for construction. Advertising agencies should consider issuing addenda to add or remove significant work, to correct significant errors and omissions, and to resolve conflicts in the contract documents. Whether a project is advertised by Caltrans or by other agencies, structure related addenda must be reviewed and approved by the OSFP Liaison Engineer prior to being issued.

4.14.1 ADDENDA FOR CALTRANS ADVERTISED PROJECTS

For Caltrans advertised projects, the District makes the final decision on whether to issue an addendum. However, when structures are involved, the Division of Engineering Services (DES) provides input into the decision through the Office Structure Office Engineer (SOE), the focal point in DES for preparing structure portions of addenda.

When a change warrants an addendum related to structure work, SOE coordinates with the District, the structure designer, SFP Liaison and other applicable functional units to assemble and integrate the revised plan details, quantities, and specifications into a structure's addendum package. SOE transmits the package to the District who processes the structure amendments with their own and submits the combined package to the Division of Office Engineer (DOE). DOE issues the final addendum to prospective bidders and distributes copies of the addendum to the appropriate Caltrans units.

For projects that are consultant designed (and Caltrans advertised), the addendum process is the same as above except that SOE coordinates with the OSFP Liaison Engineer who then provides the necessary consultant coordination and oversight

to procure the needed details, quantities, specifications, and approvals to support the addendum.

The Liaison Engineer is the point of contact for consultants and others who discover an issue or conflict that involve consultant designed structures. When issues and conflicts are discovered, the Liaison Engineer must be notified immediately to expedite the preparation of an addendum if one is warranted.

4.14.2 ADDENDA FOR PROJECTS ADVERTISED BY OTHERS

For projects advertised by others, the sponsoring agencies determine whether to issue addenda and must coordinate with consultants as necessary to obtain the required plan, specification, and estimate amendments. The sponsoring agencies or consultants must then coordinate with the Liaison Engineer to obtain review and approval of the addenda.
When the sponsoring agency considers issuing addenda that could potentially impact structures, the Liaison Engineer must be notified immediately to discuss the submittals and reviews required as well as the coordination and timeframes involved. Required submittals may consist of plans, specifications, estimates, and necessary supporting documents like design and check calculations, reports, and quantities.

It is the Liaison Engineers' goal to team with the consultant and sponsoring agency to complete the addenda process as expeditiously as possible.

There are instances where Caltrans will require the local agency to issue an addendum to incorporate changes into the contract documents as a condition of oversight approval. In these cases, the local agency must prepare an addendum unless a mutually agreed alternative is found.

4.15 BIDDER INQUIRIES

During the advertisement period for a construction project, contractors, fabricators and suppliers often have questions regarding the plans and specifications and will contact designers and others for an answer. During advertisement, those making bidder inquiries must be referred to the contact information listed in the bid documents to get their question answered. Inquiries made after award of the construction contract must be referred to the Resident Engineer.

For projects advertised by Caltrans, the contact information specified is that of the Caltrans Office Engineer. The Office Engineer will then forward any structure

related inquires to the Structures Duty Senior. The Structure Duty Senior resides in Structure Office Engineer (SOE) and serves as the designated point of contact for structure related inquiries.

The purpose of having the Structures Duty Senior designated as the point of contact is to provide all potential bidders with uniform responses to questions and to provide the same information given to one bidder to all bidders. This avoids inadvertently giving a bidder an unfair advantage. The Structures Duty Senior also triggers the issuance of addenda or other action necessary to deal with issues in contract documents that bidder's inquires expose.

Potential bidders can also make inquiries and see the results of previous inquiries through the Division of Office Engineer's web site.

Other key elements of the Caltrans bidders' inquiry process are as follows:

- A systematic distribution to all contract document holders of all inquiries, responses, and actions.
- A systematic distribution of all inquiries and responses to Caltrans units with an interest in the project. This includes the District, Structures Design, Construction, OSFP (in the case of OSFP projects), and others. Copies are also forwarded to the RE pending file.

Sponsoring agencies are strongly encouraged to establish a similar process to deal with such inquiries.

Regardless of the bidder's inquiry process used by other advertising agencies, the agencies shall forward to the OSFP Liaison Engineer documentation of all inquiries and responses and actions that affect the structure work.

Any actions that result in modifications to the approved contract documents must be made by addendum or contract change order, either which must be reviewed and approved by OSFP before being issued.

OFFICE OF SPECIAL FUNDED PROJECTS

INFORMATION AND PROCEDURES GUIDE

CHAPTER 5: CONSTRUCTION

STRUCTURES & ENGINEERING SERVICES
DIVISION OF ENGINEERING SERVICES
DEPARTMENT OF TRANSPORTATION
STATE OF CALIFORNIA

2024

Updates and information concerning the contents of this guide may be obtained from:

Office of Special Funded Projects and Structure Local Assistance (OSFP/SLA) page
or
Contact the Caltrans, Office of Special Funded Projects, American Council of Engineering Companies (ACEC) representative.

The Office of Special Funded Projects has prepared the contents of this guide. When necessary, revisions are made and posted on the web site listed above. It is the responsibility of all that use this guide to verify it is current and appropriateness for the use intended, to obtain the revisions, and to disregard obsolete or inapplicable information.

TABLE OF CONTENTS

5 CONSTRUCTION
5.1 ROLES AND RESPONSIBILITIES..... 5
5.2 CONTRACT CHANGE ORDERS.....8
5.3 VALUE ENGINEERING CHANGE PROPOSALS.....12
5.4 WORKING DRAWINGS AND SUBMITTALS.....19
5.5 AS-BUILT PLANS..... 23

Editable forms and bridge design information noted in the OSFP Information and Procedures Guide are available upon request from the SFP Liaison:

1.5.1	Statement of Work for Structures
1.6.1	Quality Control Plan Checklist
3.2.1	Advance Planning Study Checklist
3.2.2	Bridge Life-Cycle Cost Analysis (BLCCA) Documents
4.1.1a	BD-0500 Bridge Site Data Submittal
4.1.1b	BD-0502 Bridge Site Data Submittal-Minor
4.1.1c	BD-0503 Bridge Site Data Submittal Non-Standard RW/SW
4.1.2	Bridge or Structure Field Site Investigation Checklist
4.1.3	Railroad Separation Field Site Investigation Checklist
4.1.4	Bridge or Structure Hydraulic Site Survey Checklist
4.1.5	Foundation Plan Preparation Checklist
4.6.1	BD 0361 Structure P&Q Submittal Checklist
4.6.2	BD 0354 Structure Standard Plan Transmittal
4.7.1	Estimating Quantities
4.7.2	BD-0362 Structure Quantity Summary
4.7.3	BD-0363 Structure Quantity Summary-Other
4.9.1	BD-0307 Joint Movement Calculations LRFD
4.9.2	MTD 3.7 Shaft Design Information Sheet
4.10.1	Pumping Plant Design Manual 2019

Other documents referenced in this Guide are available at the Caltrans internet website: https://dot.ca.gov/ or https://dot.ca.gov/manuals/

INDEX TO ABBREVIATIONS:

AAA	Advertise, Award and Administer
AASHTO	AASHTO LRFD Bridge Design Specifications
ACEC	American Council of Engineering Companies
A&E	Architectural and Engineering Contract
APS	Advance Planning Study
BLCCA	Bridge Life-Cycle Cost Analysis
BD	Bridge Design
BDD	Bridge Design Detail
BDM	Bridge Design Memo
BDP	Bridge Design Practice
CA	California Amendments to AASHTO LRFD Bridge Design Specifications
CMGC	Construction Manager/General Contractor
DB	Design Build
DES	Division of Engineering Services
DRP	Draft Project Report
EE	Earthquake Engineering
GS	Geotechnical Services
MTD	Bridge Memos to Designers
OC	Overcrossing
OH	Overhead (railroad)
OSFP	Office of Special Funded Projects
PDPM	Project Development Procedures Manual
PDT	Project Development Team
PID	Project Initiation Document
POC	Pedestrian Overcrossing
PM	Project Manager
RP	Project Report
PS&E	Plans, Specifications and Estimate
PUC	Pedestrian Undercrossing
QC	Quality Control
SC	Structures Construction
SDC	Caltrans Seismic Design Criteria
SM&I	Structures Maintenance and Investigations
SOE	Structure Office Engineer
SFP	Special Funded Projects
STP	Structure Technical Policies
UC	Undercrossing
UP	Underpass (railroad)
VECP	Value Engineering Change Proposal

5 CONSTRUCTION

5.1 ROLES & RESPONSIBILITIES

This section outlines roles and responsibilities after the construction contract has been awarded and executed. This section supplements Section 1-2 “Roles and Responsibilities” which outlines general responsibilities and explanations that apply to the full life of the project.

Many different construction offices and agencies or other entities may be involved in any given construction project. When several entities are involved in a construction issue, it is important to recognize that the official lines of communication must be maintained. To ensure that clear direction is given to the Prime Contractor or any sub-contractor, the direction must come only from the Resident Engineer/Structure Representative. Communications protocol must be consistent with that established by the Resident Engineer prior to the start of work. During the course of any construction support, if contact is made with contractor or sub-contractor forces by the design consultant or OSFP staff, it should be made clear that any approval or direction of the work must come from the Resident Engineer. Any contacts with contractor forces would normally be very limited and made with the full knowledge of the Structures Representative.

Following is a list of roles and responsibilities associated with the main project stakeholders involved in Special Funded Projects. The list is not all-inclusive and is meant to briefly capture roles and responsibilities as they relate to projects that involve OSFP oversight. Additional roles and responsibilities are listed under other sections of this Guide as they relate specifically to different issues.

5.1.1 THE RESIDENT ENGINEER

- Is the primary point of contact and the responsible party for a construction contract.
- Is a Caltrans employee on a State administered construction contract and is usually a consultant on a contract administered by a Local Agency.
- Establishes the communications protocol for those involved with the contract work.

5.1.2 THE STRUCTURES REPRESENTATIVE

- May or may not be the Resident Engineer.
- Is a Caltrans employee on a State administered construction contract and is usually a consultant on a contract administered by a Local Agency.
- Is the point of contact for structure issues on a construction contract.
- Establishes the communications protocol for those involved in structure work.
- Coordinates as necessary with the Caltrans Structure Construction Oversight Engineer for non-State administered construction contracts.
- Coordinates as necessary to ensure a timely and complete review process involving VECPs, CCOs, and working drawing submittals.
- Completes the As-Built plans submittal.

5.1.3 STRUCTURE CONSTRUCTION OVERSIGHT ENGINEER

- Is the Caltrans Construction Engineer responsible for oversight of the structure contract work on non-State administered construction contracts.
- Reviews structure related CCOs and other construction changes.
- Ensures As-Built plan submittals have been completed.

5.1.4 CALTRANS OFFICE OF STRUCTURE CONSTRUCTION

- Is the unit that receives, distributes, and maintains the file copies of working drawing submittals.

5.1.5 SPONSORING AGENCIES

- Ensure design consultant availability through construction completion, including construction support and completion of project As-Builts.
- Provides construction administration staff for locally administered projects.

5.1.6 CALTRANS DISTRICTS

- Provides the Resident Engineer for State administered projects.
- Provides the Construction Oversight Engineer for locally administered projects.

5.1.7 OFFICE OF SPECIAL FUNDED PROJECTS

- Provide Liaison & Oversight to each District and sponsoring agencies for Special Funded Projects
- Establish and maintain a liaison relationship with the construction stakeholders.
- Provide design support to Districts, Design Consultants, Structure Representatives, and Agencies.
- Provide support on structure issues for Request for Information (RFI)
- Review and approve any structure related Addendums required.
- Review and give technical approval for any structure related Value Engineering Change Proposals (VECP).
- Review and give technical approval for any structure related Contract Change Orders.
- Provide support and review of working drawings.
- Visit project sites as necessary.
- Ensure As-built plans have been completed by the Design Consultant and submitted. For locally advertised projects the construction redlines to as-builts are submitted to the Caltrans Construction Oversight Structure Representative.

5.1.8 DESIGN CONSULTANTS

During the construction phase of the project, the Design Consultant (Including Sub-Design Consultant such as Electrical, Mechanical, Geotechnical, Structural, etc.) must be retained to perform or take part in the following:

- Develop responses for request for information when requested.
- Perform any work required including redesign and plan details for any necessary Addendums.
- Attend the pre-construction meeting with the construction contractor upon request.
- Review or develop contract change orders and supporting documents.
- Review and evaluate Value Engineering Change Proposals (VECP).
- Correct errors or omissions in contract drawings or special provisions.
- Review and approve working drawings and submittals by the construction contractor.
- Design additional related structural engineering work that the Local agency, Structure Representative, Structure Construction Oversight Engineer, or OSFP Liaison Engineer may request.

- Help resolve all discrepancies in the contract documents and visit the job site as required to address construction problems when requested by the construction contract administrator (Resident Engineer) or Caltrans SFP Liaison Engineer.
- Conduct any necessary direct communication with field construction personnel in accordance with the provisions of Structure Construction Manual.
- Prepare and submit the As-built structure plans.
- Be aware of conflict of interest issues concerning working relationships as restricted by Public Contract Code.

5.2 CONTRACT CHANGE ORDERS

Contract Change Orders (CCOs) change the requirements of construction contracts that were previously reviewed and approved through the project development stages of projects.

The appropriate project development units must review and approve CCOs before being issued. For CCOs that are structure related, the OSFP Liaison Engineer must review and provide technical design approval in writing prior to the CCO receiving final approval in conformance to departmental policies.

This section outlines the coordination and preparation required to develop structure related CCOs and the reviews necessary to obtain design approval by the OSFP Liaison Engineer.

Sponsoring agencies and consultants should establish contingencies in budgets and schedules for unexpected capital costs and for the engineering to prepare and support contract changes since CCOs can be expected as projects are constructed.

5.2.1 CHANGE ORDER COORDINATION

Structure Representatives and consultants must notify the Liaison Engineer of potential changes to contract requirements as soon as possible to discuss the need for a CCO and the parameters that will be involved. Some major factors that must be discussed are as follows: the scope of changes to the structure elements and overall project, design approaches, documents that must be prepared, reviews that will be required, and time schedule constraints.

Once the parameters are reconciled and CCO development is underway, the Structure Representative and consultant must communicate the status of the development and coordinate issues that arise with the Liaison Engineer to ensure subsequent timely reviews and approval. The exact coordination and lines of communication depends on whether the construction contract is administered by Caltrans or by others as described below.

5.2.2 PROJECTS ADMINISTERED BY CALTRANS

For construction projects administered by Caltrans, communication between the Caltrans Structure Representative and the consultant is through the Liaison Engineer. When a potential change is identified, the Structures Representative or consultant must notify the Liaison Engineer who then coordinates with the consultant or Structure Representative, respectively.

The Liaison Engineer coordinates with the consultant to obtain the necessary structural analysis and CCO documents. Once the consultant prepared documents are reviewed and approved, the Liaison Engineer transmits the appropriate CCO documents with an approval letter to the DES Office of Structure Construction who in turn writes an approval letter to the Structure Representative for executing the CCO.

In cases where the Structure Representative or contractor prepares the CCO details and the related support documents, the Liaison Engineer will coordinate the necessary technical reviews from the consultant.

When revised, supplemental, or additional electronic (DGN) plan detail sheets required for the CCO are prepared, reviewed and approved, the originals electronic (DGN) plans will be stored within DES and approved copies will be distributed per DES policy.

5.2.3 PROJECTS ADMINISTERED BY OTHERS

For construction projects administered by others, the preparation of CCOs, reviews, and approval are conducted in the same manner as for projects advertised by Caltrans except as follows: 1) the Structure Representative and consultant may communicate directly; 2) the Structures Construction Oversight Engineer must also review and approve any changes before the Liaison Engineer provides design approval; and 3) the Liaison provides written approval for the changes directly to the Structures Construction Oversight Engineer.

Once the CCO is issued, the Liaison Engineer must be provided with the electronic (PDF) revised plans, special provisions and other documents as requested for distribution within DES. The consultant or Structure Representative must distribute to all others as necessary.

5.2.4 PREPARATION AND REVIEW OF CHANGE ORDER DOCUMENTS

The types of documents that must be prepared and submitted to the Liaison Engineer for review depend on the scope of changes involved. The documents must consist of plan details, specifications, calculations, reports, and others as necessary to construct and support the change. The exact types of documents will be as determined by the Liaison Engineer.

The documents must meet the same quality standards as for documents prepared in the project development phases and as described below. All documents must be stamped and signed by a registered engineer when required.

5.2.5 PLAN DETAILS

There are several different methods that can be used in CCOs to modify the contract plan details, and the following criteria should be used to help select the most appropriate: 1) The method must delineate the change clearly, concisely, and with no ambiguity, 2) The method must be an effective way to record the particular change in the as-builts, and 3) Provided the previous two criteria are met, the method used should be one that is the most expeditious.

Simple changes to plan details can be made with a sketch that shows the plan revisions. This method requires the Structure Representative (and ultimately the consultant) to make the corresponding corrections to the as-built drawings and should not be used for complex detail changes.

Changes of increased complexity must be made by one of the following methods that conforms to the *Bridge Design Details* manual: 1) revisions to the original plan sheets, 2) replacement plan sheets, 3) supplemental plan sheets, or 4) additional plan sheets. All plan sheets must be prepared on formatted sheets as described in “Plans” elsewhere in this Guide. Each of these methods produces plan detail sheets that are essentially “as-built ready”.

For plan sheets prepared in accordance with the *Bridge Design Details* manual, the Liaison Engineer provides an oversight approval signature directly on each plan sheet. To revise the original plan sheets, the consultant must contact the Liaison Engineer to determine how the “original” sheets (electronic DGN files for

State AAA projects) will be obtained or generated, ensuring that the oversight signature is left blank.

5.2.6 CONTRACT SPECIFICATIONS

For simple changes, the Structure Representative may write the specifications changes directly into the text body of the CCO. For extensive, complex, or lengthy specification changes, attachments to a CCO are usually required that consist of edited Standard Structure Specifications (SSPs) or “all new” specifications all of which must conform to “Contract Special Provisions” elsewhere in this Guide.

5.2.7 STRUCTURE CALCULATIONS

Structure design calculations and independent design check calculations must conform to “Structure Calculations” elsewhere in this Guide. Structure design and independent check calculations must document the analysis for the direct structure changes that are made and must analyze and document changes in forces and capacities of all structure elements that could potentially see an influence as a result of the change. Calculations must incorporate the most recent design specifications and policies unless otherwise approved by the Liaison Engineer.

5.2.8 QUANTITY CALCULATIONS AND COST ESTIMATES

The need for quantity calculations and cost estimates is based the needs of the Structure Representative. If required, quantity calculations and check quantity calculations must be prepared and conform to “PS&E Estimates” elsewhere in this Guide.

5.2.9 FOUNDATION REPORT

A foundation report that conforms to “Foundation Report” elsewhere in this Guide is required when foundations are affected.

5.2.10 HYDRAULICS REPORT

A hydraulics report that conforms to “Hydraulics Report” elsewhere in this Guide is required for changes that affect the encroachment that was originally planned on waterways.

Review durations for the first submittal will be dependent on the changes involved in the CCO. Review durations may range from a few days for the simplest changes and up to six weeks for complex changes.

Review durations for subsequent submittals will be substantially shorter than for the first review provided the comments from the first review are thoroughly addressed. For complex changes, the minimum review duration should be assumed not less than two weeks.

5.3 VALUE ENGINEERING CHANGE PROPOSAL

Construction contractors can propose Value Engineering Change Proposals (VECP) on Special Funded projects in accordance to the Standard Specifications and other contract documents to potentially reduce construction costs, construction activity duration, traffic congestion, right-of-way delay, and public impact.

Although VECP proposals can potentially reduce construction costs, VECPs have true economic merit for a project only when there is still a savings after development and review costs are factored in. VECPs become especially unviable from an economic viewpoint when the sponsoring agency's review costs exceed their portion of the construction savings.

VECPs must undergo thorough reviews before being approved and implemented since they revise contract work previously reviewed and approved through the project development process. Construction administration personnel must review VECPs for constructability and for conformance to the construction contract. Project development personnel must review VECPs for conformance to design standards and project objectives.

Structure related VECPs on Special Funded Projects require review and approval by the OSFP Liaison Engineer.

5.3.1 THE PURPOSE OF THIS GUIDE SECTION IS AS FOLLOWS

- Address the roles, standards, and procedures required to obtain OSFP's input, review, and approval in a timely manner.

- Define how OSFP involvement fits into the framework that Resident Engineers/Structure Representatives use to process VECPs as outlined in the VECP Guidance Manual.

To achieve this purpose, this Guide expands upon the principles described in the VECP Guidance Manual for processing VECPs. And, like the VECP Guidance Manual, this section is not to establish terms of the construction contract but is to inform those involved with VECPs of the requirements to make for efficient development and review.

5.3.2 ROLES AND RESPONSIBILITIES

Listed below are the primary representatives and their roles in developing structure related VECPs on Special Funded Projects. The role descriptions are those as it relates to OSFP's goal in the VECP process to provide timely input, reviews, and approvals. The roles do not address the involvement of other units as required by their own procedures.

5.3.2.1 CONTRACTOR:

- Conceptualizes and proposes VECPs.
- Extensively coordinates VECP proposals with the Resident Engineer/Structure Representative.
- Develops the necessary documents to support and construct the change.
- Provides the design construction support for the change.
- Reimburses sponsoring agencies for review costs.

5.3.2.2 RESIDENT ENGINEER/STRUCTURE REPRESENTATIVE

- Coordinates with the Liaison Engineer.
- Coordinates with the Caltrans Project Manager (for projects administered by Caltrans).
- Coordinates with the Sponsoring Agency.
- Reviews VECP for feasibility, constructability and conformance to the construction contract.
- Leads, coordinates, and facilitates VECP development and reviews with the contractor and the Liaison Engineer.
- Arranges and facilitates meetings between affected parties.
- Determines if a VECP is cost effective.
- Takes the necessary steps to administratively recover review costs.
- Provides the final VECP approval in the form of a contract change order.

5.3.2.3 CALTRANS STRUCTURE CONSTRUCTION OVERSIGHT ENGINEER (FOR LOCALLY ADMINISTERED PROJECTS)

- Coordinates with the Liaison Engineer.
- Coordinates with the Caltrans Project Manager.
- Reviews the Structure Representative's procedures.
- Reviews VECPs for feasibility, constructability, cost effectiveness, and conformance to construction standards.

5.3.2.4 CALTRANS PROJECT MANAGER

- Coordinates with sponsoring agency.
- Works with the local agency to revise the Cooperative Agreement, if necessary, especially relative to the reimbursement of Caltrans review costs.
- Ensures project objectives are attained.

5.3.2.5 SPONSORING AGENCY

- Provides concurrence with the general nature of VECP changes and the impacts on project costs and schedules.
- Engages the design consultant to review VECP.
- Reimburses Caltrans for review costs.

5.3.2.6 LIAISON ENGINEER

- Coordinates with the Resident Engineer/Structure Representative.
- Coordinates with the Caltrans Structure Construction Oversight Engineer (for locally administered projects)
- Leads structure design reviews and approvals.
- Provides input relative to feasibility and cost effectiveness of the proposed VECP.
- Obtains reviews and concurrences from designers of record.
- Provides oversight and quality assurance through the necessary DES units.
- Provides the final structure design approval.

5.3.2.7 DESIGNERS OF RECORD (ORIGINAL)

- Provides input to the Liaison Engineer relative to feasibility and cost effectiveness.

- Reviews VECPs for structural integrity, impacts to the original design, and ensures conformance to project development standards.

5.3.2.8 VECP DEVELOPMENT AND REVIEW

The VECP Guidance Manual outlines incremental stages of VECP development. For the purposes of this section, the stages are summarized as follows:

- Conceptual Stage
- Preliminary Stage
- Final Stage

VECP development must proceed through the above incremental stages. In each stage, the contractor develops and submits the proposals to the Resident Engineer/Structure Representative for input and review (the remainder of this Guide section will assume the Structure Representative is the key contract administrator). If the Structure Representative determines the proposals warrant further review, the proposals must be submitted to the Liaison Engineer for review.

VECP development should not proceed to the next stage until concurrence is obtained from the Liaison Engineer.

The discussion below briefly describes the proposal stages and the procedures, requirements, and considerations necessary to obtain the Liaison Engineer's review and approval. Upon request, in all stages, the Liaison Engineer will meet with the Structure Representative, contractor, and other key representatives as necessary to discuss and resolve issues. The designers of record must attend the meetings upon request.

5.3.2.9 CONCEPTUAL STAGE

At the Conceptual Stage, the contractor informs the Structure Representative of a potential VECP and the general parameters the VECP will involve. In this stage, the Liaison Engineer requires the following information:

- The potential structural changes and the purpose
- The identity of the designers who will develop the VECP
- The desired schedule to implement the change.

To warrant further consideration, the Conceptual proposal must meet the following:

- The concept must appear to be potentially structurally feasible, cost effective, and have merit.
- The contractor must not intend to directly employ the designers of record, or their sub-consultants, to prepare the VECP (per Section 2-1.056 of the Standard Specifications and for conflict of interest reasons. However, the Sponsoring Agency may directly employ the designers of record to develop the VECP).
- The designers of record must recommend concurrence with the concept.
- The designers of record must be available to perform reviews in a timely manner.
- The pertinent DES units must recommend concurrence with the concept.
- The sponsoring agency and contractor must concur with potential schedule changes.
- The sponsoring agency must be willing to pay for VECP reviews by the designers of record and reimburse Caltrans for review costs incurred.

The duration for this review will be a minimum of two weeks.

As a part of the Conceptual Stage, the Structure Representative should lead a meeting that includes the Liaison Engineer, contractor, and others as appropriate to discuss the concept and considerations to develop the VECP further. The meeting should address the following:

- Procedural requirements to develop the VECP further
- Design criteria—ordinarily, the most recent current design standards and practices are required
- Reports and documents the contractor must prepare
- Review times
- Schedule for further VECP development
- Review costs
- Method of reimbursement for review costs

5.3.2.9 PRELIMINARY STAGE

At the Preliminary stage, the contractor further develops the VECP and identifies the nature of all changes and shows the changes will have merit. In this stage, the Liaison Engineer requires the following:

- Preliminary details that identify the structural modifications
- Preliminary analysis that show the general design approach and general effects on all affected structure elements

- Preliminary estimate of construction cost savings
- Preliminary estimate of the review costs
- Net savings the VECP will achieve

The contractor must develop this proposal up to the point of preparing final analysis, design, and details as part of the following Final Stage.

The Preliminary proposal must show or meet the following to warrant further consideration:

- The changes can be designed to be structurally adequate, will be based on the proper parameters, will be constructible, and will conform to standards.
- The necessary supporting reports and documents, including plan details, calculations, foundation reports, hydraulic reports, etc. will be prepared.
- The designers of record and pertinent internal DES units concur with the proposal.
- The VECP will affect a cost savings after review costs are considered.

The duration for this review will be a minimum of two weeks.

At this stage, all parties should understand the following:

- Procedural requirements to develop the VECP further
- Design criteria and the extent of analysis that must be performed
- Reports and documents the contractor must prepare
- Review times
- Review costs
- Schedule for further VECP development
- Who will be the designers of record for the different portions of the structure design and who will provide the associated construction support
- Who will prepare as-built plans

If necessary to discern these issues, the Structure Representative should lead a meeting that includes the Liaison Engineer, contractor, and others as appropriate.

5.3.2.10 FINAL STAGE

At the Final stage, the contractor prepares the final design, details, and supporting documents necessary to support the change. In this stage, the Liaison Engineer requires the following:

- Final plan details that show the changes
- Complete analysis and calculations that support the structural modifications
- Reports and other documentation necessary to support the change
- Final cost estimates and savings the VECP will achieve

The Final stage proposal must meet the following to warrant approval of the VECP by the Liaison Engineer:

- Plans, calculations, and other documents must fully address the changes proposed and conform to the requirements outlined later in this Guide section.
- The changes must be structurally adequate, based on the proper parameters, are constructible, and conform to the appropriate standards.
- The designers of record and pertinent internal DES units must concur with the proposal.
- The VECP must affect a net cost savings.

The approximate duration to perform the reviews and quality assurance is 4 to 6 weeks.

The conclusion of this stage should result in the approval of the VECP (if warranted), a calculation of the final cost savings performed by the Structure Representative, and the issuance of a contract change order.

5.3.2.11 STRUCTURE RELATED VECP DOCUMENTS

The following documents must be developed as necessary to support the VECP:

- Plan Details
- Contract Specifications
- Structure Calculations
- Quantity Calculations and Cost Estimates
- Foundation Report
- Hydraulics Report
- Other documents as required

The documents must meet the same quality standards as for documents prepared in the project development phases and must conform to the requirements in “Contract Change Orders” elsewhere in this Guide. Documents that are sub-standard will not be accepted. Reviews will not commence until documents of enough quality are submitted.

For scheduling purposes, the review times for the First Complete Submittal may be assumed to be 6 weeks.

Review times for subsequent submittals are dependent on the adequacy of the preceding submittal. For scheduling purposes, the minimum review period for subsequent submittals should be assumed to be not less than 2 weeks.

5.4 WORKING DRAWINGS AND SUBMITTALS

The contract documents require the construction contractor to provide working drawings for specific items of work to supplement the contract plans. The working drawings must be submitted directly to the Engineer (Structure Representative or Resident Engineer) or to the Structure Construction Office Associate Mailbox.

When the Contractor is required to submit working drawings to the Structure Construction Office Associate Mailbox (sc.office.associates@dot.ca.gov), the Contractor must do so, even for locally administered projects. Failure to comply usually results in extended review times. The Standard Specifications and the Contract Special Provisions indicate requirements for the working drawing submittal. Deviation from the specified submittal process must be approved in advance by the Liaison Engineer through a contract change order.

5.4.1 TYPES OF WORKING DRAWINGS

The following types of working drawings are examples of those that require submission to the Engineer for approval. The Engineer reviews and approves these working drawings at the “field level”.

- Temporary Facilities
- Shoring and Cofferdam Systems
- Structure Mounted Utilities
- Standard Piles
- Falsework and Forming Systems
- Sign Structures
- Temporary Supports
- Bridge Removal Plans
- Precast Concrete Box Culverts
- Soundwalls
- Slip Forms for Retaining Walls
- Permanent Railing

The following types of working drawings are examples of those that require submission to the Structure Construction Office Associate Mailbox:

5.4.1.1 BRIDGE RELATED

- Prestressing Systems
- Structural Steel
- Temporary Support of Casing
- Test Borings
- Micropile Systems
- Proprietary Piling Systems
- Precast Concrete Bridge Members
- PTFE Bearings
- Alternative Joint Seal Assemblies (MR ≤ 4 inches)
- Joint Seal Assemblies (MR > 4 inches)
- Asphaltic Plug Joint Seal Systems

5.4.1.2 WALL RELATED

- Proprietary Earth Retaining Systems
- Soil Nail Wall Systems
- Tieback Anchor Systems
- Proprietary Soundwall Systems

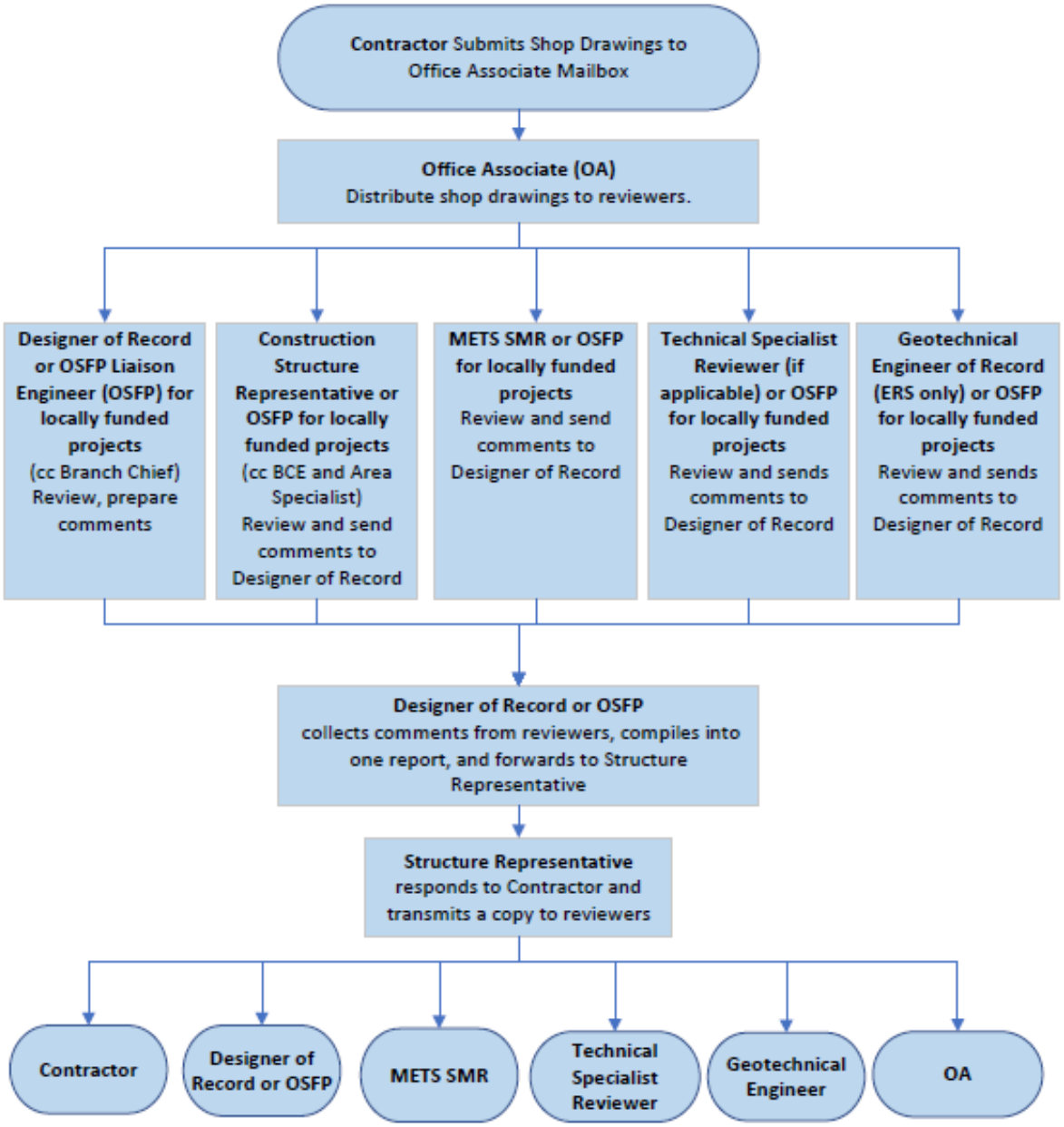
Working drawings related to buildings and pump plants are not covered in this section. For working drawings affiliated with pump plants, see the “Pump Plant” section elsewhere in this guide. For buildings, the responsible OSFP Structure Liaison should be contacted for guidance.

The remainder of this section will refer to working drawings that require submittal to the Structure Construction Office Associate Mailbox.

1. The Contractor submits working drawings to the Structure Construction Office Associate Mailbox.
2. The Structure Construction Office Associate will distribute the working drawings to the OSFP Liaison, Structure Representative, METS, Technical Specialists and Geotechnical Engineer.
3. The OSFP Liaison will forward the working drawings to the consultant designer / Engineer of Record.
4. The OSFP Liaison will collect review comments from OSFP reviewer, Structure Representative, METS, Technical Specialists and Geotechnical

Engineer. The OSFP Liaison will forward the comments to the consultant designer / Engineer of Record.

5. The consultant designer / Engineer of Record will collate all comments onto the working drawings and forward to the OSFP Liaison.
6. The OSFP Liaison will forward the collated comments on a set of working drawing to the Structure Representative.
7. The Structure Representative will respond to the Contractor and transmit a copy to technical reviewers.


Contractor Submits Shop Drawings to Office Associate Mailbox
Office Associate (OA) Distribute shop drawings to reviewers.
Designer of Record or OSFP Liaison Engineer (OSFP) for locally funded projects (cc Branch Chief) Review, prepare comments
Construction Structure Representative or OSFP for locally funded projects (cc BCE and Area Specialist) Review and send comments to Designer of Record
METS SMR or OSFP for locally funded projects Review and send comments to Designer of Record
Technical Specialist Reviewer (if applicable) or OSFP for locally funded projects Review and sends comments to Designer of Record
Geotechnical Engineer of Record (ERS only) or OSFP for locally funded projects Review and sends comments to Designer of Record
Designer of Record or OSFP collects comments from reviewers, compiles into one report, and forwards to Structure Representative
Structure Representative responds to Contractor and transmits a copy to reviewers
Contractor
Designer of Record or OSFP
METS SMR
Technical Specialist Reviewer
Geotechnical Engineer
OA

5.5 STRUCTURE AS-BUILT PLANS

Structure As-Built Plans (As-Builts) are required for bridge and transportation related structures that are constructed within the State right-of-way and other structures for which the State has maintenance responsibilities. As-Builts provide historical records of improvements made and are essential to the long-term operation and improvement of the State transportation system.

Sponsoring agencies are responsible for ensuring that acceptable structure As-Builts are submitted to the Office of Special Funded Projects (OSFP). Structure As-Builts consist of all plan details prepared using structure formatted border sheets that were reviewed and approved by OSFP (signed by Liaison) during the PS&E development phase of the project.

As-Builts for all other plan sheets are Roadway As-Builts Plans and shall be submitted to the appropriate District office in which the project was developed.

5.5.1 PROCESSING STRUCTURE AS-BUILT PLANS

Within sixty (60) days following completion and acceptance of the project construction contract, the responsible agency shall furnish acceptable structure As-Builts to OSFP. As-Builts must be submitted and approved by the OSFP Liaison Engineer within this timeframe, so all involved parties must complete their portion of the As-Built process in a timely manner.

The following procedures shall be used to facilitate the timely processing of structure As-Builts.

5.5.1.1 STATE ADVERTISED PROJECTS

1. Caltrans Structure Representative – Compile all structure revisions, including supplemental plan sheets and Contract Change Orders. Deliver the field office set of red-marked As-Built prints to the Office of Structure Construction, Sacramento.
2. Office of Structure Construction, Sacramento – Deliver the field office set of red-marked As-Built prints to OSFP.
3. Office of Special Funded Projects – Obtain the set of original drawings (DGN files without Liaison signatures) and forward them to the sponsoring agency's Design Consultant along with the field office set of red-marked As-Built prints.
4. Design Consultant for the Sponsoring Agency – Make As-Built corrections. Deliver the final As-Builts and field office set of red-marked As-Builts to OSFP.

5. Office of Special Funded Projects – Review the final As-Builts for acceptance. Return As-Builts to the Design Consultant for any corrections necessary. When found acceptable:

    - For structures with a Caltrans Bridge Number, deliver the final As-Builts to Structure Maintenance and Investigations (SM&I) for final processing into the As-Built database.
    - For structures without a Caltrans Bridge Number, deliver the final As-Builts to the local District office for final processing into their database.

5.5.1.2 LOCALLY ADVERTISED PROJECTS

1. Construction Contract Administrator/Structure Representative – Review structure As-Built changes with the Caltrans Oversight Structure Representative and ensure that all structure revisions, including supplemental plan sheets and Contract Change Orders, have been compiled. The Caltrans Oversight Structure Representative will deliver the field office set of red-marked As-Built files to the Office of Structure Construction, Sacramento.
2. Office of Structure Construction, Sacramento – Deliver the field office set of red-marked As-Built files to OSFP.
3. Office of Special Funded Projects – Forward the field office set of red-marked As-Built prints to the sponsoring agency's Design Consultant.
4. Design Consultant for the Sponsoring Agency – Obtain the set of original drawings from the sponsoring agency that advertised the project. Make As-Built corrections to the signed contract plans. Deliver the final As-Builts and field office set of red-marked As-Built files to OSFP.
5. Office of Special Funded Projects – Review the final As-Builts for acceptance. Return As-Builts to the Design Consultant for any corrections necessary. When found acceptable:

    - For structures with a Caltrans Bridge Number, deliver the final As-Builts to SM&I for final processing into the As-Built database.
    - For structures without a Caltrans Bridge Number, deliver the final As-Builts to the local District office for final processing into their database.

5.5.1.3 STRUCTURE AS-BUILT PLAN CORRECTIONS

As-Built corrections shall be made to the original plan drawings in accordance to the Caltrans *Bridge Design Details* manual.

The final As-Builts shall be prepared by or under the authority of the registered engineer whose stamp is on the original design plans.

When making As-Built corrections, the Design Consultant shall be aware of the following procedures that are routinely overlooked:

- As-Built corrections must be made on the **original signed drawings**. The original drawings are the dated, signed and approved drawings used in printing the as-advertised contract plans.
- The Design Consultant shall place the “As-Built” stamp, as shown in the *Bridge Design Details* manual, on each sheet, including the “Log of Test Boring” sheets and sheets with no changes. Black ink shall be used to apply the stamp.
- If no changes are shown on a sheet, a stamp or decal indicating “No As-Built Changes” shall be placed above the “As-Built” stamp. Black ink shall be used to apply the stamp.
- In making as-build changes to the Contract Plans, the plan sheets, details, and notes shall not be deleted. Instead, draw a line through the item in such a manner that it will not be obliterated.
- No changes or stamps shall be shown in red pencil or ink.