



Caltrans

**STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

PROJECT REQUIREMENTS

BOOK 2

FOR DESIGN AND CONSTRUCTION ON STATE HIGHWAY

IN FRESNO COUNTY, IN FRESNO ON ROUTE 180 BETWEEN ROUTE 41 AND ROUTE 168

DISTRICT 06, ROUTE 180

CONTRACT NO. 06-0C1104

06-Fre-180-R58.4/R60.4

Project ID 0600000934

Federal Aid Project

ACNH-P180(056)N

Dated: May 26, 2011

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1 GENERAL

1.1 General

The Design-Builder shall perform all Work necessary to meet the requirements of the Contract.

1.2 Introduction to Books 2 and 3

This introduction is intended to provide instructions to the Design-Builder on the relationship between Books 2 and 3. It does not replace the order of precedence set forth in Book 1. Book 1, Section 1.3 defines the order of precedence for the Contract Documents. If there are any conflicts between this introduction and Book 1, Section 1.3, Book 1 shall control.

Book 3 sets forth the standards applicable to the Project. Some standards have been modified for application to the Contract. Those modified standards are identified in Book 3. Book 3 includes Technical Memoranda that modify the Department's Manuals and Special Provisions that modify the Department's Standard Specifications. Any Department Special Provisions or Technical Memoranda not included in Book 3 shall not be used by the Design-Builder without prior Approval of Department. In some instances, only specific sections of the given standard apply. These sections are specified in Book 2.

Book 2 sets forth requirements that are intended to apply to this Project. Book 2 incorporates the standards in Book 3 by reference. In many cases, Book 2 will modify, supplement, or replace the standards in Book 3.

The text of Book 2 shall take higher precedence than the exhibits of Book 2, unless otherwise specified.

1.3 Project Description

1.3.1 Basic Configuration

The Preliminary Design Drawings provided in the RID convey the general intent of the Project. The Basic Configuration means those portions of the Preliminary Design Drawings that depict:

1. Horizontal alignment
2. Lane and shoulder widths
3. Number of lanes
4. Location of structures
5. Location of soundwalls
6. Approximate location of Project limits

1.3.2 Project Limits

The Project is located in Fresno County in the City of Fresno. The Project limits are as follows:

- West Project limit – Approximately at Sta. 832+00 on mainline Route 180.
- East Project limit – Approximately at Sta. 938+90 on mainline Route 180.

The lateral limits of the Project shall extend to the locations necessary to complete the Work and meet the Project requirements.

1.3.3 General Description

The Design-Builder shall not rely on the physical description contained in this Section 1 to identify all Project components. The Design-Builder shall determine the full scope of the Project through thorough examination of the RFP and the Project Site, or as may be reasonably inferred from such examination.

The Project generally consists of constructing new multi-lane connector ramps, two new overcrossing structures, widening one existing overcrossing structure, modify existing drainage system, retaining walls,

sound walls, removing and installing overhead sign structures, installing ramp metering systems at two locations, and maintaining existing landscaping.

The Project will include:

- Construct approximately 5.5 miles of new multi-lane connector ramps
- Construct two overcrossing structures
- Widen existing overcrossing structure at First Street
- Modify existing and install additional drainage systems
- Construct retaining walls
- Construct sound walls
- Signing and striping
- Lighting
- Widen Westbound 180 on-ramp from Cedar Avenue and install ramp metering system
- Install ramp metering system on Westbound Route 180 to Southbound Route 41 connector ramp
- Maintain portions of existing landscaping
- Erosion control including slope stabilization and storm water pollution prevention.
- Rock blanket within gore and median areas as indicated on draft Layout Plans.
- All new pavements should be jointed plain concrete pavement (JPCP) with 20-year design except conforming areas to connect to the existing facility where 20-year design hot-mix asphalt (HMA) will be allowed.
- To maintain the same number of traffic lanes during construction, a temporary 12' lane and 2' shoulder will be constructed adjacent to the eastbound No. 1 lane, approximately from Stations 855 to 930. The structural sections of this lane will have to be designed to provide 20-year life pavement. When this detour lane is no more needed, the pavement will be left in place. However, it shall be restriped to restore the 10' original median shoulder.

1.3.4 Cooperation

Attention is directed to Section 7-1.14, Cooperation,” and Section 8-1.10, “Utility and Non-Highway Facilities,” of the Standard Specifications and these special provisions.

It is anticipated that work by other contractors on the following projects may be in progress adjacent to or within the limits of this project during progress of the work on this contract:

1.3.4.1 Department – Westbound Route 180 To Northbound Route 41 Connector Ramp Metering

Ramp metering of this connector ramp is scheduled to begin construction in May 2011.

2 PROJECT MANAGEMENT

2.1 Scope Management

2.1.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements of scope management, including preparing, documenting, revising, and submitting information that details the Work and changes to the Work.

2.1.2 Administrative Requirements

Following NTP1, the Design-Builder shall structure its project management processes, including payment breakdown on invoices and file structure for document control according to the activity breakdown provided in the Project Schedule.

The Design-Builder shall schedule, conduct, prepare, and distribute the minutes of an overall Project preconstruction conference.

2.1.3 Deliverables

The Design-Builder shall provide Project preconstruction conference minutes within seven Days after the preconstruction conference.

2.2 Cost Management

2.2.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements of cost management, including the preparing, processing, revising, and submitting of invoices and progress reports.

2.2.2 Administrative Requirements

2.2.2.1 Payment Breakdowns

Following NTP1, the Design-Builder shall develop a payment breakdown based on Form 9 of the ITB and the activity breakdown in the Project Schedule. This breakdown shall be documented in an Original Payment Breakdown.

The Design-Builder shall ensure that all costs necessary to meet the particular requirements of each item are included in the payment breakdown.

During the course of the Project, the Design-Builder shall incorporate any Approved changes to the payment breakdown and document the new payment breakdown in a Revised Payment Breakdown.

In all payment breakdowns, the Design-Builder shall show the total cost per item and the cost per billing period for each item.

The Design-Builder shall ensure that all cost breakdowns are consistent and total up to the Contract Price.

The Design-Builder shall be entitled to mobilization in the amount of 5 percent of the Contract Price.

2.2.2.2 Invoices

2.2.2.2.1 General

Department reserves the right to withhold processing of an invoice if the requirements of this section are not met.

The Design-Builder shall structure the billing periods to start on the first day of the month and end on the last day of the month. The Design-Builder shall include the following on the invoice cover sheet:

1. Project numbers (federal and State) and title
2. Invoice number (numbered consecutively starting with “01”)
3. Period covered by the invoice (specific Days)
4. Total earned to date for the Project as a whole and for each Work Segment, if any
5. Authorized signature and title of signatory
6. Date that invoice was signed

The Design-Builder shall include the Progress Report, for the period being billed, with the invoice.

On a monthly basis, at a minimum, the Design-Builder shall meet with Department to review the following prior to submitting invoices:

- Activity percent completes, which are based on physical percent complete estimated by the field personnel relating to a resource and cost loaded schedule activity
- Incorporation of approved Change Orders as individual activities with proper title, coding by Change Order number, associated logic, duration, as well as cost/resource loading
- Verification of any unit price items
- Status of outstanding Nonconforming Work and Warranties
- Backup documentation for cost reimbursable procurement and Change Order schedule activities

2.2.2.2.2 Invoice Calculations

Department will base payments on Department’s estimate of physical percent complete of the Work, not on measured quantities (except where specifically stated in the Contract).

The payment to the Design-Builder will be the amount shown on the Design-Builder’s Approved invoice less deductions made by Department.

The following Project Management items from Form 9 submitted with the technical and price proposal will be paid by prorating any unpaid balances by the amount of time remaining until Substantial Completion:

- Contract Management (includes Scope Management, Cost Management, and Schedule Management)
- Quality Management
- Human Resources Management
- Safety Management
- Public Information Management
- Environmental Management
- Maintenance During Construction
- Insurance (no payment will be made for insurance until insurance invoices are provided)
- Bonds

The Department makes the payments for Mobilization according to Public Contract Code § 10264.

The Department pays the item total for mobilization in excess of 10 percent of the total bid in the first payment after Final Acceptance.

Earned value does not include the costs of bonds, insurance and prior mobilization payments.

The Department will base payments for design based on estimated percentage complete for each Release for Construction (RFC) package with the following limitations:

- 25 percent will be paid at NTP1.
- 50 percent when 10 percent of the original Contract amount has been earned. Earned value does not include the costs of bonds, insurance and prior mobilization payments.
- 25 percent when 25 percent of the original Contract amount has been earned. Earned value does not include the costs of bonds, insurance, and prior mobilization payments

Department will base payments for design based on estimated percentage complete for each Release for Construction (RFC) package with the following limitations:

- A maximum 90 percent will be paid when RFC Documents have been issued.
- A maximum of 95 percent will be paid when all construction Work associated with each RFC package is complete.
- A maximum of 100 percent will be paid when all As-Built Documents and Project History File Documents have been Accepted.

2.2.2.3 Progress Report

The Design-Builder shall include the following in a monthly progress report:

1. Summary of work performed during the previous month. Include digital color photographs of the Project progress.
2. Safety
 - Summary of Project accidents (frequency and severity) and corrective actions taken
 - Updates to emergency services access points to the Project Site
 - Updates on safety training provided
3. Labor compliance
 - The total monthly labor hours for construction/maintenance and non-construction personnel by classification of management, engineering, and other technical personnel used on the job.
 - Disadvantaged Business Enterprise (DBE) progress and Project updates
 - Equal Employment Opportunity (EEO) progress and Project updates
 - Update on labor compliance unresolved issues
4. Quality updates
 - Summary of quality audits and quality control processes performed
 - Listing of non-conformances and resolutions
 - Summary of Quality Manual updates
5. Public Information updates
 - Summary of public input received and responses
 - Summary of media contacts
 - Summary of complaints and resolution
6. Environmental compliance
 - Summary and copies of environmental monitoring reports
 - Summary of non-compliance issues and resolution
 - Summary of agency inspections
7. Utilities
 - Status of private utility work performed and required

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- Status of public utility work performed and required
8. Geotechnical
 - Summary of vibration and settlement monitoring activities and issues
 - Copies of vibration monitoring reports
 - Copies of settlement monitoring reports
 9. Maintenance of Traffic
 - Summary of traffic switches and a look ahead to future traffic switches
 - Summary of known traffic incidents within the Work zone
 10. Visual Quality
 - Summary of visual quality activities
 - Summary of recommendations and decisions
 11. Change Orders
 - Summary of outstanding change orders
 12. Project reporting
 - The Design-Builder and all subcontractors shall complete a monthly report on the number of newly hired employees and the number of existing employees. This information shall include the number of employees (subtotal by new hire and existing), total hours for employees (subtotal by new hire and existing), and total wages for employees (subtotal by new hire and existing). The information shall be submitted on a form that will be provided by Department.

2.2.3 Deliverables

2.2.3.1 Invoices

The Design-Builder shall include with the monthly invoice an electronic copy of the billing spreadsheet, and an updated schedule in an electronic media compatible with Department's software.

2.2.3.2 Monthly Progress Reports

The Design-Builder shall provide six hardcopies of the Monthly Progress Report and an electronic pdf copy.

2.2.3.3 Original Payment Breakdown

The Design-Builder shall submit for Department Acceptance the Original Payment Breakdown for Approval as a condition of NTP2. Department will respond within 20 Working Days of receipt of the Original Payment Breakdown.

2.2.3.4 Revised Payment Breakdown

The Design-Builder shall submit the Revised Payment Breakdown for Department Acceptance of any change to the Payment Breakdown. Department will respond within 20 Working Days of receipt of the Revised Payment Breakdown.

2.2.3.5 Design Breakdown Report

Within 20 Working Days of NTP1, the Design-Builder shall provide a breakdown of the design hours and design costs for the Project in accordance with the following:

- The breakdown shall be provided in an electronic Excel spreadsheet.
- The breakdown shall list all major design activities. At a minimum, the breakdown should be broken down to a level of detail consistent with the Baseline CPM schedule.

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- The breakdown shall list hours and rates per activity for each employee classification (e.g., Technicians, Senior Engineers, Project Managers, Administration).
 - The breakdown shall list budgeted expenses per activity.
 - The breakdown shall list a combined mark-up factor for overhead and profit.
 - The spreadsheet shall sum the design activities, hours per activity, expenses, and overhead/profit mark-up into a single Lump Sum value equal to **Form 9, Line 9** – Design Services.

2.3 Schedule Management

Schedule Management shall be in accordance Design-Build Modifications to Caltrans Standard Specifications 8-1.04 Progress Schedule of the Contract Documents.

2.4 Quality Management

2.4.1 General

2.4.1.1 Design-Builder Responsibility

The Design-Builder shall develop, implement, and maintain a Quality Program (QP) meeting the requirements of this Section 2.4. The QP shall be comprised of the Design-Builder's quality policy, quality objectives, design and construction quality plans, quality procedures, Work instructions, and records.

The Design-Builder shall be responsible for all Work for the design and construction quality of the Project and for fully complying with the Project's scope of Work and the Design-Builder's Quality Program (QP).

2.4.1.2 Department Role

Department will assure the Design-Builder's Quality Program is effective.

2.4.1.3 Quality Management Goals

2.4.1.3.1 Integrated Program

The Design-Builder shall develop, implement, and maintain a Quality Program that:

- Establishes comprehensive quality management processes and procedures.
- Integrates the quality goals of both the design and construction elements of the Project.
- Defines the minimum standards and procedures for quality management.
- Assigns the responsibilities for specific quality management functions.

2.4.1.3.2 Design Quality Management

The Design-Builder shall develop, implement, and maintain a design quality management plan that includes the following:

- Exhibits sound Design Quality Control and Quality Assurance review processes.
- Ensures the Released for Construction Documents meet the requirements of the Contract.
- Provides quality measures and encourages continuous improvement of the design deliverable products.
- Involves Department throughout the entire design development process.
- Integrates local and regulatory agencies and other applicable third parties in the design review comment process.

2.4.1.3.3 Construction Quality Management

The Design-Builder shall develop, implement, and maintain a construction quality management plan that:

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- Provides quality measures and encourages continuous improvement of the construction phase.
 - Educates all construction staff of their role in the quality management program and ensures they understand their role is to build the Work in accordance with the Released for Construction Documents and the Project requirements.
 - Ensures all construction quality assurance staff understand their role is to determine whether the Work meets the Project requirements.
 - Integrates all Subcontractors and Suppliers in the construction quality management plan.
 - Involves Department throughout the entire construction process.

2.4.1.3.4 Continuous Improvement

Department expects Quality Program improvements throughout the delivery of the entire Project. It is of the utmost importance that the Design-Builder involves all its staff and partners with Department to ensure overall Project satisfaction.

2.4.1.3.5 Flexibility

The description of the Quality Program in this Section 2.4 is not intended to be all encompassing, but to give the Design-Builder and Department the flexibility to design and develop a program that best fits the needs of the Project and both parties.

2.4.2 Administrative Requirements

2.4.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to quality management, the order of precedence shall be as set forth below, unless otherwise specified:

- Special Provisions*
- Caltrans Standard Specifications
- Standard Plans
- Department Technical Memoranda
- Caltrans *CADD Manual**
- AASHTO/NSBA *Steel Bridge Collaboration—Shop Detail Drawing Review/Approval Guidelines*
- AASHTO/NSBA *Steel Bridge Collaboration—Shop Detail Drawings Presentation Guidelines*
- AASHTO/NSBA *Steel Bridge Collaboration—Steel Bridge Fabrication QC/QA Guide Specification*
- Remaining standards set forth in Book 3

*Document modified for design-build.

2.4.2.2 Quality Approach

The overall quality approach defined by this Section requires the Design-Builder to develop, implement, and maintain a Quality Program that encompasses the design and construction quality aspects, as well as documentation requirements for the Project. Department will audit the Design-Builder's Quality Program to determine whether quality activities are being carried out and implemented effectively.

The Design-Builder shall perform Quality Control and Quality Assurance activities for the design of the Project in accordance with the policies and procedures defined in the Quality Manual described in Section 2.4.2.3. Department's oversight role will include audits of the design products.

The Design-Builder shall perform construction quality testing and inspection activities to ensure that materials and the constructed Work meet Contract requirements. The Design-Builder shall perform tests and inspections in accordance with the policies and procedures defined in the Quality Manual. Department will perform contract acceptance testing and inspection for verification that the Work meets Contract requirements.

The Design-Builder shall document quality activities and maintain quality data in accordance with the policies and procedures defined in the Quality Manual. The Design-Builder shall provide a Document Control System to store and record all documents generated under the Contract for document management. The Design-Builder shall enter all Project documents including documentation of quality activities, tests, inspections, plans, reports, and correspondence into the DCS.

2.4.2.3 Quality Manual (QM)

2.4.2.3.1 Quality Manual – General (CT approves – timeframe?)

The Design-Builder's Quality Program shall include a Quality Manual (QM). The Quality Manual shall encompass all Contract requirements with regard to design, construction, and documentation requirements for all quality processes. The Quality Manual shall be approved and endorsed by the Design-Builder's executive management committee.

The Department shall approve the Quality Manual prior to start of any work and shall be in effect until all requirements of the Contract have been fulfilled and the Project is Accepted.

The Design-Builder shall revise its Quality Manual and its implementation when either the Design-Builder or Department identifies a systemic problem. These revisions shall be approved by the Department prior to implementation.

The structure of the documents describing the Quality Manual shall be: Quality policy (for the entire Quality Program), quality objectives, policies (for each element of the Quality Manual), procedures, forms and work instructions.

The Quality Manual shall graphically show, via flow chart, the processes and their relationships to each other, the inspection and test controls, and a narrative for each process.

Quality Program Procedures

All written procedures shall clearly describe the purpose of the process, overview of the process, responsibilities, steps of the process, and records resulting from the process.

Withholding of Payment and Work Suspension

If there is evidence that the Design-Builder's quality procedures are not adequate (as evidenced by Department's oversight reviews or problems during design or construction), Department may, at its sole discretion, withhold payment for design and construction until sufficient quality procedures are in place. If construction is in progress, Department may suspend ongoing work represented by the deficient quality procedures and require correction of design and/or construction defects.

Subject to Department's determination, Department may assess the Design-Builder a \$100-per-hour monetary deduction for failure to facilitate satisfactory progress or completion of the Work. Hourly charges may be applied to periods during which Department determines the Design-Builder has not satisfactorily responded to a documented non-compliance. No charge will be assessed if the deficiency is corrected by the Design-Builder within one hour of written notification from Department.

2.4.2.3.2 Quality Manual – Template

To aid the Design-Builder with development of the Quality Manual for the Project, Department has developed a Quality Manual Template (Exhibit A) consisting of four volumes:

- Volume I – Quality Management Plan (includes the overall Quality Management Plan, Design Quality Management Plan, and the Construction Quality Management Plan)
- Volume II – Construction Quality Inspection and Testing Plan
- Volume III – Materials Control Schedule
- Volume IV – Document Management Plan

These manuals contain the quality processes and procedures Department expects to see in the Design-Builder's final Quality Manual for the Project. The template shall be considered minimum and the Design-Builder shall enhance these manuals as necessary to provide an overall comprehensive Quality Manual for the Project. The Design-Builder may submit its own Quality Manual, but it shall cover all the topics contained in Volumes I-IV of Department's Quality Manual Template and meet all requirements of the Contract. This Quality Manual will be subject to the Approval process detailed in this Section 2.4.3.1.

Other areas the Design-Builder should pay close attention to in their final Quality Manual are:

- Unique and/or innovative design items
- Unique and/or innovative construction items
- Warranty Requirements that could lead the Design-Builder to modify their quality processes or procedures

2.4.2.3.3 Quality Manual – Responsibility

The Quality Manual shall

- graphically depict the lines of responsibility and interfaces to describe the Design-Builder's organization;
- require that all Design-Builder personnel be responsible for reporting quality problems;
- describe all verification resources, such as design verifiers, checkers, inspectors, and testers that the Design-Builder will utilize;
- depict how the Design-Builder's design technical experts are incorporated into the construction phase of the Project

Quality Manual Personnel/Staff

The Design-Builder's Quality Manager shall:

- Be Approved by Department.
- Have overall responsibility for the success of the Quality Program
- Have no responsibilities in the production of the Work.
- Verify and provide confidence that the Work meets or will meet the contractual requirements.
- Be the point of contact to resolve non-conformances and project quality issues with Department.
- Report to the Design-Builder's executive management committee and be independent of the Design-Builder's Project Manager.
- Provide the Department Contract Manager with all reports and documents generated under the contract.
- Have the authority to stop work.

The Design-Builder shall also identify all other staff with the authority to stop Work, and ensure they understand the processes to implement this.

None of the Design-Builder's quality staff has the ability to deviate from Project requirements or to interpret Project specifications. Their role is solely to ensure the finished Work meets the requirements of the Contract.

Resource Qualifications

Personnel assigned to perform testing or inspection shall possess the necessary Department Technical Certifications for the Work they are testing or inspecting. Critical Activity Point Managers shall be registered Professional Engineers in the State of California or shall have the applicable Department Technical Certifications for the Work performed under the Critical Activity Point.

Management Accountability

The Quality Manual shall describe the Quality Manager's accountability for ensuring the effective implementation and maintenance of the Quality Manual.

Management Review

The Design-Builder's executive management committee shall review the Quality Manual at least quarterly, and more frequently if necessary, to ensure its continuing suitability and effectiveness in satisfying the requirements of this Contract and the Design-Builder's stated quality policy and objectives.

The Design-Builder shall invite Department to participate in the management reviews.

The management reviews shall, at a minimum, review the results of internal audits, Department audit results, corrective actions taken, trends in nonconformance, and time to resolution.

The outputs of management reviews shall be incorporated into the Quality Manual.

2.4.2.3.4 Quality Manual - Construction

Quality Planning

The Quality Manual shall include an Inspection and Testing Plan describing all of the proposed inspections and tests to be performed throughout the construction process. Department has provided a Construction Quality Inspection and Testing Plan in the Quality Manual Template, Vol. II. The Design-Builder shall tailor the Inspection and Testing Plan to meet the Project requirements.

Inspection and Testing Plan

The Inspection and Testing Plan shall

- describe all of the incoming, in-process, and final inspections and tests to be undertaken.
- show what products or services are to be subcontracted.
- be controlled through the provision of document control and be updated when new Subcontractor or Supplier contracts are implemented.
- identify critical activity points at which Work shall be formally accepted by independent quality personnel and Department prior to proceeding to the next stage of the Work. The Design-Builder shall provide Critical Activity Point Managers to ensure that all required tests and inspections have been performed leading up to critical activity points, and that the test and inspection results meet Contract requirements. The Design-Builder is encouraged to enhance this portion of the Construction Quality Inspection & Testing Plan from the Quality Manual Template.
- describe verification of Suppliers' and Subcontractors' compliance with requirements.

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- depict the Quality Inspection (QI) critical activity points from the Materials Control Schedule and shall contain a written sign-off form for this activity.
 - be approved by the Quality Manager.

The Design-Builder shall define the following within the inspection and testing procedures:

- The activity to be tested or inspected
- The agency or laboratory to perform the test or inspection
- The frequency of the test or inspection
- The test or inspection procedure or reference standard
- The specified requirement reference
- The record that documents the results

All material tests shall reference the activity ID.

The Quality Manual shall identify Work for which statistical techniques will be used as a basis of quality and acceptance or rejection of lots.

Materials Control Schedule

Department has provided the Materials Control Schedule (MCS) for the Project which outlines the minimum sampling, testing, and inspection required for most materials used in highway construction. The MCS is included as Vol. III of the Quality Manual Template.

The Design-Builder shall review the MCS for areas where inspection or testing is not addressed or the Design-Builder desires an increased rate of inspection or testing. The MCS has been reviewed and approved by the Federal Highway Administration (FHWA), so any recommended changes by the Design-builder will require Approval from Department and possibly FHWA.

Both the Design-Builder and Department shall designate a Materials Control Schedule Coordinator for the Project. The Design-Builder's designee will be directly responsible for all MCS issues that arise on the Project, including:

- Ensuring all requirements of the MCS are met.
- Evaluating and resolving of all test result and test tolerance issues.
- Ensuring proper sampling processes and procedures are utilized by all quality staff.
- Ensuring all Quality Inspection (QI) critical activity points are addressed as defined in the MCS.
- Reviewing and tracking all quality training requirements.
- Scheduling Independent Assurance reviews for the Project.
- Ensuring the Materials Certification for the Project is completed and all issues properly addressed.
- Ensuring proper completion of all sample cards and all necessary tests are completed on the sampled materials.
- Coordinating the MCS requirements with all Suppliers and Subcontractors.

The Department will be taking all samples for acceptance testing and independent assurance sampling testing. The material sample shall be submitted to the Materials Control Schedule Coordinator for delivery and testing.

The Design-Builder shall provide all applicable testing and inspection data, in a timely manner. This will ensure the MCS requirements are being adhered to and, if shortcomings are found, improvements to the

Inspection & Testing plan shall be made. The Design-Builder shall input and provide all testing and inspection records, including records from suppliers and subcontractors, electronically to the DCS.

Quantities and Production Tracking

Department will track general quantities of materials, labor, and equipment and enter the data into DCS.

The Design-Builder shall share quantities, as requested, for verification of testing rates (in accordance with the Materials Control Schedule) with both their quality staff and Department's staff on the Project.

2.4.2.3.5 Quality Manual - Design

General

All design (including design by Subcontractors) must meet the requirements of the Design-Builder's Quality Manual and the Contract Documents.

Design and Development Planning

The Quality Manual shall describe the design and verification activities separately.

The Quality Manual shall describe how the design team schedules the design efforts, including design reviews, verification and checking stages, and issue dates of design deliverables.

The Quality Manual shall include details as to the level of involvement of Department in the design development process. The Design-Builder is encouraged to involve Department in all design development processes, including Independent Technical Reviews, and Constructability Reviews.

The Quality Manual shall describe how the security of documents shall be controlled during the Project.

Organizational and Technical Interfaces

The Quality Manual shall describe the coordination of the design with construction.

Design Input

The Quality Manual shall describe how all design criteria, Contract requirements, and other design inputs are defined, reviewed, and approved.

The Design-Builder shall maintain an accessible, centrally controlled manual, database, or list that contains all relevant design inputs or references to design inputs to be used by design personnel to incorporate into the design.

The Design-Builder shall ensure that the design inputs are communicated to, and accessible by, the relevant designers responsible for incorporating design inputs into the design outputs.

Design Output

Submission of design documents to agencies other than Department shall be determined by the Design-Builder and included in the Quality Manual. All Work associated with review and comment of the design by outside agencies shall be the responsibility of the Design-Builder. The Design-Builder shall share copies of all correspondence with outside agencies and any design review comments by them with Department.

The Quality Manual shall define the design outputs (i.e., the specific plans and specifications) to be produced.

Released for Construction Documents

Released for Construction Documents shall constitute the documents issued for the purposes of construction.

The Design-Builder shall ensure

- that no construction Work is undertaken without Released for Construction Documents.
- that the timing of submission of Released for Construction Documents is indicated in the Project schedules.
- that all Work, including modifications to the Work, is designed under the authority of and signed by a California-licensed Professional Engineer.

All Released for Construction Documents shall meet the following requirements:

- The Design-Builder shall prepare plans that are similar in appearance and content as shown in the Plans Preparation Manual (PPM). Variations may result due to design-build delivery. The Design-Builder shall meet with Department to obtain Approval of any variations in plan content and format.
- The Design-Builder shall prepare all drawings in accordance with Department CADD standards.
- The Design-Builder shall ensure that all drawing files are prepared in MicroStation V8 version.
- The Design-Builder shall ensure that CAiCE is used for design, unless otherwise specified by Department.
- The Design-Builder shall ensure that all deliverables containing CADD data shall be in MicroStation, see Section 4.1 of CADD Users Manual, or CAiCE format for design deliverables, see Sections 3.6 and 3.7 of the CADD Users Manual. This shall include CADD data received from other agencies.
- The Design-Builder shall ensure that all Microstation drawings, CAiCE design files, and associated documents are organized in a logical manner, have a uniform and consistent appearance, and clearly depict the intention of the design and construction.
- The Design-Builder shall follow general plotting requirements as stated in Section 4.1 of the CADD Users Manual.
- The Design-Builder shall ensure that all designs and drawings are in U.S. Survey Foot.
- The Design-Builder shall include the limits of excavation for all excavation work.
- The Design-Builder shall include quantities in all Released for Construction Documents for all items which require inspection or testing in accordance with the MCS.
- The Design-Builder shall ensure that all special provisions, shop drawings, and other items necessary to construct the Work are submitted as Released for Construction Documents.

Shop and Working Drawing Documents

The Design-Builder's Engineer of Record shall review, approve, authorize, and confirm any methods or procedures that are contained in the Caltrans *Standard Specifications*, then submit the signed design drawings to the Design-Builder's construction team. The construction team shall then generate shop and working drawings as necessary to clearly define, control, construct, and inspect the Project. These working drawings shall be sent back to the design team for review and internal approval. All such drawings shall be reviewed and approved by the Engineer of Record, and shall be stamped "Approved for Construction" as per the Caltrans *Standard Specifications*; prior to being issued for construction.

The Design-Builder shall consult with Department and all other applicable governmental entities that may require review of shop and working drawings and shall coordinate the preparation, submittal, and review of all such shop and working drawings. Where governmental approvals or approvals from Utility Owners are required, shop and working drawings shall be submitted to the applicable party for review and approval in accordance with their requirements.

Shop and working drawings for the Project shall include structural steel fabrication plans, anchor bolt layouts, shop details, erection plans, equipment lists, and any other information specifically required by the Construction Quality Manager, Caltrans *Standard Specifications* or other governmental entities.

Shop and working drawings and calculations for excavation shoring, cribs, cofferdams, falsework, MSE walls, overhead signs, temporary support systems, formwork, and other temporary Project elements that describe the methods of construction proposed to be used for the Project shall be prepared by the Design-Builder in accordance with their Quality Manual. Receipt of submittals for temporary Project elements by Department shall in no way constitute approval of the planned Project element or impose any liability upon Department.

Approved shop or working drawings shall be provided to Department at least five Working Days prior to the start of any construction detailed by those drawings. The Design-Builder shall make no changes in any approved shop or working drawing after the design engineer has approved them. Any deviations from approved shop or working drawings shall require the fabricator to submit revised drawings to Design-Builder's design engineers for their approval, as outlined above.

As-Built Documents

The Design-Builder shall deliver to Department As-Built Plans that depict the final completed Project, including all changes from Released for Construction submittals, and data showing all items such as the electrical systems, drainage systems, lighting systems, underground and overhead Utilities, traffic controls and striping, signing placement, highway alignment and grade revisions, typical sections, and all other relevant data, including any operations and maintenance manuals for mechanical and electrical systems.

The Design-Builder shall ensure that the As-Built Documents meet the requirements of the Released for Construction Documents and the following additional requirements (see Section 4.3 of the CADD Users Manual and the Construction Manual):

- As-Built Documents shall include all base mapping (topography), design plans (including shop drawings), design calculations, design reports, specifications, and electronic CADD data.
- The Design-Builder shall ensure that all title blocks of calculation sheets include the calculation title, file number, page number, initials of the designer and the checker, and dates of design and checking.
- The Design-Builder shall ensure that all calculations indicate the design requirement, the assumptions made, the methods used, the source of the information, and the cross-reference for the applicable design drawings.
- The Design-Builder shall ensure that all structure calculations performed using software are independently checked by a California-licensed Professional Engineer with 10 years minimum experience. The Design-Builder shall ensure that all calculations are verified.
- The Design-Builder shall ensure that all calculations are readily accessible, clear, understandable, concise, complete, and accurate.
- The Design-Builder shall ensure that all calculations are bound and numbered with a table of contents.
- The Design-Builder shall ensure that all calculations identify the code or standard utilized and indicate the specific section referenced in the right hand column.
- In the calculations, the Design-Builder shall reference the computer programs used.
- The Design-Builder shall ensure that all manual calculations are printed, neatly and legibly, on 8½-inch by 11-inch or 11-inch by 17-inch standard computation sheets.

The Design-Builder shall ensure that the As-Built Documents reflect the actual condition of the constructed Work. The Design-Builder's Project Manager shall sign and date the title sheet of the As-Built Plans to

certify that the Project was completed in accordance with the plans, the Contract Documents, the governmental approvals, and applicable law.

The Design-Builder shall collect, properly identify, and deliver to Department all original diaries, logs, notebooks, accounts, records, reports, and other documents prepared in the performance of the Contract upon completion or termination of the Contract.

Design Review

Department Review Procedures

Department will review as many design packages as it can within the limitations of its staff; however, at Department's sole discretion, it may limit the number of design submittals, and design re-submittals in a given week.

After each formal review, the Design-Builder shall address all comments and concerns raised by Department by revising the design and/or plans to Department's satisfaction.

Over-the-Shoulder Reviews

Over-the-shoulder reviews are informal examinations by Department of design documents during the Project design process. Over-the-shoulder reviews will mainly assess whether the requirements and design criteria of the Contract documents are being followed and whether the Design-Builder's design quality management plan activities are being undertaken in accordance with the approved Quality Manual.

Each design package may have multiple over-the-shoulder reviews at the request of either Department or the Design-Builder. The reviews may, at Department's discretion, include review of design drawings, electronic files, calculations, reports, specifications, geotechnical data, progress prints, computer images, draft documents, draft specifications and reports, other design documents, and any other relevant design information as requested by Department.

It is the intent of these reviews to check for concept, level of detail, design criteria, and fatal flaws. Comments made by the oversight team will be considered non-binding. It is the Design-Builder's responsibility to confirm conformance with the Contract requirements. These reviews will not routinely include detailed calculation or drawing reviews, although Department retains the right to perform detailed reviews of any item at any time. If mutually agreed upon between the parties, for specific review items, the over-the-shoulder review may consist of an exchange of electronic files between the Design-Builder's designer and Department.

The Design-Builder shall schedule over-the-shoulder reviews with Department during the course of the development of each design package, prior to issuance of Released for Construction Documents. The over-the-shoulder reviews are not critical activity points that restrict the progress of design. They are simply reviews of the design as it progresses and opportunities for Department to provide comments and feedback on the design. The Quality Manual shall define the frequency, timing, content, and format of the over-the-shoulder reviews.

Prior to every over-the-shoulder review, the Design-Builder shall provide Department with hardcopies of the latest design of the element to be reviewed.

In-Progress Design Workshops

Throughout the design process, the Design-Builder or Department may request (with at least five Working Days notice) in-progress design workshops to discuss and verify design progress and to assist the Design-Builder and/or its designer(s) in resolving design questions and issues.

At least five Working Days prior to each in-progress workshop, the Design-Builder shall assemble and submit drawings or other documents to be reviewed during the workshop to Department for its information and review.

The Design-Builder shall maintain a written record of all in-progress design workshops, including:

- A list of the participants in attendance
- Description of the items covered and discussed
- Identification of discrepancies and comments, and a report on corrective actions (both those taken and those planned)
- Identification of follow-up action items, due dates, the party responsible for action items requiring resolution, and deadlines for resolution

Oversight Visits

Throughout the design process, Department may make oversight visits to discuss and verify design progress and ascertain the overall progress of the Project with respect to the Design-Builder's Quality Manual. If, at the sole option of Department, the Design-Builder is not meeting the goals and objectives of the Quality Manual, the Design-Builder shall suspend all Project work and Department may withhold payment for the associated design activities.

Department Review Time Requirements

Department will complete its review of the Design-Builder's plans and submittals based on the following review time requirements:

QMP	30 Calendar Days
Design Plans	15 Calendar Days
Structure Plans	15 Calendar Days
Shop Plans	15 Calendar Days
Released for Construction Submittal:	10 Working Days
Other Reports/Plans	***
Design Exceptions	30 Calendar Days
RFI Submittal:	3 Working Days

*** Review times for Other Reports/Plans are established in the Technical Provisions as 15 to 30 Calendar Days

These review timelines depict the maximum allowed time Department has to review the associated submittals and respond to the Design-Builder without impacting the overall Project schedule. Each design package above may go through multiple iterations of review by Department before Acceptance. The Department review timelines above start over for each package re-submittal. The actual Department review timeline may be directly related to the extent of involvement the Design-Builder allows during the design development process. More up-front Department involvement may shorten the review timelines. Department, however, makes no guarantees of a streamlined review process for any design submittal. Submittal review times may be reduced or extended as mutually agreed upon for simple or complex submittals. Department does not control and therefore cannot guarantee the review times by third parties.

Design submittals

Released for Construction Submittals

The Design-Builder shall submit the Released for Construction (RFC) Documents to the Design Quality Manager for review and approval prior to submitting the RFC Documents for Department approval. The Design-Builder shall incorporate comments from the over-the-shoulder reviews and/or re-submittals into its design and resolve all concerns and questions to the satisfaction of Department. RFC Documents are intended to allow construction to begin on segments or elements of the Project as the design progresses and before final design is complete.

The Design-Builder may proceed with construction of elements or portions of the Project in accordance with Released for Construction Documents before the design of the entire Project has been completed at their sole risk.

The Design-Builder acknowledges and agrees that it may not start construction on any Released for Construction Documents until Department and applicable government entities, Utilities and Railroads Accept the Plans. Construction of any item, element, or phase covered by the Design Quality Manager's statement approving construction shall progress only to the extent covered by the design documents included in that approval. Before progressing further with construction, the Design-Builder shall complete the next phase of design or complete the final design, and obtain Department's concurrence. Any subsequent phases of design to be released for construction shall be checked and approved by the Design Quality Manager in the same manner as indicated above for the initial item or element.

Department's concurrence/acceptance will not constitute approval of the design or subsequent construction, nor relieve the Design-Builder of its responsibility to meet the Contract requirements. Irrespective of whether Department provides the Design-Builder with the authority to begin construction on elements of the Project prior to completion of the entire design, the Design-Builder shall bear the responsibility to ensure that construction meets the requirements of the Contract Documents, applicable law, and the governmental approvals.

Re-submittal Process

Re-submittals of any design submittal may be required if deemed necessary by the Design Quality Manager or Department. Each re-submittal must address all comments received from a prior submittal in a manner satisfactory to the commenting party. The Design-Builder shall not be entitled to any additional compensation or time extension due to any re-submittal requirement by the Design Quality Manager's review process or Department.

The Design-Builder acknowledges and agrees that re-submittal of any submittal may be required. The Design-Builder shall resubmit the submittal as many times as necessary to address the comments of the Design Quality Manager's review process and Department.

The Design-Builder may continue its design activities, at its sole risk, during the re-submittal process. Such continuation in no way relieves the Design-Builder of the responsibility to incorporate the comments of the re-submittal process and Department into the design documents.

Upon completion of the Design Quality Manager's review, the Design-Builder may forward such re-submittals to Department for review and comment. If Department requests additional information during review of the re-submittal, the Design Quality Manager shall conduct an additional review of the resubmitted items.

Concurrent Submittals

During Project Startup, a list and schedule of deliverables will be established and provided to Department.

It will be expected that more than one review package will be submitted for review at the same time requiring some of the reviews to be completed concurrently. However, the maximum number of submittals to Department allowed per week and per type are as follows:

Design Plans	2
Structure Plans	2
Other Reports/Plans	2

Design Changes

The Quality Manual shall describe how changes to design are identified, reviewed, and approved by authorized personnel prior to their implementation.

The Quality Manual shall describe the method of communicating changes or revisions made in the field.

Either the Design-Builder or Department may initiate design changes for items or elements undergoing construction.

2.4.2.3.6 Quality Manual – Document and Data Control

General

The Design-Builder's Quality Manual shall include a Document Management Plan. Department has provided a Document Management Plan, Vol. IV of the Quality Manual Template, for the Design-Builder to enhance and include in the Design-Builder's Quality Manual.

The Design-Builder's Document Management Plan shall:

- Describe the Design-Builder's document control system (DCS) to store and record all documents, correspondence, design inputs, drawings, progress reports, technical reports, specifications, Contract Documents, submittals, calculations, test results, inspection reports, nonconformance reports, administrative documents, and other documents generated under the Contract. This includes all hardcopy and electronic records.
- Identify how records are to be maintained and kept throughout the duration of the Project,
- Describe the methods by which all documents issued and received by the Design-Builder will be logged, tracked, and retrieved.
- Identify how all documents will be tracked using a unique document control number.

Document Submittals to Department

The Design-Builder shall furnish hardcopies of all Project deliverables to Department. All management plans, such as the Quality Manual, Public Information Plan, Environmental Management Plan, Utility Plan, and Traffic Management Plan shall be individually bound. Each document that is transmitted to Department shall be controlled by a unique document control number.

Electronic copies of all documents generated under the Contract, including all Project deliverables, shall be uploaded to DCS in native format and software-generated PDF format. An example would include creating PDF files from MicroStation drawings (DGN) for Released for Construction plan sheets. Scanned PDF files will not be accepted unless the original document is in handwritten form or if the original is not electronic.

All electronic data for Plan submittals; including MicroStation, CAiCE, and all other design software-specific electronic files to be submitted shall be uploaded to DCS in native format.

Document and Data Approval and Issue

The Design-Builder shall ensure that all deliverables include a signed and dated certification by the originator of the deliverable assuring that the deliverable is complete and meets the Contract requirements.

Document and Data Changes

The Design-Builder shall ensure that any changes to documents provided to Department are in a format that can enable changes to be readily apparent and trackable (e.g., documents using the redline/strikeout method).

2.4.2.4 Department Role**2.4.2.4.1 General**

Department will perform systematic audits, reviews, and testing and inspection in its role. There are three primary roles:

- Design auditing will be performed on the products of design (drawings, calculations, specifications, special provisions, studies, reports and other design outputs). Design auditing is performed on an ongoing basis during the design phase of the Project.
- Department will perform construction acceptance testing and independent assurance sampling and testing. Department will provide formal acceptance of Work at critical activity points. Department will also perform Source Inspection.
- Management Program auditing will be performed on the implementation of the Design-Builder's management plans and Quality Manual. These audits will be systematic and independent examinations to determine whether quality activities and related results comply with planned quality activities and expected results and whether they are implemented effectively and are suitable to achieve objectives.
- Each organization (i.e., Design-Builder, Subcontractor, Supplier, etc.) will be subject to periodic management system audits.

Auditing will entail the collection and documentation of objective evidence to verify whether requirements have been met. The results of auditing will be documented on standardized audit report forms with copies provided to the Design-Builder. Non-conformances will be communicated and tracked in separate reports. The audit results will also be recorded in a database, and regular summary and status reports will be provided to the Design-Builder. The timing, frequency, and depth of auditing will be at Department's discretion.

At any time as deemed necessary at the sole discretion of Department, Department oversight staff may perform inspections or take samples for further investigation of possible non-conforming Work.

2.4.2.4.2 Access and Testing

Representatives of agencies of the federal government and representatives of other agencies of California shall have the right to inspect the Work to the same extent provided above for Department and as required by Governmental Rules.

The Design-Builder shall provide safe access to the Work, its organization, and all Subcontractor and Supplier organizations to allow Department to carry out oversight activities. This will include the taking of samples for the purposes of testing, the examination of records, and interviews with personnel from the Design-Builder's organization and all Subcontractor and Supplier organizations.

The Design-Builder shall not use the results of oversight activities carried out by parties other than itself to be used as a substitute for its own quality activities, unless otherwise Approved in writing by Department.

The Design-Builder shall provide Department with copies of requested records within two Days of receipt of request.

When requested, the Design-Builder shall advise Department of the time, to within four hours accuracy, when a specific activity is scheduled within the next five Days.

The Design-Builder shall, within five Days of the identification of a construction-related non-conformance(s) by Department, propose a resolution for Department's Acceptance or Approval.

Following Acceptance or Approval of the proposed resolution by Department, the Design-Builder shall notify Department 24 hours prior to implementing the proposed solution so that Department may witness the implementation, should Department so choose.

2.4.2.5 Review and Disposition of Nonconforming Product

The Design-Builder shall ensure that non-conformances identified during the design verification and checking, testing, and inspection activities are recorded. The Design-Builder is responsible for the resolution of all non-conformances, including those of subcontractor or suppliers.

The Quality Manual shall describe how the Design-Builder plans to deal with discovered non-conformances, tracking non-conformances, resolving non-conformances, and preventing similar non-conformances from occurring on future work within the Project.

2.4.2.6 Corrective and Preventative Action

2.4.2.6.1 General

The Design-Builder shall review the cause of major and systemic non-conformances and develop corrective action to prevent recurrence.

The Quality Manual shall describe the corrective and preventive actions the Design-Builder will take upon the identification of actual or potential major and systemic non-conformances, identified internally or by Department.

The Design-Builder's proposed corrective action shall be documented in a format and medium acceptable to Department.

The Design-Builder shall advise Department when the corrective action has been implemented so Department may verify the implementation, should Department so choose.

2.4.2.6.2 Corrective and Preventive Action

The Design-Builder shall, within five Days of the identification of a major or systemic problem by either Design-Builder or Department staff, propose to Department, for their Approval, a corrective or preventive action to prevent the recurrence of the problem. The Design-builder shall update the Quality Management System to incorporate the Approved corrective action.

2.4.2.7 Internal Quality Audits

The Design-Builder shall ensure that internal quality audits, for each element of the Quality Management System, are performed at least every six months.

2.4.2.8 Software

The Design-Builder shall use the DCS for logging and tracking their construction inspection and testing data and for design comments logging, tracking, and resolution for this Project. The Design-Builder shall provide DCS access to the Department.

2.4.3 Deliverables

2.4.3.1 Final Quality Manual

2.4.3.1.1 Submittal and Approval

The Design-Builder shall submit six individually bound hardcopies and one electronic version on CD-ROM of the Quality Manual (Vol. I – IV) for Department Approval within 30 Days of NTP1. Department will respond to the Design-Builder within 30 calendar Days of receipt of the draft Quality Manual, and will either Approve or return comments on the submitted manual. If the draft Quality Manual is not Approved, Department's comments shall be corrected by the Design-Builder within 10 Days after Department has returned the comments and a new draft Quality Manual resubmitted. It is the Design-Builder's responsibility to meet with Department as often as necessary to discuss and resolve Department's comments within said 10 Days.

If the Design-Builder begins design before Approval of the Quality Manual, they shall do so only at their sole risk. Department reserves the right to withhold payment for design and construction Work until the Quality Manual has been Approved. Once the Quality Manual is approved, the Design-Builder shall not revise any portion without the prior written Approval of Department.

Following Approval, the Design-Builder shall provide Department with 10 hardcopies of the Quality Manual and upload an electronic version in native and PDF format into DCS.

2.4.3.1.2 Track Changes

The Design-Builder shall track all changes made to Department's Quality Manual Templates and clearly depict them to Department in their submittals. Versions with tracked changes shall be submitted with all native electronic files.

2.4.3.1.3 Ownership

The Design-Builder shall acknowledge in each submittal they understand that Department has full and complete ownership of the products submitted and may use all products on this and other projects without any compensation or consideration to the Design-Builder.

2.4.3.2 Released For Construction Documents

The Design-Builder shall submit to Department for Acceptance two hardcopies of all Released for Construction Documents. The Design-Builder shall create electronic PDF versions of all hardcopies and upload them into DCS. RFC packages shall include the following (at a minimum):

- Cover Sheet with submittal description and schedule activity identification
- Design Quality Manager Certification in accordance with the Quality Manual
- Design plans
- Design calculations
- Design reports
- Specifications
- Governmental, Utility Owner, and Railroad approvals

Other electronic files included in Released for Construction submittals shall include the following:

- MicroStation and/or CAiCE files, including all drawings and data files used to create the RFC Documents.

- Excel spreadsheet with drawing index (for DCS compatibility). This spreadsheet shall include the discipline, drawing number, drawing title, sheet number (sequentially), and sheet title.

2.4.3.3 Shop and Working Drawing Documents

The Design-Builder shall submit to Department two complete hardcopies of all shop and working drawings and upload electronic versions in native and PDF format into DCS.

2.4.3.4 As-Built Documents

The Design-Builder shall submit to Department for Acceptance two complete hardcopies of all As-Built Plans and one set of electronic files, tiff and dgn, on CD-ROM of all As-Built Documents available in a digital format (See Section 4.3 of the CADD Users Manual). Department will advise the Design-Builder of the status of their Acceptance of the As-Built Documents within 30 Working Days of receipt of same. Formal written Acceptance of the As-Built Documents must be granted by Department before finalization of the Contract. Upon Acceptance, the Design-Builder shall upload electronic versions of all As-Built Documents, in native and PDF format into DCS.

2.4.3.5 Product Data

The Design-Builder shall submit to Department for Acceptance two hardcopies of all manufacturers' warranties, guarantees, instruction sheets, parts lists, and other product data within 20 Working Days of installation of the items to which they relate, and in any event prior to Final Acceptance. Department will advise the Design-Builder of the status of this product data within 10 Working Days of receipt of same.

Electronic versions in native and PDF format shall be uploaded to DCS.

The Design-Builder shall ensure that the product data cited in this section are organized and indexed in a manner to allow easy retrieval of information.

2.5 Human Resource Management

2.5.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements of human resource management, including personnel, facilities, and equipment.

2.5.2 Administrative Requirements

2.5.2.1 General

All personnel performing Work on the Project shall have the experience, skill, and knowledge to perform the Work assigned to them. All personnel performing Work on the Project shall also have appropriate required professional licenses and certifications.

2.5.2.2 Key Personnel

2.5.2.2.1 General

Key Personnel for the Project shall include the following:

- Design-builder's Project Manager
- Construction Quality Manager
- Design Manager
- Traffic Engineering Manager
- Utilities Design Engineering/Coordination Manager
- Visual Quality Manager

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- Design Quality Manager
 - Hydraulics Engineer
 - Safety Manager

2.5.2.2.2 Minimum Requirements of Key Personnel

The following provides a brief job description and minimum requirements of the Key Personnel assigned to the Project. All Key Personnel will be required to be available to the Project Site during activities that involve their areas of responsibility.

The following provides a brief job description and minimum requirements of the Key Personnel assigned to the Project.

Design-Builder's Project Manager

- Shall be responsible for the overall design, construction, quality control, and Contract administration for the Project. This person shall have full responsibility for the prosecution of the Work, and will: i) act as agent and be a single point of contact in all matters on behalf of the Design-Builder; ii) be present (or his/her Approved designee will be present) at the Site at all times that Work is performed; iii) and have full decision-making and budgetary authority to act on behalf of the Design-Builder and bind the Design-Builder on all matters relating to the Project.
- Shall have at least five years or preferred 10 years of recent experience managing the design and/or construction of major highway projects.

Construction Quality Manager

- Shall be responsible for overseeing the day-to-day quality aspect of construction and Project management activities including managing the Design-Builder's workmanship inspections, overseeing Design-Builder's production testing, and coordinating with Department's verification testing and inspection.
- Either the Construction Quality Manager or the Design Quality Manager shall be designated as the Quality Manager by the Design-Builder and shall have overall responsibility for overseeing the Quality Management of design, construction, and Project management activities, including authority and responsibility for all Quality Management resources.
- The Design Quality Assurance Manager and Construction Quality Manager shall be different people.
- Shall report directly to the Design-Builder's executive management committee.
- Shall be assigned full-time to the Project and be on Site during regular business hours whenever any Work is being performed and be available to be on Site within two hours outside of regular business hours.
- Shall not have any production-related responsibilities.
- Shall have the authority to stop any and all Work that does not meet the Contract requirements.
- Must be a registered Professional Engineer in the State of California now or by the time the first Notice to Proceed is issued.
- Shall have at least five years or preferred 10 years of recent experience overseeing the inspection and materials testing on major highway construction projects.

Design Manager

- Shall be responsible for ensuring that the overall Project design is completed and design criteria requirements are met. The Design Manager must be available to Department within 24 hours whenever design activities are being performed, including design activities related to field design changes.
- Shall work under the direct supervision of the Design-Builder's Project Manager.

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- Shall be a licensed Professional Engineer in the State of California now or by the time the first Notice to Proceed is issued.
 - Shall have at least five years or preferred 10 years of recent experience in managing the design of highway projects.

Traffic Engineering Manager

- Shall report to the Design Manager.
- Shall be a licensed Professional Engineer in the State of California now or by the time the first Notice to Proceed is issued.
- Shall be experienced in signal design, lighting design, signing design, work zone safety, and work zone traffic control plan design.
- Shall have at least five years of recent relevant experience in traffic engineering and traffic management on similar projects.

Utilities Design Engineering/Coordination Manager

- Shall be responsible for the design and construction of the Utilities defined as the Design-Builder's responsibility in the RFP and for coordinating the design and construction of Utilities with other Utility Owners.
- Shall serve as the main point of contact on matters of public and private Utilities.
- Shall be a licensed Professional Engineer in the State of California now or by the time the first Notice to Proceed is issued.
- Shall report to the Design Manager.
- Must have experience in design of storm sewers, sanitary sewers, and water mains.
- Must show relevant experience with utility coordination and construction for a similar project

Visual Quality Manager

- Shall report directly to the Design Manager and provide Department's Contract Manager with all documents and reports generated under the contract.
- Shall have the authority to review construction work to ensure the construction details meet the requirements of the visual quality design details in the Visual Quality Manual. These reviews shall be included as construction holdpoints in the Design-Builder's Quality Manual.
- Shall be available during construction activities.
- Shall be a licensed designer in the State of California now or by the time the first Notice to Proceed is issued.
- Shall have a minimum of 10 years of recent extensive involvement in transportation projects in the disciplines of transportation planning and landscape architecture.

Design Quality Manager

- Shall report directly to the Design-Builder's executive management committee
- Shall be a licensed Professional Engineer in the State of California now or by the time the first Notice to Proceed is issued.
- Shall have responsibility for design quality management including overseeing the day-to-day quality aspects of design.
- Shall be responsible for implementing design related quality planning and training, as well as providing continuous improvement of the quality management system.
- Either the Construction Quality Manager or the Design Quality Manager shall be designated as the Quality Manager by the Design-Builder and shall have overall responsibility for overseeing the Quality

Management of design, construction, and project management activities, including authority and responsibility for all Quality Management resources.

- The Design Quality Assurance Manager and Construction Quality Manager shall be different people.
- Shall not be assigned any other duties or responsibilities on the Project.
- Shall have at least five years of recent experience managing and overseeing the design of major highway projects.

Hydraulics Engineer

- Shall report directly to the Design Manager.
- Shall attend regularly scheduled review, progress, coordination, and other meetings at the co-located facility.
- Shall be available to the Project within 24 hours during construction activities.
- Shall be a licensed Professional Engineer in the State of California now or by the time the first Notice to Proceed is issued.
- Shall have at least five years or preferred 10 years of recent experience designing and incorporating hydraulic features associated with urban roadways (e.g., roadway and storm sewer design, stormwater treatment structures, WCA, NPDES, Section 404 permits, and 401 certification).

Safety Manager

- Must not be under the direct supervision of construction personnel and will report directly to Design-Builder's Project Manager.
- Shall be on Site weekly and available to the Site for the duration of the Project.
- Shall have the authority to stop any and all Work when unsafe conditions are present.
- Must be familiar with work zone safety regulations and must have at least five years of recent experience working in roadway work zone safety and OSHA (Cal-OSHA) regulations.

2.5.2.2.3 Approval of Key Personnel

Department will have the right to Approve or reject the Design-Builder's Key Personnel prior to their participation on the Project. Such Approval will be based on the qualification requirements set forth above and elsewhere in the Contract Documents for all Key Personnel.

2.5.2.2.4 Deductions for Removal

Unless otherwise Approved, the Design-Builder will be assessed a monetary deduction for key personnel who can not meet the following commitments to the Project, except for extenuating circumstances, such as the disability or death of the employee.

The Design-Builder's Project Manager is to remain on the Project until Final Acceptance; if not, the monetary deduction to be assessed will be \$20,000.

The Design-Builder will be assessed a monetary deduction of \$15,000 for each of the key personnel in the following list who does not remain on the Project for the completion of his or her particular function:

- Construction Quality Manager
- Design Manager
- Traffic Engineering Manager
- Utilities Design Engineering/Coordination Manager
- Visual Quality Manager

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- Design Quality Manager
 - Environmental Compliance Manager
 - Hydraulics Engineer
 - Safety Manager

For any changes in personnel, the Design-Builder shall submit the qualification summaries and resume of the individual and obtain written Approval of the person's participation in the Project before his or her start of work.

2.5.2.2.5 Replacement of Key Personnel

The Design-Builder shall notify Department in writing of any proposed changes to Approved Key Personnel and shall include a detailed resume summarizing the items set forth above and elsewhere in the Contract Documents. No Key Personnel shall be replaced without the prior written Approval of Department. The changes will only be Approved if the replacement Key Personnel are equally qualified or more qualified than the original Key Personnel.

2.5.2.2.6 Directory of Key Personnel

The Design-Builder shall prepare a directory of Approved Key Personnel that includes the following information for each individual: name, Project title, Project office address, Project office location, e-mail address, telephone numbers (office, mobile, pager), and fax number. The directory shall be kept current throughout the course of the Project.

2.5.2.3 Co-location

2.5.2.3.1 General Provisions

For this Project, co-located facilities will be required. The Design-Builder shall provide or arrange for the use of meeting space for regularly scheduled Project meetings. The Design-Builder shall provide office space and high speed internet connections for the use of up to three Department personnel in the office of its design consultant during the design phase of the Project.

2.5.2.3.2 Location

The design consultant's office will be located in the city of Fresno for the design phase of the Project.

2.5.3 Deliverables

The Design-Builder shall submit to Department the directory of Approved Key Personnel within seven Days of NTP1.

If the Design-Builder proposes changes to Approved Key Personnel, the Design-Builder shall submit a request in writing setting forth the qualifications of the replacement(s) as required by Section 2.5.2.2 for Approval by Department.

2.6 Safety Management

2.6.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements of safety management.

2.6.2 Administrative Requirements

2.6.2.1 Design-Builder Safety Management Plan

The Design-Builder shall develop, implement, and maintain a written Safety Management Plan that describes the processes to be followed.

The Plan shall be Project-specific, shall include Work to be performed by Subcontractors, and shall describe processes to control hazards.

At a minimum, the Design-Builder's Safety Management Plan shall:

1. Be consistent with the Project insurance requirements.
2. Describe the participation of safety personnel in all Work activities.
3. Delineate administrative responsibilities for implementing the Safety Program.
4. Identify responsibilities and accountability.
5. Identify full-time dedicated safety professionals or managers covering all production shifts.
6. Describe the process of conducting safety orientation for all employees. The description of the safety orientation process shall include the following:
 - a. A description of the extent and nature of the Project
 - b. A description of any hazards that can typically be expected during the course of Work that is specific to the job assignment
 - c. Required Work practices, job conduct, and injury-reporting procedures
 - d. Any other general information to acquaint the employee with special Work and safety requirements at the Work Site
7. Describe the Design-Builder's drug policy, including the policy at the Work Site and any pre-job Site and post-incident drug testing to satisfy Project insurance requirements.
8. Describe employee-training requirements.
9. Describe safety inspection procedures of Work areas, materials, and equipment to ensure compliance with the Safety Program; methods of record keeping; and correction of deficiencies.
10. Describe incident and emergency response procedures for incidents, including response capabilities, evacuation and egress, responsibilities for reporting and investigating incidents, exposures, contingency plans, and the maintenance of safety-related logs.
11. Describe incident reporting procedures.
12. Describe the Design-Builder's Work Site control policy and plans for maintaining Site cleanup, on-Site first aid facilities or medical clinic, and safe access.
13. Identify public safety requirements (e.g., fencing, signs, barricades).
14. Describe the Design-Builder's hazard communication program.
15. Describe the process of including representatives from the Design-Builder and all major Subcontractors, as well as Department personnel working on the Project.
16. Describe the Design-Builder's method of tracking open safety issues.
17. Describe hazard analysis, tracking, reduction of risk, logs, and mapping procedures.
18. Describe the Design-Builder's management and auditing of the Safety Management Plan.
19. Describe personal protective equipment (PPE) requirements and policy.
20. Describe safety procedures for Design-Builder's employees working around and handling contaminated materials.

2.6.3 [NOT USED]**2.6.4 Construction Requirements****2.6.4.1 Working Conditions**

All Work under this Contract shall comply with the requirements and standards specified by the Williams-Steiger Occupational Safety and Health Act of 1970, 29 U.S.C. §651, et seq., Public Law 91-596, as well as other applicable federal, State, and local laws. The Design-Builder shall not require any laborer or mechanic to Work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to his/her health and safety as determined under construction safety and health standards promulgated by the U.S. Secretary of Labor.

2.6.5 Deliverables

The Design-Builder shall submit three individually bound copies of the Safety Management Plan and revisions to the plan for Approval within 20 Days of NTP1.

The Design-Builder shall provide verbal notification and a written report to Department of all incidents arising out of or in connection with the performance of the Work, whether on or adjacent to the Site, which cause death, personal injury, or property damage. The Design-Builder shall verbally notify Department within one hour from time of occurrence of an event causing public injury. Verbal notification shall include date and time, location, brief description, extent of property damage, and extent of injuries.

The Design-Builder shall provide a written monthly incident summary report to Department as part of the Progress Report conditions of Section 2.2.2.3.

EXHIBIT 2-A

Quality Manual Template

This exhibit is provided as an electronic file.

3 PUBLIC INFORMATION

3.1 General

The Design-Builder shall perform all Work necessary to meet the requirements associated with public information in accordance with the requirements of the contract document and these technical provisions.

3.2 Administrative Requirements

Public information goals for the Project shall be consistent with the Department *Strategic Plan* (see Book 3, Applicable Standards). These include meeting customer expectations with information that is reliable and encourages open communications with and among all audiences.

3.2.1 Standards

1. Caltrans Project Communication Handbook

3.2.2 Public Information Plan

At a minimum, Department requires its communications efforts for this (and every) Project to establish and build trust between Department, the Project Design-Builder, Project stakeholders, and the general public.

To be effective on all projects, three broad categories of information shall be communicated and coordinated between Department and the Design-Builder. These are messages that communicate the following:

- The **Vision** of the Project – answers to questions such as why the Project is needed, what Work will be done, how the Project will benefit customers, how the Project fits into the community, and how the Project fits into the State’s broader transportation plans.
- The Project’s **Progress** – ongoing messages to keep people informed about how the Project is moving forward, whether it’s on schedule and on budget, what disruptions or improvements are coming in the near future, and what beneficial innovations are being used.
- **Coping** during the Project – information that helps people deal with inconveniences caused by the Project, such as details about detours, blocked driveways, traffic restoration projects, and, construction and noise impacts on local residents and businesses. This shall include describing informational resources available to the public.

The Design-Builder shall develop and maintain a consistent level of public communication with the goal of establishing public awareness and understanding of the Project. To this end, the Design-Builder shall develop, implement, and maintain a Public Information Plan (PIP) that recognizes the fluid nature of the Project, as well as the fact that the communications program’s goals are critical to the overall success of the Project. (The PIP shall incorporate communications processes defined throughout Section 3 and those required in other functional areas, such as determining the construction and noise impacts on local residents and businesses.) The Design-Builder shall develop the PIP consistent with Exhibit 3-A, . The Design-Builder shall serve as a facilitator to address public information issues and shall be proactive in providing information and responding to the public.

The Design-Builder’s public information staff shall be accessible 24 hours a Day, seven Days a week, and shall respond within two hours of contact to address Project issues (except in cases of emergency situations, in which case response shall be within 15 minutes). The Design-Builder’s public information staff shall provide contact information, including home, fax, mobile, and pager numbers, to Department within two Days of NTP1. The Design-Builder’s public information staff shall hold coordination meetings weekly (or as jointly deemed necessary) with Department.

The Design-Builder shall meet at least weekly with Department and other appropriate representatives as designated by Department to review, assess input, and/or modify the Design-Builder's Public Information Plan. Regular communications shall occur with Department, which includes phone calls and e-mail updates.

The Design-Builder shall use the Public Information Plan as the framework for disseminating and responding to information from the public. The Design-Builder shall become aware of and comply with the California Public Records Act throughout the Project.

3.2.3 Customer Groups (Audiences)

Department has identified a number of customer groups that must be communicated with during the Project. The Design-Builder shall describe in its Public Information Plan its approach to communicating with these groups and coordinating with Department. The identified groups include :

- Area residents
- Property owners
- Commuters
- The traveling public
- Commercial vehicle operators
- City staff and regional government officials
- Fresno County Transportation Authority (FCTA)
- City Chamber of Commerce
- Department employees
- School district transportation agencies/charter companies
- Business owners, employees, and customers
- News media, specifically the *Fresno Bee*
- Emergency response agencies, including police, fire, and ambulance agencies
- County Sheriff
- Utilities
- School districts
- local Colleges
- Water management organizations, environmental permitting agencies, and other local service districts

3.2.4 Crisis Communications

The Public Information Plan shall include a crisis communications approach for responding to emergencies and incidents during the Project. The Design-Builder's crisis communications approach shall include the following:

- Designated staff to respond to the emergency
- Types of potential emergencies
- Approaches to addressing potential emergencies
- Cause of specific disruptions (i.e., whether construction-related or not)
- Actions being taken to alleviate the problem
- Impact to the public and notification procedures
- Anticipated duration of the disruption

3.2.5 Data Collection and Management

The Public Information Plan shall include an approach for the collection, organization, and management of information about the Project and about the public's wants and needs. This requires the Design-Builder to collect, compile, and access information regarding construction and to assess the perceptions and emotions of the public during the course of the Work.

The Design-Builder's data collection and management approach shall account for the ongoing information needs of various customers. For example, residents, commuters, and most other customers will need information about the construction schedule and what roads will be affected and/or closed by construction. Likewise, commercial vehicle operators will need specific information on any conditions that would restrict or prevent commercial vehicles from using roadways under construction. Emergency response providers shall be notified by the Design-Builder if designated routes for emergency vehicles are altered. All Project customers and stakeholders will require reliable, accurate, accessible, and timely information on when and where construction is taking place.

In addition, the Design-Builder's data collection and management approach shall describe strategies to identify and respond to customers' perceptions and emotions, and stakeholder concerns throughout the duration of the Work. This shall include a detailed description of the information-gathering process and specific timelines developed to ensure timely responses.

In addition to its own innovative strategies and solutions, the Design-Builder shall employ the following methods for collection and management of data.

3.2.5.1 Construction Activities and Maintenance of Traffic Information

The Design-Builder shall collect and maintain current and accurate information of construction activities, including location, estimated duration of activity, type of work being performed, physical impacts (e.g., lane closures, narrowed lanes, commercial vehicle restrictions, etc.), and planned construction detours. The Design-Builder shall update this information as conditions change. The Design-Builder shall also collect information about how Work activities affect traffic flow and movement.

The Design-Builder shall collect and disseminate this information to the Project's public Web site and to Department. The Design-Builder shall enter the information in Department's 511 Condition Acquisition and Reporting System (CARS). In developing the functional requirements, the Design-Builder's data collection and management approach shall include the following:

- Type of information to be collected and stored
- Aggregation of data
- Data collection methodology
- User data needs
- Archiving procedures
- Access to information (will vary depending on user – i.e., Department versus general public)

In addition:

- Information gathered by the Design-Builder shall be reviewed for accuracy and forwarded as soon as it becomes available (within a maximum of two hours) to Department.
- Information gathered by the Design-Builder shall be posted on the Project's public Web site no later than two hours after it becomes available.
- The Design-Builder shall work with Department to coordinate and develop the technical interfaces between the Project's public Web site, the construction information recorded, and any other relevant information dissemination systems identified by the Design-Builder and/or Department.

-
- Changes in information gathered by the Design-Builder shall be submitted to the Department and posted immediately by the Department to the Project's public Web site as described in Section 3.2.7.2.1.
 - The Design-Builder shall coordinate the dissemination of information (construction, commercial vehicle, incident, etc.) with Department, other agencies, and relevant customers (e.g., the media) throughout the Project.
 - The Design-Builder shall be responsible for the accuracy and reliability of the information provided.

The Design-Builder shall track changes, including changes to short-term construction-related closures or emergency closures, in scheduled construction activities and report on all unscheduled activities as quickly as possible. The Design-Builder shall record, maintain, and make the information available to Department for use and dissemination.

The Design-Builder shall meet the following requirements for providing information:

- All planned construction activities shall be recorded no later than 30 Days before planned start date and shall include possible construction noise impacts.
- Construction information updates/changes shall be recorded within 24 hours of the information being made available to Department and the Project's public Web site.
- Construction updates (i.e., planned closure cancelled, planned nighttime construction noise impacts canceled or completed, lane closed, closure removed, etc. that directly affect the public) shall be monitored by the Design-Builder. The Design-Builder shall immediately notify Department of changes, post the information on the Web site, and disseminate it through other technologies.
- All information shall be verified for accuracy before release.

The Design-Builder shall maintain basic information, contact names, and phone numbers for other construction projects that may affect traffic conditions on the Project or surrounding local street network. This information shall be included in the construction information maintained by the Design-Builder.

The Design-Builder shall operate and maintain the construction information dissemination process for the entire duration of the Work. The process shall operate 24 hours a Day, seven Days a week. Requests for information and system faults shall be acknowledged within two hours of notification and resolved within the following two hours. The Design-Builder shall provide regular reports as requested, summarizing activities and adherence to the Contract requirements.

The Design-Builder shall perform verification of information, collection process, and interfaces to demonstrate compliance with the requirements of this Contract. The Design-Builder shall prepare a detailed plan to describe its approach to meeting the requirements of the Contract.

Recording and dissemination of information shall be operational within 14 Days following NTP1.

The Design-Builder shall include the following types of information and minimum performance requirements in the Public Information Plan.

3.2.5.1.1 Construction Schedule

Construction notification shall be made available to Department and publicized by the Design-Builder through its information tools (see Section 3.2.7) seven Days prior to the beginning of construction in any area of the Project.

Notification of construction events shall include the following:

- Description of the activity
- The start of the activity

- The end of the activity

The Design-Builder shall provide current construction information to Department as an input to incident management strategies to prevent traffic from being rerouted into areas of construction-related congestion.

3.2.5.1.2 Maintenance of Traffic and Access

The Design-Builder shall provide maintenance of traffic (MOT) and access information for the entire Project to commuters, residents, and businesses within a minimum of four blocks on either side of the limits of construction at least 14 Days prior to any construction in the affected area.

The Design-Builder shall include the following elements within the notifications to the public:

- Residents and businesses affected
- Alternate routes and detours
- A contact for further information

3.2.5.1.3 Traffic Conditions

The Design-Builder shall inform Department of any unusual traffic conditions (such as road obstructions, etc.) within 15 minutes of detection.

3.2.5.1.4 Commercial Vehicle Access and Restriction Information

Seven Days prior to an activity taking place that may restrict or impede the movement of commercial vehicles due to reduced lane widths, reduced height clearances, or lower weight limits, the Design-Builder shall provide the California Highway Patrol, Department's District 6, Department's Office of Truck Services (Transportation Permits), and Department's Project Manager with notice including:

- Description of the event
- The start of the event
- The end of the event

3.2.5.1.5 Emergency Services Vehicle Access

The Design-Builder shall communicate information regarding access for emergency services to the necessary parties by a schedule agreed upon by the Design-Builder and the emergency services providers. This schedule agreement shall be included in the Public Information Plan and the crisis communications approach developed by the Design-Builder and communicated in writing to Department.

3.2.5.1.6 Changes to Access

The Design-Builder shall inform businesses and residents of any changes to access at least seven Days prior to the start of any construction activities that may affect them. Information shall include the purpose of the access change, expected duration, detour options, and Design-Builder contact information. Seven Days prior to start of construction, the Design-Builder shall submit to Department information regarding changes in access.

3.2.5.1.7 Bicycle, Pedestrian, Handicapped Mobility, and Access

The Design-Builder shall clearly define and communicate to Department accommodations for access by bicycles, pedestrians and handicapped persons, including alternate routes and detours. The Design-Builder shall make every effort to accommodate and maintain accessibility throughout the duration of the Project.

3.2.5.1.8 Utility Shut-Offs

Regular communication with businesses and/or residents affected by Utility shut-offs shall be conducted by the Design-Builder to mitigate the impacts of potential Utility disruptions. The Design-Builder shall

personally contact all affected businesses and residents and shall maintain a record of each notification. The Design-Builder shall provide a written notice to the affected parties at least 48 hours in advance of the Utility shut-off. Notices shall indicate the expected duration of the outage and provide information indicating how those affected by the outage can contact the Design-Builder. Such notices shall also be provided to Department.

The Design-Builder shall provide an emergency Utility contact list of all Utility Owners' representatives with facilities within the Project Site as part of the Public Information Plan. The Design-Builder shall be responsible for keeping the emergency Utility contact list updated on at least a quarterly basis.

3.2.5.1.9 Incident Information

The Design-Builder shall act as an additional source of incident information in the Project. This incident information includes traffic accidents, disabled vehicles, oversized vehicles traveling on the network, Utility disruptions, adverse weather conditions (e.g., wind, ice, rain, and snow), and debris and/or animals on roadways.

As the Design-Builder becomes aware of incidents, the Design-Builder shall report such incidents within 15 minutes of detection.

3.2.5.1.10 Events

The Design-Builder shall compile a weekly listing of special events in the Project area that may be affected by the Work. The Design-Builder shall coordinate, communicate, and provide a plan to minimize conflicts for public events held by public and private entities. (Examples include city festivals and parades.) The Design-Builder shall notify Department of planned events that may be affected by construction a minimum of 14 Days before each event takes place.

3.2.5.1.11 Nighttime Construction Noise

The Design-Builder shall notify nearby residents in writing of the expected start and completion of construction activities expected to generate nighttime construction noise. Notifications shall be made at least seven Days in advance. Changes in the expected schedule of these activities shall be made within one Day of determination. The Design-Builder shall continually inform the affected residences of these possible nighttime construction noise impacts.

3.2.6 *Methods of Disseminating Information*

The public interest in the different aspects of the Project will be extensive, ranging from understanding of the construction schedule to the specifics of design and how it fits with community needs and aesthetics. In close cooperation with Department, the Design-Builder shall provide specific Project information for the public, as well as respond to the public's day-to-day needs and concerns. The Design-Builder shall provide credible, timely information to establish an effective working partnership with the Project's customer groups.

In addition to its own innovative strategies and solutions, the Design-Builder shall use the following methods for managing and disseminating information.

3.2.6.1 Communications Matrix

A communications matrix process shall be developed and used by the Design-Builder to manage the dissemination of information to customer groups and to report to Department. The Design-Builder shall develop a communications matrix for the customer groups, which will identify the following:

- The customer group(s) requiring information
- Location or region of customer group(s)

-
- What information is needed
 - When information is needed
 - Tools to be used to disseminate information
 - Results of information dissemination

As part of the communications matrix management process, the Design-Builder shall incorporate a coordination effort that integrates public information, Maintenance of Traffic (MOT), and intelligent transportation systems (ITS) requirements.

The communications matrix shall be used to assess performance during the scope of the Project and shall be updated continuously.

3.2.6.2 Public Contact

The Design-Builder shall work with Department to facilitate coordinated and consistent efforts when contacting and disseminating information to the public. The Design-Builder shall track all contacts, at a minimum, the names, addresses, e-mail addresses, fax and phone numbers, questions, comments, concerns, dates of contact, and the response provided, using an electronic database capable of producing reports.

Department has obtained the names and addresses of many residents and businesses located in the Project area. Contacts that already have been made with businesses and residents along the Project shall be incorporated by the Design-Builder with the Design-Builder's contacts.

Reports detailing public contacts shall be provided to Department on a weekly basis.

3.2.6.3 Telephone Hotline

The Design-Builder shall implement a telephone hotline with trained personnel knowledgeable of the Project as a means of receiving community input, answering questions, and prompting possible solutions regarding Project-related activities. The hotline shall be available to the public 24 hours a Day, seven Days a week and shall be publicized in all Project information materials. The hotline must be a handicap-accessible, free call for the public. An immediate response is preferable for all calls, although a voice mail option is permissible. All voice mail messages shall be replied to within 24 hours of receipt. All calls and resulting actions from this hotline shall be tracked and integrated into the Project's electronic contacts database for Department's inspection. The Design-Builder, in developing design and conducting its construction activities, shall consider data received from this hotline.

3.2.6.4 Media Relations

An ongoing media relations effort shall occur and be managed by the Design-Builder with direction and support from Department's District 6 Public Information Office in accordance with Deputy Directive (DD) 19R2. Department will be responsible for conveying Vision messages (as described in Section 3.2) to the media and addressing Project-specific Progress (see Section 3.2) questions such as budget, milestones, etc. Department and the Design-Builder shall work together to develop key talking points and to convey Coping messages (see Section 3.2), such as day-to-day lane closures, and specific phasing questions.

During the Work, the Design-Builder shall immediately notify Department of any situations involving the media, and all communications requests shall be tracked by Department. The Design-Builder shall become familiar with the Department media policy (DD 19R2) included in the Reference Information Documents (RID). This policy outlines expected Design-Builder behavior when contacted by media representatives.

The Design-Builder shall not use information gained on or from the Project for its own business promotion purposes without written consent of Department.

3.2.6.5 Community and Business Relations

Department will develop and implement a community and business relations effort to enhance and build relationships with the neighborhoods and public, including affected businesses, and to provide high-level Vision and Progress messages. As part of the communication matrix process and with oversight from Department, the Design-Builder shall develop and implement community relations strategies that communicate Coping messages to the public. Coping strategies shall focus on providing the public with the information they need to make short- and long-term decisions about how they can deal with the Work with as little disruption as possible.

3.2.6.6 Government Affairs

Department will be responsible for federal, State, and local government affairs (except where responsibility is specifically assigned to the Design-Builder, such as for coordination purposes and for securing permits). The Design-Builder shall assist in giving timely information to Department regarding construction activities, and shall participate in meetings with elected officials and staff as requested.

3.2.6.7 Information Service Providers

Third-party information service providers, such as traffic-information Web sites, may play a valuable role in assisting to disseminate Project-related information to the public. The Design-Builder shall describe strategies to communicate relevant information to these entities via Department. The Design-Builder will take specific Project information (e.g., lane closures, ramp/loop closures, roadway closures) and provide it to Department's (511mn.org) Web site.

3.2.6.8 Project Identity

The Design-Builder shall support Department in efforts to provide key educational messages and to build awareness about the Project. Department has created a project identity, or "brand," that will allow the various entities of the Project team to present Project information seamlessly to the public. The Design-Builder shall use the Department logo, as well as the Project name, to identify itself as part of the Project team and in its communication vehicles to the public. The goal is to eliminate individualism and to portray all communications about the Project as a partnership between Department and the Design-Builder. Approval of all Project identity and brand materials will be a cooperative effort between the Design-Builder and the Department.

3.2.7 Tools for Disseminating Information

In addition to its own innovative strategies and solutions, the Design-Builder shall use the following tools for disseminating information.

3.2.7.1 [Not Used]

3.2.7.2 Electronic Information Dissemination

A wide range of information concerning conditions in the Project area shall be available from the Design-Builder and the Department. The Design-Builder shall employ multiple means to disseminate information about conditions in the Project through existing and Project-specific means. The primary electronic methods will be through Project and Department Web sites, e-mail, fax broadcasts, variable message signs, and the 511 Roadway Information System.

3.2.7.2.1 Web Site

The Design-Builder shall provide updated information about construction, transit options, alternate routes and other relevant information to allow the Department to maintain the Project's public Web site (www.dot.ca.gov/dist6/environmental/projects/sr180braidedramps/). The Design-Builder shall work with Department to develop innovative and creative strategies to enhance the existing Web site and the information provided on the Web site. The Design-Builder shall provide, at a minimum, construction

information, commercial vehicle restrictions, regular input for a community/construction calendar of events, frequently asked questions (and the answers to those questions), and other relevant information. The Design-Builder shall update this information daily, or more often if needed. The Design-Builder shall be responsible for evaluating user needs, including the type of information that is of interest to specific users (e.g., general public, commercial vehicle operators, etc.).

3.2.7.3 Emergency Information Dissemination

As part of the crisis communications approach, the Design-Builder shall establish and manage an emergency response telephone tree. All appropriate stakeholder personnel shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations. The Department Project Manager, Department public information staff, and the Design-Builder's Project Manager shall be included on the telephone tree for notification of any emergency that may surface.

3.2.7.3.1 List of Emergency Service Providers

The Design-Builder shall develop and maintain a contact list of emergency service providers as part of the crisis communications approach. The Design-Builder shall provide information to emergency service providers as outlined in the communications matrix and crisis communications approach.

3.2.7.4 Public Meetings and Personal Contact

3.2.7.4.1 Public Information Meetings and Open Houses

The Design-Builder shall conduct weekly construction meetings every Friday in a convenient location for community members in active Project areas when determined by the Design-Builder and Department. Participants shall include the Design-Builder's Project Manager, Department Project Manager, and a designated FCTA representative. Local participants shown above in 3.2.3 are expected to attend. The Design-Builder will provide the meeting facility. The purpose of these meetings shall be to update affected parties, resolve complaints, etc. The Design-Builder's management and public information teams and Department shall attend all meetings. The Design-Builder shall organize and arrange all Project meetings and extend invitations to appropriate participants as agreed by Department. The Design-Builder's Project Manager and other Design-Builder-selected personnel shall meet with the Department Project Manager and a designated FCTA representative at a mutually agreed upon location on Thursdays to plan the Friday morning meeting.

The Design-Builder shall conduct an Open House within 14 Days of NTP2 to discuss construction staging, maintenance of traffic, and other issues of interest to the community.

3.2.7.4.2 Personal Contacts

A representative from the Design-Builder's public information team shall implement and manage door-to-door and phone contact with residents and businesses in areas of major activity, such as road and driveway closures or construction operations at night. Contact shall occur at least seven Days before work begins and shall consist of information explaining the planned work and the expected duration of the work, and providing contact information and answering questions. These contacts shall be conducted within a minimum four-block radius of the activity.

3.2.7.4.3 Supplying Information to Third Parties

The Design-Builder shall furnish Project information, including plan sheets, electronic data files (description of content), and construction and design information, to third parties (such as owner's attorneys or agents) within seven Days of contact and notification of Department. When appropriate, this information shall be furnished via an FTP site or may be disseminated in both paper and electronic format.

3.2.7.5 Information Materials

The Design-Builder, in coordination with Department, shall prepare information materials for FCTA representative, any business, resident, news media outlet, or others to support its communications efforts as necessary in the Project area. These materials shall include tentative schedules, contact names, telephone numbers, Project descriptions and maps. Department shall review and Approve all content of the information materials, which shall also be available on the Project Web site.

3.3 [NOT USED]

3.4 [NOT USED]

3.5 Deliverables

Five hardcopies of the Design-Builder’s final Public Information Plan shall be submitted to Department for Approval within 14 Days of NTP1. Department will respond within seven Working Days of receipt of the plan.

The Design-Builder shall submit specific public information dissemination pieces (i.e., faxes, e-mails, collateral materials, and access maps) to Department for Approval on a schedule agreed to by the Design-Builder and Department prior to dissemination by the Design-Builder.

Upon Approval of the above mentioned deliverables, the Design-Builder shall provide electronic versions to Department.

EXHIBIT 3-A

Public Information Plan

This document is provided as an electronic file.

4 ENVIRONMENTAL COMPLIANCE

4.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements for environmental compliance as set forth in the Standard Environmental Reference (www.dot.ca.gov/ser) and in any previously approved environmental documentation for Project.

4.2 Administrative Requirements

4.2.1 Standards

The Design-Builder shall design and construct the project specific requirements relating to environmental compliance in accordance with the standards and requirements below, in order of priority.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal Proposal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification before proceeding with design and/or construction. Use the most current version of each listed standard as of the Invitation for bid (IFB) issue date unless modified by Addendum or change order.

Environmental Standards and Requirements Priority Agency Title

Priority	Agency	Title
1	Department	Exhibit 4-A&4-B, Project Environmental Documents
2	Department	Standard Environmental Reference
3	Department	Special Provisions
4	Department	2006 Revised and New Standard Plans
5	Department	Standard Plans May 2006
6	Department	Design Build Modifications to the Standard Specifications
7	Department	Standard Specifications
8	Department	Construction Site Best Management Practices (BMPs) Manual
9	Department	Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
10	Various	Technical Memoranda
11	RWQCB	SUSMP Requirements
12	Department	Volume II, CT Environmental Handbook; Cultural Resources
13	Department	Volume III, CT Environmental Handbook; Biological Resources
14	Department	Volume IV, CT Environmental Handbook, Community Impact

4.2.2 References

Use the references listed below as supplementary guidelines for all environmental related analysis, design and construction. These references are not mandatory on the Design-Builder.

Environmental Publications References

Agency	Title
Department	Surveys Manual
Department	Ready-To-List and Construction Contract Award Guide (RTL Guide)
Department	Construction Manual
Department	California Test Methods
U.S. ACE	<i>Wetlands Delineation Manual</i>

4.2.3 Permits

Unless otherwise indicated in Table 4.2.3-1, all permits required for the Project will be the responsibility of the Design-Builder and permits provided by Department that must be amended or renewed as a result of the Design-Builder's Work or due to lapse in time shall be the responsibility of the Design-Builder. The Design-Builder shall provide Department with copies of all permit applications, drawings, correspondence, and environmental management plans at least 3 working days prior to the Design-Builder's submittal for permits so that the Department may review, comment and concur. The Design-Builder shall comply with the requirements of all permits.

Table 4.2.3-1: Project Environmental Permit, Agreement, and/or Approval Responsibilities

REQUIRED PERMITS, AGREEMENTS, & Approvals	N/A	COORDINATE	PREPARE APPLICATION	OBTAIN	IMPLEMENT	RENEW	AMEND
404 USACOE	X						
401 RWQCB	X						
NPDES SWRCB					X		
State Waste Discharge Requirements (Porter Cologne) RWQCB					X		
FESA Section 7 USFWS	X						
BO Section 7 USFWS	X						
FESA Section 7 NOAA/NMFS	X						
BO Section 7 NOAA/NMFS	X						
FESA Section 10 USFWS	X						
EFH - NOAA/NMFS	X						
Coastal Development Permit CCC	X						
Fed. Coastal Zone Mgt. Act – Consistency Determination CCC	X						
BCDC Permit	X						
Fed. Coastal Zone Mgt. Act – Consistency Determination BCDC	X						
1602 DFG	X						
2080.1 DFG	X						
2080(B) DFG	X						
Air Quality Permits	X						
Other (specify)							

Should the Design Builder’s design necessitate a modification of permits obtained, it is the Design-Builder's responsibility to obtain all necessary agency approvals for permit modifications. Modifications of permits

previously obtained shall be subject approval prior to submission to the agency responsible for the permit approval.

4.2.3 Meetings

Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve matters relating to Environmental compliance during the design and construction stages. The requesting entity shall provide the other parties with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

4.2.4 Environmental Management Plan

The Design-Builder shall submit an Environmental Management Plan (EMP) that describes the Design-Builder's approach, based on the Mitigation Monitoring and Reporting Record for mitigating environmental impacts and containing the following elements:

- Environmental personnel and training
- Environmental Commitments Record (ERC) Weekly and monthly reporting
- Environmental notification contact list
- Schedule of EMP activities
- Spill Containment and Countermeasure Plan to describe the Design-Builder's plans to prevent, contain, clean up, remove, dispose and mitigate all regulated material spills caused by the Design-Builder or any Design-Builder related entities. The Plan shall be in accordance with the July 2002 United States Environmental Protection Agency (EPA) update. The Spill Containment Plan shall include a Notification List for containing and reporting.
- Hazardous Materials Management Plan, including procedure for discovery of unanticipated hazardous waste or contaminated materials
- Construction Noise Monitoring Plan
- Air Quality Management Plan
- Asbestos Control Management Plan
- Lead-Based Paint Control Management Plan
- Aerially Deposited Lead (ADL) Soils Management Plan
- Storm Water Data Report (SWDR)
- Storm Water Pollution Prevention Plan (SWPPP)
- Sedimentation and Erosion Control Plan
- Noise Control Plan

All plans shall be developed by the Design-Builder and reviewed and approved, and/or the appropriate jurisdictional agency, if any.

4.2.5.1 Environmental Personnel and Training

4.2.5.1.1 Environmental Personnel

The Design-Builder shall designate an Environmental Team that consists of those persons responsible for permitting, erosion and sediment control, environmental compliance, environmental monitoring, and hazardous materials.

Storm Water Pollution Prevention Plan Manager

The Design-Builder shall provide a Water Pollution Control Manager (WPCM) to implement the SWPPP. The WPCM must comply with the Permit (Order No. 2009-0009-DWQ, NPDES No. CAS 000002) qualifications for Qualified SWPPP Developer (QSD) and Qualified SWPPP Practitioner (QSP), *Caltrans Standard Special Provisions*, and current Storm Water Quality Handbooks, Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual. The Design-Builder's WPCM shall be responsible for preparation and compliance with the NPDES permit.

Certified Erosion and Sediment Control Supervisor

The Design-Builder shall assign a Certified Erosion Control Supervisor with detailed knowledge, skills, and experience in each of the following:

- Permit requirements and application processes, design standards, specifications, and special provisions for storm water facilities.
- Design and implementation of best management practices in compliance with the 180 Braided Ramps Project.

The Certified Erosion Control Supervisor shall be responsible for the installation and maintenance of all temporary and permanent erosion and sediment control during the life of the project. The Certified Erosion Control Supervisor shall perform the required weekly erosion control inspection reports.

Installer

At least one certified installer at the time of installation shall be required for the following erosion control activities: seeding, sodding, mulching, silt fence or other perimeter sediment control device installations, erosion control blanket installation, hydraulic soil stabilizer installation, silt curtain installation, ditch check installation, storm drain inlet protection, riprap placement, compost installation, and erosion stabilization mat installation.

4.2.5.1.2 Environmental Protection Training

The Design-Builder shall design and implement an environmental protection-training program for all of the Design-Builder's employees and Subcontractors (including truck drivers and equipment operators). Every employee of the Design-Builder who works on the Project (management through workers, including each new employee who begins work after Project commencement) and all of the Design-Builder's Subcontractors shall participate in an environmental protection-training program. The training program shall orient employees and Subcontractors to the following:

- The overall importance of environmental issues in achieving a successful project
- The particular environmental sensitivities of the Project
- Erosion and sediment control procedures in accordance with the SWPPP including the functions and proper installation of Best Management Practices (BMPs) based on the Special Provisions.
- Proper procedures for spill containment
- Proper and safe handling of contaminated soil and groundwater

Assistance will be provided regarding clarification and understanding of Department environmental goals and policies. The Design-Builder shall notify the regulatory agencies and Project staff of the training sessions and invite them to participate.

4.2.6 Coordination with Other Agencies and Disciplines

Department will assist in the coordination and resolution of all environmental issues with affected interests and regulatory agencies. The Design-Builder shall document the resolutions of issues for the correspondence

file, including meeting minutes and memoranda for the record. The Design-Builder shall document the permit requirements and contacts with the permitting agencies.

4.2.7 Certification Requirements

The Design-Builder shall perform all laboratory testing at a Department certified and approved lab and an AMRL-accredited facility for material tests required by this section. All material testers are to be certified for the materials they are testing.

4.3 Design Requirements

The Design-Builder shall design and construct all elements of the projects related to Environmental Compliance in accordance to all the standards and regulations listed in this Technical Provision.

4.4 Construction Requirements

4.4.1 Mitigation Measures

The mitigation measures cover all areas of environmental concern impacted by the Project, with a detailed list of actions required and assignment of responsibility for each action. The list shall include environmental requirements, including watershed and local government consent conditions, and include recognition of Project-specific issues, procedural steps for mitigation, and particular actions planned to comply with the governing regulations.

Design-Builder shall be responsible for maintaining mitigation measures during the life of the Project to minimize potential environmental impacts. Design-Builder shall ensure the Project design is in compliance with all applicable Governmental Rules and shall prepare plans and procedures to assure and document compliance, where required.

Design-Builder is responsible for the protection of Environmentally Sensitive Areas (ESAs), notwithstanding the oversight role of Department. The Project may be subject to inspections from the California Department of Fish and Game (CDFG), United States Fish and Wildlife Service (USFWS), United States Army Corps of Engineers the San Joaquin Valley Air Pollution Control District and the Department.

Design-Builder shall follow the terms and conditions of the Environmental Commitments Record and all permit(s) pertaining to requirements for the protection or mitigation of impacts on ESAs.

ESAs include cultural and biological resources as defined in the environmental document, as well as those discovered during the permitting and the preconstruction survey(s) process. No construction activity shall affect the ESAs without approval of the appropriate permitting agency and Department.

Identified ESAs shall be mapped, and the maps shall be included in the Environmental Commitments Record. Protection of the ESA shall be facilitated by identification of the Site location using flags, caution tape, and fencing, as appropriate.

Environmental training of all construction workers shall include the importance of ESA protection, visual recognition through fencing, and potential project and personal liabilities resulting from ESA damage/impact. Design-Builder shall assure inspection of the ESA in accordance with the Environmental Commitments Record and immediately report any damage/impact to Department and appropriate State or Federal agencies.

4.4.1.1 Cultural Resources

The Design-Builder shall make every effort to keep the project within the boundaries identified in the project Environmental Document. Should the scope of extent of the project be altered during the project design or construction phase, those changes that extent the project beyond the limits identified on the Area of Potential Effect (APE) map shall be reviewed by Department Cultural Resources staff members to determine the need to obtain an environmental reevaluation.

4.4.1.2 Contaminated Properties

Asbestos Containing Material (ACM) and Regulated Waste

The Design-Builder shall procure all necessary permits and pay all fees related to ACM and Regulated Waste.

NESHAP Asbestos Notification shall be required if structures will be disturbed during construction. The appropriate special provisions for testing of areas suspected to contain ACM and for handling and disposal of ACM shall be provided for review and approval. The Design-Builder shall prepare an Asbestos and Regulated Materials Assessment Report that describes the results of the assessment and of the abatement and removal activities.

In the event that additional waste materials suspected of containing asbestos or other regulated materials are encountered during construction activities, the Design-Builder shall immediately stop work and provide notification. The Design-Builder will perform all work necessary to assess, abate, and remove any asbestos or other regulated materials.

Health and Safety Plan

The Design-Builder shall prepare a Hazardous Waste Operations Safety and Health Program for Hazardous Waste Operations, following Federal, State of California and local requirements including CAL/OSHA, CCR Title 8, 5192 et seq., and Federal OSHA, 29 CFR 1910 et seq, and 1926 et seq. A Certified Industrial Hygienist licensed by American Board of Industrial Hygiene shall approve the Hazardous Waste Operations Safety and Health Program.

The Design-Builder shall submit a site specific Health and Safety Plan (HASP) as Part of the Hazardous Waste Operations Safety and Health Program, and as defined in CCR Title 8, 5192(1)(B), within thirty (30) days of receiving Notice to Proceed.

The Design-Builder shall distribute the HASP to all employees that could be potentially exposed to Hazardous Materials. Employees shall be required to read the HASP, sign a compliance agreement, and abide by all provisions. The HASP shall be displayed or made available on the Project at all times. The Design-Builder shall develop and maintain on site all industrial hygiene information, including “right-to-know” information. It is anticipated and considered as part of the Scope of Work that the Design-Builder will perform Hazardous Waste Operations requiring protective gear up to and including Level C. The Design-Builder shall provide Personal Protective Equipment (PPE) and monitoring equipment to conform to the requirements set forth by CAL/OSHA and Federal/OSHA.

In the event that the Design-Builder encounters or has reason to believe it has encountered Hazardous Materials requiring Hazardous Waste Operations on the Project, the Design-Builder shall provide verbal notification and proceed with the Hazardous Waste Operations work.

The Design-Builder shall then provide written notification by implementing a mitigation plan. If the finding of Hazardous Substances precludes the continuation of work in that work area, the Design-Builder shall continue Working in areas not affected thereby.

The Design-Builder shall maintain documentation and provide information, as requested, regarding potential or actual exposure to the public.

The Design-Builder shall maintain records of all related incidents and provide notification immediately.

The Design-Builder shall be responsible for management of the Hazardous Materials and Hazardous Waste encountered on the Project.

Removal, Handling, and Transportation of Hazardous Materials

Design-Builder shall be responsible for the removal, handling, transportation and disposal, if any, of Hazardous Materials, including but not limited to yellow striping resulting from the Project. Design-Builder shall be responsible for filing any information regarding the discovery, handling, removal, transportation and disposal of Hazardous Materials related to this Project with the appropriate Federal, State or local regulatory agencies. Such information includes investigation reports, health and safety plans, transportation and waste tracking documentation, field-testing results and reports, NPDES Permit and correspondence, regulatory notifications, and any hazardous waste or contaminated material correspondence. All draft documents for the regulatory agencies are to be provided for review and concurrence.

Design-Builder shall be responsible for obtaining the Environmental Protection Agency Identification (EPA ID) number from DTSC no later than seven (7) calendar days in advance of the excavation and or removal of any Hazardous Material, Hazardous Waste, or contaminated material. The following information shall be required:

- Type of material (physical characteristics)
- Volume (cubic yards or gallons)
- Site address (at a minimum, route, post miles, and cross streets)
- Zip Code (mandatory for tracking purposes)
- Test results or waste profile

Once an EPA ID number has been obtained, the material shall be manifested by a transporter that possesses the credentials required under Title 22 (§66263) of the CCR. Design-Builder shall submit copies of the manifests signed by the disposal facility.

Design-Builder shall have means for conducting emergency Hazardous Materials Management (i.e., tank removal, lead abatement, asbestos abatement, spills, etc.). The Design-Builder shall provide immediate notification Department of such conditions.

Removal and Disposal of Yellow Thermoplastic and Paint

Yellow striping removal poses a hazardous waste concern whether the striping is ground off alone or ground off with pavement. The Design-Builder shall provide a Lead Compliance Plan (LCP) and shall be submitted for comments and approval at least two (2) weeks before fieldwork begins. Testing on removed material must be conducted for classification purposes. The Design-Builder shall remove and dispose of yellow striping per Special Provisions.

Soil and Groundwater - General

The Design-Builder shall review all Phase I and Phase II Environmental Site Assessment (ESA) reports completed for the Project. The Design-Builder shall be responsible for updating the Phase I ESA if Department or the Design-Builder determines the Phase I ESA is inadequate in its coverage of the Project area. The Design-Builder shall be responsible for additional drilling investigation and/or Phase II work that may be needed to accommodate the work.

The Design-Builder shall sample and test the soils and groundwater that are suspected to be contaminated. The Design-Builder shall also monitor soil excavation activities and evaluate planned treatment procedures. When all contaminated soil excavation and corrective action, and all groundwater dewatering has been completed for the Project. The Design-Builder shall prepare a Corrective Action Implementation Report for the entire Project. The report shall be completed in accordance with applicable California Pollution Control Program requirements. The Design-Builder shall install wheel/undercarriage washing equipment, or a functional equivalent, at excavation locations, as the first method by which to ensure that haul trucks have clean wheels and undercarriages before entering the roadway.

Contaminated Soil Contingency Plan

In the event on-site observations indicate contaminated materials (such as solid waste including demolition debris, containers or free product) or contaminated soil (based on organic vapor detector readings above background, visual staining or olfactory evidence) have been encountered in the Project area, the Design-Builder shall be responsible for notifying and for filing any information with the appropriate Federal, State or local regulatory agencies.

No excavation of contaminated materials or soil shall take place without Approval.

The Design-Builder shall stockpile all contaminated material or soil encountered within excavation limits as described in these provisions. To expedite the bridge substructure construction, the Design-Builder may haul and temporarily stockpile all excavation materials from the bridge substructure construction to the temporary stockpiles sites designated near the Project site as approved by Department.

The Design-Builder's disposal plan for contaminated soil may include re-using the contaminated soil in fill areas on this Project. The Design-Builder shall locate the contaminated soil on the As-Built Plans.

The Design-Builder may determine that some or all of the contaminated soil and all of the contaminated materials must be disposed at a California-permitted municipal solid waste (MSW) landfill facility or industrial landfill facility. The Design-Builder shall select the California permitted MSW landfill facility or industrial landfill facility for disposal of the contaminated soils and materials.

The Design-Builder shall be responsible for providing all required information to the landfill (typically waste profile information and soil analytical data) in order to obtain landfill acceptance of the contaminated soil for disposal or for use as daily cover as dictated by landfill acceptance criteria.

The Design-Builder shall provide access to in-place and/or stockpiled soil to collect and analyze any additional samples required by the landfill.

The Design-Builder shall provide the landfill-required waste profile form(s) for review and signature.

Contaminated material shall not be hauled to the landfill facility until the Design-Builder has written approval from the landfill accepting the contaminated material for disposal at the landfill facility.

The Design-Builder shall provide copies of shipping papers/manifests and landfill scale tickets daily while material is being hauled to the landfill.

Temporary Stockpile of Contaminated Soil

The stockpile shall be placed at a location near the Project as approved by Department. The Design-Builder shall stockpile the contaminated soil on minimum 10-mil plastic, and cover the stockpile with minimum 10-mil reinforced plastic. Fencing shall surround the stockpile. The stockpile cover shall be securely anchored. The Design-Builder shall be responsible for the maintenance of the stockpile cover for the duration of the Contract or until all contaminated material is removed. The Design-Builder shall inspect the stockpile a minimum of once per week. The Design-Builder shall keep records of the weekly stockpile inspection, recording at minimum, the date and time inspected, and the stockpile coverage pre and post-inspection. Contaminated soil from different locations that may contain different contaminants shall be placed and maintained in separate stockpiles.

Aerially Deposited Lead

Aerially deposited lead is lead deposited within unpaved areas or formerly unpaved areas, primarily due to vehicle emissions. ADL is typically found within the top five (5) feet of material in unpaved areas within the highway ROW. Lead was phased out as a fuel additive beginning around 1985. This section of State Route 180 was constructed after that phase out. Since no testing of the soils for ADL is warranted, provisions for potential contact with lead in soil have been provided for with an approved Non-Standard Special Provision

(NSSP) for a health and safety lead compliance plan (LCP) to be implemented. The LCP is used where expected lead in soil would not exceed natural back-ground levels.

Wells

Prior to the start of construction, the Design-Builder shall locate all wells, including active and inactive potable and non-potable wells, piezometers, abandoned wells, and monitoring wells within the Project limits. The Design-Builder shall provide recommendations on which wells shall be sealed. Written notification will be given to the Design-Builder whether to seal the wells. A Design-Builder licensed by the California Department of Health in accordance with the Water Well Construction Code, California Rules, shall seal the wells. For any wells that must remain in place during construction (typically monitoring wells), the Design-Builder shall protect the wells and conduct all activities in a manner that will not damage or jeopardize the wells. Replacement or repair of wells damaged by the Design Builder shall be at the expense of the Design-Builder.

4.4.1.3 Noise

Construction Noise

The Design-Builder shall perform work within the permissible noise levels, work schedule limitations, and procedures provided for in this Section, the General Requirements, and applicable Federal, State, County and municipal codes, regulations, and standards. Reference Department Standard Specifications Section 7-1.011, Sound Control Requirements.

Other than those provided herein, the Design-Builder shall be responsible for obtaining permits, variances, equipment certifications, and other documents required by this Section and by applicable Federal, State, County and municipal codes, regulations and standards.

The noise level from the Design-Builder's operations, between the hours of 9:00 p.m. and 7:00 a.m., shall not exceed 86 dBa at a distance of 15 m. This requirement shall not relieve the Design-Builder from responsibility for complying with local ordinances regulating noise level.

The noise level requirement shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Design-Builder. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

The Design-Builder shall submit a Noise Control Plan and a Noise Monitoring Plan, as specified in the Construction Noise and Vibration Control Section of the General Requirements. An Acoustical Engineer meeting the qualifications specified in the General Requirements shall prepare both plans.

The Design-Builder shall not operate noise generating construction equipment at the construction site prior to acceptance of the Noise Control and Monitoring Plans. The Design-Builder shall update the Noise Control Plan every three months.

As this Project will occur in a heavily populated urban area, the Design-Builder shall include in the EMP a detailed listing of the proposed construction noise mitigation measures that will be used during daytime and nighttime hours. Possible construction noise mitigation methods could include:

- Limiting the time and duration of the noisiest nighttime construction activities.
- Implementing methods to reduce pile driving noise levels.
- Constructing temporary noise barriers or curtains around stationary equipment or other noise-producing construction activities that must be located close to residences to decrease noise levels at nearby sensitive receptors.
- Using resilient bed liners in dump trucks to be loaded onsite during nighttime hours.

The Design-Builder shall provide at least seven (7) days notice to affected communities for any necessary blasting and/or loud construction activities, such as pile driving or jack hammering.

The Design-Builder shall fit all internal combustion motors with mufflers and other noise control equipment as specified by the manufacturer.

The Design-Builder shall outfit construction equipment engines with adequate mufflers, intake silencers, and engine enclosures to reduce their noise levels by 5 to 10 dBA.

The Design-Builder shall turn off construction equipment during prolonged periods of nonuse to eliminate noise.

The Design-Builder shall maintain all equipment and train its equipment operators in good practices to reduce noise levels.

The Design-Builder shall perform aggressive public information activities to notify nearby residents of the expected start and completion of noise producing construction activities.

The Design-Builder shall use ambient sound-sensing backup alarms that could reduce disturbances from backup alarms during quieter construction periods.

The Design-Builder shall locate stationary equipment away from receiving properties to decrease noise.

The Design-Builder shall, at all times, be responsible for addressing the noise related concerns and policies of the Department, FHWA, local governments, and roadside neighbors throughout the design and construction of the Project.

The Design-Builder shall implement a training program to ensure all employees and Subcontractors are educated as to the construction noise abatement requirements.

Noise Barriers

The general locations of the noise mitigations identified are provided in the Preliminary Engineering Documents, Environmental Document or project noise technical reports for the Project in the Reference Documents. Specific lengths and heights of noise barriers are provided in the Preliminary Engineering Documents or project noise technical report for the project.

Noise barriers shall be constructed at the general locations provided. Noise barriers shall be constructed at locations and to lines and grades as shown.

The Design-Builder shall comply with the requirements concerning architectural treatments for noise barriers.

Traffic Noise

The Design-Builder shall be responsible for noise analyses and mitigation measures in compliance with the requirements of the Environmental Document or project noise technical report and the Contract Documents. Noise analysis and mitigation shall be in conformance with all Noise Analysis and Abatement Guidelines. The Design-Builder shall use the Traffic Noise Model v2.5, currently approved by FHWA, or the same model used to perform noise analyses within the NEPA phase of the Project. Preliminary noise model data for mitigation measures within the project limits and, lengths and heights for noise barriers are provided in the Environmental Document or project noise technical report.

4.4.1.4 Air Quality

Construction

The Design-Builder shall mitigate construction/grading activities that disrupt ground cover by controlling fugitive dust emissions and other airborne particulates in accordance with these provisions, including measures such as applying water to exposed soils and limiting the extent and duration of exposed soil

conditions. The Design-Builder shall prepare and implement a Generated Waste Management Plan, and a Storm Water Pollution Prevention Plan (SWPPP). The Generated Waste Management Plan shall be prepared and implemented in accordance with Title 22, Division 4.5, California Code of Regulations (CCR), and all other applicable laws and regulations.

The Design-Builder shall comply with the San Joaquin Valley Air Pollution Control District Rule 9510 (Indirect Source Review Rule). This rule applies to construction equipment emissions for transportation projects that exceed 2.0 tons of either PM 10 and/or NO_x air pollutants. The Design-Builder is responsible for the Indirect Source Review Air Impact Analysis and any applicable fees. The provisions of Department Standard Specifications, Section 14-9.01F “Air Pollution Control” and Section 14-9.02 “Dust Control” require the Design-Builder to comply with the San Joaquin Valley Air Pollution Control District rules, ordinances and regulations.

Burning of wastes is prohibited. The Design-Builder shall remove scrap and waste material and dispose of in accordance with laws, codes, regulations, ordinances and permits.

The Design-Builder shall use construction equipment designed and equipped to prevent or control air pollution in conformance with all applicable regulations of EPA, State and local authorities. Maintain evidence of such design and equipment and make available for inspection.

The Design-Builder shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on the Project and shall keep records available for inspection.

The Design-Builder shall, at all times, be responsible for responding to the air quality concerns and policies of SJVAPCD, USEPA, FHWA, local governments, and roadside neighbors throughout the design and building of the Project.

In the event that the scope or design of the Project is altered during the design-build process, the Design-Builder shall evaluate the necessity for further air quality analysis.

4.4.1.5 Water Quality

The Design-Builder shall evaluate, determine the need for and feasibility of incorporating Design Pollution Prevention, Permanent Treatment, Maintenance and Construction Site Best Management Practices (BMPs) into the project in accordance with the Project Planning Design Guide and applicable Department Stormwater National Pollutant Discharge Elimination System Permit (Order No. 99-06-DWQ) (CAS000003) issued to the Department.

The Design-Builder shall submit a Notification of Construction (NOC) to the Department’s District 6 NPDES Storm Water Branch for processing by the Regional Water Quality Control Board at least 30 days prior to the start of construction. The Design-Builder shall prepare a Storm Water Pollution Prevention Plan (SWPPP) and implement it during construction.

The Design-Builder shall submit an Notice of Completion of Construction (NOCC) to Department’s District 6 NPDES Storm Water Branch for processing by the Regional Water Quality Control Board upon completion of construction and site stabilization. The project will be considered complete when the criteria for final stabilization in the Construction General Permit is met.

4.4.1.6 [NOT USED]

4.4.1.7 Wildlife and Vegetation

The Design-Builder shall identify impacts, develop mitigation measures, and implement mitigation measures to minimize unavoidable construction and long-term impacts of the Project on wildlife and vegetation. Wildlife and vegetation mitigation measures shall include demarcation of sensitive wildlife and vegetation

areas, protection of active bird nests, and control of invasive plant species. The Design-Builder shall provide notification if either of the following occurs:

- Species are discovered within the Project area that are identified in the Project’s environmental documentation based on the federal or State threatened or endangered species list
- New threatened or endangered species are listed or discovered within the Project area

General Migratory Bird Treaty Act

The Design-Builder shall comply with the Federal Migratory Bird Treaty Act (15 USC 703-711) 50 CFR Part 21 and 50 CFR Part 10, and the California Department of Fish and Game Code Sections 3503, 3513, and 3800, that protect migratory birds, their occupied nests, and their eggs from disturbance or destruction. The Federal Endangered Species Act of 1973 (16 USC 1531, 1543) and the California Endangered Species Act (Fish and Game Code 2050-2115.5) prohibit the take of listed species and protect occupied and unoccupied nest of threatened endangered species.

Between February 15 and August 31, the Design-Builder shall notify the Department in writing 15 working days prior to beginning work. The notification shall include timing and order of work to be performed.

The Department shall be responsible for completing the migratory bird nest survey within the Project limits 30 days prior to the start of construction. Any vegetation scheduled to be removed will be surveyed for nests. The Design-Builder is required to provide documentation identifying the number of nests removed and whether or not the nests are occupied with eggs or nestlings.

The Design-Builder shall use exclusion techniques prior to the nesting season to prevent migratory birds from nesting on the structures. If evidence of bird nesting is discovered during the nesting season, the Design-Builder shall not disturb the nesting birds or nests and shall immediately stop work adjacent to the nesting birds and notify the Department. During the nesting season migratory birds will be handled as follows:

- If nesting migratory birds are found within the project limits when exclusion is not feasible, the nesting area will be designated as an environmentally sensitive area and no work will occur within 250 feet until the nesting season is over.

Environmentally sensitive area fencing will delineate the boundaries of the environmentally sensitive area for migratory birds. A delay due to migratory birds or their nests, when ordered by the Department, will be considered a temporary suspension of work, in accordance with the provisions in Section 8-1.05, “Temporary Suspension of Work” of the Standard Specifications.

4.4.1.8 Erosion and Sediment Control Mixing SWPPP with Final Measures

The Design-Builder shall use both temporary and permanent erosion and sediment control measures. Temporary measures shall be used during construction and permanent measures shall be used for the long-term stabilization of disturbed areas. Shaping and reestablishing vegetation are the basic erosion prevention methods.

SWPPP requirements for Temporary Erosion and Sediment Control During Construction – The Design-Builder shall develop an erosion and sediment control plan with design details for each stage of construction. The Design-Builder shall control erosion and limit its negative impacts. The Design-Builder shall use best management practices for temporary erosion and sediment control, including temporary erosion control ponds. Temporary erosion control best management practices include correct shaping, temporary seed, mulch, blanket, and other devices. Other devices may include gravel bag (berms) barriers, temporary drains for fill slopes, or temporary flumes to safely carry water down a slope and other items, such as ditch checks, earth diversions, and other diversions.

Permanent Erosion and Sediment Control – Permanent erosion control measures are primarily designed to function with established vegetation after projects are complete. The Design-Builder shall use best management practices for permanent erosion control. The Design-Builder shall follow the requirements in Section 14 of the Technical Provisions (Highway Planting and Irrigation) for erosion control.

4.4.1.9 Visual Setting

Architectural treatments, such as color and/or textures, will be applied to vertical surfaces or structures and should relate to other structures in the corridor.

4.4.1.10 [NOT USED]

4.4.2 Environmental Monitoring and Reporting

The Design-Builder shall include an environmental monitoring plan in the EMP, which shall indicate times, locations, and other monitoring parameters.

4.4.2.1 Weekly Reports

The content of the weekly reports shall document evidence of the Design-Builder's performance and include the following:

- Name of environmental monitoring inspector
- Date of monitoring
- Weather conditions
 - Location
 - Resource(s) addressed
 - Locations and nature of violations
- Recommended remedial actions

4.4.2.2 Monthly Reports

The Design-Builder shall combine the weekly report forms into a document that summarizes the month's environmental monitoring activities and submit for Approval.

4.4.3 Environmental Notification Contact List

The Design-Builder shall prepare an Environmental Notification Contact List that includes all contact persons and reporting and notification requirements for unforeseen potential environmental impacts, encountered during the course of the Project. The Environmental Notification Contact List shall:

- Include all contact Persons representing the Design-Builder, governmental entities, and regulatory agencies regarding environmental matters.
- Specify the chain of contact.
- Include for each contact the person's name; agency or corporate affiliation; address; e-mail address; home, cellular, office telephone number(s); and fax number.

The list shall specify, at a minimum, the appropriate contact person(s) for reporting and notification of the following events:

- Design-Builder-caused hazardous material spill
- Discharge to groundwater
- Discovery of:

-
- An active bird nest (with eggs or young)
 - Cultural or historic artifacts
 - Human bones or remains
 - Wildlife injured during construction activities
 - Hazardous materials such as petroleum-contaminated soils, asbestos-containing materials, solid wastes, and other regulated materials
 - Disturbance of any threatened or endangered species or its habitat
 - NPDES inspections by RWQCB
 - Illicit discharges of water and/or sediment leaving site
 - Occurrence of Project activities:
 - In streams or wetlands
 - Outside the planned Right of Way limits
 - Violation of permits and regulations such as:
 - Clean Water Act Section 401—Water Quality Certification
 - Clean Water Act Section 402—National Pollutant Discharge Elimination System
 - 1602 CDFG Streambed Alteration Agreement -
 - California Rules and Statutes
 - Local watershed district or water management organization requirements
 - Any pollution issue not covered in items listed above

The Design-Builder shall determine the appropriate first point of contact for other environmental issues.

4.4.4 Schedule

The Design-Builder shall include with the EMP a schedule of activities for environmental mitigation related to Project phasing.

The Design-Builder shall include a schedule for implementation of the environmental protection-training program in the EMP. The schedule shall include training sessions at key times (e.g., prior to construction in sensitive areas or construction timing restrictions to protect threatened and endangered species) to update workers on specific restrictions, conditions, concerns, or requirements.

4.5 Deliverables

4.5.1 Environmental Management Plan (EMP)

The Design-Builder shall submit an EMP 90 days prior to construction that must be approved prior to construction. Response to the EMP submittal will be given within 15 Days.

4.5.2 Environmental Documents

The Design-Builder shall submit the following documents and must receive Approval prior to construction:

- Storm Water Pollution Prevention Plan and amendments, as required, to reflect Project development and staging
- Completed permit applications and permits as issued
- Environmental Notification Contact List

The Design-Builder shall submit the following documents for approval.

Asbestos and Regulated Waste

- Asbestos and Regulated Materials Assessment Report – Shall be submitted for Approval.

Contaminated Materials

- Investigation Work Plan – Shall be submitted for Approval.
- Contaminated Soil Cleanup Plan – Shall be submitted for Approval.
- Contaminated Soil Documentation Report – Shall be submitted for Acceptance.
- Non-petroleum Contaminated Soil Voluntary Investigation and Cleanup (VIC) applications – Shall be submitted for Approval and signature.
- Non-Petroleum Contaminated Soil Response Action Plan – The draft Response Action Plan(s) shall be submitted for Approval. The Design-Builder shall submit a draft Response Action Implementation Report for Approval no later than 40 Days after the cleanup actions are completed at each VIC site. If requested, the Design-Builder shall meet with to review the draft and final Response Action Implementation Report(s). After receiving Approval of the final Response Action Implementation Report(s), the Design-Builder shall submit the Response Action Implementation Report(s) to the MPCA VIC program for approval.
- Health and Safety Plan - Shall be submitted for Approval.
- Lead Compliance Plan - Shall be submitted for Approval.
- Evacuation and Transportation Plan - Shall be submitted for Approval.

Groundwater

- Groundwater Discharge Report – Shall be submitted weekly.
- Contaminated Groundwater Dewatering Plan – Shall be submitted for Approval.
- Contaminated Groundwater Documentation Report – Shall be submitted for Acceptance no later than 60 Days after all contaminated groundwater-dewatering actions are complete.
- Wastewater Management Plan – Shall be submitted for Approval.
- Correspondence file
- All final reports for environmental work

4.5.3 Environmental Monitoring Reports

The Design-Builder shall submit copies of the environmental monitoring reports on a monthly basis or as directed.

4.5.4 Final Design Documents

The Design-Builder shall submit final design documents when design is complete, including office and field generated design changes. Final design documents include:

- Plans
- Shop drawings
- Design calculations
- Reports/Project documentation
- Specifications and Special Provisions

4.5.5 As-Builts Documents

Upon completion of the Project and prior to Final Acceptance, the Design-Builder shall deliver to Department a complete set of As-Built Documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hardcopy and electronic form. The As-Built Documents shall meet the format and content requirements of Final Design Documents.

4.5.6 Measurement and Payment

All environmental items not specifically identified for payment will be paid for as a lump sum for Environmental work, as part of the Contract Price.

EXHIBITS

- Exhibit 4-A: Initial Study with Negative Declaration
Exhibit 4-B: Project Environmental Document - Categorical Exclusion

These exhibits are provided as electronic files.

5 [NOT USED]

6 UTILITIES

6.1 General

There are no known utility conflicts on this project. This section applies to existing underground and overhead Utilities.

Locations of existing utilities are included in the Reference Information Documents (RID).

Unless otherwise specified, the Design-Builder shall be responsible for any temporary Relocations of Public and Private Utilities impacted by the Project and the Design-Builder's operations.

6.2 Administrative Requirements

6.2.1 *Initial Allocation of Responsibility*

The preliminary Utility Information Sheets (UISs) provide information as to the initial allocation of Utility Work responsibility between the Design-Builder and the Utility Owners. The UIS information provided in the RID is only for the Design-Builder's information regarding the Utility Owners' current preferences of such work allocation.

6.2.1.1 Department-Supplied Information

Department has completed an initial Utility survey and has identified many of the existing Utilities in the Project area. .

The preliminary UISs provide information as to the locations, and specific Utility Owner conditions. These locations were determined from the best available information; however, the Design-Builder acknowledges that

- the existing UISs may not identify all existing Utilities impacted by the Project;
- the existing UISs may not show the identified existing Utilities at their correct locations or indicate their correct sizes and/or types; and
- the Contract Price includes contingencies deemed adequate by the Design-Builder to cover the possibility that the existing UISs do not adequately or accurately identify all situations in which existing Utilities may require Relocation, taking into consideration the fact that the Design-Builder is entitled to Change Orders only in specified situations.

6.2.1.2 Design-Builder Responsibilities

6.2.1.2.1 [NOT USED]

6.2.1.2.2 Other Design-Builder Requirements

The allocation of responsibility for any Utility Work to a Utility Owner will not relieve the Design-Builder of the obligation to coordinate with the Utility Owner as necessary for the Utility Work to be performed or of the obligation to perform any other Utility Work not specifically assigned to such Utility Owner. The circumstances under which the Design-Builder shall be entitled to a Change Order for Utility Work are set forth in Book 1.

In considering the locations and the potential impacts of Utility Work on the Project, the Design-Builder shall avoid Utility Work to the extent practicable; otherwise, the Design-Builder shall minimize the potential costs and delays of Utility Work to the extent practicable and allowable. Any Utility installed in a new location within the R/W shall be installed in a location as proposed by the Design-Builder, based on coordination with all affected parties and subject to issuance of a Utility permit by Department.

6.2.1.3 Change in Responsibility

If requested by a Utility Owner and Approved by Department, Utility Work (including Service Lines connecting thereto and temporary Relocations) not included within the scope of the Design-Builder's Work shall be added to the Utility Work by execution of a Work Order or a separate Change Order.

6.2.2 Procedures and Agreements

6.2.2.1 Utility Owners Without Master Utility Agreement

6.2.2.1.1 Utilities Identified at the Time of the RFP

The Design-Builder is responsible for all coordination activities with Utility Owners that have not entered into a MUA by the Proposal Due Date. The Design-Builder shall contact all such Utility Owners to ascertain the location of all existing utilities, if any, before performing excavation operations. The Design-Builder shall conduct operations in the vicinity of existing Utilities in a manner that will prevent damage to any Utility.

The Design-Builder shall mark the proposed excavation before contacting Underground Service Alert. The Design-Builder shall call Underground Service Alert at least 48 hours (excluding Saturdays, Sundays, and holidays) before starting excavation operations.

When the Design-Builder works near electrical power lines, the Design-Builder shall

- work with the lines energized if the Work can be done safely, or
- make arrangements with the power company, at Design-Builder's sole expense, to
 - temporarily shut off the power,
 - temporarily insulate the line(s),
 - bypass the power from the work area, or
 - make other arrangements necessary for a safe work place.

Department makes no warranty, guarantee, promise, or representation as to whether the Utility Owner will temporarily shut off power, insulate its line(s), or charge the Design-Builder a fee for preparing a safe work area for the Design-Builder.

The Design-Builder shall not start construction operations adjacent to Utility properties until arrangements that are satisfactory to the Utility Owner have been made by the Design-Builder for the protection of the Utility and continuation of its service. Should the Design-Builder's equipment come in contact with or damage a Utility in any way, even though there may be no apparent evidence of breakage or harm, the Design-Builder shall promptly notify the proper authorities and cooperate with those authorities in determining damage and restoring interrupted services if needed. Where contact is made with a Utility, the Design-Builder shall suspend operations immediately and vacate the area until it has been determined by the Utility Owner that it is safe to resume operations.

The Design-Builder shall employ special equipment, construction methods, and hand labor, if necessary, to accomplish the planned Work adjacent to Utilities without damaging them. At no time shall the Design-Builder interfere with persons engaged in protecting or moving Utility property or in operating the Utility.

6.2.2.1.2 Newly Discovered Utilities

If the Design-Builder discovers Utilities not identified or not identified with "reasonable accuracy" as defined in Book 1, the Design-Builder shall immediately notify Department and the Utility Owner. Costs for Utility Work related to newly discovered Utilities shall be allocated in accordance with Book 1.

6.2.2.2 Owners with Utility Agreements

The terms of all Utility Agreements and any amendments shall be in Department's sole discretion. The Design-Builder shall not have the authority to enter into any Utility Agreements with any Utility Owners on Department's behalf. The Design-Builder shall cooperate with Department at the Design-Builder's expense in connection with negotiating and preparing Utility Agreements. The Design-Builder shall prepare and provide all written information concerning the Project requested by Department and shall provide staff to attend negotiation sessions.

6.2.2.2.1 Master Utility Agreements (MUAs)

A MUA establishes a general framework for addressing the Utility issues within the Project that affect a Utility Owner. All Utility Work must be performed according to all applicable terms and conditions of the Contract Documents, which will include MUAs where applicable. Department will negotiate the MUA with the Utility Owner and the Utility Owner will execute it. The Design-Builder will execute and become a party to the MUA simultaneously with the execution of the Design-Build Contract. Department will subsequently execute the MUA, which will be effective immediately. The Design-Builder agrees that it will comply with all of the terms and conditions of the MUA.

Department may enter into MUAs with Utility Owners with affected facilities after the Proposal Due Date. Such execution will not entitle the Design-Builder to a Change Order unless the MUA results in a substantial cost increase to the Design-Builder; however, any Utility Work added to the Contract pursuant to MUAs executed after the Proposal Due Date will entitle the Design-Builder to a Change Order according to Book 1.

6.2.2.2.2 Work Orders

When the Design-Builder has achieved a level of design to determine Utility conflict(s), the Design-Builder will coordinate with the respective Utility Owner and Department to develop a proposed resolution and pertinent information required for the Work Order. Department and the Utility Owner will then enter into a Work Order with the Design-Builder to define, negotiate, and order the performance by the responsible party of the Utility Work at the specific location. The Work Order will also describe applicable terms and conditions for such Utility Work.

If Department elects to have a Work Order function as a Change Order according to Book 1, Department will modify the Work Order accordingly to reflect the dual function. Department will assume responsibilities for negotiating with Utility Owners to resolve issues between them relating the determination of legal responsibility for costs. Regardless of which party will perform the Utility Work or pay for it, the Design-Builder will prepare and negotiate the appropriate portions of the Work Order with the Utility Owner. The Utility Owner will have no voice in the terms and conditions of the Change Order portion of the Work Order. The Design-Builder must prepare and negotiate all exhibits to the Work Orders and other required materials except for those that the Utility Owner provides. If Department requires any changes to the Work Order form or its exhibits, the Design-Builder will make them. The Design-Builder may prepare one Work order for a group of Utility Relocations upon receiving Department's Approval. Department will cooperate with the Design-Builder in the Work Order process, which may include attending negotiation sessions and obtaining any necessary legal review; however, Department will not be required to incur any other costs associated with the Work Order Process.

Each Work Order will include the Design-Builder-generated Project design plans (used to identify the conflict) and any applicable design details. Department Utility permits, R/W documents, and/or Utility easement documents for the construction of an affected Utility at a particular location(s) will also be incorporated into the Work Order. The Design-Builder will coordinate the submittal of all Work Orders, and will not submit more than five Work Orders per week to Department for its review. If Department receives excess Work Orders, it may elect, at its sole discretion, to either (a) consider the Work Orders submitted for the following week or weeks as necessary (a "deferral"), or (b) review such submittals as if they were

excessive in number. Department must notify the Design-Builder of its election no later than five Working Days after receiving the excess submittals. If Department does not provide notice after five Working Days, the receipt of excess submittals will be treated as a deferral.

If all parties mutually agree, a Work Order may be split into Part A and Part B to expedite the design. Part A would authorize the design to proceed before the final design cost was determined. Part B would authorize construction.

A Work Order will only amend a MUA for purposes of the Contract when a Change Order or Directive Letter has been issued. With the exception of Work responsibility allocations, if there is a conflict between the terms of the Contract Documents and the terms of a Work Order that is not also a Change Order, the Contract Documents will prevail between Department and the Design-Builder. Work responsibility allocations in executed Work Orders will prevail over the Contract Documents. No Work Order will be required for Incidental Utility Work unless the Utility Owner or Department requests it.

Book 2's provisions regarding the Design-Builder's obligations to provide quality management will prevail over any contrary provision in the Work Order.

6.2.2.2.3 Utility Design Sheets (UDS)

When the Design-Builder has achieved a level of design to determine Utility conflict(s), the Design-Builder shall coordinate with the respective Utility Owner and Department to develop a proposed resolution and pertinent information required for the Utility Design Sheet (UDS). Department and the Utility Owners will then enter into Utility Agreements to define, negotiate, and order the performance by the responsible party of the Utility Work at each specific UDS location. The Utility Agreements will also describe applicable terms and conditions for such Utility Work.

The Design-Builder shall prepare the UDS, coordinate the Utility Work and participate in discussions regarding proposed resolutions for Utility conflict(s) with Department and the Utility Owner regardless of who is doing the Utility Work or who is paying for it. The Design-Builder shall prepare all exhibits to the UDS and other required materials except for those provided by the Utility Owner. The Design-Builder shall make any changes in the UDS or exhibits required by Department. If Approved by Department, the Design-Builder may prepare one UDS for a group of Utility Relocations.

Department will cooperate with the Design-Builder in the UDS process, which may include attending necessary meetings; however, Department will not be required to incur any other costs associated with the UDS process.

Each UDS shall include Design-Builder-generated Project design plans (used to identify the conflict) and any applicable design details. Department Utility permits, Utility Agreements, R/W documents, and/or Utility easement documents for the construction of an affected Utility at a particular location(s) shall also be included with the UDS.

6.2.2.3 Utility Permits and Construction Easements

When the Design-Builder is responsible for performance of the construction of the Utility Work, although it is the responsibility of the Utility Owner to obtain Department Utility permits, the Design-Builder shall coordinate with the Utility Owner to obtain all construction-related local entity Utility permits, Department Utility permits, and/or Construction Easements or agreements. The Design-Builder shall comply with such Utility permits and Construction Easements or agreements. Separate permits may be required for Work on streets under local entity jurisdictions. A Utility permit from Department is required for any new Utility facility and for Betterments within Department R/W.

6.2.2.4 Utility Tracking Report

The Design-Builder shall maintain a Utility Tracking Report that lists all Utilities affected or potentially affected by the Project. The Utility Tracking Report shall contain not less than the following information for each Utility listed thereon:

- The name of the Utility Owner and a unique identification number for tracking;
- A brief description of the Utility by size and type;
- The location of the Utility, based upon Project control datum or by station and offset;
- The proposed treatment of the Utility and the date such treatment was Approved by Department;
- Once a Work Order has been executed, the party responsible for performance of such Utility Work;
- The nature of the Utility Owner’s existing right of occupancy of the R/W for such Utility;
- The scheduled start and completion dates of construction of the Utility Work;
- The actual start and completion dates of construction of the Utility Work;
- The status of construction for the Utility Work, including percentage complete; and
- Such other information as Department may request.

The first Utility Tracking Report shall identify all changes from and additions to the information provided by Department that is used by the Design-Builder in the creation of the UDS. Each subsequent version of the report shall identify all changes from the previous version. The report shall be sortable so that data can be reported by the following parameters: the utility identification number, the Utility Owner, the scheduled start-of-construction date, and the scheduled completion date.

6.2.3 Coordination and Cooperation

All Utility Work shall require cooperation between the Design-Builder and the Utility Owners. The Design-Builder shall be responsible for all coordination with the affected Utility Owners in order to accomplish the Utility Work. In the discharge of its coordination responsibilities, the Design-Builder shall

- provide to the Utility Owners, as soon as practicable, an estimated schedule for their respective Utility Work and notify the Utility Owners of any significant changes to the schedule as soon as practicable;
- keep Utility Owners fully informed of Project schedules and changes that affect or may affect their Utility facilities;
- consider Utility Owners’ needs for the allocation of resources to perform their Utility Work;
- keep Utility Owners involved in making the decisions that affect their facilities so Utility Owners are able to provide uninterrupted service to their customers, or be subject to the least interruption practicable; and
- coordinate the Utility Work to attempt to avoid multiple Utility Relocations of the same Utility.

6.2.3.1 Utility Coordination Meetings and Correspondence

Department and the Design-Builder shall be available to meet at the request of the other party, as necessary, to discuss and resolve matters relating to the Utility Work. The requesting party shall provide the other party with not less than seven Days prior notice of such meetings.

6.2.3.1.1 Meeting Minutes and Correspondence

The Design-Builder shall produce minutes of meetings with Utility Owners and/or Department and shall distribute copies of the minutes to the Utility Owner and Department no later than seven Days after each meeting date. The Design-Builder shall provide Department copies of all correspondence between the Design-Builder and any Utility Owner no later than seven Days after receiving or sending it.

6.2.3.2 Scheduling

The UIs indicate the estimated amount of time required for the Utility Owners to design and/or construct their Utility Work where applicable. The foregoing time frames, and any time frames for design, construction, and/or performance of other tasks or reviews stated in the MUA, shall be considered estimates only and may not be relied upon by the Design-Builder for any purpose.

6.2.3.3 Cost Estimates

If Department will reimburse a Utility Owner for any costs in connection with a Utility Relocation, whether on a lump sum or an actual cost basis, the Design-Builder shall obtain and submit to Department a definitive cost estimate from the Utility Owner with a proposed Work Order. The cost estimate shall meet the requirements of the applicable MUA and the Work Order form. The amount to be paid by Department will be agreed to by the Utility Owner and Department. Upon Approval by Department, the estimate will be attached to and incorporated into the applicable Work Order.

If a Utility Owner will reimburse Department for Utility Work performed by the Design-Builder, whether on a lump sum or an actual cost basis, the Design-Builder shall prepare and submit to Department and the Utility Owner a definitive cost estimate for such Utility Work with a proposed Work Order. The cost estimate shall meet the requirements of the applicable MUA, the Work Order form, and the Utility Owner's reasonable requirements with respect to the form and content of such estimate. The Design-Builder shall provide justification of its costs to the Utility Owner as requested by the Utility Owner. Upon approval by the Utility Owner, the approved estimate shall be attached and incorporated into the applicable Work Order.

Where possible, all reimbursements to Utility Owners for costs less than \$100,000.00 per agreement or from Utility Owners will be negotiated and established on a lump sum basis rather than on an actual cost or time and materials basis, unless otherwise Approved by Department. Accordingly, the Design-Builder shall pursue lump sum agreements in negotiating the Work Orders with Utility Owners and preparing and obtaining cost estimates. However, no lump sum arrangement will be entered into for Utility Work if such arrangement would preclude federal reimbursement for such Utility Work pursuant to 23 CFR Section 645.113(f). All reimbursements to Utility Owners for amounts over \$100,000.00 will be negotiated and established on an actual cost or time and materials basis, unless otherwise Approved by Department. Upon Department's request, the Design-Builder shall provide billing information for Department's invoices to Utility Owners for the Design-Builder's Utility Work, including substantiation of costs in accordance with the requirements of the applicable Utility Agreements.

6.2.3.4 Overrun of Estimated Cost

6.2.3.4.1 Department Responsible for Payment of Utility Work

The Design-Builder shall maintain accurate up-to-date records of each Utility Relocation cost as the Utility Work progresses. On an actual cost Work Order, immediately after the records indicate that the reimbursable costs of the Utility Work will exceed the amount of funds agreed upon in the Work Order, the Design-Builder shall immediately notify Department and the Utility Owner in writing. The notification shall include an estimate of the amount of additional funds necessary to complete the Utility Work, and the reason(s) the original amount will be exceeded. If Approved by Department, an amended Work Order shall be executed by all parties.

Should the Design-Builder perform Utility Work that would qualify for Department reimbursement, but for which Department has not previously encumbered funds, that Utility Work shall be done at the Design-Builder's risk. In order to qualify for reimbursement for that Utility Work, the Design-Builder shall notify Department and the Utility Owner in writing of the additional cost before performing the work. Notification shall include an estimate in the amount of additional funds necessary to cover the additional cost and the

reasons why the current amount encumbered will be exceeded. Any payments for increases in the cost estimates shall be Approved in writing by Department prior to the Design-Builder incurring such costs.

6.2.3.4.2 Utility Owner Responsible for Payment of Utility Work

The Design-Builder shall maintain accurate up-to-date records of each Utility Relocation cost as the Utility Work progresses. On an actual cost Work Order, when the records indicate that the reimbursable costs of the Utility Work will exceed the amount of funds encumbered, the Design-Builder shall immediately notify the Utility Owner and Department in writing. The notification shall include an estimate of the amount of additional funds necessary to complete the Utility Work and the reason(s) the original encumbrance will be exceeded together with supporting documents.

The Utility Owner shall pay the estimated Utility Relocation costs for each Utility Relocation Work as provided in the applicable Work Order, as adjusted for any increase/decrease in the actual costs of performing that Utility Work. Any increases in cost estimates shall be approved in writing by the Utility Owner prior to incurring additional costs.

6.2.3.5 Notifications

6.2.3.5.1 Notices to Utility Owners

The Design-Builder shall issue all notices to the Utility Owners in accordance with the Utility Agreements or the Notice and Order process, whichever is applicable. The Design-Builder shall notify all affected Utility Owners at least 48 hours before commencing any operations that affect a Utility, unless otherwise agreed to in a Utility Agreement.

6.2.3.5.2 Notices Regarding Utility Owner Performance

The Design-Builder shall be responsible for verifying progress of the Utility Owner's work and for notifying Department should the Design-Builder have cause to believe that the Utility Owner will not meet the specified time frame(s) for any of the following: construction; review of the Design-Builder's plans; comment, review, and approval for Work Orders; or inspection. The Design-Builder shall provide such written notice to Department immediately after discovery.

If the Utility Owner is performing construction, the Design-Builder shall verify that the required Department Utility permit is obtained and complied with. If the Design-Builder determines that the Utility Owner does not have the necessary Department Utility permit or is in violation of the permit or Utility Agreement, the Design-Builder shall notify Department in writing immediately after discovery.

6.2.4 Failure of Utility Owner to Cooperate

The Design-Builder shall make diligent efforts to obtain the cooperation of each Utility Owner as necessary for the Project. The Design-Builder shall notify Department immediately if the Design-Builder becomes aware that a Utility Owner is not cooperating in providing needed work and/or Work approvals. After such notice, the Design-Builder shall continue to diligently pursue the Utility Owner's cooperation and assist Department as requested with regard to the problem. Any assistance provided by Department, including legal action as described in this Section 6.2.4, will not relieve the Design-Builder of its sole and primary responsibility for the satisfactory completion of all Utility Work and compliance with all other requirements.

In addition to and without limiting its rights pursuant to the preceding paragraph, Department may, in its sole discretion, decide to take legal action against an uncooperative Utility Owner. The Design-Builder shall cooperate as requested by Department in connection with such lawsuits, including having the Design-Builder's staff and consultants act as witnesses in such lawsuits and providing information to Department's counsel at the Design-Builder's expense.

6.2.5 Partnering and Dispute Resolution Procedures

Any disputes that arise between Department and the Design-Builder shall be subject to the Dispute Resolution provisions set forth in Book 1; however, if the dispute involves a Utility Owner, the Dispute Resolution provisions set forth in Book 1 shall be modified in accordance with this section to include participation by the Utility Owners, or as modified in the applicable MUA(s) with the Utility Owner(s).

The Design-Builder and Department agree that the Utility Owner(s) shall be invited to participate in all partnering activities related to the Utility Work of the affected Utility Owner(s). The Design-Builder, Department and the Utility Owners may agree to a modified dispute resolution process either in the MUA or in a separate agreement.

6.2.6 Standards

In the event of a conflict among the standards set forth in Book 3 relating to Utilities, the order of precedence shall be as set forth below, unless otherwise specified.

Utility Standards and Requirements

Priority	Agency	Title
1	Department	Standard Special Provisions
2	Department	Standard Specifications, May 2006
3	Department	Standard Plans, May 2006
4	Department	Project Development Procedures Manual
5		California Streets and Highways Code
6	Department	Ready to List (RTL) Construction Contract Award Guide
7	Department	Plans Preparation Manual
8	Department	CADD Users Manual
9	Department	Encroachment Permit Manual
10	AASHTO	A Policy on the Accommodation of Utilities within Freeway Right-of-Way
11	AASHTO	A Guide for Accommodating Utilities within Highway Right-of-Way

6.3 Design Requirements

6.3.1 General

All design furnished by the Design-Builder and all reviews and approvals by the Design-Builder of design furnished by the Utility Owners shall be in full compliance with the requirements of the applicable Utility Agreements, the Visual Quality Management Plan, and the Environmental Management Plan. The Design-Builder shall be responsible for taking all actions necessary to verify that design plans, whether furnished by the Design-Builder or by the Utility Owner, and regardless of the type of design plans provided by the Utility Owners, are consistent and compatible with the Contract Document requirements (including applicable performance specifications), the Utility Agreements, the written standards of the respective Utility Owners, all applicable governmental rules, all Utility permits, and with the Design-Builder's design and construction of the Project. In case of conflicts, the most stringent standards or requirements will govern. The Design-Builder shall obtain information regarding the standard design plans the Utility Owners routinely use for their Utility Work.

6.3.2 Utilities Adjacent to Structures

Underground Utilities shall not be installed within 15 feet of any foundation element, unless otherwise Approved by Department.

Installations of all Utilities near structures supported on spread footings shall be subject to the following restrictions:

- When referencing mechanically stabilized earth (MSE) walls, the leveling pad and reinforcing zone shall be considered spread footing elements.
- No Utilities shall be installed below a line extending from the bottom of the footing horizontally for a distance of 3 feet from the edge of the footing and then continuing downward and outward on a 2:1 slope.

Utilities installed in the vicinity of MSE walls must follow restrictions outlined in Department Technical Memorandum No. 03-16-MRR-06.

Buried Utilities that may produce stray current shall not be installed within 300 feet of any MSE wall unless a corrosion control evaluation is prepared and all necessary corrosion control measures are implemented to properly mitigate the effects of stray current. The corrosion control evaluation and all resulting Design Documents shall be certified by a California-licensed Professional Engineer who is certified by the National Association of Corrosion Engineers.

6.3.3 Investigations

The Design-Builder shall take all actions necessary to identify and confirm the existence and exact location, size, and type of all Utility facilities within the R/W or otherwise potentially impacted by the Project construction, whether or not such Utilities are shown in the drainage plans or in the UISs. This shall include all potentially impacted Service Lines. Such actions shall include making diligent inquiry at the offices of the Utility Owners, consulting public records, and conducting field studies (such as potholing), taking into consideration the possibility that Utility Owners may provide inaccurate or inexact information with regard to their facilities. If the Design-Builder's investigations identify Utilities or Service Lines not described in the drainage plans or in the UISs, or if the Design-Builder determines that any Utility or Service Line was not accurately indicated in the drainage plans or in the UISs, the Design-Builder shall notify Department immediately upon discovery. Any inaccuracy in, or omission from, the information provided in this RFP with respect to existing Utilities shall not relieve the Design-Builder of its duties with respect to the Utility Work.

The Design-Builder shall prepare a UDS for each Utility impacted by the Project, identifying the location of the existing Utility and the final Relocation recommendation to mitigate potential conflict, including, if applicable, the proposed new location (without regard to whether the Design-Builder or the Utility Owner will be furnishing design). The appropriate UDSs, along with CADD-prepared preliminary design plan sheets, shall be attached to each Work Order. The information shown on the preliminary design sheets shall include the following:

- Existing and proposed R/W;
- Existing topography;
- Proposed Project elements;
- Existing Utilities; and
- Proposed Relocation of the Utility in conflict.

6.3.4 Design by Design-Builder

If the Design-Builder and the Utility Owner agree that the Design-Builder shall furnish the design of the Utility Work, the Design-Builder shall, before beginning construction, submit its design to the Utility Owner for review and approval for each Utility Relocation design. All subsequent changes to designs will require written Utility Owner approval. The Design-Builder shall also submit each design to Department for its advance review and comment. The Design-Builder shall furnish the design of all the Utility Work necessary for the Project as stated in the Utility Agreements. The foregoing obligation includes temporary Utility

Relocations and all necessary Relocations of Service Lines connected to such Utilities, regardless of the ownership of such Service Lines or of the property served by such Service Lines.

In each instance where the Design-Builder performs the design of the Utility Work concerning a Utility Owner's facilities, the Design-Builder shall be responsible for obtaining written specifications, current at the time of the Utility Work, from the Utility Owner and for verifying that they are consistent and compatible with the Design-Builder's overall Project design. The Utility Owner's written specifications will be included in the Work Order.

Designs shall be furnished in full accordance with the requirements of the Contract Documents applicable to the Utility Work and the design requirements, including format, of the applicable Utility Agreement(s). In the event of a conflict between the Utility Owner's design standards and the standards or requirements of the Contract Documents, the most stringent standards or requirements will govern. The Design-Builder shall submit its designs to the Utility Owner for written approval by the Utility Owner in accordance with the procedure set forth in the applicable Utility Agreement(s). The Design-Builder shall obtain Utility Owner approval of the Utility Work Plans prior to commencement of construction. The Design-Builder shall document the Utility Owner's approval by obtaining a Design Approval Letter from the Utility Owner, and formally submitting a copy to Department. Upon approval by the Utility Owner, the Design-Builder shall attach the Utility Work Plans to the Work Order. All subsequent changes to designs will require written Utility Owner approval and shall be shown on the As-Built Documents upon completion of the Work.

6.3.5 Design by Utility Owner

The Design-Builder shall obtain Utility Work Plans from the Utility Owner for all Utility Work that the Utility Owner is responsible for designing. The Design-Builder shall review these plans for compliance with the design requirements within the Contract Documents and provide comments to the Utility Owner as appropriate. As a minimum, the work plan information must meet the standard of quality necessary for the Utility Owner to construct the Utility Relocation. The Design-Builder shall provide all information necessary for the Utility Owners to create Utility Work Plans, including, construction staking and survey information, profile and/or cross section information, and potholing for confirmation of conflicts and coordinates. The Design-Builder shall confirm that there are no conflicts when the Design-Builder determines that the location of a Utility does not conflict with the design of the Project. The Design-Builder shall evidence its review and certification that the design complies with the design requirements within the Contract Documents by issuing a Design Approval Letter to the Utility Owner and forwarding a copy to Department.

6.4 Construction Requirements

6.4.1 Construction by Design-Builder

In each instance where the Design-Builder performs the construction of the Utility Work, the Design-Builder shall be responsible for obtaining written standards and specifications, current at the time of the Utility Work, from the Utility Owner and for verifying that they are consistent and compatible with the Design-Builder's overall Project design. The Utility Owner's written standards and specifications will be included in the Work Order or UDS if there are no Master Utility Agreements. The Design-Builder is also responsible for complying with the Utility Owner's written standards and specifications, the approved plans, all applicable governmental rules, Utility permits, and the requirements of the Contract Documents. In case of conflict, the most stringent standard or requirement will govern.

The Design-Builder shall be responsible for restoring infrastructure damaged due to the Utility Work performed by the Design-Builder.

All Utility Work accomplished by the Design-Builder for the City of Fresno on water mains and Fresno Metropolitan Flood Control District on drainage pipes shall be accomplished in accordance with the City of Fresno and Fresno Metropolitan Flood Control District Special Provisions and Specifications.

6.4.1.1 Inspection

Each Utility Owner, through its representative, will have the right to inspect the construction performed on its Utilities by the Design-Builder. The Design-Builder shall not unreasonably refuse such Utility Owner inspection requests and shall coordinate the schedule and scope of such inspections with the Utility Owner.

6.4.1.2 Approval

The Utility Owner's written approval of the Utility Work shall be in accordance with the Utility Owner's Construction Inspection Approval Letter .

6.4.2 Construction by Utility Owner

The Design-Builder shall inspect all Utility Work performed by Utility Owners and/or their Subcontractors in order to verify compliance with requirements. The Design-Builder shall approve the construction performed by each Utility Owner in order to verify that the construction complies with the Contract Document requirements, the Utility Agreements, the approved plans for such construction, all applicable Governmental Rules, and Utility permits. In order to evidence its approval, the Design-Builder shall provide a Construction Inspection Approval Letter to the Utility Owner with a copy to Department. The Design-Builder shall immediately notify Department in writing regarding any noncompliance.

6.4.3 Incidental Utility Work

Incidental Utility Work includes all of the following Utility Work necessary and/or convenient for the construction of the Project:

- Protection of existing Utilities
- Removing Public Utilities from service and leaving these Utilities in place

The Design-Builder shall be responsible for all Incidental Utility Work without regard to the allocation of responsibility for Utility Work. The Design-Builder shall make all arrangements and perform all Utility Work necessary in order to accomplish the Incidental Utility Work, including, but not limited to, locating existing Utilities, identifying conflicts, performing any necessary coordination with Utility Owners and property owners, furnishing design, performing construction, reimbursing Utility Owner Inspection costs, and obtaining and complying with all applicable legal requirements and required Governmental Approvals.

6.4.3.1 Protection of Existing Utilities

The Design-Builder shall be responsible for the protection of existing Utilities impacted by the Project, as necessary to ensure their continued safe operation and structural integrity. The protection of existing Utilities may be either temporary or permanent.

6.4.3.2 Utility Removal Work

The Utility Removal Work consists of all Utility Work necessary to remove any existing Utilities for which leaving the existing Utility in place is not feasible or allowed, or which is required to be removed in order to accommodate or permit construction of the Project.

6.4.4 [NOT USED]

6.4.5 Maintenance of Utility Service

The Design-Builder shall take appropriate measures to ensure that all Utilities remain fully operational during all phases of construction to the greatest extent practicable. Necessary interruptions of service shall be described in the Work Order, which is subject to the approval of the Utility Owner.

The Design-Builder's proposals for shutdowns and temporary diversions of affected Utility facilities, if approved by the Utility Owner, shall be included in the Work Order or Utility Design Sheet.

6.4.6 Betterments

Replacements for any existing Utilities shall be designed and constructed to provide service at least equal to that offered by the existing facilities (unless the Utility Owner specifies a lesser replacement), but may not include any Betterments, unless added to the Utility Work through a Work Order. Utility Owners may request Department to permit the Design-Builder to perform additional Work relating to Betterments at the Utility Owner's expense. If Department Approves any such request, then the Design-Builder shall perform such Betterment Work. Upon execution of a Work Order by the Utility Owner, Department, and the Design-Builder, such Betterment shall be added to the Utility Work. Book 1 addresses the Design-Builder's right to a time extension and/or a Contract Price increase for any Betterment added to the Utility Work and sets forth certain additional provisions related to Betterments.

The Design-Builder shall provide all coordination, including all definitive cost estimates and billing information necessary to address requested Betterments.

6.4.7 Damage to Utilities by Design-Builder

In performing the Work, the Design-Builder shall require its Subcontractors, employees, and agents to exercise due precaution and care to avoid causing damage to the Utility Owner's facilities, persons, and property. The Design-Builder shall be responsible for any and all damage caused by the Design-Builder's Subcontractors, employees or agents to the property, facilities, structures, or persons of the Utility Owner. The Design-Builder shall immediately notify the affected Utility Owners of any Utilities damaged by the Design-Builder during the Design-Builder's performance of the Work. The Design-Builder shall be responsible for all costs and/or schedule impact associated with said damage.

Promptly after the Design-Builder's discovery of such damage or the Design-Builder's receipt of notice of any such damage from the Utility Owner or from any other source: (a) the Design-Builder shall repair the damage to the Utility Owner's satisfaction, or (b) at the Utility Owner's election, the Utility Owner may make such repairs at the Design-Builder's expense. If the Design-Builder fails to make any required payment to a Utility Owner 60 Days after receiving the Utility Owner's invoice, Department may make such payment if required pursuant to the applicable MUA or otherwise at Department's sole discretion. If the Design-Builder's failure to pay is due to a reasonable dispute, then Department may not make such payment until at least 60 Days after the final resolution of such dispute has occurred without payment by the Design-Builder. If Department makes any payment, the Design-Builder shall reimburse Department for such payment within 10 Days after receipt of Department's invoice, or, in Department's discretion, Department may deduct the amount of reimbursement due from the next payment (or payments, if necessary) due to Design-Builder under the Contract.

6.5 Deliverables

Deliverables shall be submitted to Department in hard copy and electronic versions.

- MUA: The Design-Builder shall sign four originals and return all to Department (When executed)
- Department Utility Permit Application: The Design-Builder shall submit one original with two sketches to Department for Approval on all Utilities that are designed by the Design-Builder. Submittal shall be within two Days of the Design-Builder's receipt of the Utility's Design Approval Letter. Department will respond within 10 Working Days of receipt.
- Utility Tracking Report (blank form): One information copy of the Utility Tracking Report shall be submitted to Department weekly or as otherwise directed by Department. A preliminary Utility Tracking Report shall be submitted to Department for Acceptance prior to NTP 2.
- Utility Design Sheet (UDS): The Design-Builder shall submit a copy to Department and the Utility two Days before the initial Work Order meeting.

- Work Order: Design-Builder shall submit three originals of the Work Order (including any exhibits) to Department for Approval upon execution by the Utility and Design-Builder. Department will respond with comments within 10 Working Days of receipt.
- Design Approval Letters: The Design-Builder shall submit a copy of each Design Approval Letter to Department as an exhibit to each Work Order.
- Utility Owner’s Construction Inspection Approval Letter: The Design-Builder shall submit a Construction Inspection Approval Letter to Department within seven Days of Utility Work completion for each Utility Work Order.

Design-Builder’s Construction Inspection Approval Letter: The Design-Builder shall submit a Construction Inspection Approval Letter to Department within seven Days of Utility Work completion for each segment of work accomplished by a Utility Owner.

7 RIGHT OF WAY (R/W)

7.1 General

Department will acquire all permanent Right of Way (R/W) necessary for the Project. The R/W Work Map (attached as Exhibit 7- A) indicates the existing R/W lines for the Project. The R/W Work Map also indicates any permanent and/or Temporary Easements being acquired by Department for the Project.

If it is determined by the Design-Builder and agreed upon by Department that Temporary Easements are necessary for the Project, Department will accomplish all acquisition activities unless otherwise indicated below. Schedule implications associated with the acquisition of Construction Easements shall be the responsibility of the Design-Builder. The cost of such easements will be deducted from the most current partial payment.

Right of possession of the Site and the improvements made thereon by the Design-Builder shall remain at all times with Department. The Design-Builder's right to entry and use of the Site arises solely from permission granted by Department under the Contract.

7.2 Administrative Requirements

The Design-Builder shall comply with only those administrative requirements set forth in section 7 that are applicable to Work performed by the Design-Builder.

7.2.1 Standards

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Design-Builder's Submittal standard.

If there is any unresolved ambiguity in standards, obtain clarification before proceeding with design or construction.

Use the most current version of each listed standard as of the Request for Proposal (RFP) issue date unless modified by Addendum or Change Order. In the event of a conflict among the standards set forth in Book 3 relating to R/W activities, the order of precedence shall be as set forth below, unless otherwise specified:

Right of Way Standards and Requirements

Priority	Agency	Title
1		Uniform Relocation Assistance and Real Property Acquisition Policies Act 1970 as amended
2	California	Government Code
3	Department	Right of Way Manual
4	Department	Surveys Manual
5	Department	CADD Users Manual
6	Department	Plans Preparation Manual
7	Department	Special Provisions
8	Department	2006 Revised New Standard Plans
9	Department	Standard Plans May 2006
10	Department	Design-Build Modifications to the Standard Specifications for Construction
11	Department	Standard Specifications
12	Department	Technical Memoranda

*Document modified for design-build.

Pursuant to 23 CFR §710.313(d)(1)(i), the Design-Builder shall comply with the procedures, guidelines, and standards set forth in the Department *Right of Way Manual* regardless of whether the procedures, guidelines, or standards are written as mandatory requirements. Wherever the *Right of Way Manual* refers to activities to be performed by Department or Department personnel, the Design-Builder shall be responsible for conducting those activities. If there are any questions regarding the scope of the Design-Builder's obligations pursuant to the *Right of Way Manual*, the Design-Builder shall be responsible for requesting clarification from Department. The determination of whether the obligation is mandatory shall be in the sole discretion of Department.

7.2.2 Meeting Requirements

The Design-Builder shall conduct:

- Progress meetings with Department, affected governmental persons, and other required groups, held monthly or as agreed upon by Department and the Design-Builder
- Meetings with Department and affected property owners as needed
- Other meetings either identified within this section or requested by Department

The Design-Builder shall prepare all necessary displays, agendas (sent to all participants one week prior to scheduled meetings), and meeting minutes (sent to Department within five Working Days of the meeting).

7.2.3 [NOT USED]

7.2.4 Software Requirements

The Design-Builder shall prepare all electronic drawings in MicroStation and supporting electronic data in CaiCE. All reports and documents shall be prepared in Microsoft Word format.

7.3 Resources Provided by Department

The Department will provide the R/W Maps (Exhibit 7- A).

7.4 [NOT USED]

7.5 Acquisition Activities

Regardless of whether Department or the Design-Builder is responsible for acquisition activities, Department will be responsible for payments to all property owners for purchase of temporary and permanent R/W and for relocation payments. The Design-Builder shall reimburse Department for all costs of Construction Easements and additional R/W in accordance with Book 1.

7.5.1 Construction Easements

The Design-Builder shall notify Department in writing of all Construction Easements necessary for construction of the Project based on the Design-Builder's Release for Construction (RFC) designs. This written notification shall identify the Construction Easements sought and shall include drawings depicting proposed construction limits and cross-sections. Department will be responsible for the acquisition of all Construction Easements for the Project at the Design-Builder's cost. Acquisition of Construction Easements by Department could take up to 18 calendar months for additional parcels from the time the written notification is submitted by the Design-Builder. Schedule implications associated with the acquisition of Construction Easements shall be the responsibility of the Design-Builder. Payment for Construction Easements shall be made by Department and deducted from the Design-Builder's monthly progress payment. The cost of Construction Easements shall be included in the Design-Builder's Proposal Price.

7.5.2 [NOT USED]

7.5.3 Eminent Domain – Condemnation

The Design-Builder shall provide support for eminent domain acquisition activities, if necessary.

7.5.4 Identification of Additional R/W

If the Design-Builder determines that additional R/W is necessary or required by a Change Order, the Design-Builder shall prepare and submit a written request to Department for consideration. This request shall identify the additional R/W sought, along with a justification for its need, and shall include drawings depicting proposed construction limits and cross-sections. Department will review the request, determine whether the acquisition is acceptable and within the scope of the environmental documentation, and notify the Design-Builder in writing regarding the schedule and process required to complete the acquisition. The Design-Builder shall reimburse Department for all costs associated with such acquisitions, subject to Book 1, Section 6.1.2. Department will require up to 18 calendar months for acquisition of additional parcels from the time of the written request. Schedule implications shall be included in the Design-Builder's schedule.

If acquisition of additional R/W is determined to be acceptable, the Design-Builder shall prepare and submit, at its sole cost and expense, the following documents to Department:

- R/W package in accordance with Section 7.4.2.
- A legal description for the additional parcel in accordance with Section 7.4.2 that identifies and provides separate and distinct descriptions for fee or easement parcels.
- An appraisal in accordance with Section 7.4.3, on a parcel basis of the cost to acquire that includes values for land, improvements, damages or benefits (if any), and relocation (if applicable).
- A current Phase 1 Site Assessment in accordance with ASTM Standard E 1527, completed not more than 30 Days prior to submittal, for each additional R/W parcel.
- Should relocation be required as a result of the acquisition of additional R/W, relocation assistance in accordance with Section 7.4.4.

The Design-Builder shall correct any deficiencies noted by Department and resubmit the documents for review and processing. This process shall continue until Department has received a complete submittal having no deficiencies.

Department will conduct the negotiation and property acquisition process. Access to the additional R/W will not be allowed until Department has obtained possession and relocation is completed, if applicable.

7.6 Deliverables

All deliverables to Department shall be submitted in both electronic format and hardcopy whenever possible.

- Meeting minutes shall be submitted to Department within five Working Days of all meetings.

7.6.1 [NOT USED]

7.6.2 Acquisition Activities Deliverables Summary

For acquisition of additional R/W and/or construction easements, Department will provide a R/W authorization map for the Design-Builder to approve prior to Department's proceeding with the acquisition. The Design-Builder shall approve R/W authorization map prior to acquisition beginning.

The Design-Builder shall provide the following items related to eminent domain—condemnation:

- Materials and exhibits for hearings or trials as required

EXHIBIT 7-A

Right of Way Work Map

This exhibit is provided as electronic file

8 GEOTECHNICAL

8.1 General

The Design-Builder must perform all Work necessary to meet the requirements of geotechnical subsurface exploration, analysis, design, and construction in accordance with the requirements of the contract documents, and these Technical Provisions.

Design and construct the geotechnical work in accordance with requirements of this specification, including performance requirements, standards and references, warranties, design and construction criteria, maintenance during construction, and required submittals.

Limited pre-contract geotechnical subsurface exploration has been performed for the Project to reduce unknowns and uncertainties. Geotechnical subsurface information obtained is included as part of the Preliminary Engineering Documents.

8.2 Administrative Requirements

8.2.1 Standards

Perform the geotechnical work in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification from Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the Instructions to Invitation for Bid (IFB)] issue date unless modified by Addendum or Change Order.

Geotechnical Standards and Requirements

Priority	Agency	Title
1	Department	California Amendments to the AASHTO LRFD Bridge Design Specifications
2	AASHTO	LRFD Bridge Design Specifications
3	Department	Special Provisions
4	Department	Standard Plans
5	Department	Design-Build Modifications to the Standard Specifications for Construction
6	Department	Standard Specifications
7	Department	Seismic Design Criteria
8	Department	Division of Engineering Services (DES) Memo to Designers 3-1 Deep Foundations
9	Department	Division of Engineering Services (DES) Memo to Designers 5-20 Foundation Report / Geotechnical Design Report Checklist for Earth Retaining Systems
10	Department	Division of Engineering Services (DES) Memo to Designers 1-35 Foundation Recommendation and Reports

11	Department	Division of Engineering Services (DES) Memo to Designers 20-1 Seismic Design Methodology
12	Department	Division of Engineering Services (DES) Memo to Designers 4-1 Spread Footings
13	Department	Division of Engineering Services (DES) Memo to Designers 20-10 Surface Fault Rupture Displacement Hazard Investigations
14	Department	Division of Engineering Services (DES) Memo to Designer 20-12 Site Seismicity for Existing and Temporary Bridges
15	AASHTO	LRFD Bridge Construction Specifications
16	Department	Soil and Rock Logging, Classification, and Presentation Manual
17	Department	Guidelines for Preparing Geotechnical Design Reports
18	Department	Foundation Report Preparation for Bridge Foundations
19	Department	GS Procedures
20	Department	Bridge Construction Records and Procedures Manuals
21	ASTM	American Society of Testing and Materials (ASTM) Standards
22	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
23	Department	California Test Methods

8.2.2 References

Use the references listed below as supplementary guidelines for the geotechnical subsurface exploration, analysis, and design.

Geotechnical References

Agency	Title
FHWA	Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications
AASHTO	Manual on Subsurface Investigations
FHWA	Subsurface Investigations – Geotechnical Site Characterization
FHWA	Geotechnical Engineering Circular No. 5, Evaluation of Soil and Rock Properties
FHWA	The Cone Penetration Test
FHWA	The Pressure Meter Test for Highway Applications
NCHRP	Synthesis 368, Cone Penetration Testing
FHWA	Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines
FHWA	Geotechnical Engineering Circular No. 2, Earth Retaining Systems

FHWA	Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes
FHWA	Manual for Design & Construction Monitoring of Soil Nail Walls
FHWA	Geotechnical Engineering Circular Number 4, Ground Anchors and Anchored Systems
FHWA	Design and Construction of Driven Pile Foundations, Volumes I and II
FHWA	Handbook on Design and Construction of Drilled Shafts Under Lateral Load
FHWA	Drilled Shafts: Construction Procedures and Design Methods
NCHRP	Synthesis 360, Rock-Socketed Shafts for Highway Structure Foundations
API	Recommended Practice for Planning, Design, and Constructing Fixed Offshore Platforms – Working Stress Design

8.2.3 Preliminary Engineering Documents

The Preliminary Engineering Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use. The Design-Builder has the flexibility to make Project changes, but must not impair the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

8.2.4 Software Requirements

Use gINT (version 8 or higher) or a compatible computer program to develop and maintain an electronic database of subsurface information and to produce the hard copy of Boring Records and Log of Test Borings (LOTBs).

The Design-Builder must prepare drawings compatible to MicroStation SE and CAiCE Version 10SP6 as the drafting and design software, respectively.

8.2.5 Equipment Requirements

Instrument for measuring vibrations must be capable of measuring, recording, and producing an electronic file and hardcopy printout of the frequency and peak particle velocity in three mutually perpendicular axes. Vector-sum instrument is not allowed. The instrument must also be capable of measuring and recording the frequency and displacement of each vibration event.

Electronic Cone Penetration Test (CPT) cone must be calibrated within last 12 months.

Standard Penetration Test (SPT) hammer must be tested for energy efficiency within last 12 months, and with energy efficiency ratio reported in the boring logs and boring records.

8.2.6 Personnel Requirements

Provide a geotechnical team that includes, at a minimum, one Professional Engineer (with both Civil and Geotechnical Engineer Licenses) and one Certified Engineering Geologist, both licensed in the State of California. The team leader must be a Professional Engineer (with both Civil and Geotechnical Engineer Licenses) licensed in the State of California. The team leader must have a minimum of eight years of recent experience in matters relating to geotechnical subsurface exploration; geotechnical analysis; design; and construction of bridge foundations and retaining walls.

8.2.7 Certification Requirements

Perform all laboratory tests and testing equipment calibration at AMRL-accredited facilities for the geotechnical tests and equipment calibration required by this section.

8.3 Design Requirements

8.3.1 Geotechnical Execution Plan

The Design-Builder must prepare a Geotechnical Execution Plan (GEP) and a list of geotechnical milestones and scheduled meetings associated with the milestones.

GEP must identify required geotechnical efforts for the design and construction of the Project.

GEP must discuss, but not limited to, the following aspects:

- Geotechnical design and construction issues;
- Assessment of potential bridge foundation and earth retaining system types;
- Planned subsurface exploration program;
- Planned geotechnical design methodologies and schedule; and
- Planned instrumentation and monitoring programs.

Submit the draft GEP for review. Schedule a meeting, within ten (10) days of the submittal of the draft GEP to present the geotechnical concept, the geotechnical needs of the Project, the draft Geotechnical Execution Plan, and the meeting schedule.

Submit Final Geotechnical Execution Plan for review and record.

8.3.2 Geotechnical Subsurface Information

The Design-Builder must obtain geotechnical subsurface information by performing geotechnical subsurface exploration necessary for the geotechnical design and construction of the Project.

For bridge foundation design, perform borings and/or CPTs at each bridge support location if no reliable and applicable bore holes or CPTs information at the support location are available.

8.3.3 Geotechnical Subsurface Exploration

8.3.3.1 Drilling

Perform drilling in accordance with ASTM Standards.

8.3.3.2 Cone Penetration Test

Perform Cone Penetration Tests (CPT) in accordance with ASTM D5778. Data to be collected includes raw and corrected tip resistance, side friction and excess pore water pressure. This data must be collected electronically and presented in graphical format that includes an interpretation of the soil behavior type index and soil behavior type.

8.3.3.3 Geotechnical In-Situ Test, Instrumentation and Geophysical Exploration

Perform Geotechnical In-Situ Test and Geophysical Exploration as necessary in accordance with required ASTM/CTM and the requirements of FR/GDR guidelines.

Install geotechnical instruments as necessary in accordance with required ASTM/CTM and the requirements of FR/GDR guidelines. Replace or recalibrate instruments that are damaged during construction within 5 days.

8.3.3.4 Borehole Site Cleanup

Backfill borehole, after drilling or CPT sounding, with a cement bentonite grout mix or bentonite hole plug, and asphalt or concrete to match existing pavement if borehole is at pavement.

8.3.3.5 Geotechnical Laboratory Test

Perform tests in accordance with California Test Methods (CTM), American Society for Testing and Materials (ASTM), or AASHTO standards.

8.3.3.6 Sample Retention and Transfer

Transfer retrieved rock samples to Department Lab after required tests and analyses are completed. Department must keep these samples until at least completion of Project.

8.3.4 Geotechnical Reports

Prepare Geotechnical Design Reports (GDRs) and Foundation Reports (FRs). Prepare separate Foundation Reports for each bridge when replacement, retrofit, or modifications to existing bridges are to be constructed.

Submit Geotechnical Design Reports, Foundation Reports, addenda, and revisions with contents in accordance with Section 8.5, for review. Sign and seal the reports by the Geotechnical Engineer who performed the work on the reports, who must be a licensed Geotechnical Engineer in the State of California.

The Design-Builder will receive a response within 21 Days of receipt of each geotechnical report. The construction of subject structure, slope, or embankment, must not be started until the Design-Builder receives a notice of Released for Construction. If such work is performed before such notice is provided, it must be at the sole risk of the Design-Builder .

8.4 Construction Requirements

8.4.1 Bridge Foundation Test

Driven Pile:

For pile diameter between 18 inches and 36 inches: Perform one Pile Dynamic Analysis (PDA) Test for each Control Zone to verify pile nominal resistance. A Control Zone is a zone that has the same subsurface profile and engineering properties. Develop acceptance criteria for the Control Zone by using the PDA test result and the Wave Equation. Submit Driving System Submittal 10 days before pile driving.

For pile diameter greater than 36 inches, including Cast in Steel Shell (CISS): Perform one PDA test and one-static axial pile load test for each Control Zone to verify pile nominal resistance. A Control Zone is a zone that has the same subsurface profile and engineering properties. The acceptance criteria are in accordance with the provisions in Sections 10.7.3.8 and 10.7.3.10 of the California Amendments to the AASHTO LRFD Bridge Design Specifications for compression and tension, respectively.

8.4.2 Soil Nail Wall Requirements

Follow Caltrans Standard Special Provisions for Soil Nail Wall (Earthwork) and (Nails).

Identify wall zones, with one Design Pull out Resistance assigned for each wall zone, on the Plans.

Perform two verification tests on each wall zone before starting excavation for the wall zone.

Perform proof tests on sacrificial proof test nails. The number of sacrificial proof test nails must be no less than 10% of the total number of designed soil nails.

Show the locations of eighty percent of the proof test nails on the Final Design Drawings. The locations of remaining twenty percent of proof test nails must be determined during construction.

8.5 Deliverables

The Design-Builder must develop Released for Construction (RFC) Documents, and As-Built Plans and Final Documents in accordance with the requirements of this section.

8.5.1 *Geotechnical Subsurface Information*

Submit geotechnical subsurface information in both hard copy format and electronic format that is in compliance with the required Department database format. The database of subsurface information must be recorded, maintained, and submitted using gINT or comparable software.

Subsurface information obtained must be recorded and reported in accordance with the following:

- Department Soil and Rock Logging, Classification, and Presentation Manual, and
- Data Interchange for Geotechnical and Geoenvironmental Specialists (DIGGS) Schemas and Data Dictionaries.

Subsurface information must be submitted along with applicable Geotechnical Reports. The subsurface information that must be submitted includes:

- Boring and Sampling
 - Final Borehole Log or Borehole Record of each bore hole performed
 - Digital photo logs of rock core samples with associated rock core information shown on each digital photo
 - Test report of energy efficiency ratio of Standard Penetration Test (SPT) hammer for each drill rig used to drill the bore holes
- CPT Sounding
 - An electronic copy of the CPT raw data and hard copy CPT logs for each CPT performed.
 - Calibration report of electronic CPT cone.
- Geotechnical In-Situ Instrumentation
 - Results of geotechnical in-situ instrumentation tests performed
- Geophysical Test
 - Results of geophysical tests performed with interpretation report
- Laboratory Test
 - Results of laboratory tests performed
- Survey data of bore hole, CPT, In-Situ instrumentation, and geophysical test locations, including elevation, strata information, northing and easting, converted latitude and longitude, and station and offset.

8.5.2 *Analysis and Design Calculation*

Submit applicable analysis and design calculations including both hardcopy and electronic files, along with each geotechnical report as appendices for review. The person who performed the calculation must sign each calculation package. Each calculation package must be independently checked and reviewed; and the checker and reviewer must initial each calculation package.

8.5.3 Geotechnical Reports

Submit a hardcopy and an electronic copy of geotechnical reports, including Geotechnical Execution Plan, Geotechnical Design Reports and Foundation Reports, for review.

The reports must include geotechnical subsurface information, geotechnical laboratory test results, analyses, design, recommendations, and associated documents in accordance with Caltrans Guidelines for Preparing Geotechnical Design Reports and Foundation Reports.

Incorporate existing information, including information provided by Department, in the reports as applicable.

EXHIBITS

Exhibit 8-A: Map of Boring Locations

Exhibit 8-B: Modified Dynamic Cone Penetrometer

These exhibits are provided as electronic files.

9 LAND SURVEYING

9.1 General

The Design-Builder shall conduct all work necessary to meet the requirements associated with land surveying, including project, and supplemental horizontal and vertical control surveys, subsequent mapping and topographic surveys, bridge-site surveys, utility surveys, soils surveys, construction surveys, as-built surveys, and all other land surveying services necessary to complete the project in an accurate, neat, and timely fashion. When Department Standards exist for survey activities, such surveying shall be done in accordance with Department Standards. This work shall not include primary horizontal and vertical control surveys, right way engineering, right-of-way surveys, and all land surveying associated with right-of-way engineering close-out activities and right-of-way monumentation.

The Department will perform primary horizontal and vertical control surveys, right-of-way surveys, right-of-way engineering including close-out activities, and right-of-way monumentation required in support of the work.

9.2 Administrative Requirements

9.2.1 *Laws, Standards, and Specifications*

All of the land surveying work performed by the Design-Builder shall be conducted in accordance with the requirements of California Statutes and the standards and specifications listed below. Note: the standards and specifications below are listed by order of priority. Also, the most current version of each shall be used unless modified by an Addendum or Change Order.

If there is any ambiguity in the laws, standards or specifications, the Design-Builder shall seek clarification from the Department before doing the work.

In the event of a conflict among the standards set forth in Book 3 relating to land surveying, the order of precedence shall be as set forth below, unless otherwise specified:

Priority	Entity	Title
1	State	All California Law
2	Department	Surveys Manual
3	Department	Standard Specifications
4	Department	Standard Plans
5	Department	Safety Manual
6	Department	Plans Preparation Manual and the CADD Users Manual
7	Federal Geographic Data Committee (FGDC)	Geospatial Positioning Accuracy Standards, Part 3. National Standards for Spatial Data Accuracy

*Document modified for design-build

9.2.2 *Quality Management Plan*

The Design-Builder shall develop a Quality Management Plan (QMP) that includes the complete description of the quality control (QC) and quality assurance (QA) activities for each surveying product.

The QMP shall be written to achieve the following:

- All individuals responsible for land surveying know what constitutes quality survey products.
- All individuals responsible understand the specifications, standards, and legal requirements for the survey products.
- To have a clearly defined QC plan and QA plan for each survey product.

The Department will perform an Independent Quality Assurance (IQA) of the QMP as well as for the resultant survey products.

9.2.3 Meetings

The Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve any questions or problems related to the land surveying work for this project. The requesting party shall provide the other party not less than five (5) working days notice of such meetings.

9.2.4 Survey Data Provided to the Design-Builder

The Design-Builder shall verify and confirm the location, accuracy, and datum of all land surveying data provided to the Design-Builder, regardless of the source of the information. The Design-Builder shall document all forms of data verification. If the Design-Builder identifies any discrepancy, the discrepancy shall be reported in writing to the Department for review. The Department will respond to the discrepancy within 10 business days.

9.2.5 Survey Coordination and Qualifications

The Design-Builder shall designate a Survey Manager for the Project. The Survey Manager shall possess either a valid California Professional Land Surveyor license, or a valid California Registered Civil Engineer license issued prior to January 1, 1982. The Survey Manager will manage all Design-Builder survey activities associated with the Project and shall be responsible for directing and reviewing all Design-Builder and Subcontractor survey work and be the point of contact for all survey activities. The Survey Manager shall be in responsible charge of each land surveying activity, or designate a licensed Land Surveyor or a pre 1982 licensed Civil Engineer to be in responsible charge of specific land surveying tasks.

The Design-Builder's Survey Manager shall be available for regular, periodic technical meetings with Department survey staff in association with the land surveying tasks required for this project. The Survey Manager shall be available to be on-site during design and construction activities. All land surveying required, as part of the project shall be in full compliance with all State and local laws. The Survey Manager shall have a thorough knowledge and understanding of all aspects of the standards and specifications identified in Section 9.2.1 above.

9.2.6 Department Supplied Information

Department will provide all Department land surveying data relevant to the project which may include, but not limited to, the following items:

- The location and coordinate values of the available horizontal and vertical control stations within the Project, Exhibit 9- A.
- Existing centerline roadway alignments.
- Engineering survey data.
- Photogrammetric mapping.
- Right of Way mapping.
- Land net retracement mapping.
- As-Built utility location information.

9.2.7 Safety Requirements

The Survey Manager and all staff performing land surveying tasks for this project shall have a thorough knowledge and understanding of all of the relevant safety practices and procedures as outlined in the Caltrans Safety Manual and the Caltrans Surveys Manual. The Design-Builder's land surveying staff shall be properly outfitted with the necessary safety equipment to perform any surveying as part of this project.

9.3 Design Requirements

9.3.1 Survey Control Requirements

9.3.1.1 Survey Control Adjustments and Accuracy

The Design-Builder shall document the use of present survey control networks and the establishment of any subsequent survey control networks that will be used in conjunction with the Project. These records shall include survey control monument locations, types, accuracy values, adjustment results, and establishment methods.

The accuracy standard for any subsequent control networks established by the Design-Builder shall be in conformance with Chapter 5 and Figure 5-1 of the Department Surveys Manual and all other specifications described in the Caltrans Surveys Manual.

9.3.1.2 Survey Control Datum

The horizontal survey datum used for the Project shall be the California Coordinate System of 1983 (CCS83) as described in the Public Resources Code, Sections 8801 et. seq., and using the zone and epoch designated by the Department.

The vertical survey datum shall be the California Orthometric Heights of 1988 (COH88) as described in the Public Resources Code, Section 8890 et. seq..

9.3.2 Preservation of Survey Monuments

9.3.2.1 Public and Private Land Survey Monuments

The Design-Builder shall locate and preserve all previously established survey monuments located within the Project in accordance with Section 8771 of the Business and Professions Code.

9.3.3 Prepare Base Maps and Plan Sheets

The Design-Builder shall conduct all tasks necessary to complete all mapping for the Project. This shall include all planimetric, topographic, design, utility, centerline alignment, and base maps necessary to complete the Project.

9.3.3.1 [NOT USED]

9.3.3.2 Surveys and Photogrammetric Mapping for Design

This shall include location surveys as described below. This list is not intended to be all-inclusive, but rather to cover design surveys commonly encountered.

9.3.3.3 Photogrammetric Maps and Products

Photogrammetric maps and products shall conform to the specifications within Chapter 13: Photogrammetry of the Caltrans Surveys Manual.

9.3.3.4 Engineering Surveys

Engineering survey maps and products shall conform to the specifications within Chapter 11: Engineering Surveys of the Caltrans Surveys Manual.

9.3.4 Survey Records and Reports

The Design-Builder shall maintain neat, accurate, and complete documentation for all land survey work performed for this project. These records shall include all calculations, mapping, staking notes, and field crew daily diaries. The Design-Builder shall prepare a formal survey report for all survey calculations related to survey control networks, design surveys, and construction surveys. The intent of each report is to document and perpetuate the information and rationale used to perform the land surveying task.

9.4 Construction Requirements

9.4.1 Construction Surveys

The Design-Builder shall perform all construction surveying necessary to facilitate all construction operations for the duration of the Project and shall conform to the specifications within Chapter 12: Construction Surveys of the Caltrans Surveys Manual.

9.5 Deliverables

9.5.1 General Requirements

The Design-Builder shall index and submit all calculations, notes, computer files, raw data, project reports, meeting notes, correspondence, digital images, maps, corner records, records of survey, aerial photogrammetric products, centerline alignment maps, and other maps and related items as part of the work.

Deliverables shall be submitted in both hardcopy where appropriate (i.e. electronic measurement raw data should only be provided in electronic format) and electronic formats at the completion of each activity. Electronic data submitted shall be compatible with Department software and operating systems. Mapping shall conform to the Caltrans Plans Preparation Manual and the Caltrans CADD Users Manual. GIS deliverables shall adhere to the FGDC Geospatial Positioning Accuracy Standards and the National Spatial Data Infrastructure (NSDI) requirements.

Photogrammetric products shall conform to the specifications within Chapter 13: Photogrammetry of the Caltrans Surveys Manual.

Final acceptance for the survey portion of the Work will not be given until all deliverables have been submitted and approved by Department. Department will have 10 calendar days to complete its compliance review of the Design-Builder's submitted project deliverables.

9.5.2 Survey Records

Survey records shall be delivered in both hardcopy where appropriate (i.e. electronic measurement raw data should only be provided in electronic format) and electronic file format. They shall be delivered at the time of substantial completion unless requested by Department at an earlier time.

9.5.3 Survey Reports

Each survey report shall be submitted to the Department within 30 Calendar Days of the completion of each survey regardless of the type of survey performed.

The report shall be in a hardcopy format and also in electronic file format when possible. The reports shall include information related to the source data used, the calculations performed, and the data produced as part of the survey process. The Department will provide the format specifications of each report type. Each report

shall be reviewed and signed by a California Professional Land Surveyor, or California Registered Civil Engineer licensed prior to January 1, 1982.

9.5.4 As-Builts

The Design-Builder shall produce reports documenting the location of the as-built alignments, profiles, structure locations, and utilities. These reports shall include descriptive statements for any survey methods used to determine the as-built location of the feature being surveyed. The Design-Builder's as-built data shall include the coordinate types (x , y , and/or z) and feature codes in the same format that the preliminary construction data was generated in. Where data has been provided to the Design-Builder from Department in an x , y only coordinate format, or z only coordinate format, the Design-Builder shall provide Department with data in an x , y only coordinate format, or z only coordinate format.

9.5.4.1 Survey Base Map

The Design-Builder shall provide to Department an as-built survey base map file in MicroStation format (.DGN). This file will include:

- Utilities – Structures and related items above and below the ground that are part of the power, water, sewer (storm and sanitary), natural gas, telephone, communications, and pipeline systems within the Project.
- Alignment – The location of the in-place roadway and railroad alignment within the Project.
- Survey Control – The location and coordinate values of available horizontal and vertical control stations within the Project.

The Design-Builder shall provide an XML file written in schema 1.0 containing coordinate geometry and feature code information for the above mentioned utilities, property information, centerline alignments, and survey control items.

The Design-Builder shall provide an XML file written in schema 1.0 consisting of the as-built storm sewer system.

All as-built survey files shall be delivered within 30 working days of Substantial Completion of the Project.

10 EARTHWORK

10.1 General

The Design-Builder shall perform all Work necessary to meet the requirements of earthwork, including clearing and grubbing; excavation and embankment; removal of pavement, pavement markings, and miscellaneous structures; subgrade preparation and stabilization; dust control; aggregate surfacing; and earth shouldering in accordance with the requirements of this Section 10 and the standards below.

10.2 Administrative Requirements

10.2.1 Standards

In the event of a conflict among the standards set forth in Book 3 relating to grading, the order of precedence shall be as set forth below, unless otherwise specified:

<i>Priority</i>	<i>Author or Agency</i>	<i>Title</i>
1	Department	Standard Special Provisions
2	Department	Standard Specifications*
3	Department	Highway Design Manual
4	Department	Storm Water Quality Handbook – Project Planning and Design Guide
5	Department	Technical Memoranda
6	Department	Geotechnical and Pavement Manual
7	Department	Asbestos and Regulated Waste Manual for Structure Demolition or Relocations for Construction Projects
8	Department	Construction Manual

*Documents modified for design-build.

10.2.2 References

Use the references listed below as supplementary guidelines for the grading analysis and design. These publications have no established order of precedence.

Grading Publication References

<i>Agency</i>	<i>Title</i>
Department	Construction Procedures Directives
Department	Construction Policy Bulletins
Department	Standard Test Methods – Volumes 1, 2 & 3

10.3 Design Requirements

See Standards.

10.4 Construction Requirements

The Design-Builder shall remove all existing pavement, curb and gutter, drainage facilities, soil, rock, and other obstructions within the Project limits necessary to construct the Project. The Design-Builder shall

remove all unused pavements within the Project limits. When removing such items, the Design-Builder shall saw cut the pavement with neat lines at the removal terminations.

10.4.1 [NOT USED]

10.4.2 Removal of Miscellaneous Objects

The Design-Builder shall remove and properly dispose of all objects encountered within the Right of Way that are not otherwise designated for removal, salvage, or reuse, such as abandoned automobiles, furniture, appliances, garbage, and other waste materials.

10.4.3 Disposal of Materials

Topsoil and duff shall not be removed from the Site. Topsoil and duff shall be stripped, stockpiled, and reused within the project limits.

10.5 Deliverables

10.5.1 [NOT USED]

10.5.2 [NOT USED]

10.5.3 Borrow Site Plan

If borrow material is required for the Project, the Design-Builder shall submit a Borrow Site Plan to Department for Approval and must receive Department Approval before using the site. Department will respond within 10 Working Days of receipt of the plan.

11 ROADWAYS

11.1 General

The Design-Builder shall perform all Work necessary to meet the requirements of roadways. Roadway classifications include mainline, acceleration lanes, deceleration lanes, auxiliary lanes, collector/distributor roads, ramps, and city streets.

11.2 Administrative Requirements

11.2.1 Standards

The Design-Builder shall perform Roadway Work in accordance with the relevant requirements of the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Design-Builder's Submittal has a higher standard, then adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by Addendum or Change Order.

Roadway Standards

Priority	Agency	Title
1	Department	Highway Design Manual (HDM)
2	AASHTO	Policy on Geometric Design of Highways and Streets
3	Department	Standard Special Provisions
4	Department	Design-Build Modifications to the Standard Specifications
5	Department	Standard Specifications
6	TRB	Highway Capacity manual
7	AASHTO	Roadside Design Guide
8	Department	Project Development Procedure Manual
9	Various Agencies	Technical Memoranda
10	Department	Standard Plans

*Document modified for design-build

Remaining standards set forth in Book 3

11.2.2 References

Use the references listed below as supplementary guidelines for the design of the roadway and/or freeway system. These publications have no established order of precedence.

Roadway References

<i>Agency</i>	<i>Title</i>
Department	Plans Preparation Manual
Department	Drafting and Plans Manual and the Caltrans CADD Users Manual
Department	Final Environmental Document
NCHRP	Report 350-Recommended Procedures for the Safety Performance Evaluation of Highway Features
Department	Ready to List and Construction Contract Award Guide (RTL Guide)

*Document modified for design-build

11.2.3 Local Road System

The Design-Builder shall meet local road criteria provided by the local governing agencies.

11.2.4 Preliminary Engineering Plans

The Preliminary Engineering plans in the Reference Information Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

11.2.5 Software

The Design-Builder shall prepare drawings in MicroStation andCAiCE by AutoDesk on the same version in use by the Department on the date of the Final RFP.

The Design-Builder shall use AutoTurn by Transoft Solutions.

11.2.6 Meetings

Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve matters relating to Roadway Work during the design and construction stages. The requesting party shall provide the other parties with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

11.3 Design Requirements

11.3.1 Design Standards

The Design-Builder shall design and construct all roadways to comply with the following performance requirements:

- Meet all Department and AASHTO roadway design and safety standards;

The scope of improvements shown in the Preliminary Engineering Documents reflects the preferred alternative described in the Final Environmental Document. This preliminary design was used to establish the right of way limits. The Design-Builder shall acquire additional right of way, provide environmental clearance, and obtain Department approval for any design changes that extend beyond the right of way limits or exceed the impacts of the preferred alternative.

The Design-Builder shall design and construct all roadway elements according to Department and AASHTO standards. This includes but is not limited to horizontal alignment, vertical alignment, superelevation, cross

slopes, lane widths, shoulder widths, medians, clear zone, side slopes, and cut and fill slopes. This Project has additional specific requirements for some of these elements, which are given in this section.

The Design-Builder shall design all temporary roadway facilities to comply with the same design and construction requirements as that of the permanent roadway facilities. Design-Builder shall furnish all necessary design documents and obtain all necessary permits for temporary traffic detours, temporary realignments of existing local roadways, and access roads affected by Project construction. Design-Builder shall coordinate the design of these elements with Department and affected local agencies.

The Design-Builder shall prepare all necessary engineering studies and applicable design reports to justify all project roadway elements used in the project.

The Design-Builder shall determine the construction limits of all improvements required on all roadways and include said limits in the design documents.

The Design-Builder shall obtain approval from Department prior to constructing any temporary entrance/exit ramps and perform any associated engineering, documentation, and coordination.

The design vehicle type for all turning movements and acceleration/deceleration lengths for the mainline, ramps, arterials, and other roadways associated with the Project is the STAA.

The Preliminary Engineering Plans show typical sections for mainline and branch connections. These include the number of lanes, shoulders, medians, curb and gutter, and other cross section elements. The number and location of lanes in each direction on mainline including the auxiliary lanes shall be consistent with the Preliminary Engineering Plans. The Design-Builder shall extend the full depth pavement section for the entire width of all shoulders. The pavement includes the roadway pavement; the access ramps from and to the interchanges and incidental shoulder paving, such as maintenance vehicle pullouts and maintenance roads.

The Design-Builder shall follow the Project-specific design standards for specific roadways shown in the following tables.

PROJECT-SPECIFIC DESIGN STANDARDS

Roadway: Route 180 mainline

Location: From Route 41 to Route 168

Design Standards	Freeway Mainline
Jurisdictional System	Caltrans
Functional Class	Freeway
Access Control	Full
Highway Type	Multi-Lane Divided, Urban Section
Design Vehicle	STAA
Terrain	Flat terrain
Traffic Volumes AADT Year 2005	See Project Report
Traffic Volumes Projected AADT Year 2031	See Project Report
Projected Posted Speed	65 mph
Proposed Design Speed	80 mph
Shoulder Bus Use	No
Median Type	Concrete Median Barrier
Special Features:	
1. The horizontal clearance to obstruction along shoulders shall be in accordance to the Highway Design Manual.	
2. Protection shall be provided on all retaining walls, sound walls, and barriers in accordance to the Highway Design Manual and Standard Plans.	

Roadway: All branch connections

Location: On Route 180 between Routes 41 and 168

Design Standards	Branch Connections
Jurisdictional System	Caltrans
Functional Class	Freeway
Access Control	Full
Highway Type	Branch Connection Ramps, Urban Section
Design Vehicle	STAA
Terrain	Flat terrain
Traffic Volumes Current AADT	See Project Report
Traffic Volumes Projected Yr 2035 AADT	See Project Report
Projected Posted Speed	50 mph
Proposed Design Speed	50 mph
Shoulder Bus Use	No
Median Type	N/A
Special Features:	
1. The horizontal clearance to obstruction along shoulders shall be in accordance to the Highway Design Manual.	
2. Protection shall be provided on all retaining walls, sound walls, and barriers in accordance to the Highway Design Manual and Standard Plans.	
3. Types of bridge railing shall be approved by the Department.	

11.3.1.1 Slopes

See Design Exception.

11.3.1.2 Traffic Barrier

The Design-Builder shall use galvanized steel posts for all plate beam guardrail installations unless otherwise Approved by Department. Any guardrail installations that have not been crash tested using steel posts, such as Thrie-Beam Bullnoses, shall be constructed using wood posts in accordance with *NCHRP Report 350 – Recommended Procedures for the Safety Performance Evaluation of Highway Features*.

The Design-Builder shall design and construct all guardrail terminals to avoid vaulting. Refer to the *Roadside Design Guide* and the *Standard Plans* for appropriate safety devices.

The Design-Builder shall meet the requirements for the use of concrete traffic barrier set forth in the project Visual Quality requirements section in these technical provisions.

11.3.1.3 Fencing

Design-Builder shall comply with the *Highway Design Manual*, *Caltrans Standard Plans* and *Caltrans Standard Specifications* to meet fencing Work requirements.

11.3.1.4 Retaining Walls and Sound Walls

The Design-Builder shall construct retaining walls in accordance with the Highway Design Manual. Sound walls shall be constructed according to the recommendations as shown on the Preliminary Engineering Plans.

11.3.1.5 Clearing and Grubbing

Clearing and grubbing Work may not start without an Approved SWPPP and a Traffic Management Plan (TMP). Refer to Drainage section and Maintenance of Traffic section, respectively, in these Technical Provisions.

11.3.1.6 Early Start of Rough Grading

In order for the Design-Builder to proceed with the rough grading of a portion of the Project, Department shall have previously released for construction specific pertinent items of the design. These items include, but not limited to, the information described below:

- Horizontal and vertical alignment
- Typical sections
- Related elements of the drainage system
- Preliminary Geotechnical Design Report
- Preliminary Foundation Report
- Advance Planning Study
- Settlement monitoring program
- Construction specifications (for fills)
- Environmental clearance
- Traffic Management Plan (TMP)

11.3.1.7 Visual Quality

The Design-Builder shall design and construct all work in compliance with the Visual Quality section in the technical provisions.

11.3.2 Design Exceptions

Department has approved various design exceptions, which are included in Exhibit 11- A Fact Sheet Exceptions to Design Standards. These design exceptions apply only at the locations specified in the design exception forms. The Design-Builder shall meet or exceed all mitigation commitments listed in the forms. Department discourages creating additional exceptions and increasing the magnitude of the existing approved exceptions, and will not consider exceptions for modest benefits.

Department may consider further exceptions from standards or criteria on a case-by-case basis, at specific locations where the Design-Builder demonstrates that substantial benefit to Department and the public would accrue from the recommendation. Obtain Department approval of any such changes to the standards or criteria. Fully and clearly document any changes from the Department standards and criteria and maintain a complete record of all such changes for Department reference

11.3.2.1 Mandatory Design Exceptions

Mandatory standards use the word “shall” and are printed in bold face type in the HDM.

The Design-Builder shall design all the elements associated with mainline highway and other roadways in accordance with the criteria established in the Contract Documents. Some elements of the design developed in the preliminary design may not meet these design requirements. For these variances, mandatory design exceptions have already been approved by Department and are described below. The Design-Builder shall submit the final mandatory design exceptions for Approval by Department.

The Design-Builder is discouraged from creating additional mandatory design exceptions, since there is no assurance that they will be Approved by Department; however, elimination of existing design exceptions by the Design-Builder is encouraged. If the Design-Builder’s design creates additional design exceptions, the Design-Builder must demonstrate on a case-by-case basis that substantial benefits to the Project and the public would result from the Design-Builder’s recommendation. Any additional exceptions requested by the Design-Builder will be subject to Department Approval. The Design-Builder shall comply with the Design Exception Process as stated in Chapter 21 of the Project Development Procedures Manual (PDPM)

Upon receipt of the design exception request, the request will be submitted to the Department’s Design Reviewer and Design Coordinator for their review and approval. This process could take approximately two (2) to five (5) months.

Exhibit 11- A Fact Sheet Exceptions to Mandatory Design Standards details the specific locations and minimum design parameters of the exceptions that have been approved. The Design-Builder shall strive to enhance the geometric features of the Project and eliminate or minimize these design exceptions. The Design-Builder should be cautioned that merely eliminating design exceptions without regard to the impacts to the overall design may not be considered an enhancement or benefit to the project. Each improvement to these design exceptions, when taken as a whole, shall provide an overall benefit to the traveling public over the existing or proposed conditions. The following Mandatory Design Exception has been approved

- Design Exception #1 – Spacing Between Freeway-to Freeway Interchanges

11.3.2.2 Advisory Design Exceptions

Advisory standards use the word “should” and are indicated by Underlining in the HDM.

The Design-Builder shall design all the elements associated with mainline highway and other roadways in accordance with the criteria established in the Contract Documents. Some elements of the design developed in the preliminary design may not meet these design requirements. For these variances, advisory design exceptions have already been approved by Department and are described below. The Design-Builder shall submit the final design exceptions for Approval by Department.

The Design-Builder is discouraged from creating additional advisory design exceptions, since there is no assurance that they will be approved by Department; however, elimination of existing design exceptions by the Design-Builder is encouraged. If the Design-Builder’s design creates additional design exceptions, the Design-Builder must demonstrate on a case-by-case basis that substantial benefits to the Project and the public would result from the Design-Builder’s recommendation. Any additional exceptions requested by the Design-Builder will be subject to Department approval. The format and requirements of the Advisory Design Exceptions shall follow the format and requirements of the Mandatory Design Exceptions as stated in Chapter 21 of the Project Development Procedures Manual (PDPM) with the exception that the Advisory Design Exceptions only need Department’s District Approval. The Geometrician and FHWA approval are not necessary for an Advisory Design Exception.

Upon receipt of the design exception request, Department will review and if deemed acceptable, approve the request.

This process could take approximately two (2) to four (4) months.

Exhibit 11- B Fact Sheet Exceptions to Advisory Design Standards detail the specific locations and minimum design parameters of the exceptions that have been approved. The Design-Builder shall strive to enhance the geometric features of the Project and eliminate or minimize these design exceptions. The Design-Builder should be cautioned that merely eliminating design exceptions without regard to the impacts to the overall design may not be considered an enhancement or benefit to the project. Each improvement to these design exceptions, when taken as a whole, shall provide an overall benefit to the traveling public over the existing or proposed conditions.

The following two (2) Advisory Design Exceptions have been approved:

- Advisory Design Exception #1 – No passing lane on ramps exceeding 1,000 feet
- Advisory Design Exception #2 – Side Slopes

11.4 Construction Requirements

Construction shall be in accordance with the requirements of the Standard Specifications and the Special Provisions.

11.5 Deliverables

The Design-Builder shall develop Released for Construction (RFC) and As-Built Documents in accordance with the requirements of this section.

11.5.1 Released for Construction Documents

The Design-Builder shall produce plans and specifications in a format that aids and facilitates design review by Department. Designs shall be developed in accordance with the Caltrans CADD Manual, Caltrans Plan Preparation Manual, and the Design Quality Management Plan before construction may begin. Department Approval for RFC plans is required.

The following list of RFC plans, which is not an all inclusive list, shall be produced:

Title sheet

General layout sheets

List of standard plans

Earthwork tabulation and summary

Typical sections

Alignment plan

Roadway profiles

Superelevation plans

Construction Detail Plan

Contour Grading Plan

Drainage Plans, Profile and Details

Stage Construction and Traffic Handling Plan

Detour Plans

Construction Area Signs Plan

Pavement Delineation Plans

Retaining Wall Plans, Details and Quantities

Sound Wall Plans, Details and Quantities

Signals, Lighting and Electrical Systems Plan

Roadway cross-sections

Specifications and special provisions

11.5.2 As-Built Documents

Upon completion of the Project, the Design-Builder shall deliver a complete set of as-built documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-built documents must be submitted in both hardcopy and electronic form. The as-built documents shall meet the format and content in accordance with the *Caltrans Plans Preparation Manual*.

The As-Built Documents shall include:

Plans

Shop drawings

Design calculations (when requested by Department)

Reports/Project documentation

Specifications and Special Provisions

11.5.2.1 Plans

As-Built Plans shall include the following in compliance with the *Caltrans Plans Preparation Manual*:

General Requirements (All Sheets)

Stationing and beginning and end of construction

Roadways labeled

Scale, north arrow, legend

References to other sheets (i.e., See Sheet No. xx)

Text reads from right side of the sheet or from the bottom of the sheet

All text is legible with no text overlapping or lines going through text

Drawn by: and Checked by: Initials included

Sheet title in lower right

State Project number (EA – Expenditure Authorization)

File name, plot name, and date and time of plot at lower left

Complies with *Caltrans CADD Manual* standards (i.e., level, line style, line weight, text size, cells, etc.)

Bedding Details

Show typical section treatment type, pipe size, slopes, and dimensions

Tabulate locations

Title Sheet

Show: necessary station equations (only for the alignment that the length is based on); gravel pits and pit data, if applicable; scales at lower left; federal and governing specifications at upper right; Project number at upper right; index with sheet numbers;

Provide: signature block with appropriate signature lines; Work description; index map with legible names of major streets, roadways and other features; design designation; design exception information for each roadway; Project location information at lower middle; length/limits of Project based on northbound or eastbound alignment; north arrow and map scale

Label: counties; cities; sections/townships/ranges; bridges; CSAHs or county roads referred to as such (not just as city street names)

General Layout

Show: locations of plan-view sheets (construction, paving, intersections, drainage); existing roadways; bodies of water; significant land features/topography; noise walls

Label: proposed and existing roadways; bodies of water; cities; plan sheets; noise walls

Earthwork Tabulation and Summary

Show: excavation and embankment volumes tabulated by alignment for purposes of determining testing rates

Typical Sections

Show: proposed and existing finished surfaces; grading sections; pavement and backfill structure; R/W and subsurface drainage

Label: roadway centerlines; profile grade; grading grade; existing ground; slopes; curbs; station limits

Dimension: roadway dimensions; dimensions to grading PIs; subcut and muck excavation depths

Standard Plan Sheets

Standard Plans placed in numerical order.

The version of Standard Plans sheets in existence at the Proposal Due Date shall be used.

If any revision has been made to a Standard Plan sheet, the sheet shall include the “Drawn By” and “Checked By” initials, Engineer’s certification, and the word “Revised” added at the lower right corner of the sheet.

Alignment Plan

Provide: description of horizontal control; alignment and curve data (Δ , degree of curve, radius, tangent length, curve length, azimuth); x , y coordinates at all alignment points (PI, PC, PT, CC, begin and end points, equations)

Label: alignment names; stationing; control points; roadway names; point equivalents; beginning and end of alignments; R/W boundaries

Construction Plans

Label: alignments; curbs; pedestrian ramps; medians; traffic arrows; locations of standard plates used; walls; bridges; existing features; environmentally sensitive areas; R/W and easements; construction limits

Dimension: roadway; shoulder; paths/walks; tapers; intersection radii

Profiles

Provide: vertical control note indicating datum and benchmarks

Label: grades; PVC/PVI/PVT information; design speed met; high and low points; beginning and end points; lengths of vertical curve; tie-in points; intersections with other alignments; profile grade; grading grade; ditch grades; existing ground line; bridges

Label: grades; spot elevations; high and low points of all gutter profile lines along the Project

Dimension: subgrade excavation depth and tapers

Paving Plans and Details

Show: coordinate grid ticks and labels (minimum of three per sheet); plan sheet location box (on projects with complicated plan sheet layouts); note(s) referring to details

Label: roadway alignments; stationing; curb type; medians; joints; headers; bridges; stations of end points; and reinforced panels over culverts (patterned)

Dimension: panels; pavement thickness; taper rates (1:x, not x:1); shoulders

Superelevation Plans

Show: superelevation transition patterns and, if needed, superelevation profile diagrams

Label: alignments; walls; bridges

Dimension: roadway and shoulder widths; slopes; transition end points

Fencing Plans

Label: stationing; walls; bridges; existing railroads; lakes and rivers; environmentally sensitive areas; R/W and easements; existing and proposed fence data (types, locations, details, and gates); coordinate grid ticks and labels (minimum of three per sheet)

Dimension: R/W to fence

Cross-Sections

Show: existing and proposed Utilities; existing and proposed R/W and easements

Provide: 1-inch grid

11.5.2.2 Design Calculations

Design calculations shall include, but not limited to, the information described below:

- Horizontal sight distance (Intersections, all Roads, and mainline)
- Vertical sight distance: stopping, decision sight distance, and passing (if applicable) for all Roads
- Intersection geometrics (vehicle turning movements)
- Clear zones
- Superelevation
- Traffic barrier, end treatments, and impact attenuators
- Retaining Wall
- Sound Wall
- Earthwork
- Structures

11.5.2.3 Design Justification

Upon request by Department, the Design-Builder shall submit design justifications wherever the Contract Documents require that the “Design-Builder shall consider” various factors or alternatives. Documentation may be computer generated or hand written, though hardcopies and electronic versions shall be submitted. Design justifications shall clearly identify the following:

Design issue

Items requiring consideration

Basis for evaluation

Final decision and justification

11.5.2.4 Non-Standard Specifications and Special Provisions

If the Design-Builder requests Department’s Approval to utilize methods or materials that are not Department standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials.

EXHIBITS

- Exhibit 11- A Fact Sheet Exceptions to Advisory Design Standards – Embankment Slopes
- Exhibit 11- B Fact Sheet Exceptions to Advisory Design Standards - Single Lane Ramp
- Exhibit 11- C Fact Sheet Exceptions to Mandatory Design Standards

All exhibits are provided as electronic files.

12 DRAINAGE

12.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements associated with drainage, including culverts, roadway ditches, permanent and temporary stormwater management systems, structural pollution control devices, retention/detention facilities (ponds), and closed storm drain systems.

12.2 Administrative Requirements

12.2.1 Standards

Design and construct the drainage systems in accordance with the relevant requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal Proposal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification from Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order.

Drainage Standards

Priority	Agency	Title
1	Department	Highway Design Manual
2	Department	Bridge Design Specifications (LFD Version, April 2000)
3	Department	Bridge Design Aids
4	Department	Bridge Design Details
5	Department	Bridge Design Practice
6	Department	Standard Special Provisions
7	Department	Standard Specifications
8	Department	Standard Plans
9	Department	Construction Site Best Management Practices (BMPs) Manual
10	Department	Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
11	Department	Project Planning and Design Guide
12	Department	Construction Manual
13	Department	Design Information Bulletin 83
15	FHWA	Hydraulic Engineering Circular Number 21 (HEC-21) Design of Bridge Deck Drainage Systems

*Document modified for design-build

12.2.2 References

Use the references listed below as supplementary guidelines for the drainage systems analysis and design. These publications have no established order of precedence.

Drainage Publications References

Agency	Title
AASHTO	Roadside Design Guide
AASHTO	Model Drainage Manual
Department	Ready –To-List and Construction Contract Award Guide (RTL Guide)
Department	Fish Passage Design for Road Crossings
FHWA	Hydraulic Design and Procedures Manual
FHWA	Hydraulic Engineering Circulars (as listed in Caltrans Highway Design Manual)
FHWA	Hydraulic Design Series (as listed in Caltrans Highway Design Manual)

12.2.3 Preliminary Engineering Plans

The Preliminary Engineering Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

12.2.4 Software

The Design-Builder shall choose drainage design software from various drainage software packages listed in the *Caltrans Highway Design Manual* for analyzing and designing all systems.

The Design-Builder shall prepare drawings in MicroStation and CAiCE by AutoDesk on the same version in use by Department on the date of Final RFP.

12.2.5 Data Collection

To establish a drainage system that complies with the requirements and accommodates the historical hydrologic flows in the Project limits, the Design-Builder is responsible for collecting all necessary data, including the elements outlined below:

The Design-Builder shall identify all water resources issues, using available data, including water quality requirements as imposed by local, State, and federal government regulations; National Wetland Inventory and other wetland/protected waters inventories; and official documents concerning the Project, such as the environmental studies. The Design-Builder shall also acquire local agency drainage and stormwater management plans, and records of citizen concerns.

Water resources issues include areas with historically inadequate drainage (flooding or citizen complaints), environmentally sensitive areas, localized flooding, and maintenance problems associated with drainage and areas known to contain hazardous waste. The Design-Builder shall also determine watershed boundaries, protected waters, county ditches, areas classified as wetlands, floodplains, and boundaries between regulatory agencies (i.e., watershed districts and watershed management organizations).

The Design-Builder shall acquire existing storm drain plans and/or survey data, including all data on culverts, drainage systems, and storm sewer systems within the Project area. The Design-Builder shall also determine existing drainage areas that contribute to the highway drainage system and the estimated runoff used for design of the existing system.

The Design-Builder shall obtain additional photogrammetric and/or geographic information system (GIS) data for the Project area that depicts the outstanding resource value waters and/or impaired waters. The Design-Builder shall collect additional data and information not included in the RID required for the hydraulics analysis.

12.2.4 Coordination with Other Agencies and Disciplines

The Design-Builder shall coordinate all water resource issues with local agencies, affected interests, and regulatory agencies, including the Fresno Metropolitan Flood Control District. The Design-Builder shall document the resolutions of issues for the correspondence file, including meeting minutes and memoranda for the record.

The Design-Builder shall comply with and document the permit requirements, modifications, and contacts with the permitting agencies.

12.3 Design Requirements

The Design-Builder shall remove the existing drainage facilities, where necessary, within the Project Limits and design and construct new drainage facilities to accommodate Project and off-Site drainage and meet all applicable requirements. Drainage facilities shall be compatible with existing and/or proposed drainage systems in adjacent properties and shall preserve existing drainage patterns. Where drainage patterns must be changed from existing patterns, the Design-Builder shall secure all permits, drainage easements, local agency and Department approval prior to construction of any drainage facilities.

The Design-Builder shall develop a Project Drainage Overview Map, which shall serve as the base plan for final drainage design. The Project Drainage Overview Map shall show the existing drainage features and proposed Project drainage master plan, including drainage areas and contributing flows of existing and proposed drainage. The Project Drainage Overview Map shall also show impacts from the Project and proposed mitigation within the Map extents; and all waters of the State, outstanding resource value waters and impaired waters within 2,000 feet of the Project, or waters receiving Project runoff, and comply with permit or local agency requirements.

12.3.1 [NOT USED]

12.3.2 Surface Hydrology

12.3.2.1 Design Frequencies

The drainage design frequencies shall be as indicated by the *Caltrans Highway Design Manual*, but in no instance shall the storm sewer system be designed for a frequency less than the 10-year rainfall event.

The Design-Builder shall use rainfall intensity and design storm criteria specified in the *Caltrans Highway Design Manual*. The Design-Builder shall evaluate flood potential for extreme storms, including areas inundated and flow routes for water leaving Department facilities.

12.3.2.2 Hydrologic Methods

The Design-Builder shall perform hydrologic analyses and follow design methodology as prescribed by the *Caltrans Highway Design Manual*.

For design rainfall total amounts, the Design-Builder shall use the IDF 2000 output provided by Department and the *Caltrans Highway Design Manual*. The drainage areas shall be modeled to include future development and increased runoff associated with development. Flood damage potential for the completed Project shall not exceed pre-Project conditions.

12.3.3 Permanent Stormwater Treatment System

The Design-Builder shall design and construct stormwater treatment systems to meet requirements for water quality, water quantity, and rate control, as determined by local, State and federal requirements and the Department NPDES regulations.

12.3.5 Hydraulic Structures

For all crossings (bridges and culverts) requiring structures greater than 48 inches in diameter, the Design-Builder shall complete a bridge or culvert Hydraulics Recommendation Letter and supporting hydraulic computations. These documents shall be submitted to Department for Approval.

12.3.5.1 Culverts

A culvert is a hydraulic structure sized to convey water runoff under a highway, railroad, or other embankment. Minor culverts are 48 inches or less in diameter; major culverts are 54 inches or larger.

The Design-Builder shall analyze the existing and proposed culverts and drainageways impacted, replaced, or created by the Project design for any localized flooding problems. The Design-Builder shall design culvert replacements and improvements to meet the requirements of the local watershed management organization and the affected cities' stormwater management criteria or master drainage plans.

The Design-Builder shall complete culvert design forms for minor culverts. Design computations and risk assessments shall be completed by the Design-Builder for major culverts. Where culvert or bridge design is influenced by upstream storage, the flood-routing computations shall be included with the culvert or bridge analysis.

12.3.5.2 [NOT USED]

12.3.5.3 Storm Drains

12.3.5.3.1 Design Elements

The storm drain system design shall include these items:

- Drainage area plans for each storm drain inlet with pertinent data, such as boundaries of the drainage area, topographic contours, runoff coefficients, times of concentration, and land use with design curve number and/or design runoff coefficient.
- Location and tabulation of all existing and proposed pipe and drainage structures including all pipe and drainage structures proposed to be removed or abandoned. These will include size, class or gauge, catch basin spacing, detailed structure designs, and any special designs.
- Complete pipe profiles, including pipe size, type, and gradient; station offsets from the centerline of the roadway; gutter spread calculations, length of pipe; class/gauge of pipe; and numbered drainage structures with coordinate location and elevations.

The minimum longitudinal slope should be such that when flowing half full, a self cleaning velocity of 3 feet per second is attained.

12.3.5.4 Roadside Open Channels

Roadside open channels shall not be used on this Project unless otherwise approved by Department. If used, the Design-Builder shall design roadside channels as specified in the *Caltrans Highway Design Manual*. The Design-Builder shall use equations from the *Caltrans Highway Design Manual* and HEC 15 to determine shear stress for designing and evaluating channel linings.

12.4 Construction Requirements

Drainage shall be designed to accommodate construction staging and shall be provided during all stages of construction. The Design-Builder shall provide drainage design details for each stage of construction. The design shall include temporary erosion control and other Best Management Practices needed to satisfy the NPDES and other regulatory requirements. The water resources notes in the plans shall include a description of the drainage design for each stage of construction.

The Design-Builder shall obtain Department Approval for abandonment methods for all existing drainage features that the Design-Builder is abandoning with this Project.

Storm sewer construction can occur by either open cut or trenchless methods approved by the Department.

Existing sanitary sewer and water main utilities shall remain in place and active.

The Design-Builder shall phase construction activities to maintain detour routes and traffic during storm sewer installation.

All surfaces impacted by construction shall be restored.

Storm sewer within the roadway area being milled and overlaid shall remain in place. Castings shall be adjusted if needed on a case-by-case basis to meet the required casting depth below pavement. If castings need adjusting, they shall be raised as a whole. No additional rings shall be added to supplement for raising the entire casting assembly.

12.5 Deliverables

12.5.1 Project Drainage Overview Map

The Design-Builder shall submit a Project Drainage Overview Map to Department for Acceptance prior to initiating detailed design, and shall submit a copy of the Project Drainage Overview Map in MicroStation format.

The Design-Builder shall submit preliminary drainage calculations and drainage models to the Department for acceptance prior to initiating detail design.

12.5.2 Released for Construction Documents (RFC)

The Design-Builder shall produce plans and specifications in a format that facilitates design review by Department. The Released for Construction Documents shall include the following items:

- Drainage Area Map with time of concentration (Tc) and curve numbers and/or runoff coefficients
- Drainage/Utility plans including the SWPPP
- Drainage/Utility profiles
- Drainage tabulations and estimated quantities
- Drainage calculations and drainage models
- Temporary and permanent erosion control plans

- Specifications and Special Provisions

12.5.2.1 Drainage/Utility Plans

- Provide drainage structure data (type, location, diameter, length, class tabulations) and details, roadway cross slope and superelevation, and a complete set of roadway cross-sections to show the construction staging and associated temporary drainage.
- Label alignments, stationing, walls, bridges, paths/walks, lakes, rivers, environmentally sensitive areas, R/W and easements, existing drainage structures, proposed drainage structures, surface flow arrows, riprap locations, and ditch blocks.
- Show existing and proposed contours, high and low point station and elevation, roadway cross slope and superelevation, ponds, normal water line, high water line, and coordinate grid ticks and labels (minimum of three per sheet).
- Show dimensions for roadways and shoulders.

12.5.2.2 Drainage/Utility Profiles

- Label elbows, bends, reducers, existing and proposed ground lines, Utilities adjacent to structures or pipes, pipe data (type, diameter, length, class), and structure numbers.
- Show existing structures or pipes (dashed) and existing and proposed ground lines.

12.5.2.3 Drainage Tabulations

- Provide structure/pipe data (type, diameter, length, class, structure numbers, guide post locations, station and offset for aprons, pipes, and structures).

12.5.2.4 Temporary and Permanent Erosion Control Plans

- The Design-Builder shall label alignments, stationing, walls, bridges, paths/walks, lakes, rivers, environmentally sensitive areas, R/W and easements, existing drainage structures and pipes, proposed drainage structures and pipes, surface flow arrows, riprap locations, ditch blocks, biorolls, blankets, seed mixes, mulch, and other erosion control items.
- Show high and low point station and elevation, ponds, normal water line, high water line, coordinate grid ticks and labels (minimum of three per sheet), land feature changes, erosion control features, and notes.
- Show dimensions for roadways and shoulders.

12.5.2.5 Specifications and Special Provisions

If the Design-Builder requests Department's Approval to use methods or materials that are not Department standards, such request should include comprehensive specifications and provisions associated with the proposed non-standard methods or materials. A minimum 72-hour review period applies.

12.5.3 Reports/Project Documentation

The Design-Builder shall provide Department with a Drainage Design Report signed by a California-licensed Professional Engineer, which shall be a record set of all drainage computations, both hydrologic and hydraulic, and all support data. The Report shall include:

- Hydraulic notes, models, and tabulations
- Culvert designs and reports for major stream crossings
- Pond designs, including graphic display of treatment areas and maintenance guidelines for operation
- Complete set of calculations and detailed drainage area maps
- Grit chamber, proprietary device, and any underground storage device designs and maintenance manuals (including recommended maintenance and inspection timelines).

- Correspondence file

The Design-Builder shall prepare bound reports and Project documentation in hardcopy and electronic format, organized by design topic, and delivered to Department prior to Final Acceptance.

12.5.4 As-Built Plans

Upon completion of the Project, the Design-Builder shall deliver to Department a complete set of As-Built Documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. The As-Built shall be signed by a licensed California Professional Engineer.

13 STRUCTURES DESIGN

13.1 General

All structural design shall comply with the specifications and requirements contained in the technical manuals listed in the Structure Design and Plans Section of this provision in accordance to all applicable Department standards and requirements and any additional requirements noted in these Technical Provisions. The terms “latest” and “current” applied to the manuals, documents and specifications in the Structure Design and Plans Section of this provision and these Technical Provisions will be “latest” and “current” as of the date when the Final Contract documents are signed.

Structures to be widened shall be seismically retrofitted in accordance to all applicable Department’s standards and requirements and maintenance requirements.

Design-Builder shall furnish individual bridge and project quantities summarized in the appropriate Department Quantity Summary and Estimate Forms.

Bridge Specific Technical Provisions recommended for each structure shall over-ride the General Technical Provisions.

13.2 Administrative Requirements

13.2.1 Structure Design and Plans

Structure Plans shall be prepared in accordance with, but by no means limited to, the latest editions of manuals and documents listed below as appropriate:

13.2.1.1 All Structures and Structural Appurtenances and Retaining Walls

Structures Standards

Priority	Agency	Title
1	Department	California Amendments to AASHTO LRFD Bridge Design Specifications – Latest Edition
2	AASHTO	LRFD Bridge Design Specifications, 4 th Edition and applicable Interim Revisions
	Department	Bridge Design Specifications (LFD Version, April 2000)
	Department	Bridge Design Aids Manual
	Department	Bridge Design Details Manual
	Department	Bridge Design Practice Manual
	Department	Bridge Memo to Designers Manual
	Department	Bridge Standard Detail Sheets (XS Sheets)
	Department	Seismic Design Criteria
	Department	Structural Detailing Standards
	Department	Standard Plans
	Department	Standard Specifications
	Department	Bridge Deck Construction Manual

Department	Falsework Manual
Department	Foundation Manual
Department	Office of Special Funded Projects (OSFP) Information and Procedures Guide
Department	Prestress Manual
Department	Trenching and Shoring Manual
Department	Outline of Field Construction Practices
Department	Plans Preparation Manual

Sign and Lighting Structures

AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals
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Any manuals or documents other than those approved by Department will require approval prior to being used for design or the preparation of structure plans.

Current Bridge Standard Details Sheets (XS-Sheets) and current Standard Plans including Revisions to Standard Plans (RSPs) shall be incorporated into the structure plans as applicable.

13.3 Design Requirements

13.3.1 Bridge Design

The OSFP Information and Procedures Guide shall apply to all of the following items listed below.

- Structure Type Selection
- Unchecked Details Submittal
- PS&E Deliverables, Review & Approval

13.3.2 Bridge Names and Numbers

Requests for bridge numbers and names for new structures shall include:

- County and State Route Identification Number;
- Post Mile at Beginning of Bridge (to the nearest .01 PM); and
- Site Map or Strip Map of sufficient detail to clearly indicate the relationship of the street names and names of the pertinent features in the vicinity of the bridge site.

The assigned bridge name and number shall be painted on all structures, and the bridge name and number of the existing structures shall be painted on the widened structures. Locations indicating where to paint the bridge number and name on a structure shall be shown on the General Plan in accordance with Caltrans' Bridge Design Details Manual.

A request for numbers and names must also be made for earth retaining structures designed not using *Caltrans Standard Plans*.

13.3.3 [NOT USED]

13.3.4 Other Structure Design

13.3.4.1 Approach Slabs

The Design-Builder shall inspect all existing structure approach slabs for deficiencies. Results of previous condition analysis performed by Department can be found in Bridge Inspection Reports. Approach slab repairs or replacements, if required, shall be addressed as part of the bridge Type Selection Process.

13.3.4.2 Soundwalls

A supplemental plan set shall provide the location limits and heights of standard soundwalls. The Design-Builder shall not be required to do additional noise studies to those already provided, unless The Design-Builder changes the basic configuration in such a way so as to make the current noise studies no longer applicable. Any changes in the locations or heights of standard soundwalls in the supplemental plan set may require additional analysis, calculations, modeling, and reporting based on Department's standards, including visual impacts and community input.

13.3.4.3 [NOT USED]

13.3.4.4 Miscellaneous Structures

Miscellaneous structures include, but are not limited to, the following structure types:

- Earth retaining systems (retaining walls), including aesthetic treatments
- Soundwalls, including aesthetic treatments
- Bridge-mounted signs
- Barrier-mounted signs on structures
- Overhead sign structures
- Culverts and drainage structures
- Pumping plants
- Reinforced concrete boxes

Miscellaneous structures shall be designed in accordance with the latest editions of the *Caltrans Highway Design Manual*, Visual Impact Assessment, the references listed in 13.2.1.1 and other applicable requirements included in these Technical Provisions and Department's standards.

Deliverables are generally the same for miscellaneous structures as for bridge structures and shall meet the requirements in these Technical Provisions. Any variations from these requirements (e.g., submittal requirements, review duration, etc.) will be allowed only by express written permission.

13.3.5 Reference Materials

Structure reference materials included in the Reference Documents are for the Design-Builder's information only. The structure reference materials include existing bridge data, As-Built plans, approved Advanced Planning Study (APS) reports, retaining wall/drainage structure sections, survey information, existing bridge photographs, etc.

13.3.5.1 Advance Planning Studies

Advance Planning Study (APS) reports are included in the Reference Documents. The APS report contains information that the Design-Builder may find valuable in preparing the Final Design Documents. However, revisions to the structure type, if not specifically limited elsewhere in the project documentation, and/or the alignment indicated in the APS may be necessary and shall be subject to analysis at the Type Selection stage of the Project to ensure that all Contract requirements are met.

The following information is provided to assist the Design-Builder in determining the level of completion and suitability of any portion of the APS documents:

- The APS reports include a single structure alternative. Other structure alternative types may be considered. Such structure alternative types shall be evaluated at the Type Selection phase of the Project.
- Structure aesthetics features are not included in the APS reports. However the Type Selection reports shall clearly delineate Aesthetic features and shall be consistent with the Visual Impact Assessment.
- Seismic retrofit recommendations included in the APS reports are based on a qualitative evaluation. A quantitative seismic retrofit evaluation of all existing structures to be widened, modified, or replaced is required to ensure conformance with current standards and to determine the extent of required retrofit. Evaluation results and seismic retrofit recommendations, if any, shall be included in the Type Selection reports.
- Work recommended for inclusion in the structure maintenance records for bridge structures is included in the APS reports. The Type Selection reports shall describe recommended maintenance work.
- Deck drains may be necessary for structures that are being widened.

13.3.6 Structure Design Specific

13.3.6.1 First Street Undercrossing (Widen)

Bridge No. 42-0323R

13.3.6.1.1 Existing bridge

- a) Built in 1999.
- b) Continuous 2-Span Cast-in-Place Reinforced Concrete Box Girder.

13.3.6.1.2 Proposed bridge widening

- a) Continuous 2-Span Cast-in-Place Reinforced Concrete Box Girder, 4'-6" deep, match existing.
- b) Diaphragm Abutments on CIDH Concrete Piles
- c) 4'-0" diameter column on 5'-0" diameter Type 1 Pile Shaft.
- d) Structure Approach Type N(45D).

13.3.6.1.3 Vertical clearance

- a) Existing Vertical Clearance = 18'-1".
- b) Final Vertical Clearance = 17'-10".

- c) Falsework is required.
- d) Minimum Temporary Vertical Clearance (15 ft) for falsework meets Department standard.
- e) Further study and field survey are recommended to confirm the actual vertical clearance.

13.3.6.1.4 Utilities

There is no utilities conflict.

13.3.6.1.5 [NOT USED]

13.3.6.1.6 [NOT USED]

13.3.6.1.7 Design/Construction issues

- a) Abutments and Bent preliminarily recommended to be supported on CIDH Piles.
- b) Stage Construction

Two stages

Stage one is to remove barrier rail and overhang on south side of bridge and construct new widen structure. Closure pour to be placed between existing bridge and widening.

Stage two is to install Concrete Barrier Type 60 on the widened structure.

13.3.6.1.8 Preliminary Foundation/Seismic Report Summary

- a) Nearest Active Fault

San Andreas Fault Zone (Fault ID No. 311)

- b) Magnitude (Mmax)

7.9

- c) Distance of Bridge Site from Fault

67 miles

- d) Peak Ground Acceleration (PGA)

0.24g

- e) Soil Profile Type

Type D

- f) Ground Water Table

Encountered at elevation 194.8 feet (approximate depth of 89 feet) in July 1995 for W180/S41 Connector Separation, Br. No. 42-287F. Groundwater level will fluctuate with the change of season and other factors including local irrigation. Actual ground water level should be determined during final foundation investigation.

- g) Liquefaction Potential

Potential for liquefaction is considered low during maximum credible seismic event.

- h) Lateral Spreading

Low due to flat topography and low PGA.

- i) Scour Potential

N/A

- j) Existing Foundation Type
Abutments: 16-inch CIDH, Bents: 60-inch CIDH
- k) Proposed Foundation Type
Abutments: 16-inch CIDH, Bents: 60-inch CIDH

13.3.6.1.9 Seismic Issues

Further seismic study of existing bridge is required to evaluate if seismic retrofit is necessary.

13.3.6.1.10 Maintenance Issues

See Bridge Inspection Reports.

13.3.6.2 Braided Ramp on “N5” Alignment (name to be determined)

Bridge No. to be determined

13.3.6.2.1 Proposed New Structure

- a) Continuous 4-Span Cast-In-Place Prestressed Concrete Box Girder.
- b) Seat Type Abutments.
- c) Single Column Bent at Bents 2 and 4.
- d) Double Column Outrigger Bent at Bent 3.
- e) Structure Approach Type N(30S).

13.3.6.2.2 Vertical clearance

- a) Final Vertical Clearance = 16'-6" minimum
- b) Falsework is required.

13.3.6.2.3 Utilities

There is no utilities conflict.

13.3.6.2.4 [NOT USED]

13.3.6.2.5 [NOT USED]

13.3.6.2.6 Design/Construction issues

- a) Abutments and Bents preliminarily recommended to be supported on CIDH Piles

13.3.6.2.7 Preliminary Foundation/Seismic Report Summary

- a) Nearest Active Fault
San Andreas Fault Zone (Fault ID No. 311)
- b) Magnitude (Mmax)
7.9
- c) Distance of Bridge Site from Fault
67 miles

d) Peak Ground Acceleration (PGA)

0.24g

e) Soil Profile Type

Type D

f) Ground Water Table

Encountered at elevation 194.8 feet (approximate depth of 89 feet) in July 1995 for W180/S41 Connector Separation, Br. No. 42-287F. Ground water level will fluctuate with the change of season and other factors including local irrigation. Actual ground water level should be determined during final foundation investigation.

g) Liquefaction Potential

Potential for liquefaction is considered low due to low PGA, relatively high density of the soil and absence of shallow ground water.

h) Lateral Spreading

Low due to flat topography and low PGA.

i) Scour Potential

N/A

j) Foundation Type (Preliminary)

Abutments: 16-inch CIDH piles, Bents: CIDH piles

13.3.6.3 Braided Ramp on “S5” Alignment (name to be determined)

Bridge No. to be determined

13.3.6.3.1 Proposed New Structure

a) Continuous 4-Span Cast-In-Place Prestressed Concrete Box Girder

b) Seat Type Abutments

c) Single Column Bent at Bents 2 and 4

d) Double Column Outrigger Bent at Bent 3

e) Structure Approach Type N(30S).

13.3.6.3.2 Vertical clearance

a) Final Vertical Clearance = 16'-6" minimum

b) Falsework is required.

13.3.6.3.3 Utilities

There is no utilities conflict.

13.3.6.3.4 [NOT USED]**13.3.6.3.5 [NOT USED]****13.3.6.3.6 Design/Construction issues**

- a) Abutments and Bents preliminarily recommended to be supported on CIDH Piles

13.3.6.3.7 Preliminary Foundation/Seismic Report Summary

- a) Nearest Active Fault

San Andreas Fault Zone (Fault ID No. 311)

- b) Magnitude (Mmax)

7.9

- c) Distance of Bridge Site from Fault

67 miles

- d) Peak Ground Acceleration (PGA)

0.24g

- e) Soil Profile Type

Type D

- f) Ground Water Table

Encountered at elevation 194.8 feet (approximate depth of 89 feet) in July 1995 for W180/S41 Connector Separation, Br. No. 42-287F. Ground water level will fluctuate with the change of season and other factors including local irrigation. Actual ground water level should be determined during final foundation investigation.

- g) Liquefaction Potential

Potential for liquefaction is considered low due to low PGA, relatively high density of the soil and absence of shallow ground water.

- h) Lateral Spreading

Low due to flat topography and low PGA.

- i) Scour Potential

N/A

- j) Foundation Type (Preliminary)

Abutments: 16-inch CIDH piles, Bents: CIDH piles

13.4 Construction Requirements**13.4.1 Surface Finishes**

All concrete surfaces shall receive a surface finish in accordance with the Standard Specifications. Finish colors shall be selected during the Visual Quality Management Process outlined in Section 15.

13.4.2 Retaining Walls

13.4.2.1 Permanent Retaining Wall Structures

The Design-Builder shall determine the location(s) and types of retaining walls needed on the Project.

Wall type selection and design by the Design-Builder shall meet all applicable Department requirements including, but not limited to, those related to differential settlement, Visual Quality Management, Utilities, Lighting, Signage, Drainage, and Landscaping.

When proprietary or alternate wall systems other than Department standard walls are used, the Design-Builder shall provide site specifics to the wall provider. Site specifics include, but are not limited to: profiles, wall heights, loading conditions (e.g. dead loads, live loads), results of foundation investigations, water conditions, all utilities (in-place, proposed, and future), site restrictions, expected wall cross section, and desirable wall face treatments. Any proposed proprietary or alternate wall system will require prior approval from Department. Walls types to be used at bridge abutments and/or approach embankments will also require prior approval.

The Design-Builder shall not use steel sheet pile, timber, or recycled material for permanent retaining walls or the retaining wall foundations.

The Design-Builder may use timber as temporary supports for soldier pile walls when a concrete facing is used.

For design conditions outside of the design parameters in Caltrans *Standard Plans* retaining walls can be designed by the Design-Builder in accordance with Department requirements.

The Design-Builder shall not change or intermix wall types within an uninterrupted wall segment. Wall types can be intermixed if the retaining wall and adjacent wingwall have the same architectural treatment facing.

The Design-Builder shall notify Department of any potential right of way conflicts at the preliminary design stage.

For all retaining walls, total settlement and overall tolerances shall be based on site-specific requirements determined by the geotechnical engineer.

13.4.3 Bridge Decks

Deck construction of bridges shall comply with the *Standard Specifications*. A permanent point shall be marked on the concrete barrier on the exterior edges of bridges at the locations of columns or bents, and at the mid spans and each abutment. Locations of these points with their as-built elevations shall be shown on the as-built drawings.

13.4.4 Falsework

Each falsework construction shall be inspected before concrete placement by Design-Builder's Registered Engineer to certify compliance with the drawings and certification of that material used in construction of the falsework and that they are adequate to support all loads and applied forces. Temporary bracing shall be provided during erection and removal of falsework.

No adjustment of falsework grade or changes to any vertical or lateral component of falsework is allowed without the presence of Design-Builder's Registered Engineer.

Falsework shall not be adjusted, erected or removed over live traffic. Erection shall include all adjustments or removal of falsework components prior to concrete placement that contribute to the horizontal stability of the falsework system. Removal shall include lowering falsework, blowing sand from sand jacks, turning screws on screw jacks, and removing wedges.

Falsework over sidewalk or pedestrian walkways shall provide lighting, handrails and overhead cover with a width of not less than five (5) feet and extending ten (10) feet beyond the edges of deck.

Three (3) weeks shall be allowed by the Design-Builder for review of falsework drawings at all locations.

Falsework openings over highways and local streets shall provide a minimum width to allow for the number of traffic lanes which exist prior to construction and at each location a minimum vertical clearance of 15'-0" shall be provided for falsework openings over freeways. Vertical clearance over local streets shall be in compliance with the requirements of local agency.

Falsework adjacent to traffic shall be protected by barriers approved by Department.

13.4.5 Bridge Demolition

- Demolition plans shall be approved by a civil/structural engineer registered in California.
- Demolition plans must show the location of the equipment(s) utilized for demolition, sequence of removal, equipment(s) – specification including their weight, and any other material, which will be placed on the structure during or prior to demolition for all structures. A civil/structural engineer registered in California must be present on site during demolition operations.
- Design-Builder shall stop work at locations where tests of samples from the locations determine that existing material is contaminated with “Asbestos” until the contaminated material is removed safely.

13.4.6 Source of supply for concrete

Aggregates used in concrete for this project shall be provided from sources which comply with the requirements of the “Surface Mining and Reclamation Act of 1975”.

Attention is directed to Surface Mining and Reclamation Act of 1975, commencing in Public Resource Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations, and to California Public Contract Code Section 10295.5.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with California Public Contract Code Section 10295.5.

13.5 Deliverables

13.5.1 Structure Construction Forms and Documents Required

The Design-Builder shall submit following completed forms and documents to Department;

- Pile driving logs location at the completion of the operation for each location of bridges, retaining walls and sound walls.
- Report of falsework clearance, (Form DS-OSC 108).
- Cast In Drilled Holes (CIDH) Pile Quantity and Drilling Record.
- Test Result Summary sheet for couplers.
- Pre-Stressing Monitoring for concrete structures.
- Pre-Stressing Calibration Monitoring Sheet for concrete structures.
- Notice of Change in Clearance or Bridge Weight Rating, (Form TR-0019).
- Notice of Change in Vertical or Horizontal Clearance.
- Joint Movement calculations for type “B” seals and Joint Seal Assemblies.

- Column Guying plans.
- Falsework plans.
- Structures as-built plans.
- Bridge demolition plans.
- Final bridge deck profile.

The Design-Builder shall provide Department with completed project files at the end of the project.

13.5.2 Mock-ups and Samples

Mock-ups and samples will be required for all structure components for approval by Department of textures, colors and construction methods a minimum of 14 days prior to construction. Approved mock-ups and samples will be used as a standard throughout construction.

14 LANDSCAPE

14.1 General

The Design-Builder shall perform all Work necessary to meet the requirements for landscape, including erosion control, highway planting, irrigation systems and miscellaneous roadside treatments, preservation and protection of existing vegetation, weed control, plant establishment and worker and traveler safety. Miscellaneous roadside treatments include paving in areas beyond the gore and narrow areas, use of inert materials, treatment under guardrails, and other treatments to reduce manual maintenance activities and worker exposure to traffic.

The Design-Builder shall design and construct the landscape in accordance to the requirements of this specification, including performance requirements, standards and references, warranties, design and construction criteria, maintenance during construction, and required submittals.

14.2 Administrative Requirements

14.2.1 Standards

The Design-Builder shall design and construct the landscape elements in accordance with the relevant requirements of the standards listed by priority below

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Design-Builder's Submittal standard.

If there is any unresolved ambiguity in standards, obtain clarification from Department before proceeding with design or construction.

Use the most current version of each listed standard as of the initial Publication Date of this RFP unless modified by Addendum or Change Order.

Landscape Standards

Priority	Agency	Title
1	Department	Highway Design Manual (HDM)
2	Department	Standard Special Provisions
3	Department	Standard Specifications
4	Department	Standard Plans
5	Department	Construction Site Best Management Practices (BMPs) Manual
6	Department	Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
7	Department	Project Planning and Design Guide
8	Department	The Plant Setback and Spacing Guide
9	Department	Final Environmental Document
10	Department	Technical Memoranda
11	Department	Landscape Architecture Program P.S.&E. Guide

14.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of the landscaping and irrigation elements. These publications have no established order of precedence.

Landscape References

<i>Agency</i>	<i>Title</i>
Department	The California Native Wildflower Checklist and Native Plant Database
Department	The Water Conservation Deputy Directive (DD-13)
ISOA	International Society of Arboriculture Guide for Plant Appraisal
Department	Maintenance Manual Volume 1
AASHTO	A Guide for Transportation Landscape and Environmental Design
FHWA	Code of Federal Regulations, Title 23 (Highways), Chapter 1, Part 752 Landscape and Roadside Development
Department	Project Development Procedures Manual (PDPM)
Department	Construction Manual
California Department of Agriculture	California Noxious Weed Law, California Statutes and the current state list prohibited noxious weeds and restricted noxious weeds (“Noxious Plants of California”)
Department	Landscape Architecture Program website

14.2.3 Qualifications

14.2.3.1 Project Landscape Architect

The Design-Builder shall assign a Landscape Architect licensed to practice in the State of California to perform or directly supervise the tasks required in this Landscape section.

14.2.4 Preliminary Engineering Plans

- The Preliminary Engineering Plans show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.
- The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

14.2.5 Software

The Design-Builder shall prepare drawings in MicroStation and CAiCE by AutoDesk on the same version the Department is using on the date of Final RFP.

14.2.6 Meetings

Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve matters relating to the landscape Work during the design and construction stages. The requesting party shall provide the other parties with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes meeting within five (5) days.

14.3 Design Requirements

14.3.1 Landscape Concept Meeting

The Design-Builder shall take an inventory of all the existing landscape elements in the Project. The Design-Builder shall schedule and participate in a landscape concept meeting to present a layout of the in-place and proposed landscape elements on the Project to Department.

The Design-Builder shall use the meeting to determine the permanent landscape needs of the Project.

14.3.2 Requirements

Design and construct all landscape elements to meet the following performance requirements:

- Protect existing irrigation points of connection (POC) in place (POCs include: water meter, backflow preventer, booster pump, remote control valve, flow sensor and irrigation controller).
- At a minimum, 3-inch thick application of mulch to disturbed slopes;
- Provide a natural, pleasing appearance without decreasing motorist safety;
- Is maintainable and prevents erosion;
- Provide conduits for future irrigation systems; and
- Includes aesthetic treatments to gore areas, sound walls and retaining walls to preserve the scenic views and natural gateways to Kings Canyon National Park.

The Design-Builder shall coordinate paving treatment in areas beyond the gore and narrow areas with other paving treatments along the existing route for consistency and unity. Coordinate this theme with the local agencies and adjacent projects. Offer opportunity for agencies to sponsor betterments that compliment this theme. Coordinate with and gain approval of Department for the proposed project theme. Reduced frequency of maintenance, and access by and safety of maintenance personnel is a priority. Replacement plant material, if needed, shall be drought tolerant and conform to the requirements of the *Highway Design Manual*.

The Design-Builder shall prepare all necessary studies and applicable design reports to justify all the project landscape elements used in the project.

The Design-Builder shall design all temporary landscape elements to comply with the same design and construction requirements as that of the permanent landscape elements.

14.3.3 Vegetation Preservation

The Design-Builder shall be responsible for preparing a report of the existing vegetation that shall consist of:

- Vegetation Protection and Removal Plan, showing existing vegetation and irrigation to remain.
- Weed Control Plan

These plans shall be submitted for Department's Acceptance prior to commencing clearing and grubbing activities.

The Design-Builder shall prepare a Vegetation Preservation Plan indicating the construction limits and the proposed impacts on existing vegetation, including any impacts on existing vegetation outside of the construction limits. The location, quantity, condition, species importance, visual appeal and public acceptance of vegetation to be preserved and protected shall be documented on the plan for each protected area. The plan shall indicate the methods of vegetation preservation and protection to be used at each location indicated.

The Design-Builder shall identify and mark in the field the location and names of all existing trees, shrubs or groundcovers to be preserved and protected within the construction limits, as well as those outside of the construction limits, but within the Right of Way of the Project. Vegetation outside the Right of Way that may be impacted by construction activities shall also be identified. The Design-Builder shall maintain field markings and fencing to protect existing plant materials until Final Acceptance.

The Design-Builder shall dispose of vegetation removed by construction in accordance with *Caltrans Standard Specifications*.

14.3.4 Weed Control

The Design-Builder shall identify and map areas of weeds, including noxious and invasive weeds, to be removed or controlled in accordance with the requirements established by the Department, the California Department of Agriculture, and other local jurisdictions, including counties, municipalities and watersheds, and record the locations of these areas on a Weed Control Plan. The plan shall define methods used to control noxious weeds at each location. The Weed Control Plan shall be prepared by a California licensed Pest Control Advisor. Chemicals used to control weeds are restricted to those chemicals on the Department's Standard Special Provisions.

While Department is not aware of any areas of biological controls within the project limits, the Design-Builder shall contact other local jurisdiction biological control coordinators to determine if any areas exist. If they do, the Design-Builder shall indicate areas of biological control on the Weed Control plan. The Design-Builder shall utilize methods of weed control that will not adversely impact Department's or other jurisdiction's biological control efforts.

The Design-Builder shall perform the following tasks to control weeds:

- Clean all earth-moving equipment and vehicles of dirt, mud, and seed residue before using it or bringing it onto the Project site. Certify that all equipment has been cleaned using high-pressure water blasting or steam-cleaning methods;
- Clear the Project work area of weeds before disturbing soil. Eradicate weeds with selective herbicides recommended for those weed species;
- Minimize soil disturbance outside the slope stake limits. Monitor and control any disturbed area from weed invasion; and
- Monitor gravel, rock, borrow, and imported topsoil being used on the Project for weeds and control weed growth with post-emergent herbicides.

Prior to project acceptance, eradicate all weeds within the ROW by use of pre-emergent, selective, and nonselective herbicides. Monitor erosion control practices to prevent weed invasion in disturbed areas. If using chemical weed control, it must be applied in accordance with the weed control plan by a Qualified Applicator licensed by the California Department of Pesticide Regulations. Ensure that the product will not damage or kill the surrounding desirable plant material. If necessary, use hand pulling to eliminate weeds in these areas.

14.3.5 Erosion Control

The Design-Builder shall design temporary and permanent erosion and sediment control methods complying with all applicable laws including the Clean Water Act General Construction Permit and the Caltrans NPDES Permit in a manner that will not prohibit or compromise the installation, effectiveness, health, or design intent of vegetation.

The Design-Builder shall re-establish to original condition or better areas within temporary construction easements. The contractor shall treat all disturbed slopes immediately after construction to reduce erosion.

14.3.6 Planting Planted areas shown on the preliminary engineering plans to be protected and maintained shall be replaced if damaged during construction. If replacement planting is needed, the Design-Builder shall prepare a Planting plan indicating the location, species, size, and root condition of plants and details related to plant installation. The Planting plan shall be prepared by a California licensed Landscape Architect.

The planting shall be designed with consideration to future maintenance requirements. Plant materials selected shall be drought tolerant, native and/or adapted species that have a proven track record of success in the region and are from the plant palette of the Visual Quality Manual. The Design-Builder shall coordinate with Department to create an acceptable plant pallet that would prevent the spread or reintroduction of invasive plant species.

14.3.7 Irrigation

Existing irrigation points of connection shall be protected in place. Cap existing irrigation facilities at appropriate locations to minimize impacts to existing vegetation to remain. Use existing irrigation system to continue watering existing vegetation to remain. Provide continued irrigation to existing vegetation to remain in accordance to Caltrans Standard Specifications.

Any damaged Irrigation systems and components that are shown to remain shall be replaced in kind.

At each interchange, irrigation crossovers shall be used under roadways in locations that would accommodate the irrigation system (or future irrigation system as appropriate). Extend or replace existing crossovers as needed to match existing. Use materials meeting the requirements of Caltrans *Standard Specifications* and *Standard Plans*. Coordinate with the Department on the final locations.

14.3.8 Aesthetic Treatments

Provide architectural treatments, such as color and/or texture to soundwalls, retaining walls and gore paving to relate to other treatments within the corridor. These aesthetic treatments should be coordinated with the Department.

14.4 Construction Requirements

Construction shall be in accordance with the requirements of the standard specifications and the special provisions.

14.4.1 Vegetation Preservation

The Design-Builder shall place temporary fencing according to Caltrans Standard Specifications and Special Provisions at Environmentally Sensitive Areas to protect any plants or plant areas designated to be preserved and protected in the Vegetation Preservation plan. The Design-Builder shall remove the fencing when the Project has reached Final Acceptance.

The Design-Builder shall remove vegetation to be removed using methods that prevent damage or injury to nearby vegetation to remain and in compliance with Standard Specifications and Special Provisions.

The Design-Builder shall replace existing vegetation shown to be protected and maintained, which are affected by the project. Existing vegetation replacement shall be coordinated with Department.

The Design-Builder shall maintain existing vegetation and irrigation facilities to remain during construction in accordance with the requirements in the Caltrans Standard Specifications and Standard Special Provisions.

14.4.2 Existing Irrigation Facilities

Clearing, grubbing, and earthwork operations shall not be performed in areas where existing irrigation facilities are to remain in place until existing irrigation facilities have been checked for proper operation in conformance with the provisions in "Existing Highway Irrigation Facilities" of the standard specifications.

14.4.3 Weed Control

The Design-Builder shall remove weeds or treat areas designated for weed control to eliminate weeds. Map locations indicating areas of weed control shall be maintained throughout the Project.

The Design-Builder shall keep pesticide (herbicide) application records as well as provide all project pesticide application records to Department.

All mulch areas shall receive pre-emergent prior to mulching.

14.4.4 Plant Establishment

Plant establishment for replacement planting shall follow ‘Plant Establishment’ as defined in *Caltrans Standards Specifications* and Standard Special Provisions.

14.5 Deliverables

14.5.1 Landscape Concept Plan

The Landscape Concept Plan shall include erosion control, mulch, irrigation modifications and miscellaneous roadside treatments and shall be submitted to Department for Approval within 60 Working Days after the landscape concept meeting. Irrigation components are to be located and clustered in locations safely accessible for highway maintenance workers.

14.5.2 Vegetation and Landscape Plans

The Design-Builder shall prepare and submit to Department, a Vegetation Protection and Removal Plan, showing existing vegetation and irrigation to be removed, existing vegetation to remain and irrigation modifications and a Weed Control plan. These plans shall be submitted for Department’s Acceptance prior to starting construction activities. The landscape plans shall be prepared in conformance with the *Caltrans Plans Preparation Manual* and *Caltrans Landscape Architecture P.S.&E. Guide*.

14.5.3 As-Built Documents

Upon completion of the Project, the Design-Builder shall deliver to Department a complete set of as-built documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hardcopy and electronic form. The As-Built Documents shall meet the format and content requirements of Final Design Documents.

The Design-Builder shall provide as-built plans for landscape. The plans shall include layouts, details, and summary of quantities. The plans shall be prepared in conformance with the *Caltrans Plans Preparation Manual* and *Caltrans Landscape Architecture P.S.&E. Guide*.

The Design-Builder shall provide final calculations and design reports signed by a licensed Landscape Architect for all design elements used under this section

14.5.3.1 Final Design Documents

The Design-Builder shall submit final landscape documents to Department when final landscape work is complete, including office and field generated design changes. Final design documents include, but not limited to:

- Plans
- Reports/Project documentation
- Specifications and Special Provisions

A copy of the final irrigation plans are to be laminated and placed in each irrigation controller enclosure.

14.5.3.2 Over-the-Shoulder Design Documents

During the landscape design process, any submittals required in the Design Standards or other Contract Documents shall be prepared by the Design-Builder and submitted to Department. Submittals shall be in a format acceptable to Department and organized to facilitate review by Department.

14.5.3.3 Released for Construction Documents

The Design-Builder shall produce plans and specifications in a format that aids and facilitates design review by Department, and provide adequate information for safe, efficient, and high-quality construction. Plan sets and sheet types shall be developed in accordance with the *Caltrans CADD Standards*, *Caltrans Plan Preparation Manual*, and the Design Quality Management Plan before construction may begin. Department Approval for Landscape RFC plans is required.

14.5.3.4 Non- Standard Specifications and Non-Standard Special Provisions

If the Design-Builder requests Department's Approval to utilize methods or materials that are not Department standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials.

15 VISUAL QUALITY MANAGEMENT

15.1 General

The Design-Builder shall perform all work necessary to meet the requirements for visual quality management, including: provision of a Visual Quality Manager; development and implementation of a Visual Quality Management Plan; and coordination with a Visual Quality Management Advisory Team, inclusive of key stakeholders; to ensure informed visual quality decisions and to produce an ongoing “Record of Recommendations and Decisions” document.

Design and construct the project in accordance with requirements of this specification, including performance requirements, standards and references, warranties, design and construction criteria, maintenance during construction, and required submittals.

15.2 Administrative Requirements

15.2.1 Standards

The Design-Builder shall design and construct the project elements in accordance with the relevant requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Submittal has a higher standard than any of the listed standards, adhere to the Design-Builder’s Submittal standard.

If there is any unresolved ambiguity in standards, obtain clarification from Department before proceeding with design or construction.

Use the most current version of each listed standard as of the initial Publication Date of this Invitation to Bid (ITB) unless modified by Addendum or Change Order.

Visual Quality Management Standards

Priority	Agency	Title
1	Department	Highway Design Manual
2	Department	Project Development Procedures Manual,
3	Department	Office of Bridges and Structures, Aesthetic Guidelines for Bridge Design
4	AASHTO	A Policy on the Geometric Design of Highways and Streets
5	ASCE	Practical Highway Esthetics

15.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of the Visual Quality treatment requirements. These publications have no established order of precedence.

Visual Quality Treatment References

Agency	Title
Department	Director’s Policy No.22 Context Sensitive Solution
FHWA	Flexibility in Highway Design
Department	Visual Impact Assessment

15.2.3 Aesthetic Themes and Concepts

The Design-Builder shall coordinate Aesthetic Themes and Concepts for the Project with existing concepts along the corridor for consistency and unity.

The Design-Builder shall have the flexibility to make Project without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

15.2.4 Visual Quality Management Plan

The Design-Builder shall develop a Visual Quality Management Plan defining the qualifications, responsibilities, and authority of the Visual Quality Manager; the methods for coordinating and interacting with the Visual Quality Advisory Team; and the format and distribution of the ongoing VQM Advisory Team's "Record of Recommendations and Decisions" document.

15.2.4.1 Visual Quality Manager

15.2.4.1.1 Qualifications

See Book 2, Section 2.5 for requirements.

15.2.4.1.2 Responsibilities

The Visual Quality Manager shall have the responsibility to:

- develop and implement the Visual Quality Management Plan;
- coordinate visual quality issues with the Visual Quality Advisory Team, Department, and the other members of the Design-Builder's design and construction team; and
- oversee the Visual Quality Graphic Support Team that will provide photo simulations as needed to depict conceptual and detailed solutions to address visual quality issues.

15.2.4.2 Methodology

15.2.4.2.1 Establishing a Visual Quality Advisory Team

The Visual Quality Advisory Team shall be assembled by Department and shall consist of the following representatives:

- Caltrans Bridge Architecture and Aesthetics
- Caltrans Landscape Architecture
- Others may be added as deemed necessary

15.2.4.2.2 Commitment to Context Sensitive Design and Solutions

The Design-Builder shall conduct visual quality management work consistent with Department's Policy on Context Sensitive Design and Solutions and the following principles:

- Balance safety, mobility, community, and environmental goals in all projects
- Involve the public and affected stakeholders early and continuously
- Address all modes of travel relevant to the project
- Use an interdisciplinary team tailored to project needs
- Apply flexibility inherent in design standards
- Incorporate visual quality considerations throughout project development

15.2.4.2.3 Producing a Visual Quality Management Plan

The Design-Builder shall produce a Visual Quality Management Plan in accordance with the requirements of this Section for approval within 60 days after issuance of NTP1.

The Visual Quality Management Plan shall:

- Establish the methods for coordinating and interacting with the Visual Quality Advisory Team. The plan shall define the methods to be employed for Visual Quality Issues that determine, define, and detail solutions for maintaining and enhancing existing visual quality;
- Define the involvement of the Visual Quality Manager and the Visual Quality Advisory Team in identifying areas or elements of the proposed bridge, roadway, and surroundings that present opportunities or concerns in the development of a visually acceptable design;
- Define the responsibilities and authority the Visual Quality Manager and the Visual Quality Advisory Team will have in overseeing and reviewing the overall bridge design, design details, mock-ups, samples, and other submittals relating to the development of a visually acceptable design;
- Define how the opinions and judgments of the general public will be considered in the design solutions determined or recommended by the Visual Quality Advisory Team;
- Define how the opinions and judgments of elected officials will be incorporated into the design solutions determined or recommended by the Visual Quality Advisory Team;
- Define the authority of the Visual Quality Manager and the process for which the Visual Quality Manager will coordinate the input from the Visual Quality Advisory Team with other members of the Design Builder's design and construction team;
- Define what the process of producing the Record of Recommendations and Decisions will be throughout the Project; and
- Describe the process the Design-Builder will use to facilitate agreements in accordance with Department's cost sharing policies between Department and local units of government to cover the costs of any architectural treatments or enhancements to visual quality elements in excess of Department's participation policy.

15.2.5 Software

The Design-Builder shall use the latest version of Micro Station and CAiCE by Autodesk that Department is using on the date of Final RFP.

15.2.6 Meetings

Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve matters relating to the visual quality management Work during the design and construction stages. The requesting party shall provide the other parties with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

15.2.7 Visual Quality Management Meeting

The Design-Builder shall take an inventory of all the existing visual elements in the corridor. The Design-Builder shall schedule and participate in a Visual Quality Management concept meeting to present a layout of the in-place and proposed Visual Quality elements on the Project to Department.

The Design-Builder shall use the meeting to determine the permanent Visual Quality needs of the Project.

15.3 Design Requirements

This section includes the design requirements for developing the design of Visual Quality elements (those elements that typically affect the visual quality of highway transportation projects) including:

- Prepare an initial aesthetics plan based on criteria in this section.
- Develop a plan that integrates landscaping and aesthetic treatments.
- Design and construct aesthetic treatments that are aesthetically pleasing and fit the neighboring environment.

15.3.1 Visual Quality Elements

This section applies to those elements of highway design that affect a corridor's visual quality. The Design-Builder shall consider all pertinent factors related to the people and place where the Project is located, including the physical context that provides a basis for visual character and the social context of values, culture, tradition, politics, and expectations that give a location meaning, meanings that cannot be understood without public involvement.

The Design-Builder shall design and build a Project, that responds to the Project's context and develop design solutions that maintain or enhance existing visual quality, so that all design solutions create visual harmony with the natural environment, visual order with the community setting, and design coherence within the highway corridor.

The Design-Builder shall develop designs for and build all Visual Quality elements of the Project in compliance with the visual quality goals and the conceptual design theme established in the Visual Impact Assessment.

The Design-Builder shall design and construct all visual quality elements so that the experience of travelers and neighbors is visually harmonious, orderly, and coherent in accordance with the Visual Impact Assessment.

The Visual Quality Manager, with advice and consent from Department, shall develop RFC plans for the Visual Quality Plans.

15.4 Construction Requirements

15.4.1 Visual Quality Mock-ups and Samples

The Design-Builder shall provide samples for the items described in this Section 15.5. Samples approved by the Department, shall become the reference standard(s). The reference standard(s) shall be maintained undisturbed until Final Acceptance of the Project.

15.4.2 Gore Paving

The Design-Builder shall provide a sample that is not less than three feet by three feet, by the actual depth of paving for gore paving to demonstrate the rock blanket paving, for written approval by the Department.

15.4.3 Sound Walls

The Design-Builder shall provide a sample for the sound wall to demonstrate the texture, color and finish for written approval by the Department.

15.5 Deliverables

15.5.1 Visual Quality Plans and Landscape Design Plans

The Design-Builder shall provide RFC plans for the Visual Quality Plans and Landscape Design Plans for Acceptance by Department.

15.5.3 Visual Quality Mock-ups and Samples

The Design-Builder shall provide mock-ups or samples for Approval by Department, including samples of rock blanket for gore paving and sound walls a minimum of 14 Days prior to the construction or installation of any of these elements.

EXHIBIT 15 – A

Visual Impact Assessment

This exhibit is provided as an electronic file.

16 SIGNING, PAVEMENT MARKING, SIGNALIZATION, AND LIGHTING

16.1 General

The Design-Builder shall perform all Work necessary to meet the requirements for permanent signing, permanent pavement marking, permanent signalization, and permanent lighting for the Project.

The Design-Builder shall coordinate with the Department to ensure the appropriate design methods, procedures, submittals, plan preparation, analysis methodology, review and comment processes, approval procedures, specifications and construction requirements are met.

16.2 Administrative Requirements

16.2.1 Standards

16.2.1.1 General Standards

The Design-Builder shall design and construct the Signing, Pavement Marking, Signalization, and Lighting in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification before proceeding with design and/or construction. Use the most current version of each listed standard as of the Request for Proposals (RFP) issue date unless modified by Addendum or Change Order.

16.2.1.2 Permanent Signing Standards

Priority	Agency	Title
1.	Department	California Manual on Uniform Traffic Control Devices (CA MUTCD)
2.	Department	Highway Design Manual
3.	Department	Special Provisions and Non-Standard Special Provisions
4.	Department	2006 Revised and New Standard Plans
5.	Department	Standard Plans May 2006
6.	Department	Design-Build Modifications to the Standard Specifications
7.	Department	Standard Specifications
8.	Department	Sign Specifications
9.	Department	HOV Guidelines for Planning, Design, and Operations
10.	Various	Technical Memoranda and preliminary engineering documents
11.	AASHTO	A Policy on Geometric Design of Highways and Streets
12.	AASHTO	Standard Specifications for Structural Support for Highway Signs, Luminaires, and Traffic Signals, 4 th Edition with 2002, 2003, and 2006 Interims
13.	AASHTO	Roadside Design Guide

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| 14. | Department | Plans Preparation Manual |
| 15. | Department | CADD Users Manual |

16.2.1.3 Pavement Delineation Standards and Requirements

Priority	Agency	Title
1.	Department	California Manual on Uniform Traffic Control Devices (CA MUTCD)
2.	Department	Highway Design Manual
3.	Department	Special Provisions and Non-Standard Special Provisions
4.	Department	2006 Revised and New Standard Plans
5.	Department	Standard Plans May 2006
6.	Department	Design-Build Modifications to the Standard Specifications
7.	Department	Standard Specifications
8.	Department	Sign Specifications
9.	Department	HOV Guidelines for Planning, Design, and Operations
10.	Various	Technical Memoranda and preliminary engineering documents
11.	AASHTO	A Policy on Geometric Design of Highways and Streets
12.	AASHTO	Roadside Design Guide
13.	Department	Plans Preparation Manual
14.	Department	CADD Users Manual

16.2.1.4 Permanent Lighting Standards

Priority	Agency	Title
10.	Department	CADD Data Standards (Lighting Cell Library)
6.	Department	Signal and Lighting Guidelines
1.	Department	Special Provisions and Non-Standard Special Provisions
3.	Department	2006 Revised and New Standard Plans
4.	Department	Standard Plans May 2006
2.	Department	Standard Specifications
5.	Various	Technical Memoranda and preliminary engineering documents
7.	Department	Plans Preparation Manual
8.	ANSI	Illuminating Engineering Society of North America Roadway Lighting ANSI Approved
9.	AASHTO	Roadway Lighting Design Guide

16.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of signing, pavement marking, signalization, and lighting

Agency	Title
Department	New Policy and Directives (Pavement Delineation and Signing)
Department	Ready to List and Construction Contract Award Guide (RTL Guide)
Department	Reference Sheets for Structural Design Aids Overhead and Roadside Signs
Department	Standard Highway Signs
EIA	Electronics Industries Alliance (EIA) Standards
NCHRP	Report 350 – Recommended Procedures for the Safety Performance Evaluation of Highway Features
NEMA	National Electrical Manufacturers Association (NEMA) Standards
TIA	Telecommunications Industries Association (TIA) Standards

16.2.3 Preliminary Engineering Documents

The Preliminary Engineering Documents in the Reference Information Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints; provided the changes adhere to Department design standards.

Design-Builder shall perform the Work in accordance with the Standards and Requirements set forth in these Technical Provisions unless the Design-Builder obtains a deviation or Exception to those Standards or Requirements in accordance with the design review process set forth in the Design Build Contract.

16.2.4 Software Requirements

The Design-Builder shall prepare drawings in MicroStation SE and CaiCE Version 10SP6 as the drafting and design software, respectively.

The Design-Builder shall use the latest version of SignCAD, by SignCAD Systems, Inc. to design signs.

16.2.5 Meetings

The Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve matters relating to the Signing, Lighting, Pavement Marking, and Signalization Work during the design and construction stages. The requesting entity shall provide the other parties with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute within five (5) days of the meeting a record of the minutes to the meeting.

16.2.5.1 Permanent Signing Meetings

The Design-Builder shall take an inventory of all in-place signing in the Project. The Design-Builder shall schedule one or more permanent signing concept meeting(s) 30 Days after NTP1 to present a sketched layout of the in-place signing on the Project to the Department Traffic Engineer. The Design-Builder shall use the meeting to determine the permanent signing needs of the Project.

16.2.6 Coordination with Other Agencies and Disciplines

The Design-Builder shall obtain the permits required from other agencies.

16.2.7 Certification Requirements

The Design-Builder shall perform all laboratory testing at a the Department certified and approved lab and an AMRL-accredited facility for material tests required by this section. All material testers are to be certified for the materials they are testing.

16.3 Design Requirements

16.3.1 Permanent Signing

Design, furnish, and install all components of a sign system necessary to provide a complete and functional system that meets the following performance requirements:

- Provide for the orderly and predictable movement of all traffic.
- Provide such guidance and warnings as are needed to ensure the safe and informed operation of individual elements of the traffic stream.

The Design-Builder must get Approval for all signing plans.

The Design-Builder shall light regulatory signs on overhead sign structures. The Design-Builder shall light all signs on the overhead sign structure if one sign on the structure requires lighting.

All Overhead signs structures shall meet the vertical clearance requirements over the entire length of the pavement and shoulders as specified in the CA MUTCD.

The Design-Builder shall supply all sign panels.

16.3.1.1 Signing Concept Meetings

The Design-Builder shall take an inventory of all in-place signing in the Project. The Design-Builder shall schedule and participate in a signing concept meeting to present a layout of the in-place and proposed signing on the Project.

The Design-Builder shall design all temporary signing systems to comply with the same design and construction requirements as that of the permanent signing systems.

The Design-Builder shall prepare all necessary engineering studies and applicable design reports to justify all the project signing elements used in the project.

The Design-Builder shall use the outcome of the meeting to finalize the signing needs of the Project.

16.3.1.2 Signing Plan Requirements

The Design-Builder shall develop a Signing Plan for the project to:

- If permanent signing is erected by the Design-Builder that could be used for motorist guidance, continue to display such signing during the remaining construction of the Project.
- Maintain existing Guide signs for on-off ramps, Warning signs, Regulatory signs, Airport signs, and Hospital signs during all phases of construction.
- Replace all existing signs not meeting current sign standards within the Planned Right of Way limits.

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- All off-ramps must have intersection lane control signing (on both sides of the off-ramp for multiple lanes) for temporary (that exist for more than seven days) and permanent off-ramp lane configurations at the beginning of the turn lanes and at the intersection (mast arm mounted where possible)
 - The Signing plan shall provide for modifications to signage outside the Planned Right of Way limits that are rendered inaccurate, ineffective, confusing, or unnecessary by the Project. This includes guide signs on roadways inside and outside the Planned Right of Way limits. Guide signs include route marker assemblies, directional, distance, and information signs. The modifications shall include the addition, removal, or alteration of signs and appurtenances.
 - Include all necessary guide, warning, supplemental, sequential, and regulatory signs for the mainline, ramps, and interchanges, as well as for the arterial streets, frontage roads, and any other roadways affected by the Project.
 - Signs shall be located in such a manner that they do not conflict with other signs, vegetation, or structures and are clearly visible according to CA MUTCD standards.
 - The Design-Builder shall design and install guide signs and Trailblazer Signs outside of the final right of way for the Project. The scope of the Work for signs located outside of the final right of way includes new signs and modifications to existing sign panels and structures.
 - The Design-Builder will install signs located outside of the final right of way in existing rights-of-way controlled by other local agencies. The Design-Builder shall coordinate with the applicable local agency for the design and installation of the guide and trailblazer signs outside of the final right of way.
 - Guide signs shall include route marker assemblies, directional, distance, and information signs.

The Signing Plan shall include as a minimum, the following requirements:

- Sign locations
- Panel legends
- Proximity to Intelligent Transportation System (ITS) devices, including Changeable Message Sign (CMS) locations
- Types of proposed sign structures
- Signal system mast arm sign legends

16.3.1.3 Material Requirements

Traffic signs shall be constructed in accordance with the provisions of *Caltrans Standard Specifications* and *Caltrans Standard Plans*. The Design-Builder shall provide signing materials that:

- Are new at the time of installation;
- Unless otherwise noted herein, meet the requirements of the *Caltrans Standard Specifications*;
- The Design-Builder shall not reuse any existing sign materials as part of the permanent signing installation and shall dispose off the project site all removed signing materials and structures.

16.3.1.4 Sign panels for overhead and roadside signs along the mainline and ramps

The Design-Builder shall provide signing materials that:

-
- Shall meet the standards for retro-reflective panels.
 - Shall meet standard text size, border, legend, color, material and fabrication. The use of substandard (smaller) text size is not acceptable. The sign panel shall be designed to accommodate the standard legend and border.
 - Shall include exit numbers in the sign with the legend per Department requirements.
 - English units shall be used only, rounded down instead of up for distances.

16.3.1.5. Overhead Sign Structures

16.3.1.5.1 Existing Overhead Sign Structures

All existing overhead signs structures shall meet the following requirements:

- Overhead sign structures shall be evaluated for adequate strength per American Association of State Highway and Transportation Officials (AASHTO) and Department standards. Sign structures found to have inadequate strength shall be replaced with new sign structures.
- Overhead sign structures with posts/foundations on the mainline or ramps that are fixed objects shall be identified and corrected to meet design current standards.
- Overhead sign structures shall be upgraded to meet new safety cable railing standards.

16.3.1.5.2. New Overhead Sign Structures

All new overhead sign structures shall meet the following standards:

- Overhead sign structures shall be of tubular type.
- Overhead sign structures shall be painted a brown color to match existing overhead sign structures in the Route 180 corridor.
- Overhead sign structures shall be designed for fully loaded conditions and per Department requirements.
- Overhead sign structures shall conform to Department welding requirements.
- Overhead sign structures shall have a minimum vertical clearance of 18 feet over the roadbed.
- Single post overhead sign structures shall not be placed in the median.
- Overhead sign structures shall be illuminated if structure is for guide signs.

16.3.1.6. Sign Design

Design Overhead signs that meet the following requirements:

- Minimum clearance: 18 feet over the entire length of the pavement and shoulders; and
- Illumination: Externally illuminated with HPS lamps, per Performance Specification for Lighting.
- For variable message signs, 1,000 feet minimum unobstructed view and a minimum 800 feet in advance of a guide sign;

- Space guide signs apart at 800 feet minimum and 1,000 feet minimum in advance of a variable message sign;

16.3.1.7 Other Signage Requirements

Do not attach signs to any bridge structure unless no alternative exists.

Roadside signs along the mainline and ramps shall be mounted on wood posts; except for concrete barrier or rail-mounted signs. All sign supports shall include breakaway devices.

16.3.2 Permanent Pavement Marking

Pavement delineation Work shall include designing, installing, modifying, or removing striping and pavement markings. All pavement delineation shall conform to the CA MUTCD, *Caltrans Standard Plans* and *Standard Specifications*. The Design-Builder shall prepare pavement delineation plans that show HOV striping, edge striping, lane line striping, arrows, legends, and pavement markings consistent with the needs of the project. The Design-Builder shall design all temporary pavement delineation to comply with the same design and construction requirements as that of the permanent delineation. The Design-Builder shall prepare all necessary engineering studies and applicable design reports to justify all the project pavement delineation elements used in the project.

Design, furnish, and install all components of a pavement delineation system necessary to provide a complete and functional system that meets the following performance requirements:

Provide for the orderly and predictable movement of all traffic.

Provide such guidance and warnings as are needed to ensure the safe and informed operation of individual elements of the traffic stream.

The Design-Builder shall design and install both temporary and permanent pavement delineation as required to complete the Work. Pavement delineation shall be in accordance with applicable Department and CA MUTCD standards. The scope of the pavement delineation includes striping, raised pavement markers, and roadway delineators.

16.3.2.1 Pavement Delineation Concept Meetings

The Design-Builder shall take an inventory of all in-place pavement delineation elements in the Project. The Design-Builder shall schedule and participate in a pavement delineation concept meeting to present a layout of the in-place and proposed pavement delineation on the Project to Department. The Design-Builder shall use the outcome of the meeting to finalize the pavement delineation needs of the Project.

16.3.2.2 Pavement Delineation Plans

The pavement delineation plans (permanent or temporary) shall include the following:

- A plan view of the entire Project or roadway segment to have pavement delineation.
- All existing pavement delineation for a minimum of 500 feet past the limits of construction and adequate transition and tapers to maintain traffic at the design speed.
- Existing pavement delineation identified by material type, color, and width and completely dimensioned pavement delineation across the roadway.
- Identification of pavement delineation to be removed.

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- All new pavement delineation identified by material type, color, line width and completely dimensioned pavement delineation across the roadway, tying the pavement delineation to a construction centerline or monument line.
 - Location by station or dimension lines all proposed pavement arrows, legends, crosswalks, and other pertinent features.
 - Design drawings other than Department standard drawings that show details of pavement delineation, tapers, and transitions.

16.3.2.3 Pavement Delineation Material Requirements

The Design-Builder shall provide permanent or temporary pavement delineation that meets *Caltrans Standard Specifications*. The permanent pavement markings shall be uniform in type, color, dimensions, location, and reflectivity as if in new condition.

16.3.2.4 Striping and Pavement Markings

All striping details shall conform to the CA MUTCD, *Caltrans Standard Plans* and *Standard Specifications*, and *Caltrans HOV Guidelines for Planning, Design, and Operations*.

All striping and pavement markings on the mainline and ramps shall be thermoplastic. All markers on the mainline shall conform to *Caltrans Standard Plans*.

Striping and pavement marking modifications that may be required on local streets shall conform to standards required by local jurisdictions.

16.3.3 [NOT USED]

16.3.4 [NOT USED]

16.3.5 [NOT USED]

16.3.6 Permanent Lighting

Design, furnish and construct all components of a roadway lighting system necessary to provide a complete and functional system that meets the following performance requirements:

- Durable;
- Provide good uniformity at intersections and interchanges to create a safe and comfortable environment for those who use the facility;
- Avoid light pollution and light trespass outside of the corridor;
- Avoid disability or discomfort glare to users; and
- Provide for ease of maintenance and of servicing.

As a minimum, provide lighting design and installation at all interchanges, off-ramp gore areas, under structures, and for signs as specified in this section.

Electrical Work shall include designing, furnishing, installing, modifying, maintaining, during construction relocating, or removing of lighting systems, and sign illumination systems. Design-Builder shall also be responsible for the electrical Work, for traffic monitoring stations, communications systems, electrical equipment in structures, falsework lighting, provisions for future systems or combinations thereof, and irrigation controllers.

The Design-Builder shall prepare all necessary engineering studies and applicable design reports to justify all the project lighting system elements used in the project. Design and construct the lighting system to minimize lane closures during post-construction maintenance.

16.3.6.1 Lighting Concept Meeting

The Design-Builder shall take an inventory of all the existing lighting elements in the Project. The Design-Builder shall schedule and participate in a lighting concept meeting to present a layout of the in-place and proposed lighting system on the Project to Department.

The Design-Builder shall use the outcome of the meeting to finalize the lighting system needs of the Project.

16.3.6.2 Photometric Analysis

The Design-Builder shall complete a Photometric Analysis that includes the following:

- Lighting intensities and uniformity, light pole locations and heights, luminaire types, wattage and brightness, and quantities of each
- Lighting calculations accounting for the anticipated loss of light due to lamp lumen depreciation (LLD) and lamp dirt depreciation (LDD)
- When adjacent to residential areas, the maximum spillover lighting allowed shall be 0.2 foot-candles at ground level on residential properties
- Consideration of roadway safety, ease and cost of maintenance, cost of construction, consistency with adjacent roadway lighting designs, annual energy costs, and provision for future lighting needs and local planning policies
- Lighting distances from the light source at the following lighting levels: 1.0 foot-candle, 0.5 foot-candle, and 0.2 foot-candle for all edges of pavements, shoulder lines, lane lines, Right of Way, and 150 feet outside of Right of Way

The Design-Builder shall consider, but not be required to use the three dimensional aspects of the roadway with respect to the positioning of the illumination assemblies (i.e., roadways, ramps, overpasses, etc., are typically at varying vertical and horizontal distances from the luminaires being used to light the roadways).

16.3.6.3 Lighting Under Structures

The Design-Builder shall provide understructure lighting for all structures (except box culverts) within the Project limits.

The Design-Builder shall provide lighting that is consistent with the luminance levels and uniformity of the surrounding lighting system.

The Design-Builder shall design, furnish, and construct all understructure lighting to eliminate the need for lane closures during post-construction maintenance and shall locate luminaires to reduce the likelihood of tampering and damage by vandals.

Levels of illumination required under bridges shall be a minimum of 4.0 foot-candles measured horizontally on the surface of the walkway and vertically at a height of 6 feet above finished grade, with an average to minimum illumination uniformity ratio of 3:1.

16.3.6.4 Spillover Light

The Design-Builder shall limit spillover lighting outside of the Planned Right of Way limits.

16.3.6.5 Specific Requirements

When encountering a retaining wall during placement of the lighting poles, the Design-Builder shall mount the pole on the retaining wall and adjust the length of the pole to maintain the appropriate mounting height.

During the course of the Contract, the Design-Builder shall respond to complaints of residents adjacent to the Project and take necessary measures to mitigate any issues resulting from the new lighting system.

The Design-Builder shall design all new permanent lighting systems to be 120/240 volts. The Design-Builder shall consider locations of nearby guardrail, noise walls, retaining walls, utilities, and overhead power lines when placing light poles. The Design-Builder shall install electroliers with slip bases within the recovery clear zone unless otherwise protected by MBGR or concrete barrier.

The Design-Builder shall design all temporary lighting system to comply with the same design and construction requirements of the permanent systems.

16.3.6.6 High Mast Lighting

High mast lighting shall not be used on this project.

16.3.6.7 Electrical Service

Intersection safety lighting shall be in accordance with Department Standards.

Service for all elements shall be standard 120/240-volt (V) service. The Design-Builder shall be responsible for obtaining new or modified electrical service, including all applications and permits required from the serving utility company. The Design-Builder shall refer to the Utilities section in the technical provisions for utility requirements.

Separate service conduits shall be used for lighting circuits, Traffic Monitoring Systems (TMS), Ramp Metering System (RMS), Closed Circuit Television (CCTV), and from the service cabinet meter to the load. Large conduits with inner ducts to route the conductors for these separate circuits will not be acceptable.

Design-Builder shall be responsible for all electrical utility costs of the new or modified system, unless otherwise stated, following any change in loading on an existing meter, relocation of a meter, or installation of a new meter. This responsibility shall continue until Final Acceptance.

Department shall pay for existing power for the mainline and ramp lighting as long as the existing lighting is in use. Notify Department at least seven (7) days before disconnecting the existing lighting from power. At each location where temporary lighting will be provided, the Design-Builder shall pay the temporary lighting costs until the final lighting facilities are in place and have been accepted. Department will then resume payment responsibility for power for lighting.

16.3.6.8 Sign Lighting

Wire splices within the sign structure are not acceptable. Install NEMA 3R enclosure with type LC3 control on sign structure pole.

16.3.7 Electrical Design

The Design-Builder shall take an inventory of all the existing electrical elements in the Project. The Design-Builder shall schedule and participate in an Electrical concept meeting to present a layout of the in-place and proposed Electrical systems on the Project to Department. Electrical design plans for all electrical design systems shall conform to the following requirements:

- Existing electrical systems shall be shown.

- Identified power sources shall be shown on the plans clearly indicating the respective source locations (regardless of the design segment). Terminated conduit run with the note "service location as part of other segment" will not be acceptable.
- Equipment numbers shall correspond to their post mile location. Eastbound numbering shall be even numbered.

The following electrical element may be in the same service cabinet and on the same meter, but each shall have a separate circuit breaker:

- Traffic monitoring stations
- Ramp meters
- CCTV
- Fiber Optic (F/O) data node
- Fiber Optic video node

Highway safety lighting and sign lighting may be from the same service cabinet but on a separate meter.

A separate electrical service meter in a service cabinet shall be provided for changeable message sign (CMS) and communication hubs. All appurtenances shall comply with the horizontal clearance requirements in the Highway Design Manual.

16.4 Construction Requirements

Construction shall be in accordance with the requirements of the Standard Specifications and the Special Provisions.

The Design-Builder shall use Materials listed on the Department Approved Products List for Work Zones and Signals. The Design-Builder shall obtain the current Approved Products List.

The Design-Builder shall make appropriate arrangements with the electric company for installation or relocation of power service.

16.4.1 Permanent Signing

The Design-Builder shall mark in the field locations of the proposed signs and conduct a construction design review with Department before installation.

The Design-Builder shall obtain Department Acceptance of all sign locations in the field prior to installation.

16.4.1.1 Salvage

The Design-Builder shall provide a Salvaging Material Plan. The plan shall show materials to be salvaged and reused. All other material to be removed that is not reused or salvaged shall become the property of the Design-Builder and shall be removed from the freeway right of way in conformance with the Standard Specifications. Approval of the Salvaging Material Plan is required. The Design-Builder shall receive a response within 15 days.

16.4.2 Permanent Pavement Marking

All pavement markings, permanent or temporary, where no longer required for traffic demarcation shall be completely removed.

16.4.3 State Furnished Materials

The following material will be furnished by Department and installed by the Design-Builder:

- Controllers;
- Changeable Message Sign;
- Controller cabinets;

The Design-Builder shall submit a request for State Furnished Material listing the type and number of signal materials at least 120 days prior to the date when the materials are required. Department will place the order with the manufacturer, drop ship to the desired location and contact provided by the Design-Builder.

16.4.4 Permanent Lighting

Temporary lighting is required to be installed and operational prior to removal of the existing lighting systems and during false work installation.

16.4.4.1 Salvage

The Design-Builder shall provide a Salvaging Material Plan. The plan shall show materials to be salvaged and reused. All other material to be removed that is not reused or salvaged shall become the property of the Design-Builder and shall be removed from the freeway right of way in conformance with the Standard Specifications. Approval of the Salvaging Material Plan is required. The Design-Builder will receive a response within 15 days.

16.4.4.2 Lighting

The Design-Builder shall provide maintenance for permanent or temporary lighting installations within the project limits until Substantial Completion of the Project.

16.4.4.3 Source of Power

The Design-Builder shall coordinate with the local power supplier to provide the power service connection. The Design-Builder shall pay all costs, unless otherwise noted, charged by the electric power companies for providing power connections. The Design-Builder shall be responsible for contacting the electric utility to determine the source of power, to obtain exact locations of power poles and stub-outs for the permanent and temporary installations.

16.5 Deliverables

The Design-Builder shall develop Released for Construction (RFC) Documents, As-Built Plans and Final Design Documents in accordance with the requirements of these technical provisions.

16.5.1 Lighting Concept Plan

The Lighting Concept Plan (permanent or temporary) with incorporated comments received at the Lighting Concept Meeting shall be submitted 60 days after the concept meeting.

16.5.2 Electrical Concept Plan

The Electrical Concept Plan (permanent or temporary) with incorporated comments received at the Electrical Concept Meeting shall be submitted 60 days after the concept meeting.

16.5.3 Signing Concept Plan

The Signing Concept Plan (permanent or temporary) with incorporated comments received at the Signing Concept Meeting shall be submitted 60 days after the concept meeting.

16.5.4 Over-the-Shoulder Design Documents

During the design process, any submittals required in the Design Standards or other Contract Documents shall be prepared and submit by the Design-Builder. Submittals shall be in an acceptable format and organized to facilitate their review.

16.5.5 Released for Construction (RFC) Documents

The Design-Builder shall produce plans and specifications in a format that aids and facilitates design review, and provide adequate information for safe, efficient, and high-quality construction. Plan sets and sheet types shall be developed in accordance with the *Caltrans CADD Standards*, *Caltrans Plans Preparation Manual*, and the Design Quality Management Plan before construction may begin. Acceptance by the Department is required.

16.5.6 Final Design Documents

The Design-Builder shall submit final design documents when final design is complete, including office and field generated design changes. Final design documents include:

- Plans
- Shop drawings
- Design calculations
- Reports/Project documentation
- Specifications and Special Provisions

16.5.7 Shop Drawings

Copies of Approved shop drawings shall be provided at least five (5) days prior to the start of any Work detailed by those drawings. Design-Builder shall make no changes in any approved shop drawing after has approval has been received. Any deviations from approved shop drawings shall require that the Design-Builder submit revised shop drawings back for their approval.

Shop drawings for lighting structures and for Overhead sign structures shall be submitted for Acceptance prior to fabrication.

16.5.8 Design Justification Reports and Project Documentation

Upon request, the Design-Builder shall submit design justifications when the Design-Builder shall consider various factors or alternatives. Documentation may be computer generated or hand written and shall clearly identify the following:

- Design issue
- Items requiring consideration
- Basis for evaluation
- Final decision and justification

16.5.9 Non- Standard Specifications and Non- Standard Special Provisions

If the Design-Builder requests Approval to utilize methods or materials that are not Department standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials.

16.5.10 As-Built Documents

Upon completion of the Project and prior to Final Acceptance, the Design-Builder shall deliver a complete set of as-built documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hardcopy and electronic form. The As-Built Documents shall meet the format and content requirements of Final Design Documents.

17 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

17.1 General

The Design-Builder shall perform all Work necessary to meet the requirements for intelligent transportation systems (ITS). The ITS systems shall include Closed Circuit Television Systems (CCTV), Changeable Message Sign Systems (CMS), Traffic Monitoring Stations (TMS), Microwave Vehicle Detection Systems (MVDS), Fiber Optic Communication Systems and Microwave Communication Systems. The Design-Builder shall take an inventory of all the existing ITS elements in the Project. The Design-Builder shall design and construct the Work of relocating and modifying the existing ITS elements shown in the Preliminary Engineering Documents. The Design-Builder shall design and construct the work to generally meet the locations in the Preliminary Engineering plans in the Reference Information Documents. The scope of ITS Work shall include system planning, design, furnishing, installation, modifying, integration, testing, interim maintenance, and system acceptance of ITS.

The Design-Builder shall coordinate with the Department to ensure that the appropriate design methods, procedures, submittals, plan preparation, analysis methodology, review/comment processes, approval procedures, specifications and construction requirements are met for ITS work within the Project

17.2 Administrative Requirements

17.2.1 Standards

The Design-Builder shall perform the Work in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification before proceeding with design and/or construction. Use the most current version of each listed standard as of the *Invitation for Bid (IFB)* issue date unless modified by Addendum or Change Order.

Intelligent Transportation Systems Standards and Requirements

Priority	Agency	Title
1	Department	Design Build Modifications to the Standard Specifications for Construction
2	Department	Special Provisions and Non-Standard Special Provisions
3	Department	Standard Specifications
4	Department	2006 Revised and New Standard Plans
5	Department	Standard Plans May 2006
6	Department	Technical Memoranda and preliminary engineering documents
7	Department	Construction Manual
8	Department	Traffic Manual
9	Department	Plans Preparation Manual
10	AASHTO	Roadside Design Guide

17.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of the ITS system as appropriate.

ITS References

Agency	Title
Department	Transportation Electrical Equipment Specifications (TEES)
Department	Ready to List and Construction Contract Award Guide (RTL Guide)
Department	District 6 Fiber Optic Non-Standard Special Provisions (NSSP)
NEC	National Fire Protection Agency National Electric Code (NEC) Standards, including Listing Requirements
USDOT	National ITS Architecture
NEMA	National Electrical Manufacturers Association (NEMA) Standards
EIA	Electronics Industries Alliance (EIA) Standards
TIA	Telecommunications Industries Association (TIA) Standards
NTCIP	National Transportation Communications for ITS Protocol (NTCIP) Standards
ITE	Institute of Transportation Engineers (ITE) Standards
EIA/TIA	Fiber-Optic Test Procedure (FOTP) Standards

If the Design-Builder requests Approval to use methods or materials that are not standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials.

It is recommended that the Design-Builder utilize the ITS Non-Standard Special Provisions (NSSPs) examples included in the Reference Document for the design and construction of the ITS system. These ITS NSSPs had been approved by HQ Traffic Operations on other projects and may be used on this project and need to be re-submitted for approval. If the ITS NSSPs examples listed in the Reference Document are not utilized by the Design-Builder for the ITS design of the project, the Design-Builder must request new specifications reviews and approvals before they can be accepted as part of the Project. The new specifications approval process requires a minimum of four (4) weeks for review and approval. State Furnished Material will be required for the project. An approved list of State Furnished Material will be provided to the Design-Builder.

17.2.3 Preliminary Engineering Documents

The Preliminary Engineering documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints; provided that the Design-Builder shall perform the Work in accordance with the Standards and Requirements set forth in these

Technical Provisions unless the Design-Builder obtains a deviation or Exception to those Standards or Requirements in accordance with the design review process set forth in the Design Build Contract (Book 1).

17.2.4 Software Requirements

The Design-Builder may at its own discretion use any software when submitting plans for approval but shall prepare the final drawings using MicroStation SE and CAiCE Version 10SP6 as the drafting and design software, respectively.

Design-Builder shall use ITS devices that are compatible with the data requirements of the Department District #6 Transportation Management Center (TMC) Advanced Transportation Management Systems (ATMS) software. Due to new technology updating so rapidly, the Design-Builder shall meet with TMC Engineers to inquire about the software currently being used to ensure Project conformity.

17.2.5 Meetings

The Design-Builder shall meet at the request of the Department, as necessary, to discuss and resolve matters relating to ITS work during the design and construction stages. The requesting party shall provide the other parties with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

17.2.6 Certification Requirements

The Design-Builder shall perform all laboratory testing at a Department certified and approved lab and an AMRL-accredited facility for material tests required by this section. All material testers are to be certified for the materials they are testing.

17.2.7 Coordination with Other Agencies and Disciplines

The Design-Builder shall obtain the permits required from other agencies.

17.2.8 Department Responsibilities

Department responsibilities are as follows:

- Recommending Approval or disapproval of components and/or methods;
- Reviewing the documentation and certification of test device calibration (to ANSI specified guidelines which call for an annual calibration of test equipment) used to measure the following:
 - Electrical characteristics of power and signal control cables and conductors.
 - Insulation characteristics of power and signal control cables and conductors.
 - Optical cable test equipment.
- Making recommendations for the Approval of documentation, test results, and submittals.
- Reviewing and making recommendations for the Acceptance of the required documentation for the following items related to the system:
 - Specifications
 - Shop drawings
 - Measured and recorded values
- And be present when the following ITS component locations are staked or flagged:

- F/O cable.
- Splice vaults.
- Pull boxes
- CCTV Cameras and poles.
- Cabinets (CCTV, TMS and CMS).
- Changeable message sign pole.

17.3 Design Requirements

17.3.1 ITS Concept Meetings

The Design-Builder shall schedule and participate in ITS concept meetings to present layouts of the existing and proposed ITS system on the Project. The Design-Builder shall be responsible for determining the number and location of all affected ITS elements. The Design-Builder shall document this information, along with preliminary quantities. Existing ITS element sites shall be relocated to accommodate the roadway widening.

At the ITS concept meeting, the Design-Builder shall present a functional ITS design with hardcopy layouts. The ITS concept meeting shall include proposed approaches for and discussion of the following topic areas:

- Preliminary plan for maintaining existing TOS system during construction
- Fiber-optic cable/conduit location
- Splice vault /Pull box locations
- Cabinet locations
- Fiber-optic cable splicing and testing
- Locating ITS elements (ramp metering systems, traffic monitoring stations/count stations, CCTV cameras, and changeable message signs) and Maintenance Vehicle Pullouts (MVPs)
- Salvaged items
- Worker certifications
- Component testing (wire tests, loop detector testing)
- Test equipment calibration
- Documentation of Temporary ITS elements
- Review ITS systems and operations, including field verification of all legacy ITS systems and elements
- Define and finalize ITS functional, technical, operational, and maintenance requirements
- Finalize goals and parameters of ITS design
- Establish integration requirements
- Develop Acceptance of ITS design
- Address and discuss ITS construction issues

The Design-Builder shall submit the proposed Testing Plan. This meeting shall occur prior to any testing. Testing personnel, including the people that will be performing the field-testing shall be required to attend the meeting. The Design-Builder shall notify Department prior to F/O system testing. Department may observe each test.

17.3.2 General Requirements

The ITS design shall provide for fiber-optic communications, real-time National Television System Committee (NTSC) closed circuit television (CCTV) surveillance, operations data collection (loop detection), and motorist information features. The Design-Builder shall provide a complete, operational, and maintainable ITS systems and/or components. These systems and/or components shall be compatible with the in-place legacy system. The Design-Builder shall label the ITS devices with Department provided

naming and numbering convention. The Design-Builder shall provide an ITS design that meets, at a minimum, the following requirements:

- Expandability
- Consistent cabinet layouts throughout field device locations
- Support stand-alone operation of all field devices using backup software components
- Protection from voltage surges and lightning
- Weather-resistant elements capable of operating in rain and wind conditions and in temperature and humidity ranges encountered in the Project area
- ITS elements that are considered as the fixed objects shall be installed outside the clear recovery zone.
- If ITS elements being considered as the fixed objects cannot be installed beyond the clear recovery zone, they shall be constructed and protected per AASHTO Roadside Design Guide, Caltrans HDM and Caltrans Standard Plans.
- At a minimum, a Maintenance Vehicle Pullout (MVP) per *Caltrans Standard Plans* shall be constructed adjacent to each site of ITS components such as the Changeable Message Sign, Ramp Metering System, and Traffic Monitoring Station Count Station, and the poles of CCTV Camera

The Design-Builder shall use only components designed for 20 or more years of industrial use. All material, equipment, and component parts furnished shall be new (within 12 months from date of manufacture), of the latest design and manufacture, in an operable condition at the time of delivery and installation, and compatible with the in-place system.

17.3.2.1 District 6 Transportation Management Center (TMC)

The District 6 TMC's primary purpose is to integrate Department's District Maintenance Dispatch and Department's Division of Operations with the California Highway Patrol Dispatch into a unified command center. The integration provides the communications and computer infrastructure necessary for coordinated transportation management on freeways during normal commuting periods, as well as during special events and major incidents. The District 6 TMC serves as a central point for collecting, verifying, processing, and distributing real-time transportation information throughout the Project area. Information will be collected using various ITS components, including such roadside devices as closed circuit television cameras, ramp metering systems, traffic monitoring stations/count stations, and changeable message signs.

The data signals received at the District 6 TMC shall be configured to be integrated with the existing ATMS system processing hardware and software to enable operators to communicate with any CCTV camera, changeable message sign, traffic monitoring station (count stations), or ramp metering on the corridor and without affecting the existing system.

17.3.2.2 Communication Hub Buildings

All fiber-optic circuits shall be furnished and installed so that video and control communications shall follow two (2) paths: primary and backup. All ITS elements east of Cedar Avenue shall have a primary communications path to the Cedar Avenue Communications Hub and backup communications path to the Locan Avenue Communications Hub. All ITS elements west of Cedar Avenue shall have a primary communications path to the Cedar Avenue Communications Hub and backup communications path to the Blackstone Avenue Communications Hub. All paths shall be routed to the District 6 TMC. The network shall be designed and configured in such a manner that if the primary circuit fails for any reason, the backup circuit shall assume the primary role. When the primary circuit is restored, the communications network shall switch the communications transport function back to the primary circuit. The fiber-optic circuits from the

hubs to the District 6 TMC shall be provided to the Design-Builder by Department to complete the circuits to the District 6 TMC.

The Design-Builder shall provide necessary video and data equipment matching the video and data equipment units installed at the video node and data node, connecting wires and cables, and other equipment necessary to make the system fully operational.

17.3.3 Permanent Traffic Control

17.3.3.1 Ramp Metering Systems (RMS)

Refer to Section 26 entitled “Ramp Metering” for requirements.

17.3.3.2 Traffic Monitoring Stations/Count Stations (TMS/CS)

The Design-Builder shall install traffic monitoring stations/count stations for measuring, at a minimum, vehicular volume and lane occupancy on the freeway. The Design-Builder shall place permanent loop detection in, auxiliary and mainline lanes. The Design-Builder shall not have more than 22 detector inputs per cabinet. The Design-Builder shall furnish and install necessary equipment for all TMS/CS’s to make the system fully operational.

17.3.4 Permanent Traffic Surveillance

17.3.4.1 Closed Circuit Television (CCTV) System

17.3.4.1.1 Closed Circuit Television (CCTV) camera

The Design-Builder shall furnish and install new CCTV hardware at locations. CCTV hardware shall be placed such that the intersecting arterial is viewable and maintenance access is available.

The Design-Builder shall consult on the placement of CCTV hardware during the design progress meetings. Camera views, accessibility, and maintainability are issues of concern and the Design-Builder shall obtain input from Department for approval.

The Design-Builder shall provide a CCTV system that meets the following requirements:

- New CCTV camera equipment
- MVP or Caltrans Standard adjacent to the CCTV pole
- Cabling
- Coverage to remotely monitor highway and/or connecting arterial street traffic conditions and confirm messages displayed on changeable message signs within Project area
- Placement to allow monitoring of ramp metering and ramp queues, where applicable
- Maintenance-free, to the extent possible
- Poles and cameras shall not be placed in the median of the highway
- CCTV system shall be compatible with the current video switch in the Hub buildings and District 6 Transportation Management Center
- Lightning and surge protection

The Design-Builder shall determine new camera locations based on proximity to existing cameras affected by construction activity. The Design-Builder shall make a 5-minute video of the field review at the proposed location/height of all CCTV cameras. The video shall demonstrate the camera’s ability to zoom in and out and pan up and down. The video shall be reviewed to approve or disapprove the location and mounting height as applicable.

Work shall consist of furnishing and installing the following

- A CCTV camera assembly on a standard CCTV pole,
- Camera control circuits and accessories,
- CCTV wiring, including connectors, composite video cables, connectors and coaxial cables,
- Fiber optic (F/O) equipment and jumpers.

The CCTV camera assembly shall be supplied as a fully-assembled, integrated, tested and configured single unit from the manufacturer at the camera manufacturer facility and shall be delivered to the project site accompanied with a written certification of assembly and configuration from the camera manufacturer. This certification shall serve as the manufacturer documentation that the assembly and configuration of the camera/lens/housing equipment were performed. A sample certification document shall be furnished as part of the materials submittal data. CCTV Camera Assembly Communications Specifications:

- Serial data communications ports conforming to EIA/TIA-232 and EIA/TIA-422
- Configurable to support NTCIP 1205 - NTCIP Objects for CCTV Camera Control
- Via the CCTV protocol, the user shall be able to obtain camera position information including tilt angles, pan positions and zoom levels. The information shall be supplied as 0-359° Azimuth and -83° to +33° Elevation

Before installation and after installation, the Design-Builder shall test to verify that all new CCTV camera assembly equipment functions in accordance with the manufacturer's specifications. After installation, new CCTV camera equipment shall be tested at each individual location. The Design-Builder shall install and fully adjust the CCTV camera assembly with the associated components, power supply, and all necessary cabling and incidental equipment to make the CCTV camera assembly completely operational. All CCTV camera assembly components shall be fully interchangeable. All CCTV camera equipment installed shall be warranted for a minimum of 1 year from time of final acceptance test, or 2 years from date of delivery, whichever is longer. The period of warranty coverage shall not be less than the manufacturer's warranty period.

17.3.4.1.2 CCTV Poles

The Design-Builder shall furnish and install CCTV poles for all the CCTV camera sites.

17.3.5 Traveler Information

17.3.5.1 Changeable Message Signs (CMS)

The Design-Builder shall determine when an existing Changeable Message Sign (CMS) is affected by construction activity and relocate the affected CMS system to the new location as required on this project. The Design-Builder shall furnish and install necessary equipment for all CMS's to make the system fully operational.

17.3.6 Communication Network

The Design-Builder shall utilize the existing fiber optic network with the final products installed. The Design-Builder shall modify a communication network that has redundant routing capabilities and enough bandwidth to meet the operational requirements. The Design-Builder shall perform the following:

- Perpetuate the existing communications network functionality during the construction.
- Design and construct a fiber optic communications network to serve the ITS elements along the entire corridor.
- Provide the necessary single mode fiber optic cables to match the existing fiber optic system.

-
- Maintain network communications between Communication Hubs at Route 180/Cedar Avenue and Route 180/Blackstone Avenue.
 - Maintain network communications between Communication Hubs at Route 180/Cedar Avenue and Locan Avenue.
 - Maintain network communications between Communication Hub at Route 180/Cedar Avenue and ITS Elements on Route 168.
 - Propose solutions to achieve design objectives based on the functional, technical, operational, and maintenance requirements

The Design-Builder may install a temporary 5.8 Ghz wireless system in order to maintain network communications during construction. The wireless system shall have sufficient capacity to maintain all network communications.

The Design-Builder shall not substitute or apply any part or attach any piece of equipment contrary to the manufacturer's recommendations and standard practices.

17.3.6.1 Fiber-Optic Cable

The Design-Builder shall link the controllers of the traffic monitoring stations/count stations, changeable message signs, CCTV cameras, ramp metering systems and irrigation controllers to the communication network. The Design-Builder shall provide the necessary fiber optic pigtails to controller cabinets and shall terminate the fiber optic pigtails at the fiber distribution units. The Design-Builder is required to upgrade the existing hub communications end equipment at the Cedar Avenue Communications Hub as specified in this technical provision. Fiber-optic cable for devices outside the Project limits routed through the Project limits will be rerouted. The Design-Builder shall minimize the number of transverse crossings of the freeway. The Design-Builder shall place all fiber-optic cable in conduit. The Design-Builder shall provide fiber-optic pigtails between splice vaults and in the Hub buildings and field device control cabinets.

17.3.6.2 Fiber-Optic Connection Components

Refer to Reference Document, District 6 Fiber Optic Non-Standard Special Provisions (NSSP).

17.3.7 Splice Vault

17.3.7.1 Splice Vault

- The Design-Builder shall furnish and install the splice vault. Splice vault shall be installed on both ends of a structure and adjacent to ITS element cabinet. Splice vaults shall be installed at 1600 foot or smaller intervals.

17.3.8 Grounding

17.3.8.1 [NOT USED]

17.3.8.2 Electrical Service

Service for all elements shall be standard 120/240-volt (V) service. Design-Builder shall be responsible for obtaining new or modified electrical service including all applications and permits required from the serving utility company.

All ITS elements shall be powered commercially by Pacific Gas and Electric Company (PG&E). ITS elements shall be metered at the TC-1 rate. ITS elements shall not be connected to any TC-1 rate meter that is connected to a traffic signal.

The Design-Builder shall coordinate with the local power supplier to provide the power service connection. The Design-Builder shall pay all costs, unless otherwise noted, charged by the local power supplier for providing power connections. The Design-Builder shall be responsible for contacting the local power supplier to determine the source of power to obtain exact locations of power poles and stub-outs for the permanent and temporary installations.

17.3.8.3 Coordination with Power Utility

The Design-Builder shall coordinate with the Utility for request to shut off or turn on service during construction period if needed. Design-Builder shall be responsible for obtaining new or modified electrical service points, including all applications and permits required from the serving utility company.

17.4 Construction Requirements

The Design-Builder shall design the ITS system as a whole and receive Approval before installation of any individual field element. The Design-Builder shall make final connections of the newly installed or temporary ITS elements to the existing system. Three Working Day advanced notification to Department (District 6 TMC) is required prior to staking locations for ITS devices and shall obtain approval prior to start of any work related to the installation of any ITS devices. Upon completion of installation of all ITS devices, a final walk through is required to ensure functional, continuity and connectivity requirements are met. Confirmation that all newly constructed/installed ITS devices (loops, RMS, CMS, EMS, CCTV and others) and connectivity to the existing ITS systems are working properly is required prior to relief of maintenance.

17.4.1 General Requirements

The Design-Builder shall provide an advance notice to Department of installation of CCTV hardware, cabinets, and equipment. The Design-Builder shall provide GPS coordinates on the installed ITS elements and on existing elements where the new elements connect to them.

The Design-Builder shall provide coordinate correct As-Built drawings. The As-Built drawings shall use the Released for Construction design drawings used for construction with all deviations of components from their original design placements redrawn and shown in their coordinate correct location. As-Built drawings shall contain standard line styles and component symbols used for ITS design. Construction shall be in accordance with the requirements of the Standard Specifications and the Special Provisions.

17.4.1.1 Allowable Working Hours on the ITS System

All ITS elements outside the Planned Right of Way limits shall not be affected by the Design-Builder and remain operable during construction of the Project. The Design-Builder shall be restricted to only work on the active part of the system from 9:00 a.m. to 3:00 p.m. and 7:00 p.m. to 6:00 a.m. Notification from the Design-Builder shall be required prior to taking down active system elements. The Design-Builder shall perform all work in a manner ensuring the integrity and proper performance of all ITS elements while working on the existing system. A 48 hours notification is required prior to performing any work on existing/active ITS devices.

17.4.1.2 Repair Parts

The Design-Builder shall have repair parts available during construction for all ITS elements.

17.4.1.3 Materials and Fabrication

The Design-Builder shall round and smooth sharp corners and edges on all ITS elements that are furnished and installed.

17.4.1.4 Locates

The Design-Builder shall be responsible for all underground cables placed by the project until Final Acceptance of the project.

17.4.2 Ramp Metering System

(Not Used)

17.4.3.1 Closed Circuit Television (CCTV) System

The Design-Builder shall furnish and install the CCTV hardware. Notification from the Design-Builder shall be required when the installation of the CCTV hardware is complete. Caltrans shall work with the Design-Builder and be present to approve the locations for the CCTV pole foundation and the 334 cabinets in the field before the foundations are placed. Design-Builder will furnish and install the CCTV camera assemblies at each of the CCTV locations.

17.4.3.1.1 Video/Control Cable for Camera

The Design-Builder will furnish and install the camera video/control/power composite cable from the 334 cabinet to the top of the pole. All CCTV shall be installed behind a protective barrier per Department specifications.

17.4.3.1.2 Salvage Components

The Design-Builder shall salvage all ITS Elements removed for construction purposes.

17.4.3.2 Loop Detectors for RMS and TMS/CS

Exact locations for all loop stations shall be determined in the final design phase of the Project. The mainline count stations shall be “count loop” detection with a set of loops for all mainline roadway lanes. When installing queue detection loops, the Design-Builder shall evaluate the site conditions. Approval is required if the distance from the final ramp meter design varies more than 16 feet.

Testing and Setting Up the Loop Detector Installation

The Design-Builder shall set up the loop detector cards. The Design Builder shall be responsible for notifying Department when the loop and lead-in wire are ready for termination and testing.

17.4.4 Communication Network

The Design-Builder shall furnish and install materials and equipment such that ITS communications components are composed of identical sub-components. Identical sub-components shall be defined as components of the same manufacturer, model, and installation configuration. The ITS communications sub-components include the following:

- Fiber-optic cable
- Splice vaults, pull boxes, splice closures, and fiber-optic connection components
- CCTV video encoders and cables

All locations containing identical equipment shall be configured and wired in a consistent if not identical manner by the Design-Builder, including internal wiring and harnesses, wiring color codes, labeling terminal block positions, termination strips, power service configuration, and panel and equipment mounting and locations.

17.4.4.1 Proposed and Existing Fiber Optic Cable

For fiber optic trunk cable installations the Design-Builder shall perform the following:

- Exercise caution and excavate by hand or by utilizing a vacuum excavator when exposing an existing F/O cable.
- Existing Fiber Optic Cable shall be clearly marded and refreshed through contract duration.
- Repair all nicks or abrasions on the jacket of any F/O cable. The Design-Builder shall report all nicks or abrasions prior to making repairs.
- The F/O cable bending radius shall not be exceeded while handling and/or rerouting the F/O cable.

17.4.4.2 Damaged Fiber Optic Cable

For damaged fiber optic trunk cable the Design-Builder shall perform the following:

- Repair active F/O cable that is severed or otherwise rendered not useable by Project activities. A liquidated damage of \$1,000 per hour shall be assessed until the repair is complete or an approved temporary splice is installed. The assessment shall begin when the Design-Builder severs the cable or otherwise renders the F/O cable unusable. A part of an hour shall count as a full hour. The Design-Builder shall provide notification to Department as soon as the cable damage is discovered.
- Stock approved splice kits to repair any cable damaged by construction activities

Spliced repairs to damaged F/O cable shall comply with the following:

- Initial emergency repairs to F/O cable shall utilize mechanical splices unless all fibers (severed and not severed) are fusion spliced within 24 hours.
- Splices shall be located within existing splice vaults.
- Splices shall comply with the requirements for F/O cable splicing.

Install new cable between existing terminations or vaults, as appropriate, for cable severed by the Design-Builder's activities. Nicks or abrasions caused by exposing any cable by hand digging or vacuum excavation shall be sealed with rubber splicing tape. The Design-Builder shall seal nicks that penetrate through the cable jacket to the armor with a cast epoxy kit. The Design-Builder shall use "industry accepted lubricants" referenced in *Caltrans Standard Specification* during cable pulling operations. The lubricants shall be compatible with cable insulation materials and shall not deteriorate the cable insulation.

17.4.4.3 Fiber-Optic Cable Installation

The cable installation shall conform to Caltrans Standard Specifications and this Technical Provision. The Design-Builder shall calculate the expected tension on fiber-optic trunk cable and pulling strap prior to installing trunk cable in conduit runs. The Design-Builder shall distribute the pulling force between the inner strength member and the agamid fibers by securing both to the main pulling device. The Design-Builder shall use a "break-away" type pulling attachment to protect against over stressing cable. The Design-Builder shall not use a cable grip that pulls only on the outer jacket to pull fiber-optic cable. The Design-Builder shall backfill open trench installations of trunk cable and pigtails with granular material 6 inches over the cable elevation. Damage to the cable from any source or exceeding the manufacturer's recommended tensile strength limits or cable-bending radius is cause for the cables to be rejected. The Design-Builder shall ensure a minimum loaded bend radius of 10 inches and minimum installed bend radius of 8 inches. The Design-Builder shall not use the hand hole as a fiber pull box.

17.4.4.4 Fiber-Optic Cable Splicing

The Design-Builder shall splice fiber-optic cable as part of the fiber-optic pigtail termination. The Design-Builder shall only fusion-splice the fiber-optic cable. Cable splices will only be allowed with the Approval and only at the location specified and then only when there are no practical alternatives. Splices shall be made only in splice vaults using Approved splice closures. The Design-Builder shall strictly follow the fiber-optic cable manufacturer's methods, recommendations, materials, and techniques for splicing. The Design-Builder's splicing equipment shall be in good working order, properly calibrated, and meet all industry standards and safety regulations. The cable preparation, closure installation, and splicing shall be accomplished in accordance with industry standards. To minimize mechanical stress and splicing locations, cables shall be trained into final position observing minimum bending radii of the cable of not less than 20 times the diameter of the cable or as per the manufacturer's requirements, whichever is greater. Cleanliness and freedom from contamination shall be strictly observed with respect to splicing materials and joint construction. Upon completion of the splicing operation, the Design-Builder shall deposit all waste material in suitable containers, remove from the job site, and dispose.

17.4.4.5 Fiber-Optic Connection Components

Fiber-optic connection components may be necessary to connect Project-installed cable to the ITS communications network. The Design-Builder shall follow the requirements of the necessary components in the following sections.

Indoor Patch Cords

See Design Requirement section of this technical provision.

SC Fiber Connectors

The SC connector shall comply with the requirements for single mode fiber connector for this project.

17.4.5 Traveler Information

17.4.5.1 Changeable Message Signs

The Design-Builder shall relocate the existing changeable message signs when necessary. The Design-Builder shall be responsible to determine the new locations for the relocated changeable message signs and design to make the systems functional and operational.

17.4.6. Splice Vault

17.4.6.1 Splice Vault

The Design-Builder shall place the splice vaults in locations to minimize the number and length of pigtails. However, the location of field devices shall be the controlling factor in vault placement. The Design-Builder shall include in the construction of a splice vault a drainage system, grounding provisions, enclosure hanger bracket assembly, and a ground rod marker. The fiber-optic cables shall sweep up near the vault to meet the conduit entrance to the vault (take care not to exceed minimum bend radius). Clean splice vaults after installation and splicing of cables. Cables shall be coiled onto the F/O hanger brackets within the vault. The Design-Builder shall provide a drainage system for the Splice Vault. The Design-Builder shall furnish and install a sheath grounding unit between the splice enclosure and the ground rod. The Design-Builder shall clean existing vaults prior to installing cable.

17.4.6.2 Outdoor Fiber Splice Closure

The Design-Builder shall install sufficient desiccant (packaged silica) in the closure to reduce possible damage from moisture. The Design-Builder shall bond all fiber-optic cable shields in fiber-optic splice vaults

to the ground lug of the outdoor fiber splice closure. The Design-Builder shall bond a sheath grounding unit conductor to the ground lug of the splice closure and the other conductor to the outside ground rod. The Design-Builder shall mount the sheath grounding unit to the inner wall of the vault along the upper half. The Design-Builder shall use a ground strap to connect the two grounding posts to electrically tie them together. Non-oxidizing coating shall be applied to all connections. The Design-Builder shall tape the F/O Cables together as necessary near the Outdoor F/O Splice closure and throughout the slack length.

17.4.6.2.1 Mounting Splice Enclosure in Vault

The Design-Builder shall mount the furnished and installed outdoor fiber splice enclosure in the splice vault. Mounting of the outdoor fiber splice enclosure shall require a bracket to be constructed to fit the opening to the splice vault. The bracket shall be constructed so that the bracket and enclosure cannot fall into the vault. The bracket shall remain long enough to rest on the vault lid ledge. The objective of this bracket shall be to keep the splice enclosure off the floor of the vault.

17.4.7 Single Point Grounding

For all electrical and electronic grounding, the Design-Builder shall meet single-point grounding requirements. Single-point grounding means referencing all grounded devices to a single point (one single piece ground rod) via the shortest and straightest route. The Design-Builder shall collect the devices' chassis and electrical grounds at a ground buss before connecting them to the earth ground rod. The Design-Builder shall connect the ground busses via conductors that meet the requirements of single point grounding. For single-point grounding, the Design-Builder shall perform the following:

- Ground all equipment to meet the requirements of the manufacturer.
- Route each ground conductor to the ground buss via the straightest route that does not hinder maintenance or installation activities.
- Use a sheath-grounding unit to ground the outer shield of the fiber-optic cables in control cabinets to the equipment ground bus.
- Clean each grounding component with 300-grit emery cloth before bonding and apply a mineral-oil-based oxide inhibitor to the bond area.

Provide sheath-grounding units for all fiber-optic cable ground locations (cabinets, shelters, and splice vaults). In the fiber-optic splice vault, only one sheath-grounding unit is needed between the splice enclosure and the ground rod. When used in control cabinets, fiber patching shelters, and ITS shelters, a sheath-grounding unit is used on each fiber-optic cable entering/exiting the cabinet/shelter. The sheath-grounding unit shall:

- connect to the cable armor,
- provide a low impedance ground path for high voltage transients while allowing location and monitoring signals to pass,
- provide test access to the armor,
- automatically reset,
- have a failsafe circuitry design,
- have a hybrid surge suppression circuitry,
- be designed for below grade use, and
- Have No. 6 AWG stranded copper lead wires.

17.4.7.1 Ground Rods and Ground Rod Connections

The Design-Builder shall furnish and install ground rods and ground rod connections with the following requirements: The ground rod shall be 10 feet long, one piece, and comply with Caltrans Standard Specification. An oxide inhibitor shall be applied over bonded connections to ground rods. The Oxide Inhibitor shall

- be UL listed
- provide an airtight seal around the conductor and ground rod,
- be applied to the bonded area between the temperatures of -22 °C (-30 °F) and 149 °C (300 °F),
- be used on copper conductors,
- prevent oxides from forming, and
- be mineral oil based

The Design-Builder shall bond the ground conductor to the ground rod by one of the following three bonding methods:

- Compression.
- Exothermic Welding is used when grounding TMS Shelters, CCTV poles and CMS structures with lightning braid.
- Irreversible compression is used when grounding TMS Shelters, CCTV poles and CMS structures with lightning braid. The irreversible compression bond is achieved by:
 - Using a hydraulic press with a connector die.
 - Using a solid copper connector with a run for a 5/8-inch ground rod and a tap for the specified ground conductor.
 - Using connectors that can accommodate a conductor range from No. 6 solid copper through 500 Kcmil, are pre-filled with an antioxidant compound, and are strip sealed.

The Design-Builder may propose other methods and materials for implementing an irreversible compression bond and submit the associated products and procedures of equal quality for Approval.

17.4.8 Existing Conduit Systems

Existing conduit systems may consist of PVC, high density polyethylene, continuous polyethylene, or RSC. When installing fiber-optic cable assemblies in existing conduits through existing pull boxes, the Design-Builder shall check the cable route to ensure that there is a smooth transition between exit and entrance elevations and that the horizontal angle is not so sharp as to cause damage to the cable as it is being pulled through the existing conduit. If the Design-Builder encounters sharp bends, the Design-Builder shall reinstall conduit to provide a smooth transition. The Design-Builder shall clean the existing conduit of any debris that could impede pulling fiber-optic or copper cable through it or that could damage the cable if the debris remained.

17.5 Deliverables

17.5.1 ITS Plan Submittals

The Design-Builder shall provide five hardcopies and one electronic copy of Released for Construction documents at least three days prior to each ITS design progress meeting. The Design-Builder shall submit the Fiber-Optic System Test Plan for Approval.

17.5.1.1 Over-the-Shoulder Design Documents

During the design process, any submittals required in the Design Standards or other Contract Documents shall be prepared by the Design-Builder and submitted to Department. Submittals shall be in a format acceptable and organized to facilitate review. It shall be the responsibility of the Design-Builder to coordinate to insure that the structure of the submittals is satisfied.

17.5.1.2 Released for Construction (RFC) Documents

The Design-Builder shall produce plans and specifications in a format that aids and facilitates design review and provide adequate information for safe, efficient, and high-quality construction. Plan sets and sheet types shall be developed in accordance with the *Caltrans CADD Standards*, *Caltrans Plans Preparation Manual*, and the Design Quality Management Plan before construction may begin.

17.5.1.2.1 Plans

The following list of RFC plans, which is not an all inclusive list, shall be produced:

- Title sheet
- Legend of symbols
- Existing ITS elements with utilities
- Proposed ITS devices with GPS locations
- ITS sample plan symbology
- Typical section view
- Communication schematics
- Test schematics
- ITS element details
- Quantity tabulations

17.5.1.3 ITS element, Test, and Project Documentation

The Design-Builder shall prepare and submit ITS element, test, and Project documentation. The test documentation shall include completed forms and electronic documentation. Two sets of ITS element and test documentation shall be submitted for Acceptance. Two sets of ITS element documentation shall be required. The Design-Builder shall complete and submit the inspection checklists. The Design-Builder's Traffic Engineer shall sign off on all forms. The Design-Builder shall obtain Acceptance of the ITS element submittal package before installation of the ITS elements is Approved. Notification by the Design-Builder is required when all ITS requirements have been met. Contract work will be accepted after verifying proper operation of all components. The Design-Builder shall submit the proof of performance (POP) test results following the completion of the POP tests for Acceptance. The Design-Builder shall submit specifications for the following: Loop assembly, loop lead-in, loop conductor, and the splice encapsulator. Acceptance of each submittal is required before the installation of the ITS element will be authorized. The Design-Builder shall submit the loop detector test report within one week after completing installation for loops. The Design-Builder shall submit all wiring diagrams for review and incorporate comments resolved in the wiring diagram. The Design-Builder shall submit power and control cable test results within 7 days of making final connections.

17.5.1.3.1 Fiber-Optic Cable Test Documentation

The Design-Builder shall submit fiber-optic cable test documentation including calibration and certification of the fiber-optic cable test equipment as part of the component documentation. The Design-Builder shall follow the format of the Fiber-Optic System Test Plan. The Design-Builder shall use Department's file naming convention for all OTDR test files. The Design-Builder shall provide all test documentation on a CD. The Design-Builder shall store OTDR files under a directory named by the highway number. These files shall include the following: actual date of testing, all splice points marked, the "index of refraction" (recorded on the cable spool by the manufacturer), and file names and notes as described by Department's file naming convention. The Design-Builder shall provide OTDR "make and model" information as part of

the Project Documentation Submittal. The Design-Builder shall provide a test summary describing the following:

- Final measurements that were out of range.
- Approved changes in specified methods.
- Dates tests were performed by both Power Meter and OTDR.
- Other special circumstances.

The Design-Builder shall provide the Department's System Integrator additional two copies of the manufacturer's reel (spool) test documentation. The test documentation is shipped with the fiber-optic cable spool.

17.5.2 Final Design Documents

The Design-Builder shall submit final design documents when final design is complete, including office and field generated design changes. Final design documents include:

- Plans
- Shop drawings
- Design calculations
- Reports/Project documentation
- Specifications and Special Provisions

17.5.2.1 Non- Standard Specifications and Non-Standard Special Provisions (NSSP)

If the Design-Builder requests Approval to Specifications and Provisions that are not Department standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials. The Design-Builder shall also provide justifications for the use of NSSPs. The NSSP approval process for ITS NSSPs requires a minimum of four weeks for review and approval notwithstanding review and approval at the IPO.

17.5.2.2 As-Built Documents

Upon completion of the Project and before Final Acceptance, the Design-Builder shall deliver a complete set of as-built documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hardcopy and electronic form. The As-Built Documents shall meet the format and content requirements of Final Design Documents. The Design-Builder shall sign, seal and date the title sheet of the As-Built Documents to certify that the Work was completed in accordance with the plans, the Contract Documents, the Governmental Approvals and applicable Law.

18 MAINTENANCE OF TRAFFIC

18.1 General

The Design-Builder shall perform all Work necessary to meet the requirements associated with maintenance of traffic (MOT), including providing for the safe and efficient movement of people, goods, and services around the Project while minimizing negative impacts to residents, commuters, and businesses.

18.2 Administrative Requirements

18.2.1 Standards

The Design-Builder shall perform the Work in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's submittal has a higher standard than any of the listed standards, adhere to the design standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification before proceeding with design and/or construction.

Use the most current version of each listed standard as of the ITP issue date unless modified by Addendum or Change Order.

Maintenance of Traffic Standards and Requirements

Priority	Agency	Title
1	Department	Transportation Management Plan (TMP) Guidelines
2	Department	Technical Memoranda
3	Department	California Manual on Uniform Traffic Control Devices
4	Department	Standard Special Provisions
5	Department	2006 Revised and New Standard Plans
6	Department	Standard Plans May 2006
7	Department	Design-Build Modifications to the Standard Specifications
8	Department	Standard Specifications
9	Department	Highway Design Manual
10	AASHTO	A Policy on Geometric Design of Highways and Streets,
11	Department	Traffic Manual, Chapter 7
12	AASHTO	Roadside Design Guide, 3 rd Edition
13	Department	Ramp Meter Design Manual

*Document modified for design-build.

18.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of the maintenance of traffic. These references are not mandatory on the Design-Builder.

Maintenance of Traffic References

Agency	Title
TRB	Highway Capacity Manual

18.2.3 Traffic Management Plan

The Design-Builder shall develop, implement, and maintain a Traffic Management Plan (TMP) that includes the following items:

- Descriptions of the duties of the Traffic Engineering Manager and other personnel with MOT responsibilities.
- Descriptions of the design methods to be used for temporary roadways.
- Procedures to identify and incorporate the needs of emergency service providers, law enforcement entities, and other related corridor users.
- Methods and frequency of inspection and maintenance of all traffic control throughout the Project's limits.
- Descriptions of contact methods, personnel available, and response times for responses to any conditions needing attention during off-hours.
- Procedures to modify the plans as needed to adapt to current Project circumstances.
- Procedures to communicate TMP information to the Design-Builder's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of Book 2, Section 3.
- The procedures developed in the TMP shall be used to create the MOT plans.

18.2.4 MOT Task Force**Membership**

The Design-Builder shall establish a MOT task force, inviting representatives of the Design-Builder, Department, Cities, Counties, law enforcement agencies, emergency response providers, and other agencies whose operations affect or are affected by the Project MOT plans.

Meetings

The Design-Builder shall schedule and chair MOT task force meetings twice each month from NTP2 to Project completion. The meeting schedule and frequency may be adjusted upon the agreement of the MOT task force members. The purpose of the meetings shall be to

- further refine and develop the MOT plans,
- review the Design-Builder's MOT details,
- disseminate Project MOT information to task force meeting attendees,
- obtain MOT input from task force meeting attendees, and
- develop, refine, and review the TMP and its implementation.

18.2.4.1 Lane Closure Submittal

Maintaining traffic shall conform to the provisions in Sections 7-1.08, "Public Convenience," Section 7-1.09, "Public Safety," and Section 12, "Construction Area Traffic Control Devices," of the Caltrans Standard Specifications.

- A. Closure is defined as the closure of a traffic lane or lanes, including shoulder, ramp or connector lanes, within a single traffic control system.

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- B. Except for HMA paving operations, grinding and grooving operations, saw cutting concrete slabs or installing loop detectors with a shadow vehicle equipped with a truck-mounted attenuator (TMA), and for installing, maintaining and removing traffic control devices, whenever work, including the work of installing, maintaining, and removing temporary railing (Type K) is to be performed on the freeway within six (6) feet of the adjacent traffic lane, the adjacent traffic lane shall be closed.
- C. Closures are only allowed during the hours shown in the approved lane requirement charts, except for work required under Sections 7-1.08, "Public Convenience," Section 7-1.09, "Public Safety" in *Caltrans Standard Specifications*.
- D. Unless approved by Department, not more than one separate stationary lane closure will be allowed in each direction of travel at one time. The maximum length of a single stationary lane closure shall be 2 miles.
- F. When performing traffic control for stationary lane closures where median shoulders are less than eight (8) feet, the Design-Builder shall conform to the requirements as shown on the Traffic Handling Details Plan titled "Traffic Control System For Median Shoulders Less Than eight (8) Feet" as included in the Reference Information Document. Impact Attenuator Vehicle (IAV)/Truck-mounted attenuators (TMA) for use in moving lane closures shall be any of the following approved models, or equal:

1. Hexfoam TMA Series 3000, Alpha 1000 TMA Series 1000, and Alpha 2001 TMA Series 2001, manufactured by Energy Absorption Systems, Inc., 35 East Wacker Drive, Suite 1100, Chicago, IL 60601: 1.1. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, telephone (800) 884-8274, FAX (916) 387-9734 1.2. Southern California: Traffic Control Service, Inc., 1818 E. Orange Thorpe, Fullerton, CA 92831-5324, telephone (800) 222-8274, FAX (714) 526-9501
2. Cal T-001 Model 2 or Model 3, manufacturer and distributor: Hexcel Corporation, 11711 Dublin Boulevard, P.O. Box 2312, Dublin, CA 94568, telephone (925) 551-4900
3. Renco Rengard Model Nos. CAM 8-815 and RAM 8-815, manufacturer and distributor: Renco Inc., 1582 Pflugerville Loop Road, P.O. Box 730, Pflugerville, TX 78660-0730, telephone (800) 654-8182

Each TMA shall be individually identified with the manufacturer's name, address, TMA model number, and a specific serial number. The names and numbers shall each be a minimum 1/2-inch high and located on the left (street) side at the lower front corner. The TMA shall have a message next to the name and model number in 1/2 inch high letters which states, "The bottom of this TMA shall be _____ inches \pm _____ inch above the ground at all points for proper impact performance." Any TMA, which is damaged or appears to be in poor condition shall not be used unless recertified by the manufacturer. Department shall be the sole judge as to whether used TMAs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMA in conformance with the standards established by the Caltrans Transportation Laboratory.

Approvals for new TMA designs proposed as equal to the above approved models shall be in conformance with the procedures (including crash testing) established by the Transportation Laboratory. For information regarding submittal of new designs for evaluation contact: Caltrans Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, California 95819.

New TMAs proposed as equal to approved TMAs determined by Department to need recertification shall not be used until approved or recertified by the Caltrans Transportation Laboratory.

- G. Route 180 may be closed to public traffic at one location in one direction at a time for striping, 2 post overhead sign structure installation and removal and loop detector installation in conformance with the hours and requirements as shown on approved Full Freeway Closure Charts.

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- H. When the Design-Builder performs work with the Extended Weekend Closure option, a portable changeable message sign shall be placed at a location on the ramp, as determined by Department, 7 days in advance of the planned closure with the message: "RAMP / WILL BE / CLOSED – NEXT / WEEKEND". The Design-Builder shall place a portable changeable message sign for the entire closure duration a minimum of 1500 feet in advance of the off-ramp upstream to the ramp being closed or as determined by Department with the message: "NAME OF RAMP / EXIT / CLOSED".
- I. Closure of on-ramps or off-ramps servicing two (2) consecutive local street interchanges in the same direction of travel will not be allowed. Deviations from ramp closure requirements shall be requested in writing by the Design-Builder and submitted to Department for approval. Department may permit the deviations if public traffic will be better served and the work expedited. When an off-ramp, on-ramp or connector ramp is temporarily closed for more than one day, the Design-Builder shall furnish and erect special signs for ramp closures SC6-4(CA) (RAMP CLOSED), as shown on the plans in the Reference Information Document.
- J. Special advance notice signs SC6-3(CA) or SC6-4(CA) as shown on the Traffic Handling Details Plans in the Reference Information Document, shall be posted at locations as determined by Department, a minimum of seven (7) days prior to, but no more than 15 days before ramp or connector closures. Accurate information shall be maintained on the SC6-3(CA) and SC6-4(CA) signs. When work is not actively in progress, SC6-3(CA) and SC6-4(CA) signs shall be removed or covered. Design-Builder shall notify Department a minimum of 2 working days before installing these signs. Local authorities shall be notified at least five (5) business days before work begins. The Design-Builder shall cooperate with local authorities to handle traffic through the work area and shall make arrangements to keep the work area clear of parked vehicles.
- K. Personal vehicles of the Design-Builder's employees shall not be parked within the State's right of way.
- L. When work vehicles or equipment are parked on the shoulder within six (6) feet of a traffic lane, the shoulder area shall be closed as shown on the *Caltrans Standard Plans*.
- M. Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.
- N. Special Days are defined as Martin Luther King Day and Columbus Day.
- O. By noon Monday, the Design-Builder shall submit a written Closure Schedule of planned closures for the following week period, defined as Friday noon through the following Friday noon for Department's approval. Closures involving work (temporary railing placement and paving operations) that will reduce horizontal clearances, traveled way inclusive of shoulders, to two (2) lanes or less shall be submitted not less than 25 days and not more than 125 days before the anticipated start of operation. Closures involving work (pavement overlay, overhead sign installation, falsework and girder erection) that will reduce the vertical clearances available to the public, shall be submitted not less than 25 days and not more than 125 days before the anticipated start of operation.
- P. The Closure Schedule shall show the locations and times of the proposed closures. The Closure Schedule request forms furnished by Department shall be used. Closure Schedules submitted to Department with incomplete or inaccurate information will be rejected and returned for correction and re-submittal. The Design-Builder will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.
- Q. Closure Schedule amendments, including adding additional closures, shall be submitted by noon to Department in writing, at least three (3) business days in advance of a planned closure. Approval of Closure Schedule amendments will be at the discretion of Department.

- R. Department shall be notified of cancelled closures two (2) business days before the date of proposed closure. Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of Department.
- S. The Design-Builder shall prepare a detailed contingency plan for reopening closures to public traffic. The contingency plan shall be submitted to Department before work at the job site begins or within one business day of Department's request.
- T. If a closure is not reopened to public traffic by the specified time as shown on the approved Lane Requirement Charts, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the *Caltrans Standard Specifications*. No further closures are to be made until Department has accepted a work plan, submitted by the Design-Builder that will ensure that future closures will be reopened to public traffic at the specified time. Department will have two (2) business days to accept or reject the Design-Builder's proposed work plan. The Design-Builder will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.
- U. For each 10-minute interval, or fraction thereof past the time specified to reopen the closure as shown on the approved Lane Requirement Charts, Department will assess damages from moneys due or that may become due the Design-Builder under the contract. The damages for each 10-minute interval of delay are:
- First half hour: \$3,050
- Second half hour: \$4,575
- Third half hour and beyond: \$6,100
- V. Department shall be notified of delays in the Design-Builder's operations due to the following conditions, and if, in the opinion of Department, the Design-Builder's controlling operation is delayed or interfered with by reason of those conditions, and the Design-Builder's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way:
1. The Design-Builder's proposed Closure Schedule is denied and his planned closures are within the time frame allowed for closures as shown on the approved Lane Requirement Charts, except that the Design-Builder will not be entitled to compensation for amendments to the Closure Schedule that are not approved.
 2. The Design-Builder is denied a confirmed closure.
- Should Department direct the Design-Builder to remove a closure before the time designated in the approved Closure Schedule, delay to the Design-Builder's schedule due to removal of the closure will be considered a right of way delay. Portable changeable message signs shall be furnished, placed, operated, and maintained at locations shown on the approved Full Freeway Closure Charts and Connector Closure Charts and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the *Standard Specifications*. Messages displayed on the portable changeable message signs shall conform to Section 12-3.12 "Portable Changeable Message Signs," of the *Caltrans Standard Specifications*.
- W. Messages displayed on portable changeable message signs shall not be displayed until five (5) minutes prior to the closure installation as permitted by these technical provisions. Portable changeable message signs shall have 24-hour timer control or remote control capability.
- X. A Design-Builder's representative with a cellular phone shall be on the job site for operations that require portable changeable message signs. The representative shall modify messages as determined by Department.

Y. Traffic plastic drums shall comply with:

1. Section 12, "Construction Area Traffic Control Devices," of Caltrans Standard Specifications
2. Section 6F.62, "Drums," of the California Manual On Uniform Traffic Control Devices

Traffic plastic drum manufacturer's recommendations for weight and ballast

AA. Upon request, the Design-Builder shall submit a Certificate of Compliance for Traffic Plastic Drum under Section 6-1.07, "Certificates of Compliance," of Caltrans Standard Specifications.

BB. White and orange-colored retroreflective stripes must be a brand of retroreflective sheeting listed on the Caltrans' "Prequalified and Tested Signing and Delineation Materials." White and orange-colored stripe may be either Type III, Type IV, Type VI, Type VII, Type VIII, or Type IX retroreflective sheeting. Use the same type and brand of retroreflective sheeting for all traffic plastic drums.

CC. Traffic plastic drum must:

1. Be orange-colored low-density polyethylene (Orange-colored may be either orange, red-orange, fluorescent orange or fluorescent red-orange in color.)
2. Be flexible and collapsible upon vehicle impact
3. Have a weighted-base to maintain an upright position and prevent displacement under passing traffic

DD. Traffic plastic drum's weighted-base must be:

1. Detachable
2. Shaped to prevent rolling upon impact
3. 38-inch maximum outside diameter
4. 4-inch maximum height above the ground surface

EE. Place a traffic plastic drum on only one side of the traveled way, in a straight line on a tangent alignment, and in a true arc on a curved alignment.

FF. Use only one type of traffic plastic drum on the job site. Do not intermix traffic plastic drums, portable delineators, tubular markers, traffic cones, and Type I and Type II barricades on the same alignment.

GG. The Design-Builder shall not use sandbags or comparable ballast for the traffic plastic drum.

HH. Traffic plastic drum must be a minimum of 36 inches in height above the traveled way.

II. The Design-Builder shall immediately restore a displaced traffic plastic drum to its original location and upright position.

JJ. Upon completion of work, traffic plastic drums shall become the Design-Builder's property and must be removed from the job site.

18.3 Design Requirements

18.3.1 MOT Plans

The Design-Builder shall use the procedures in the TMP to provide for all construction staging, construction site security, and access to the construction site. The MOT plans shall be prepared under the direction of the Traffic Engineering Manager. The Design-Builder's MOT plans shall include the following items:

- Complete plan sheets for construction access, security, and appropriate traffic control.
- Plan sheets and/or details for handling construction operations such as material delivery and storage, access and exit of construction and delivery vehicles, haul roads, and other items that may impact traffic.

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- The appropriate details when temporary construction of any of the following is required to maintain traffic: traffic signals, detour roadways, bridges, retaining structures, drainage, and other miscellaneous construction.
 - Roadway plan sheets showing all traffic control devices that are in place that need to be retained, relocated, or removed and all temporary traffic control devices that need to be installed, retained, relocated, or removed.
 - Drawings showing dimensions on how to fabricate any sign not detailed in the *CA MUTCD*, the background color, and the legend.
 - The size and color of all standard traffic control devices.
 - Roadway plan sheets with the exact location of each sign so it can be easily read in relation to the roadway and other traffic control devices. No number or letter may be on the roadway plan sheets as a reference for sign placement.
 - Provisions for using temporary guardrail, temporary concrete barrier wall, or attenuators to protect the traveling public and to provide security of the project site.
 - Detail modifications to the Project MOT to address wintertime conditions or periods of suspended Work.
 - Type and location of all pavement markings to be installed, removed, or renewed for each stage and placement location of the final pavement markings.
 - A switching procedure for each control stage change identified in the MOT plans. The switching procedure shall consist of methods, actions, and signing necessary to complete the switch and the number and duties of traffic personnel assigned to perform the switch.
 - Details and descriptions of how the Design-Builder will phase milling and resurfacing to prevent traffic on milled surfaces where posted speeds are 45 mph or higher.

18.3.1.1 Design Vehicle

The MOT Plan shall accommodate a STAA design vehicle.

18.3.1.2 Temporary Auxiliary Lanes and Exit Ramp Extensions

Temporary auxiliary lanes and extensions for exit ramps shall be designed and constructed to meet the following requirements:

- Exiting traffic must not have to slow down in the through lanes to less than 50 mph in order to safely gain access to the temporary auxiliary lane.
- The temporary auxiliary lane must be long enough so that traffic leaving the through lane at 50 mph can slow down safely to a speed of 30 mph.
- The temporary auxiliary lane shall have a paved surface width of at least 12 feet and an aggregate shoulder width of at least 3 feet.
- Temporary bypass extensions shall have a paved surface width of at least 16 feet and an aggregate shoulder width of at least 3 feet on both sides.
- The infield slope shall not be steeper than 1:4 (v:h).
- Acceleration lanes shall be designed to meet the standards shown in the *Highway Design Manual*.
- All temporary auxiliary lanes and extensions for exit ramps shall be provided with temporary overhead lighting.

- A minimum 2-foot reaction distance shall be provided for any temporary or permanent barrier device, including portable temporary concrete barrier.
- The Design-Builder shall install the final signing and pavement markings required to safely open the road to traffic. This Work shall be completed on or before the date of opening.

18.3.1.3 Temporary Guardrail, Barrier, Attenuators, and Glare Screen

The Design-Builder shall be responsible for using temporary guardrail or barrier and attenuators to protect the traveling public from the following:

- Fixed objects within the clear recovery zone
- Drop-offs that are not in accordance with the traffic control treatment of longitudinal joint and edge drop-off guidelines in the Department Special Provisions
- Slopes steeper than 1:4 (v:h)

The Design-Builder shall follow the requirements of the *Traffic Manual*, Chapter 7 for portable precast concrete barrier (PPCB) delineation. The Design-Builder shall use PPCB delineation for the first 500 feet of any length of concrete barrier that is used in alignment shifts, lane transitions, or bypasses, . Two 34-inch panels of the appropriate color spaced 26 inches apart per 10-foot barrier section shall be used. The linear delineation panel shall be thin-gauge aluminum sheeting covered by micro-prismatic retroreflective sheeting (ASTM Type IX) Visual Impact Performance (VIP) manufactured by 3M Company, or Approved equal. Each panel shall be not less than 34-inch nominal length. Each panel shall be in 6-inch widths. Each panel shall have 14 raised lateral ridges spaced every 2.25 inches. Each ridge shall be 0.34 inches high with a 45-degree profile and a 0.28-inch radius top. The end of the PPCB shall not be placed within the clear recovery zone of approaching traffic unless an appropriate attenuator is used. To reduce the headlight glare of approaching vehicles, temporary glare screen meeting Department Standard Plan shall be placed on top of all portable precast concrete barrier (PPCB) that separates opposing traffic. All barriers shall have reflectorized barrier delineators of the appropriate color at 30-foot spacing, and the barrier delineators shall be side mounted.

All PPCB installation and end treatments must conform to Figures V1-12, V1-12a, and V1-12b of the *California Manual of Uniform Traffic Devices* (CA MUTCD) and to the Caltrans Special Provisions for impact attenuators (2554 in Division S of Part III). All guardrail installation must conform to Department Standard Plate 8307Q1 and 8307Q2.

18.3.1.4 Haul Roads

The Design-Builder must have its haul roads pre-approved by the appropriate governing agency. The Design-Builder shall be responsible for all restoration of haul roads to levels specified by the appropriate governing agency.

18.3.1.5 Pedestrian Access

The Design-Builder shall maintain pedestrian access on all sidewalks, and intersections along all streets as much as possible. If access cannot be maintained, the Design-Builder shall obtain Approval from Department and the appropriate governing agency to close or modify the pedestrian access and shall furnish and install proper signing for pedestrians.

Department and other appropriate governing agencies shall be notified 10 Working Days prior to the closure, and advanced signing shall be provided notifying all users of the closure. This signing shall be erected a minimum of seven Days prior to the closure and shall note the closure duration.

18.3.1.6 Project Specific Items

18.3.1.6.1 General Requirements

Two open lanes shall be provided in each direction of travel on Route 180 at all times, except as specified above.

Each lane shall be 12 feet wide.

The mainline design speed for MOT shall be 65 mph. The design speed during construction for temporary entrance and exit ramps shall be 35 mph, except for temporary loop ramps, where the design speed may be reduced to 25 mph.

Each shoulder shall be a minimum of 2 feet wide and shall be paved. Wider shoulders may be required to accommodate the necessary sight distance.

A minimum 2-foot reaction distance shall be provided for any temporary or permanent barrier device for this Project, including portable temporary concrete barriers.

The Design-Builder shall design any temporary construction and/or widening to withstand the anticipated traffic volumes and loadings during the applicable stage of the Project.

A minimum of 30 Days prior to beginning work, the Design-Builder shall place Construction Project Funding Identification signs in advance of the construction area. The signs shall be a Type 2 as per Standard Plan T7.

Department reserves the right to order extra law enforcement for the work zone, as described in the Department *Contract Administration Manual* included in the Reference Information Documents. When Department provides extra enforcement for the work zone, it will be at no expense to the Design-Builder.

18.3.1.6.2 Allowable Closures

The Design-Builder will be allowed to close ramps and lanes as shown in the lane closure charts. (Exhibit 18-A)

18.3.2 Incident Management Plan (IMP)

The Design-Builder shall provide contact information of at least 2 individuals who are available 24 hours/day for incident response to Department and local agencies prior to the start of construction.

During construction, maintenance of traffic will become increasingly sensitive to incidents such as equipment malfunctions, traffic crashes, inclement weather, and special events. The Design-Builder shall prepare and implement a formal plan to manage these incidents.

The IMP shall identify methods for incident detection and verification, incident response, incident site management, incident clearance, and motorist information. In addition, if any local agencies along the corridor have adopted incident management guidelines, the Design-Builder shall be responsible for coordinating with local policies and procedures.

The IMP shall reflect proposed construction phasing. The Design-Builder shall modify and implement the IMP in conjunction with planned special events. The IMP shall provide a mechanism to review and capture lessons learned from incidents. The IMP shall include specific time limits for the detection, verification, and classification of incidents, as well as for the dissemination of information about the incidents.

The IMP shall identify and provide for the incorporation of design elements to aid incident management, including turn-around for emergency vehicles, emergency access points, incident investigation sites, and signing to help motorists report the location of incidents in the Project.

18.4 Construction Requirements

18.4.1 Design-Builder's Responsibility

18.4.1.1 General

The Design-Builder shall be responsible for all Project maintenance of traffic starting at 12:01 a.m. on the Day Work begins on the Project. The traffic control devices must be continually and adequately monitored and maintained to ensure proper placement and the safe and efficient flow of all construction traffic into and out of the Project. Such responsibility and maintenance shall continue until 11:59 p.m. on the Day of Substantial Completion of the Project by Design-Builder. Department may, in writing, temporarily suspend such responsibility in conjunction with an official suspension for weather or other reasons. 18.4.1.2 Pavement Markers During Construction

The Design-Builder shall inspect and replace all damaged or missing pavement markers daily.

The Design-Builder shall clean or replace all pavement markers when they become damaged or lose reflectivity.

The Design-Builder shall use equipment that is not detrimental to the roadway surface for removing pavement markers, as Approved by Department.

The Design-Builder shall replace or clean temporary pavement markers whenever the reflectivity of the markers has deteriorated to 80% or less of the value specified for the material when new. Reflectance values shall be measured in accordance with ASTM D4061. The Design-Builder shall perform the required tests monthly at 1-mile intervals or at specific locations requested by Department.

18.4.2 MOT Traffic Control Supervisor

The Design-Builder shall provide a MOT Traffic Control Supervisor (TCS) to manage and monitor all MOT operations for the duration of the construction. The TCS will be considered a critical component of the Design-Builder's management team and must have prior experience managing MOT operations on similarly complex projects. The TCS does not need to be a licensed professional engineer; however, the Design-Builder may elect to use his Traffic Engineering Manager in this position.

The TCS or his designate shall be available on a 24-hour per day basis throughout the duration of the Project, must participate in all changes in the MOT setup, and perform daily Project reviews to verify that MOT devices are correctly placed and traffic is safely and efficiently moving through the Project. The TCS or his designate shall be available on the Site within 45 minutes of notification of an emergency situation and be prepared to positively respond to the need to repair the work zone traffic control or to provide alternate traffic arrangements. The TCS shall have enough authority and resources to immediately correct any deficiencies discovered or to demobilize any construction operation that is resulting in excessive delays to traffic or creating an unsafe condition.

The TCS shall perform drive-through inspections each Working Day and immediately after any shift in MOT setup. At least two of the daily inspections each week must be done at night so that the arrangement and condition of the lights can be reviewed. The inspections shall also include assurances that pedestrians and bicyclists have a safe travel path around or through the work Site and that existing businesses have adequate access during business hours, if applicable. The results of the inspections shall be documented in a daily report that, at a minimum, lists the exact time frame of the drive-through inspection and the defects noted. The report shall also document any maintenance or corrective action ordered as a result of the inspection and the name and position of the Design-Builder personnel directed to provide the maintenance or corrective action. The daily report shall state that the MOT setup and all traffic control devices are in substantial conformance with the Contract requirements except as noted and shall be signed by the TCS.

18.4.3 Video Record

Before the start of construction, the Design-Builder shall video tape the entire project site and surrounding areas to record the pre-construction condition. The Design-Builder shall provide a copy of the video tape to Department.

A drive-through video of all MOT devices shall be made each week, and immediately after each accident causing injuries, and after each shift in MOT setup. The tapes shall be maintained in a remote fireproof location, and a log of the tapes with dates and times shall be provided to Department on a monthly basis. Department shall have the right to review the tapes at any time with 24 hours notice to the Design-Builder.

18.5 Deliverables

- The TMP must be Approved prior to issuance of NTP2. The TMP shall be signed and sealed by the Traffic Engineering Manager. Department will respond to the submittal within 14 Days.
- The Design-Builder shall deliver to Department a list of all parties invited to take part in the MOT task force and the responses to all the invitations.
- The Design-Builder shall take meeting minutes and distribute them to the task force members within three Working Days of the meeting.
- The MOT plans and revisions to the plan shall be submitted to Department for Approval. The MOT plans and plan revisions shall be signed and sealed by the Traffic Engineering Manager. Department will respond to the MOT plan submittals within 10 Working Days. The Approved MOT plans must be distributed to all stakeholders at least 10 Working Days prior to implementation.
- A copy of the MOT diary shall be submitted to Department on a monthly basis. Upon completion of the Project, the MOT diaries shall be delivered to and become the property of Department.

EXHIBIT 18-A

Lane Closure Charts

This document is provided as an electronic file.

19 MAINTENANCE DURING CONSTRUCTION

19.1 General

The Design-Builder shall perform all Work necessary to meet the requirements associated with maintenance during construction.

Design, construct and maintain the highway right-of-way in accordance with requirements of this specification, including performance requirements, standards, warranties, design and construction criteria, maintenance during construction, and required submittals.

Design-Builder shall be responsible for the maintenance and upkeep of the work within the planned right of way limits, including highway, local roads, bridges, landscaping and appurtenant facilities, and shall also be responsible for maintenance and upkeep of facilities within those portions of the Planned Right of Way limits outside of the planned right of way limits while construction Work is ongoing in the area or while such facilities are being used for maintenance of traffic related to the Project. The goal shall be to maintain the facilities in the condition in which they have been constructed, or as close to such condition as is reasonably possible. Maintenance responsibilities shall include the operation of highway and local road facilities and services to provide satisfactory and safe conditions for highway and local road traffic and emergency responses as necessary to ensure public safety in all areas open to public traffic.

19.2 Administrative Requirements

19.2.1 Standards

The Design-Builder shall maintain the project during construction in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Submittal has a higher standard than any of the listed standards, adhere to the submittal standard.

If there is any unresolved ambiguity in standards, obtain clarification before proceeding with design or construction.

Use the most current version of each listed standard as of the RFP issue date unless modified by Addendum or Change Order.

Maintenance During Construction Standards and Requirements

Priority	Author	Agency Title
1	Department	Maintenance Manual Volumes I and II
2	Department	Construction Manual
3	Department	Standard Special Provisions
4	Department	2006 Revised and New Standard Plans
5	Department	Standard Plans May 2006
6	Department	Design-Build Modifications to the Standard Specifications
7	Department	Standard Specifications
8	Department	Highway Design Manual (HDM)
9	AASHTO	Roadside Design Guide, 3 rd Edition

10	AASHTO	Policy on Geometric Design of Highway and Streets
11	Department	Project Development Procedure Manual
12	Department	Technical Memoranda
13	Department	Environmental Document

*Document modified for design-build.

19.2.2 Maintenance Management Plan

The Design-Builder shall prepare a Maintenance Management Plan that includes the following:

- A list of all proposed routine maintenance activities
- Schedule of proposed routine maintenance activities
- Name of the Design-Builder's supervisor who will be in charge of maintenance efforts

19.2.3 Meetings

The Design-Builder's supervisor responsible for maintenance during construction shall attend weekly field meetings.

19.3 [NOT USED]

19.4 Construction Requirements

19.4.1 Design-Builder's Responsibilities

The Design-Builder shall assume maintenance of the entire Project, except for those activities that will be performed by Department as specified in Section 19.4.2, commencing at 12:01 a.m. on the first Day after Contract execution. This maintenance responsibility shall continue until 11:59 p.m. on the date of Final Acceptance by Department. In general, this maintenance will include all the required maintenance and repair of all work facilities damaged by normal wear, , acts of third parties, or forces of nature not defined as Force Majeure . The Design-Builder shall be responsible for maintenance of the following:

1. Temporary facilities
2. Haul routes for Project materials
3. Project detours initiated by the Design-Builder

Maintenance on temporary or existing facilities to be replaced shall be performed to provide a safe, effective, and aesthetically pleasing transportation corridor.

Responsibilities of the Design-Builder include the following:

- Repair of shoulder drop-offs
- Replacement/repair of existing asphalt shoulders if used for temporary traffic control or hauling
- Replacement/Repair of temporary roadways and crossovers
- Replacement/repair of traffic attenuators
- Maintenance of temporary delineators, temporary signing, and temporary pavement marking
- Drainage/erosion control maintenance related to construction activities
- Repair of approach slabs damaged by construction operations
- Maintenance of haul routes

- Temporary lighting and signal system maintenance
- Maintenance of temporary fencing
- Graffiti removal
- Maintenance of storm sewer system related to construction activities
- Replacement/repair of temporary and permanent barrier wall

19.4.2 Department Responsibilities

Department will be responsible for the following:

- Inspections of existing structures
- Repairs to existing major structures to remain (bridges and overhead sign structures)
- Landscaping
- Maintenance of highway features not part of the work.

19.5 Deliverables

The Design-Builder shall submit the Maintenance Management Plan to Department for their Acceptance within 60 Days after issuance of NTP1.

The Design-Builder shall prepare and submit to Department a monthly Maintenance Report detailing all maintenance activities performed. The report shall subdivide the reported activities as detailed in Section 19.4.1 above.

20 BICYCLE AND PEDESTRIAN FACILITIES

20.1 General

The Design-Builder shall perform all Work necessary to meet the requirements associated with bicycle and pedestrian facilities for the Project. The Design-Builder shall ensure the bicycle and pedestrian facilities of this project support Department’s commitment to integrate bicycle and pedestrian travel into Project Development. Design-Builder shall also ensure that all roads on which bicyclist are not prohibited meet bicyclist and pedestrian safety and mobility needs. Damaged Bicycle and Pedestrian facilities within the Planned Right of Way limits shall be restored to current standards as of the Invitation for Bid (IFB) issue date.

The Design-Builder shall maintain bicycle and pedestrian facilities in accordance with requirements of this specification, including performance requirements, standards, warranties, design and construction criteria, maintenance during construction, and required submittals.

The Design-Builder shall coordinate with the local agencies, to ensure that the appropriate design methods, procedures, submittals, plan preparation, analysis methodology, review/comment processes, approval procedures, specifications and construction requirements are met.

20.2 Administrative Requirements

20.2.1 Standards

The Design-Builder shall perform the Work in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder’s Submittal has a higher standard than any of the listed standards, adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder’s responsibility to obtain clarification before proceeding with design and/or construction.

Use the most current version of each listed standard as of the IFB issue date unless modified by Addendum or Change Order.:

20.2.1.1 Bicycle Facilities Standards and Requirements

Priority	Agency	Title
1	Department	Highway Design Manual (HDM)
2	Department	California Manual on Uniform Traffic Control Devices
3	AASHTO	Policy on Geometric Design of Highways and Streets
4	Department	Special Provisions
5	Department	2006 Revised and New Standard Plans
6	Department	Standard Plans May 2006
7	Department	Design-Build Modifications to the Standard Specifications
8	Department	Standard Specifications
9	AASHTO	Roadside Design Guide
10	Department	Technical Memoranda
11	California	Code Regulations Title 24

*Document modified for design-build.

20.2.1.2 Pedestrian Facilities Standards and Requirements

Priority	Agency	Title
1	Department	Design Information Bulletin (DIB) 82
2	Department	Highway Design Manual (HDM)
3	Department	California Manual on Uniform Traffic Control Devices
4	AASHTO	Policy on Geometric Design of Highways and Streets
5	Department	Standard Special Provisions
6	Department	2006 Revised and New Standard Plans
7	Department	Standard Plans May 2006
8	Department	Design-Build Modifications to the Standard Specifications
9	Department	Standard Specifications
10	AASHTO	Roadside Design Guide
11	Department	Technical Memoranda
12	California	Code Regulations Title 24

*Document modified for design-build.

20.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of the bicycle and pedestrian facilities. These references are not binding on the Design-Builder.

Bicycle and Pedestrian References

Agency	Title
FHWA	BIKESAFE Bicycle Safety Guide
AASHTO	Guide for the Planning, Design, and Operation of Pedestrian Facilities
AASHTO	Guide for Development of Bicycle Facilities
FHWA	Pedestrian Facilities Users Guide
FHWA	PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System
FHWA	An Analysis of Factors Contributing to “Walking Along Roadway” Crashes; Research Study and Guidelines for Sidewalks and Walkways
FHWA	How to Develop a Pedestrian Safety Action Plan
Department	Project Development Procedures Manual (PDPM)
Department	Plans Preparation Manual
Department	CADD Users Manual
Department	Ready to List and Construction Contract Award Guide (RTL Guide)
Department	Roadway Lighting Design Manual
ANSI	Illuminating Engineering Society of North America, Roadway Lighting
ANSI	Approved AASHTO Roadway Lighting Design Guide

Department Traffic Manual

20.2.3 Preliminary Engineering Documents

The Preliminary Engineering Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints; provided that the Design-Builder shall perform the Work in accordance with the Standards and Requirements set forth in these Technical Provisions unless the Design-Builder obtains a deviation or Exception to those Standards or Requirements in accordance with the design review process set forth in the Design-Build Contract.

20.2.4 Software Requirements

The Design-Builder may at its own discretion use any software when submitting plans for approval but shall prepare final drawings using MicroStation SE and CAiCE Version 10SP6 as the drafting and design software, respectively.

20.2.5 Meetings

Department and the Design-Builder shall meet at the request of either party, as necessary, to discuss and resolve matters relating to bicycle and pedestrian Work during the design and construction stages. The requesting entity shall provide the other entities with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

20.2.6 Coordination with Other Agencies

The Design-Builder shall comply with requirements for maintaining bicycle and pedestrian facilities with other agencies having jurisdiction over such facilities, including:

- City of Fresno

The Design-Builder shall document the resolutions of issues for the correspondence file, including meeting minutes and memoranda for the record. The Design-Builder shall document the permit requirements and contacts with the permitting agencies.

20.3 Design Requirements

20.3.1 Bicycle and Pedestrian Concept Meeting

The Design-Builder shall take an inventory of all the existing bicycle and pedestrian facilities in the Project. The Design-Builder shall schedule and participate in a bicycle and pedestrian concept meeting to present a layout of the in-place bicycle and pedestrian elements on the Project to Department. Presentation shall also address those elements of the roadway design that impact bicycle and pedestrian safety and mobility needs. The Design-Builder shall use the outcome of the meeting to finalize the bicycle and pedestrian needs of the Project.

20.3.2 Bicycle Facilities

Design-Builder's Bicycle facilities shall be consistent with the region's bicycle plan, comply with Environmental Approvals, and accommodate existing bicycle paths and crossings, and on-street bicycle facilities. The Design-Builder shall restore damaged Bicycle facilities within the Planned Right of Way limits to current standards as of the IFB issue date.

20.3.2.1 Grades

The Design-Builder shall maintain grades for Bicycle facilities that comply with requirements in the *Caltrans Highway Design Manual*.

20.3.2.2 Width and Separation on Bridges

The Design-Builder shall maintain width and separation on bridges to comply with requirements in the *Caltrans Highway Design Manual*.

20.3.2.3 Signing and Striping

The Design-Builder shall maintain Signing and Striping Work to conform to *Caltrans Highway Design Manual*.

20.3.3 Pedestrian Facilities

Design-Builder's pedestrian facilities shall be consistent with the region's pedestrian plan, comply with Environmental Approvals, and accommodate existing pedestrian paths and crossings, and on-street pedestrian facilities. The Design-Builder shall restore damaged Pedestrian facilities within the Planned Right of Way limits to current standards as of the IFB issue date.

20.3.3.1 Grades, Width and Separation

The Design-Builder shall maintain grades, width and separation for pedestrian facilities in accordance with the *Caltrans Highway Design Manual* and DIB 82.

20.3.3.2 Roadways

The Design-Builder shall maintain pedestrian facilities to comply with requirements in the *Caltrans Highway Design Manual*.

20.3.3.3 Bridges

The Design-Builder shall maintain width and separation on bridges for pedestrian facilities to comply with requirements in the *Caltrans Highway Design Manual*.

20.3.3.4 Exceptions to Accessibility Design Standards

If it is found that an accessibility design standard cannot be fully incorporated in a design, an exception to accessibility design standards will be required. The Design-Builder shall submit the final exception to accessibility design standards for Approval by Department. The Design-Builder is discouraged from creating additional exceptions to accessibility design standards, since there is no assurance that they will be Approved by Department; however, elimination of existing exceptions to accessibility design standards by the Design-Builder is encouraged.

20.3.4 Illumination Requirements

The Design-Builder shall comply with the illumination requirements in the *Caltrans Traffic Manual* under Highway Safety Lighting.

20.3.5 Lighting Fixtures

The Design-Builder shall coordinate with local agencies for lighting fixtures.

20.3.6 Bicycle and Pedestrian Facilities Plan

The Design-Builder shall prepare a Bicycle and Pedestrian Facilities Plan that indicates the following, but not limited to, design features:

- Alignment;
- profile;

- cross-section;
- materials of bicycle and pedestrian facilities;
- the points of connection to existing bicycle and pedestrian facilities;
- signing and pavement markings;
- separation between bicycle or pedestrian facilities and the nearest travel lane; and,
- Where applicable, the methods of illumination by indicating light fixture locations and types and demonstration through photometric analysis that the illumination meets the stated requirements.

The Design-Builder shall prepare all necessary engineering studies and applicable design reports to justify the project bicycle and pedestrian facilities used in the project.

20.3.7 Requirements with Other Agencies

The Design-Builder shall refer to City of Fresno requirements section in these Technical Provisions for the design of bicycle and pedestrian facilities for local streets having jurisdiction over such facilities.

20.4 Construction Requirements

The Design-Builder shall be responsible for construction of all work described in this Section 20.

20.5 Deliverables

The Design-Builder shall submit Released for Construction plans to Department for Acceptance. The Design-Builder shall submit Released for Construction plans to the local governing agencies for review.

21 PAVEMENTS

21.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements to design and construct pavement for all roadways in accordance with the requirements of this provision. Design and construct the project in accordance with requirements of this specification, including performance requirements, standards, warranties, design and construction criteria, maintenance during construction, and required submittals. The Design-Builder shall ensure that the appropriate design methods, procedures, submittals, plan preparation, analysis methodology, review/comment processes, approval procedures, specifications and construction requirements are met.

21.2 Administrative Requirements and Guidelines

21.2.1 Standards and Requirements

Perform the pavement analysis and design in accordance with the requirements of the standards listed below by priority. If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal standard. If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification before proceeding with design and/or construction. Use the most current version of each listed standard as of the [Instruction to Proposers (ITP) or Invitation for Bid (IFB)] issue date unless modified by addendum or change order.

Roadway Pavement Standards and Requirements

Priority	Agency	Title
1	Department	Highway Design Manual
2	Department	Technical Memoranda
3	Department	Standard Special Provisions
4	Department	2006 Revised and New Standard Plans
5	Department	Standard Plans May 2006
6	Department	Design-Build Modifications to the Standard Specifications for Construction
7	Department	Standard Specifications
8	Department	California Test Method and Lab Procedures
9	Department	Plans Preparation Manual

21.2.2 References

Use the references listed below as supplementary guidelines for the roadway pavement analysis and design. These references are not mandatory on the Design Builder.

Roadway Pavement References

Agency	Title
Department	Pavement Technical Guidance
Department	California Department of Transportation Pavement Website

AASHTO Guide for Design of Pavement Structures and 1998 Supplement

Caltrans Ready to List and Construction Contract Award Guide (RTL Guide)

Caltrans Maintenance Technical Advisory Guide

21.2.3 Preliminary Engineering Documents

The Preliminary Engineering Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, pavement design life, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints; provided that the Design-Builder shall perform the Work in accordance with the Standards and Requirements set forth in these Technical Provisions unless the Design-Builder obtains a deviation or Exception to those Standards or Requirements in accordance with the design review process set forth in the Design-Build Contract.

21.2.4 Software Requirements

The Design-Builder shall utilize statewide approved roadway pavement software for analyzing the pavement structure recommendations listed in the following Department website:

www.dot.ca.gov/hq/esc/Translab/OPD/DivisionofDesign-software.htm The Design Builder may at its own discretion use any software when submitting plans for approval but shall prepare the final drawings using MicroStation SE and CAiCE Version 10SP6 as the drafting and design software, respectively.

21.2.5 Equipment Requirements

The Design-Builder shall use profilograph and falling weight deflectometers for field measurements of pavement. The equipment shall meet the requirements of California Test Method CT 526 and 356 respectively and shall be calibrated in relation to Department equipment..

21.2.6 Personnel Requirements

The Design-Builder shall provide a Pavement Engineer who performs pavement calculations, develops pavement structure recommendations, details, or plans. The Pavement Engineer shall be licensed in the State of California and shall have a minimum of five (5) years experience in structural pavement design.

21.2.7 Certification Requirements

The Design-Builder shall perform all laboratory testing at a Department certified and approved lab and an AMRL-accredited facility for material tests required by this section. All material testers shall be certified for the materials they are testing.

21.2.8 Meetings

Department and the Design-Builder shall meet at the request of one of the parties, as necessary, to discuss and resolve matters relating to the roadway pavement work during the design and construction stages. The requesting entity shall provide the other entity with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

21.2.9 Coordination with Other Agencies and Disciplines

Department will assist in the coordination and resolution of all roadway pavement issues with affected interests and regulatory agencies. The Design-Builder shall document the resolutions of issues for the correspondence file, including meeting minutes and memoranda for the record. The Design-Builder shall document the permit requirements and contacts with the permitting agencies.

21.3 Design Requirements

21.3.1 Roadway Pavement Concept Meeting

The Design-Builder shall schedule and participate in a roadway pavement concept meeting to present the strategy for the proposed pavement structural recommendations on the Project to the Department. The Design-Builder shall use the outcome of the meeting to finalize the pavement needs of the Project.

21.3.2 Roadway Pavement Analysis and Design

The Design-Builder shall design, construct, and where applicable, maintain pavements. The Design-Builder shall design the roadway pavement within the project limits using all standards and guidance listed in this provision and as described in the *Caltrans Highway Design Manual* (particularly Chapters 600 to 670). The Design-Builder shall provide a pavement design that meets the following performance requirements:

- Provide a pavement Design-Life per Chapter 610 of the *Highway Design Manual*
- Provide a durable maintainable pavement system that meets or exceeds pavement design life criteria with the specified structural capacity; skid resistance, and superior ride quality
- Include pavement-to-structure transition areas as a part of ride quality
- Minimize pavement-to-structure transition deviations
- Minimize pavement type-to-pavement type transition deviation
- Minimize rutting, and maximize maintainability at intersections
- Provide bridge pavement approach slabs per Chapter 670 of the *Highway Design Manual* and associated publications.
- Provide free-draining pavement sections both above and beneath the pavement surface for pavement constructed on this Project. Do not exacerbate subgrade moisture below existing pavement that is left in place, and
- Finished pavement shall conform to Caltrans Standard Specifications

The Design-Builder shall analyze and prepare separate pavements designs, as applicable, for the following:

- Mainline pavements
- Ramp pavements
- Temporary pavement construction areas

21.3.3 Pavement Types

The Design-Builder shall consider rigid, flexible or composite pavements as a pavement type for the design. In selecting a pavement type, the Design-Builder shall consider, at a minimum, the following factors. Refer to Chapters 600 to 670 of the *Highway Design Manual* for a complete list:

- Pavement Design Life – The Design-Builder shall provide a pavement design life in accordance to Topic 612 of the *Highway Design Manual*.
 - In selecting a pavement design life, the Design-Builder shall provide a Life-Cycle Cost Analysis (LCCA) if so required per Topic 612 and 619 of the *Highway Design Manual* and associated pavement policy bulletins. The Design-Builder shall prepare such Analysis in conformance to the procedures and data in the *Life-Cycle Cost Analysis Procedures Manual*.
- Traffic Considerations

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- The Design-Builder shall use traffic projections provided in the Project Report or the Final Environmental Document to determine expected traffic loads, which in turn are used to develop 18-kip Equivalent Single Axle Load (ESAL) constants. The Design-Builder shall determine the Traffic Index (TI) using these ESAL constants in accordance to Chapter 610 of the *Caltrans Highway Design Manual*.
 - Where traffic projections are not provided, the Design-Builder shall gather necessary Traffic Projections, as required, to estimate traffic loading and performance of pavement.
 - • Soils Characteristics –
 - The Design-Builder shall perform all necessary California Tests described in Chapter 610 of the *Caltrans Highway Design Manual* to determine the structural quality and attributes of subgrade soils.
 - The Design-Builder shall modify and/or provide a subgrade soil that is adequate to carry projected traffic loads during the life of the pavement.
 - • Climate Regions
 - The Design-Builder shall identify and document the pavement climate region of the Project in accordance with the *Pavement Climate Map*.
 - The Design-Builder shall meet or exceed pavement requirements for the climate region.
 - • Existing pavement type
 - The Design-Builder shall consider providing continuity of existing pavement type when developing pavement designs making sure that all factors and standards stated in Chapter 610 of the *Caltrans Highway Design Manual* are met.
 - • Availability of materials, recycling and maintainability of materials

The Design-Builder shall provide pavement structures that shall consist of a combination of subgrade modifications and/or roadbed materials placed in layers above the subgrade. Materials placed shall conform to the *Caltrans Standard Specifications*. The Design-Builder shall submit complete roadway pavement structural recommendations to Department for approval. Construction of submitted pavement structures shall not commence until the Design-Builder receives notice of Release for Construction. The Design-Builder will receive a response within 15 days of receipt of such submittal. Any subsequent changes in pavement structures shall be documented and processed in accordance to the Standards set forth in this provision.

21.3.4 [NOT USED]

21.3.5 Special Pavement Designs

Special roadway pavement designs shall be fully justified and submitted for approval. Special roadway pavement designs are defined as those that meet either or both of the following criteria:

- Involve products, methods, or strategies that reduces the structural thickness to less than what is determined by the standards set forth in this provision.
- Utilize experimental products or procedures not covered in the engineering tables or methods found in the standards set forth in this provision.

The Design-Builder shall submit to Department special designs for approval in accordance to the process described in Topics 82 and 606 of the *Caltrans Highway Design Manual*. Expected timelines for approval of special designs are:

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- 30 days for exceptions to mandatory pavement design standards and for nonstandard modifications to existing standard special provisions.
 - 90 days for application of new products or strategies not covered in the *Caltrans Standard Special Provisions* and *Standard Specifications* and for new nonstandard special provisions.
 - 120 days for use of experimental or nonstandard design procedures.

21.3.6 Materials Report

The Design-Builder shall prepare a Materials Report and submit to Department for approval. The Design-Builder shall prepare the Materials Report in accordance to Topic 114 of the *Caltrans Highway Design Manual*.

21.3.7 Concrete Mix Design Options

The Design-Builder shall produce concrete mix designs to conform to the requirements of the *Caltrans Standard Specifications*, as required for the type of concrete used. All Design-Builder mix designs shall be submitted to the Department Material Laboratory for Approval prior to concrete placement on the Project. Department shall respond within 2 working days for paper reviews and 60 days for water-cement ratio reviews. The Design-Builder shall verify that the aggregate source for cement content is prequalified by Department prior to use, and qualified yearly there after throughout the construction. Alternatively, if Design-Builder decides to have Concrete Mix design done by an outside laboratory, the Design-Builder shall:

- Submit at least ten (10) days prior to start of Lean Concrete Base placement, a Mix Design together with test report on CT-548 performed by Laboratory qualified by Department for approval.
- Submit at least ten (10) days prior to start of trial slab for Portland Cement Concrete Pavement, a Mix Design together with the test report on CT-536 performed by Laboratory qualified by Department for approval.

21.4 Construction Requirements

Construction shall be in accordance with the requirements of the *Standard Specifications* and the Special Provisions.

21.4.1 Pavement Evaluation on Ride Quality and Skid Resistance

The Design-Builder shall evaluate ride quality in all lanes and shoulders using a profilograph as indicated in *Caltrans Standard Special Provisions*. The Design-Builder shall supply the profilograph and the Certified Qualified Operator (CQO) certified results. Department shall use the CQO certified results to determine Substantial Completion of pavement work. A verification of the ride quality may be conducted. Department will evaluate skid resistance. Existing skid resistance on pavement that remains in place shall not be reduced. Pavements placed by the Design-Builder shall provide a skid resistance value greater than 50.

21.4.2 Removal of Pavement

Existing PCC and AC pavement of the traveled way and shoulders, to be removed, shall be removed without affecting the adjacent pavement to remain. In the event material underlying removed pavement is disturbed, it shall be recompacted to a relative compaction of not less than 95 percent.

21.4.3 Local Standards

For roadways adjacent to and crossing the Project that are disturbed by the construction activities, the Design-Builder shall match the in-place surface type and structure of the existing roadways, unless otherwise specified in these Technical Provisions. The Design-Builder shall design and construct all tie-in work to avoid differential problems, accounting for such factors as total surfacing thickness, minimum structural

requirements, unbound base/subbase thickness, and frost-free characteristics. The Design-Builder shall reconstruct the disturbed areas based on the standards and specifications of City of Fresno. In ditches with less than 0.3% grade or ditches suspected of having standing water, the Design-Builder shall provide subsurface drains and headwalls. Six-inch drain tile shall be installed with a minimum cover of 12 inches.

21.5 Deliverables

The Design-Builder shall develop Released for Construction (RFC), As-Built Plans and Documents in accordance with the requirements of this section.

21.5.1 Materials Design Recommendation

The Design-Builder shall submit one hardcopy of the documentation for the Materials Design Recommendation accepted by Department as well as subsequent updates of construction changes to the pavement structure. The documentation shall, at a minimum, contain:

- Pavement design life (including both the construction year and design year),
- The California R-values and unified soil classification of the subgrade soil
- The California R-value(s) or strength properties for the materials selected for the subbase and/or base layers
- The Traffic Index (TI) for each pavement structure
- Depth and type of pavement
- Depth and type of subbase and/or base layers

The Design-Builder shall include on the first sheet of the project typical section plan sheets, the project design designation information in accordance with Topic 103 of the *Caltrans Highway Design Manual*.

21.5.2 Materials Report

The Design-Builder shall submit one hardcopy of the Materials Report. The Materials Report shall be prepared in reference to Topic 114 of *Caltrans Highway Design Manual*.

21.5.3 Over-the-Shoulder Design Documents

During the design process, any submittals required in the Design Standards or other Contract Documents shall be prepared by the Design-Builder. Submittals shall be in an acceptance format and organized to facilitate their review.

21.5.4 Released for Construction (RFC) Documents

The Design-Builder shall produce plans and specifications in a format that aids and facilitates design review, and provide adequate information for safe, efficient, and high-quality construction. Plan sets and sheet types shall be developed in accordance with the *Caltrans CADD Standards*, *Caltrans Plans Preparation Manual*, and the Design Quality Management Plan before construction may begin. Approval for all RFC documents is required.

21.5.5 Final Design Documents

The Design-Builder shall submit final design documents when the design is complete, including office and field generated design changes. Final design documents include:

- Plans

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- Design calculations
 - Reports/Project documentation
 - Specifications and Special Provisions

21.5.5.1 Design Justification Reports and Project Documentation

Upon request, the Design-Builder shall submit design justifications when the Design-Builder shall consider various factors or alternatives. Documentation may be computer generated or hand written and shall clearly identify the following:

- Design issue
- Items requiring consideration
 - Basis for evaluation
 - Final decision and justification

For justifications that require exceptions to pavement mandatory standards as found in the *Caltrans Highway Design Manual* and *Pavement Policy Bulletins*, an *Exception to Mandatory Pavement Design Standard* shall be prepared and submitted for approval. Other justifications that qualify as special designs per Topic 606 of the *Caltrans Highway Design Manual* shall be submitted in accordance with the submittal requirements in Topic 606.

The Design-Builder shall prepare and submit bound design calculations and Project documentation. These submittals shall be in indexed paper or electronic format, organized by design topic, and delivered to Department.

21.5.5.2 Non- Standard Specifications and Non-Standard Special Provisions

If the Design-Builder requests Approval to Specifications and Provisions that are not Department standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials.

21.5.6 As-Built Documents

Upon completion of the Project and prior to Final Acceptance, the Design-Builder shall deliver a complete set of as-built documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hardcopy and electronic form. The As-Built Documents shall meet the format and content requirements of Final Design Documents.

21.5.7 Profilograph and Data Core Data

The Design-Builder shall submit profilograph data and data cores as completed in accordance with Sections 39 and 40 of the *Caltrans Standard Specifications* and associated standard special provisions.

21.5.8 Quality Control Documents

The Design-Builder shall submit quality control reports and test results as completed in accordance with Sections 39 and 40 of the *Caltrans Standard Specifications* and associated standard special provisions.

22 STORMWATER

22.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements associated with stormwater, including permanent and temporary best management practices, structural pollution control devices, retention/detention facilities (ponds), conveyances, erosion control, protection of downstream water bodies, sampling, erosion control, permit compliance, and overall water quality protection in accordance with all applicable state and federal regulations.

22.2 Administrative Requirements

22.2.1 Standards

Design and construct the stormwater systems in accordance with the relevant requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal Proposal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification from Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the Invitation to Bid (ITB) issue date unless modified by Addendum or Change Order.

Stormwater Standards

Priority	Agency	Title
1.	Department	Standard Special Provisions
2.	Department	Standard Specifications
3.	Department	Standard Plans
4.	Department	Highway Design Manual
5.	Department	Project Planning and Design Guide (PPDG)
6.	Department	Caltrans Treatment BMP Design Guidance Documents
7.	Department	Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
8.	Department	Construction Site Best Management Practices (BMPs) Manual
9.	Department	Construction Site Stormwater Quality Sampling Manual
10.	USDA	Revised Universal Soil Loss Equation, Version 2 (RUSLE II)
11.	Department	Construction Manual

22.2.1.1 Permits

1. Department NPDES Permit 99-06-DWQ
2. Department Stormwater Management Plan
3. NPDES General Permit For Storm Water Discharges Associated with Construction 2009-0009-DWQ (CGP 2009-0009-DWQ effective July 1, 2010)

22.2.2 References

Use the references listed below as supplementary guidelines for the drainage systems analysis and design. These publications have no established order of precedence.

Stormwater Publications References

Agency	Title
AASHTO	Roadside Design Guide
AASHTO	Model Drainage Manual
Department	Ready-To-List and Construction Contract Award Guide (RTL Guide)
Department	Fish Passage Design for Road Crossings
FHWA	Hydraulic Engineering Circulars (as listed in Caltrans Highway Design Manual)
FHWA	Hydraulic Design Series (as listed in Caltrans Highway Design Manual)
CASQA	California Stormwater Quality Association (CASQA) Construction BMP Handbook

22.2.3 Preliminary Engineering Plans

The Preliminary Engineering Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

Best Management Practice design shall follow the *Caltrans Project Planning and Design Guide* and design guidance documents. The Design-Builder may use the plans and specifications developed by Department or they may choose to develop a special design to fit the project needs with coordination and approval of Department's Headquarters Office of Storm Water Management - Design. The intent is to provide some flexibility in the size or shape of the existing approved BMPs, but not to use proprietary devices that have not been tested for effectiveness by Department. Proprietary devices may only be used with prior approval of Headquarters Office of Storm Water Management – Design and with appropriate testing information to assure that they are feasible long-term for a Department facility. The stormwater design shall include a feasibility analysis of BMPs to document that the NPDES permit threshold for compliance of Maximum Extent Practicable (MEP) has been met.

All approved treatment BMPs have guidance, plans sheets, and specifications developed by Department. This information is available on the Department's Storm Water webpage (<http://www.dot.ca.gov/hq/oppd/stormwtr/index.htm>).

22.2.4 Software

The Design-Builder shall prepare drawings in MicroStation and provide a copy in adobe acrobat to share with other agencies that do not have Microstation. The Storm Water Data Report (SWDR) shall be submitted in Microsoft Word, Microsoft Excel, and Adobe Acrobat formats.

22.2.5 Stormwater Data Collection

The Design-Builder shall follow the PPDG in the preparation of the SWDR. The PID and PA/ED level SWDR information (see Exhibit 22-A) shall be used by Design-Builder to develop the PS&E level equivalent SWDR. The SWDR will utilize information from the environmental document, drainage report, geotechnical report or other project information pertinent to the overall stormwater design and as described in the PPDG, and described in Section 12 to determine the stormwater design. The calculations for drainage

design and stormwater should be consistent in methodologies for hydrology and hydraulics, though there may be some additional storm frequencies and durations needed for design of BMPs. If alternative methods are used to determine flows due to permit requirements, then the assumptions shall be clearly noted. To establish a stormwater drainage system that complies with the requirements and accommodates the historical hydrologic flows, the Design-Builder must calculate the pre and post hydrology for all sub watersheds within the project site.

22.2.4 Coordination with Other Agencies and Disciplines

The Design-Builder shall coordinate all water resource issues with local agencies, affected interests, and regulatory agencies. The Design-Builder shall document the resolutions of issues for the correspondence file, including meeting minutes and memoranda for the record. The Department will assist in the coordination and resolution of all stormwater issues with affected interests and regulatory agencies.

The Design-Builder shall comply with and document the permit requirements, modifications, and contacts with the permitting agencies. The stormwater design should be based on Department standards, plans, specifications, guidance, and permits. Local standards for stormwater design do not always meet the Department's threshold for feasibility or may not be appropriate for the highway environment due to many competing standards Department must meet including, but not limited to safety, aesthetics, and maintenance.

22.2.4 Training Qualifications and Certification

The Design-Builder shall provide staff with qualifications and certifications related to development of plans, specifications, reports, and construction related stormwater requirements in local, state, federal, and Department provisions. Those qualifications include but are not limited to the following:

- California Registered Civil Engineer in accordance with the California Engineering Act for all engineering calculations.
- Registered Civil Engineer Stamp on final SWDR
- A qualified SWPPP Developer in accordance with Section VII of the CGP 2009-0009-DWQ.
- A qualified SWPPP Practioner in accordance with Section VII of the CGP 2009-0009-DWQ.

22.3 Design Requirements

The Design-Builder shall develop a SWDR using the existing drainage information and previous Storm Water Data Reports provided. The design should follow the requirements contained in the PPDG, Environmental Document, Permits, and design guidance to develop a final SWDR report, plans and specifications. A draft SWDR shall be submitted to the Department for review at least 8 weeks prior to the commencement of any soil disturbing activities.

22.3.1 Surface Hydrology

22.3.1.1 Design Frequencies

The design frequencies for the drainage shall meet the requirements of Section 12. Stormwater treatment BMP design should use the frequencies recommended in the Department's BMP design guidance. Design Pollution Prevention BMPs should use appropriate frequencies for the function of the BMP and in accordance with methodologies in the *Caltrans Highway Design Manual* or other appropriate civil engineering methodologies.

22.3.1.2 Hydrologic Methods

The Design-Builder shall perform hydrologic analyses and follow design methodology as prescribed by the *Caltrans Highway Design Manual*.

The methods used for sizing BMPs should utilize the calculated drainage data wherever possible, but the hydrology calculations for drainage are not always the same frequency or duration as stormwater design, so additional analysis for BMP design is commonly required.

The drainage information shall include analysis of pre-project and post-project hydrology, so the Design-Builder can analyze the down stream effects of the project hydrology and document them in the SWDR. The post project hydrology should include the post construction BMPs as they will help reduce the water quality impacts of changes in flows, volume, and chemistry.

22.3.2 Permanent Stormwater Treatment System

The Design-Builder shall design stormwater treatment systems to meet requirements for water quality, water quantity, and rate control, as determined by local, State and federal requirements and the Department NPDES regulations.

22.3.3 BMP Structures

For all treatment BMP Structures that the Design-Builder chooses to modify, they shall provide a special design and structural analysis for the approval of the Headquarters Office of Storm Water Management - Design and HQ Office of Structure Design. This shall be submitted with a letter requesting the modification and stating the need for change. Additionally, all hydraulic calculations shall be provided for the modified BMP and shall be designed to meet the requirements in the *Caltrans Highway Design Manual* for bypass of flows above the water quality volume or flow or local regulations when applicable.

22.3.3.1 Conveyances

Many stormwater conveyances also function as design pollution prevention BMPs and shall be designed to standards of the *Caltrans Highway Design Manual* and *Project Planning Design Guide*. They should also be documented in the SWDR as they protect water quality, prevent erosion, and provide a water quality benefit. Appendix A of the PPDG describes many of the design pollution prevention BMPs that may be utilized in the project design.

22.3.3.2 Stormwater Mapping

The Design-Builder shall map the drainage area in accordance with Section 12 of Book 2. In addition the Design-Builder shall incorporate this information into the SWDR including sub water shed areas, flows, and volumes used to design and size BMPs, which may not always be in the drainage report.

22.3.3.3 Bio-Swales and Roadside Open Channels

The Design-Builder may use Bio-Swales, which are an open channel, if they meet the design criteria for shear stress provided in Section 12 of Book 2, *Caltrans Highway Design Manual*, and HEC 15. Bio-swales are an approved treatment BMP, but care must be taken in the design to provide a stable facility beyond the life of temporary BMPs so that a long term erosion problem does not occur.

22.4 Construction Requirements

The stormwater requirements shall be in accordance with the Caltrans NPDES permit 99-06-DWQ, the Construction General Permit 2009-0009-DWQ, the *Caltrans Construction Site BMP Manual*, *Caltrans Construction Site Storm Water Quality Sampling Manual*, Plans, Specifications, and *Caltrans Construction Manual*. There may be project specific permits with provisions related to the construction of the project that must be met.

The construction site water pollution control plan shall include BMPs in the plans, specifications, SWDR, and SWPPP/WPCP as instructed in the Department guidance.

Drainage shall be designed and constructed to accommodate construction staging and shall be provided during all stages of construction. The Design-Builder shall provide drainage design details for each stage of construction. The design shall include temporary erosion control and other Best Management Practices

needed to satisfy the NPDES and other regulatory requirements. The water resources notes in the plans shall include a description of the drainage design for each stage of construction.

22.5 Deliverables

22.5.1 Project Drainage Overview Map

The Design-Builder shall submit a Project Drainage Overview Map to Department for Acceptance prior to initiating detailed design, and shall submit a copy of the Project Drainage Overview Map in MicroStation format.

22.5.2 Released for Construction Documents (RFC)

The Design-Builder shall produce plans and specifications in a format that facilitates design review by Department. The Released for Construction Documents shall include the following items:

- Storm Water Data Report (follow Caltrans PPDG for equivalent of PS&E level SWDR and must be stamped)
- Electronic Excel SWDR and TMT submittal for tracking BMPs for design compliance monitoring (2 spread sheets)
- SWPPP/WPCP in accordance with CGP
- Risk Assessment in accordance with CGP
- Temporary and permanent erosion control plans
- Specifications, Special Provisions, and Non-Standard Special Provisions

22.5.3 Construction General Permit

As part of compliance with the CGP, the Design-Builder shall:

- File all permit registration documents (PRD's) with State Water Resources Control Board at least 30 days prior to any soil disturbing activities
 - a) Notice of Intent (NOI)
 - b) Risk Assessment (CGP Section VIII)
 - c) Storm Water Pollution Prevention Plan (CGP Section XIV)
 - d) Annual Fee
 - e) Signed Certificate Statement
- Prepare and complete Rain Event Action Plans (as required)
- Submit and file the Notice of Termination at the Completion of the project

Design-Builder shall also complete and submit the annual report (CGP Section XVI). Copies of the documents shall be provided to Department.

22.5.3.1 Drainage Plans

As part of the drainage plans, show the locations of all structural stormwater treatment BMPs including bio-filtration strips and swales.

22.5.3.2 Temporary and Permanent Erosion Control Plans

Temporary BMPs shall be included in the plans and included in the SWPPP, using the Caltrans Standard Plans and construction site BMP manual. If there are non-standard BMPs or non-standard application of temporary BMPs, they shall be identified in the specifications or in the construction details.

All Permanent BMPs shall be shown on the plans. The Design-Builder shall label alignments, stationing, walls, bridges, paths/walks, lakes, rivers, environmentally sensitive areas, R/W and easements, existing drainage structures and pipes, proposed drainage structures and pipes, surface flow arrows, riprap locations,

check dams, silt fences, rolled erosion control products, seeding, mulch areas, and other erosion control items. Plans shall also include high and low point station and elevation, ponds, normal water line, high water line, coordinate grid ticks and labels (minimum of three per sheet), land feature changes, erosion control features, and notes.

22.5.3.3 Specifications and Special Provisions

If the Design-Builder requests Department's Approval to use methods or materials that are not Department standards, such request should include comprehensive specifications and provisions associated with the proposed non-standard methods or materials. A minimum five (5) Day review period applies.

The HQ Office of Storm Water Management - Design approves non-standard specifications related to stormwater and has an application form for approval on its internet page. Many of the treatment BMPs in the PPDG require NSSPs, as the designs are new and standard special provisions have not been formally approved yet.

22.5.4 Reports/Project Documentation

The Design-Builder shall provide Department with a Storm Water Data Report signed by a California-licensed Professional Engineer, which shall be a record of all drainage computations, both hydrologic and hydraulic, and all support data. Additionally the Design-Builder shall provide a drainage report documenting all the calculations required for the drainage design. The SWDR shall include all the pertinent stormwater information required in the PPDG, including the spreadsheets in the correct format for Department to track the permanent treatment BMPs.

22.5.5 As-Built Plans

Upon completion of the Project, the Design-Builder shall deliver to Department a complete set of As-Built Documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project including all permanent stormwater BMPs. The As-Built plans shall be signed by a licensed California Professional Engineer.

EXHIBIT 22-A

PAED Stormwater Data Report

This exhibit is provided as an electronic file.

23 RAMP METERING

23.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements for ramp metering for the Project.

Design and construct the ramp metering in accordance with requirements of this specification, including performance requirements, standards, warranties, design and construction criteria, maintenance during construction, and required submittals.

The Design-Builder shall coordinate with the local agencies to ensure that the appropriate design methods, procedures, submittals, plan preparation, analysis methodology, review/comment processes, approval procedures, specifications and construction requirements are met.

23.2 Administrative Requirements

23.2.1 Standards

The Design-Builder shall design and construct the Ramp Metering systems in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Submittal has a higher standard than any of the listed standards, adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification before proceeding with design and/or construction.

Use the most current version of each listed standard as of the Invitation for Bid (IFB) issue date unless modified by Addendum or Change Order:

23.2.1 Ramp Metering Standards and Requirements

Priority	Agency	Title
1	Department	Special Provisions and Non-Standard Special Provisions
2	Department	Standard Specifications
3	Department	2006 with Revised and New Standard Plans
4	Department	Standard Plans May 2006
5	Department	Ramp Meter Design Manual
6		Caltrans Signal Design Manual
7	Department	Signal and Lighting Guidelines
8	Department	Signal Design Detail Sheets
9	Department	Traffic Manual
10	Department	California Manual on Uniform Traffic Control Devices (CA MUTCD)
11	Department	Various Technical Memoranda and preliminary engineering documents.
12	Department	CADD Users Manual
13	Department	Plans Preparation Manual
14	AASHTO	Roadside Design Guide

23.2.2 References

Use the references listed below as supplementary guidelines for the design and construction of the ramp metering facilities. These references are not binding on the Design-Builder.

Ramp Metering References

Agency	Title
Department	CADD Data Standards (Traffic Signal Cell Library)
Department	New Policy and Directives (Pavement Delineation and Signing)

23.2.3 [NOT USED]

23.2.4 Preliminary Engineering Documents

The Preliminary Engineering Documents show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

The Design-Builder shall have the flexibility to make Project changes without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints; provided that the Design-Builder shall perform the Work in accordance with the Standards and Requirements set forth in these Technical Provisions unless the Design-Builder obtains a deviation or Exception to those Standards or Requirements in accordance with the design review process set forth in the Design-Build Contract.

23.2.5 Software Requirements

The Design-Builder may at its own discretion use any software when submitting plans for approval but shall prepare final drawings using MicroStation SE and CAiCE Version 10SP6 as the drafting and design software, respectively.

23.2.6 Meetings

Department and the Design-Builder shall meet at the request of either party, as necessary, to discuss and resolve matters relating to ramp metering Work during the design and construction stages. The requesting entity shall provide the other entities with not less than five (5) days prior notice of such meetings. The Design-Builder shall prepare and distribute a record of the minutes to the meeting within five (5) days.

23.2.7 Coordination with Other Agencies

The Design-Builder shall obtain the permits required from other agencies.

23.2.8 Certification Requirements

The Design-Builder shall perform all laboratory testing at a Department certified and approved lab and an AMRL-accredited facility for material tests required by this section. All material testers are to be certified for the materials they are testing.

23.3 Design Requirements

Design, furnish, and install all components of a ramp metering system necessary to provide a complete and functional system that meets the following performance requirements:

- Provide for the orderly and predictable movement of all traffic.
- Provide such guidance and warnings as are needed to ensure the safe and informed operation of individual elements of the traffic stream.

23.3.1 Ramp Metering Concept Meeting

The Design-Builder shall take an inventory of all the existing ramp metering elements in the Project. The Design-Builder shall schedule and participate in a Ramp Metering concept meeting to present a layout of the in-place and proposed Ramp Metering systems on the Project to Department. The Design-Builder shall use the outcome of the meeting to finalize the ramp metering system needs of the Project.

23.3.2 Ramp Metering Design Requirements

Ramp Metering Work shall meet the requirements in the *Caltrans Ramp Meter Design Manual*. The Design-Builder shall design all temporary ramp-metering systems to comply with the same design and construction requirements of the permanent ramp metering systems. The Design-Builder shall prepare all necessary engineering studies and applicable design reports to justify all the project ramp metering elements used in the project. All Exit Ramp Detector Loops (Off-Loops) should be installed in a single lane Ramp where lane is full width, and should be connected to the nearest on-ramp controller cabinet in the same traffic direction.

23.3.3 Specific Requirements

All ramp metering facilities shall include all new materials, including conduit and pull boxes, state-furnished Model 2070 controller assemblies with state-furnished Model 334 cabinets, light emitting diode (LED) signal modules, poles, mast arms, ramp and mainline loop vehicle detection, signage, striping, communication equipment, and electrical service. Ramp metering design shall be done in accordance with the *Caltrans Ramp Meter Design Manual* and shall include the following requirements:

- When cutting mainline loops, the loop wires for all lanes shall go directly to the pull box in the right shoulder.
- After detection loop installation and all pavement and lane striping work is completed, the Design-Builder shall verify as working all detection loops to the satisfaction of the Department.
- A Maintenance Vehicle Pullout (MVP) shall be installed for every Ramp Metering System (RMS), and Traffic Monitoring System (TMS), and Closed Circuit Television (CCTV) cabinet location. Locations of all MVPs shall be approved by Department prior to constructing them.
- All signal sections shall be 12 inches in diameter.
- No Detector Lead-in Cable splices shall be allowed.
- Fiber optic communication to/from Caltrans District 6 Office of Traffic Management Center (TMC) shall be provided to/from every Ramp Meter System (RMS), Traffic Monitoring System (TMS) and Closed Circuit Television (CCTV) cabinet location. Connection to the TMC will be made through existing Department fiber optics network facilities near the project site as shown on preliminary design plans.

23.3.4 Electrical Requirements

All appurtenances shall comply with the horizontal clearance requirements in the *Highway Design Manual*.

23.3.5 Electrical Service

Service for all elements shall be standard 120/240-volt (V) service. Design-Builder shall be responsible for obtaining new or modified electrical service, including all applications and permits required from the serving utility company.

All ramp metering and lighting circuits shall be powered commercially by Pacific Gas and Electric Company (PG&E). Ramp metering circuits shall be metered at the TC-1 rate. Lighting circuits shall be metered at the

LS-3 rate. Ramp meter circuits shall not be connected to any TC-1 rate meter that is connected to a traffic signal.

The Design-Builder shall coordinate with the local power supplier to provide the power service connection. The Design-Builder shall pay all costs, unless otherwise noted, charged by the local power supplier for providing power connections. The Design-Builder shall be responsible for contacting the local power supplier to determine the source of power and to obtain exact locations of power poles and stub-outs for the permanent and temporary installations.

Design-Builder shall be responsible for all electrical utility costs of the new or modified system. Notify Department at least seven (7) days before disconnecting the existing lighting from power. At each location where temporary lighting will be provided, the Design-Builder shall pay the temporary lighting costs until the final lighting facilities are in place and have been accepted.

23.4 Construction Requirements

Construction shall be in accordance with the requirements of the *Standard Specifications* and the Special Provisions. The Design-Builder shall use Materials listed on the Department Approved Products List for Work Zones and ramp metering. The Design-Builder shall obtain the current Approved Products List.

23.4.1 Ramp Metering

The Design-Builder shall provide maintenance for permanent or temporary ramp metering installations within the project limits until Substantial Completion of the Project.

23.5 Deliverables

The Design-Builder shall develop Released for Construction (RFC) Documents, As-Built Plans and Final Documents in accordance with the requirements of this section.

23.5.1 Ramp Metering Concept Plan

The Ramp Metering Concept Plan (permanent or temporary) with incorporated comments received at the Ramp Metering Concept Meeting shall be submitted 60 days after the concept meeting.

23.5.2 Over-the-Shoulder Design Documents

During the design process, any submittals required in the Design Standards or other Contract Documents shall be prepared and submitted by the Design-Builder. Submittals shall be in an acceptable format and organized to facilitate their review.

23.5.3 Released for Construction (RFC) Documents

The Design-Builder shall produce plans and specifications in a format that aids and facilitates design review, and provide adequate information for safe, efficient, and high-quality construction. Plan sets and sheet types shall be developed in accordance with the *Caltrans CADD Standards*, *Caltrans Plans Preparation Manual*, and the Design Quality Management Plan before construction may begin. Approval for ramp metering RFC Documents is required.

23.5.4 Final Design Documents

The Design-Builder shall submit final design documents when final design is complete, including office and field generated design changes. Final design documents include:

- Plans
- Shop drawings

- Design calculations
- Reports/Project documentation
- Specifications and Special Provisions

23.5.5 Shop Drawings

Copies of Approved shop drawings shall be provided at least five (5) days prior to the start of any Work detailed by those drawings. Design-Builder shall make no changes in any approved shop drawing after approval has been received. Any deviations from approved shop drawings shall require that the Design-Builder submit revised shop drawings back for their approval. Shop drawings for ramp metering structures shall be submitted for Approval prior to fabrication.

23.5.6 Design Justification Reports and Project Documentation

Upon request, the Design-Builder shall submit design justifications when the Design-Builder shall consider various factors or alternatives. Documentation may be computer generated or hand written and shall clearly identify the following:

- Design issue
- Items requiring consideration
- Basis for evaluation
- Final decision and justification

23.5.7 Non- Standard Specifications and Non- Standard Special Provisions

If the Design-Builder requests Approval to utilize methods or materials that are not Department standards, such request shall include comprehensive specifications and provisions associated with the proposed non-standard methods or materials.

23.5.8 As-Built Documents

Upon completion of the Project and prior to Final Acceptance, the Design-Builder shall deliver a complete set of as-built documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hardcopy and electronic form. The As-Built Documents shall meet the format and content requirements of Final Design Documents.